IN FOCUS
I. WAGES:
A DECADE OF TRANSFORMATION

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INTRODUCTION

This analysis of wages gives a first insight into the metamorphosis of the labour market's "price system" from the political regime change to the turn of the century. It gets underway by concluding that real wages dropped slightly when compared to other former socialist countries during the "transformational recession", while unit labour costs increased under the influence of a combination of factors. Then, during the time when stabilisation measures were introduced in 1995–96, both real earnings and wage costs dropped significantly. The resulting rise in profits helped to pave the way for re-launching economic growth, which triggered a climb in real wages beginning in 1997. Another definitive development of the transformation decade was a steady widening of inequalities in earnings, extremely rapid in international comparison. The gap grew particularly large within industries – between groups with different education levels and between different types of companies tempered to some extent by the movement of individuals from one income level to the next, quite an intensive flow by international comparison. At the same time, the equalising effect of earnings mobility was strongest at the start of the transitional period and with time the correlation between occupation and position, and annual earnings grew stronger. Circular patterns also became more frequent, when people surveyed returned to the earnings decile from which they had temporarily departed.

Looking behind the transformation of relative wages, the study argues that – as the legal framework for collective bargaining evolved – company-level decisions and bargaining gained the dominant role in setting wages. The shape of relative earnings increasingly reflected differences in companies' ability to pay and in the bargaining positions of workers. By the end of the 1990s, the pure difference in male and female earnings (controlled for differences by industry and education) had declined significantly, and according to analyses of wage offers, had essentially disappeared. The differentiation between individuals occurred essentially in the realms of education and age (labour market experience). Education-related earnings yields increased. Within this, the market value of the single year of education

separating skilled workers from secondary school graduates grew the most. The difference in wages between unqualified and qualified labour is larger in the private than in the public sector, and – indicated by a small number of observations – is larger in the informal economy than in the formal one. Age-related earnings differentials suggest that work-experience accumulated under socialism has been devalued. A decline in the relative earnings of older college graduates was particularly acute. Research on big businesses has shown that well-capitalised and productive firms have relied increasingly on young and qualified labour, while productivity yields have gradually gone down where there is a higher ratio of older and qualified labour. Based on available data, we cannot preclude the possibility that "statistical" discrimination projected to specific cases has increased the differences between the average young person and the average older one.

As far as the difference between sectors is concerned, earnings in the public sector (public administration, education, health care etc.) deteriorated over the course of the transition – and particularly in the years when the austerity measures of the "Bokros Package" were in effect. This was particularly true for occupations that precluded a mass shift from the public to the business sector. Within the business sector, the sharpest drop in wages occurred in areas where competition was keen and labour was comparatively unqualified. Examples are light industry, construction, farming, and some services.

Within the various sectors, the connection between earnings and the ability to pay of companies grew closer – in line with the predictions of firm level bargaining models. This, along with differences in industry and size, is the basic reason for earnings differences between companies in foreign and domestic ownership. By the end of the decade, the wage gap between foreign and domestic businesses had declined significantly, when all other factors, such as type of labour employed, industry, size, and productivity levels were similar.

Another gauge of the significance of local conditions is that differences in the bargaining positions of labour directly affected earnings. In international comparison, the influence of (local) joblessness on earnings is still strong (though it has weakened in the years following the transformation backslide).

Without the flexible transformation of the labour market's "price system," the shift to a market economy would no doubt have been more sluggish, but the changes effected do not necessary hold the promise of a pleasant future. If the intensive inflow of FDI continues and the growth rate of capital intensity and productivity remains higher than in Western Europe (and if the forint, the local currency, continues to appreciate in real terms), then autonomous market forces will eventually lead to a long term conver-

gence in the domestic and western wage levels. There is no need for government intervention in this area. In fact, attempting to limit the freedom of the market would probably cut back on the most important engines driving the convergence – FDI, expansion of the service sector, and the rapid re-allocation of resources.

At the same time, we have to realise that market forces – given the limits to wage differentiation, which cannot be expanded forever – do not necessarily lead to a "good" equilibrium (one with a high employment level). Data suggest that earnings continued to have a fundamental influence on household incomes at the turn of the century, but some studies have found a slowdown in income differentiation despite increased differences in earnings. This can have a negative influence on the supply of low-income labour. Despite comparatively large earning differentials, regional wage differences are modest, and this foreshadows a slow decline in regional employment differences. Finally, while flexible changes in relative wages signal market disequilibrium quickly and accurately, in some cases it will take a long time to resolve the imbalance, assuming that it can be resolved at all. One type of imbalance of concern is disequilibrium in the labour supply and demand, brought about by the re-valuation of human capital.

When analysing company and individual wage data, the authors briefly touch on methodological problems that need to be considered when interpreting change. Notes on data sources and on methods of analysis conclude the section.

1. BASIC FACTS

In the years following the regime change the legal and political tools used by the socialist state to keep wages in line more or less successfully for the "sake of the national economy" were gradually eliminated. As the private sector became dominant, resistance to upward wage pressures evolved at the company level and the former wage conflict between company management and government gave way to various forms of bargaining between employees and employers or their representatives. Market pressure changed the structure of demand for labour, triggering an interactive restratification of employment and earnings. Workers now had access to formerly banned "voice and exit" bargaining tools, such as strikes, demonstrations, and voluntary quitting. A truly free labour market evolved, and the wages setting process changed fundamentally.

Until quite recently Hungarian economic thinking treated the spontaneous forces influencing wage levels and ratios as a marginal issue. Evidence of this is easy to come by. All we need to do is leaf through the economics journals of the early and mid-1990s or look at reports on business condi-

tions issued over those years. Hardly any even mention the market forces shaping wages. Instead, research focused principally on the *consequences* of the changes – income differences and impoverishment.

Today, there is no longer any need to explain the fundamental macroeconomic significance of the micro-flows that define wages. It appears that information on the issue has also attained critical mass, making it possible to look at it in perspective. However, our study would like to do more than just give a picture of the transformation of the labour market "price system." It also is an attempt to point out information gaps. At the moment of wording this text there has not been any accomplished research in Hungary on such very important questions, as the effectiveness of tripartite wage agreements or the relationship between inflationary expectations and nominal wage demands. Another problem at least as serious is that the researchers have not monitored one another. Rarely have several researchers focused on the same issue, analysing the same data using different methods.

The first part of this chapter offers a brief reminder of real wage trends and earnings inequalities, and points out distortions in wage data based on both official records and self-reporting. The second chapter reports on changes in the institutional conditions for setting wages, and on the clear signals that decentralised wage bargaining is getting stronger. Other chapters focus on differences in earnings related to gender, education, age, and region, and on relative wage trends in the different branches. The study includes the income consequences of earnings differentiation. The final chapter analyses the ways European integration is expected to affect earnings.

A set of end-notes numbered J1–J5 is attached to the end of the study. They discuss technical issues to be considered when applying the data and the research results.

## 1.1 Real Wages and Earnings Inequalities

János Köllő, Erzsébet Eperjesi Lindner

Real earnings dropped amidst the economic crisis that followed the collapse of the socialist system, although not to the extent seen in those former socialist countries (Bulgaria, Czechoslovakia, Romania) where one-time shock-therapy adjustments were made. Hungary did not need to drastically devalue its national currency, as it was less dependent on COMECON trade, and in general its trade had become increasingly liberalised in the final years of the state-socialist system. Companies that lost their liquidity rapidly reduced their staffs, so pressure on wages was less than in Czechoslovakia, Romania, or particularly, Russia. Nevertheless, net real earnings dropped every year between 1988 and 1994, and gross real earnings increased only in one of those years (1992). (Figure 1.1)

A peculiar feature of the transformation crisis period was that while net earnings significantly dropped in value (by 13.5 percent in 1989–92), for employers the actual costs of labour increased. *Godfrey (1994)* estimates that in 1989–92 unit labour costs in industry increased by 26 percent in USD. The following factors contributed to this anomaly:

(a) differences in consumer and producer price indices leading to a significant decline in real wages deflated by consumer prices and a 5 percent increase in wages deflated by industrial sales prices, (b) a 25 percent rise in non-wage labour costs (taxes, contributions) calculated with the above index, (c) a 13 percent hike in the real exchange rate, and (d) a 1 percent drop in productivity.

FIGURE 1.1: THE RATE OF ANNUAL CHANGES IN GROSS AND NET REAL EARNINGS, 1980–2001
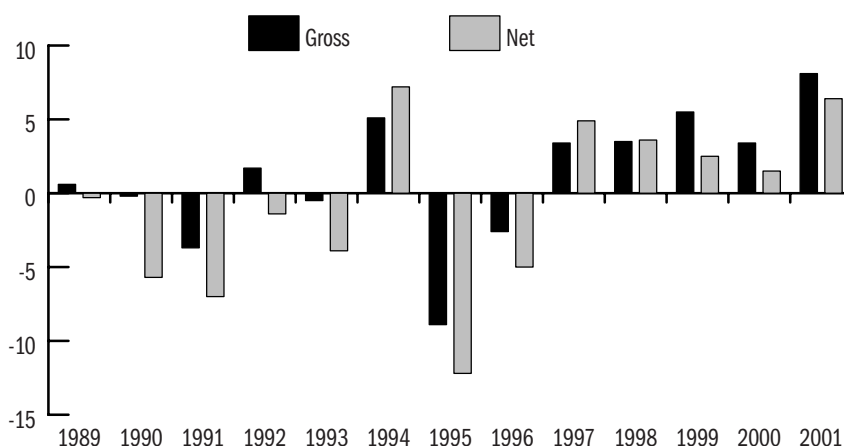
Source:: Central Statistical Office

Hungary's situation among post-socialist countries is unique in that real wages were hit by a second shock, stronger than the first, in 1995–96 when a stabilisation package bearing the name of the then, Finance Minister Lajos Bokros, was introduced. At this time, real earnings were increasing in all other countries within the Visegrád Group (Poland, Czech and Slovak Republic), by 3–5 percent in 1994–96, while they sank by 17 percent in Hungary.

This decline was different from the earlier one in that it ran parallel to a rise in productivity and the disappearance of the gap between producer and consumer price indices, while contributions on wages stopped growing. A price index gap that had been 8–11 percent in 1992–94 dropped to

1–2 percent in 1995–97, and within that, in 1995 and 1997 producer prices were the faster-growing of the two. In 1998 the consumer price index was again higher than the producer one, but only by 3 percent. In 1992, the ratio of mandatory contributions amounted to 28.9 percent of total wage costs, while it came to 27.8 percent in 1998. Other non-wage elements amounted to 14.3 percent in 1992 and 13.7 percent in 1998 according to the Labour Cost Surveys of the Central Statistical Office. These factors brought about a rise in profits as a result of the drop in real wages, which became a foundation stone for the economic growth that began in the latter part of the 1990s, and which has been pulling real wages upwards since 1997.

From the start of the regime change through the end of the 1990s – the entire period for which we have data – we see a major increase in *earnings inequalities.* All data sources clearly show the broadening of the earnings gap though there are minor deviations in details because of differences in samples or data recording methods, or different ways of calculating the inequality indices. Table 1.1 shows the values of the Gini-coefficient using the Wage Tariff Survey of the National Labour Research and Methodology Centre, the Household Budget Survey (HBS), and the Hungarian Household Panel (HHP). (The Gini value is zero if income is distributed equally among income recipients and approaches one if there is only a single recipient of the total income. In advanced countries the Gini index of earnings ranges from 0.2 to 0.4).

The Gini calculated on gross earnings data reported by firms grew from 0.27 to 0.37 between 1989 and 1998. Net earnings calculated from the gross data – using tax tables and therefore inaccurately – show a somewhat larger growth with smaller inequality, thanks to the equalising effects of personal income tax progressivity. HBS gross earnings data show a similar growth. These data are based on self-reporting which distorts the Gini index downwards (See sub-section 1.2), but they also contain earnings from part-time work and periods of employment interspaced with joblessness or inactivity, which increase inequalities. It appears that the latter effect is the dominant one, because, at least up until 1998, HBS indices are generally higher than the ones from the Wage Tariff Survey. The last column in the table shows the Gini-coefficient of the net annual household income from full-time job earnings per unit of consumption. The inequalities here are larger than for individual net earnings because of multiple occurrences of high and low earnings within families, and correlations between numbers of earners, earnings levels, and family size. According to this index, the distribution of earnings in the period under observation became increasingly unequal not only from the point of view of employers and individuals but also from that of families.

The Gini indices in the table suggest a continuous growth in inequalities, rising somewhat slower between 1992 and 1995 than before or after that time. Studies by *Éltető (1996)* and *Galasi (1995)* go as far as to show a certain equalisation of net earnings between 1992 and 1994. One possible explanation for the difference between Table 1.1 and Galasi's results is that the latter used a HHP that included earnings in the smallest companies, of individual ventures, mom and pop producers, and day labour. Éltető's analysis used a sample similar to the Wage Tariff Survey, focused on businesses employing more than ten people. But it relies on data that has been grouped, so it is not able to reflect earnings differences between extreme open categories, though they have a significant effect on overall inequalities. A study by *Kertesi and Köllő (1997)* for the period – using individual Wage Tariff Survey data – found a significant further differentiation precisely in the highest and lowest earnings ranges.

TABLE 1.1: EARNINGS INEQUALITIES IN THE TRANSITION YEARS: GINI-COEFFICIENTS

Earnings indicator	Gross monthly earnings	Net monthly earnings	Gross monthly /yearly earnings	Net yearly earnings[c]
Data from	Firms	Firms	Individual tax returns	Individual tax returns
Data source	Wage Tariff Records	Wage Tariff Records[a]	HBS[b]	HHP[b]
1989	0.27	0.21	0.29	..
1990	..	..	..	..
1991			0.30	
1992	0.30	0.25	..	0.33
1993	..	..	0.36	..
1994	0.33	0.26	0.36	0.36
1995	0.33	0.26	0.37	..
1996	0.34	0.29	0.37	0.36
1997	0.36	0.32	0.38	..
1998	0.37	0.33	0.37	0.37

a Earnings for May in businesses employing more than 20 people (more than 10 after 1994) and in public institutions, plus one twelfth of additional job income for the previous year. Net earnings are the value calculated on the basis of the tax tables for the given year.

b Gross earnings from a full-time job for people with earnings during the reference period, based on HBS. Monthly for 1989–91 and transposed from CSO annual data for 1993–98. CSO weighting. Gini for 1987 calculated from HBS is 0.24.

c Data shows net annual equivalent household income concentration from full-time job based on HHP and TÁRKI (Social Research Institute) Monitor. For more details see Section 5.1 of study.

Table 1.2 is an attempt to point out that the growth in earnings inequalities was quite high in international comparison. The comparison includes advanced countries that underwent exceptional increases in inequalities in the 1980s: Thatcher's Britain, Reagan's US, and Japan in transformation. The index, changes in which the table presents using *Katz et al (1995),* is the logarithm of the ratio of the first net earnings decile.[1] *Rutkowski (1996a, 1997)* reports similar data for the East European countries, based on gross earnings. The table includes supplementary indices calculated from the Wage Tariff Survey which include the post-1992 period and are partly based on net earnings. Since the observations for the various countries are for different periods of time, the sizes of the changes have been projected to uniform five-year periods, and are presented in the final column.

TABLE 1.2: GROWTH IN EARNINGS INEQUALITIES IN VARIOUS COUNTRIES (CHANGES IN THE LOGARITHM OF THE DECILE RATIO PROJECTED TO A FIVE-YEAR TIME FRAME)

Country		Period	Beginning	End	Five year change
United Kingdom – male	N	1979–90	0.88	1.16	0.121
United Kingdom – female	N	1979–90	0.84	1.11	0.123
United States – male	N	1979–90	1.23	1.40	0.077
United states – female	n	1979–90	0.96	1.27	0.141
Japan – male	n	1979–90	0.95	1.04	0.041
Japan – female	n	1979–90	0.78	0.83	0.023
Czech Rep.	b	1988–95	0.88	1.31	0.358
Poland	b	1988–95	0.96	1.22	0.186
Romania	b	1989–95	0.67	1.12	0.375
Hungary[a]	b	1988–93	1.14	1.30	0.158
Hungary[b]	b	1989–92	1.13	1.30	0.283
Hungary[b]	b	1992–98	1.30	1.57	0.225
Hungary[b]	b	1989–98	1.13	1.57	0.244
Hungary[b]	n	1989–98	0.93	1.39	0.255

N = net earnings, B = gross earnings.
a Czech, Polish, Romanian, and Hungarian data from Rutkowski (1996a), p. 27., and Rutkowski (1997), p. 108.
b Hungarian data: own calculations based on Wage Tariff Survey.
Sources: US, British and Japanese data from Katz et. al (1995) p. 58.

1 The first (tenth) earnings decile contains the median earnings of the worst (best) 20 percent. The advantage of the index is that if there is even-paced growth, the logarithm of the dependent variable changes linearly as a function of time.

2 From this point of view it is not particularly significant that the western data refer to net earnings and most of the eastern ones are on gross earnings. As the last two rows on Hungary show, the gross and net indices changed to essentially the same extent. Of course, from the point of view of the *level* of the decile rate, which of the wage data we calculate with certainly does make a difference.

We can see that when viewed through the western gauge, the earnings differentiation took place extremely rapidly in the East European countries and these changes were deeper-reaching that the noted British and American "extreme growth in inequalities" of the 1980s.[2] In Hungary, the growth

in inequality between 1989 and 1998 was approximately double the one that took place in the two Anglo-Saxon countries between 1979 and 1990. (Compare the last line on net earnings data with the British and American data!) Not only was the rate of the changes expressly high, but so was the level. The inequality between net earnings in 1998 was roughly as large as it was in the United States after the period of deregulation, much higher than in Britain at the end of the Thatcher era, and a full order of magnitude higher than in Japan.

The indices in Tables 1.1 and 1.2 measure cross-sectional inequalities – valid for a given moment in time or for a comparatively short period – and their growth. In parallel, however, long term inequality might even decline. (Let's assume that A earned twice as much as B the year before last, and four times as much last year, but this year things turned around and B earned four times as much as A. While cross-sectional inequalities increased – the earnings differentiation range doubled – when measured along a two-year time frame the difference between A and B disappears completely!) From the point of view of the societal effect, it definitely matters whether the increase in the distance between the highest and lowest wages leads to long-term poverty and affluence, or whether people can move up and down a steeper earnings slope. In Hungary, research based on the HHP 1992–97 waves showed intensive income and earnings mobility. *Rutkowski (1999)* estimated that the Gini calculated on the average earnings of the five-year time frame was 8.2 percent lower than the average Gini calculated from one-year income data. The effects of earnings mobility on reducing inequality in Hungary were significantly stronger than in the United States (4.8 percent in 1986–91) or the United Kingdom (5.7 percent for the same period). At the same time, Rutkowski's analysis points out that the equalising effect of earnings mobility was strongest in 1992–93, and as time went on the correlation between annual earnings categories grew stronger. "Going full circle", when the persons studied returned to the same earnings decile that they had left for a time, also occurred more frequently (op. cit. p. 16–18). *Galasi (1998)* also demonstrated an *income* mobility that was significant, but which declined in intensity.

1.2 Factors Distorting Observations

This part will basically investigate the forces behind the differentiation in earnings because we believe it has much to tell us on power relations and market trends that are important to macro-level wage development. We do have to realise though, that we are analysing an area of the economy where all information available has been distorted by mistrust and conflicting interests. Neither researchers nor official data-collecting bodies should op-

erate under the illusion that what they are measuring as "wages" or "earnings" accurately reflects reality. The job of data collectors and analysts is (should be) to learn as much as they can about the direction and amount of the distortion, and to make that public. Unfortunately, in Eastern Europe there is no deep-rooted recognition of the fact that statistical data are themselves generated in a societal process, which can be studied and learned in much the same way as the phenomena they wish to analyse with the data they collect. Scientific publications are also reticent to report on the distortions stemming from the nature of the data they use. Therefore, it appears expedient to comment on the specifics of wage data and the systematic distortions they contain.

Average Wage Hikes and Wage Inflation: What Published Wage Indices (Don't) Measure

Barnabás Ferenczi

In light of the attention focused on wage data published by the Central Statistical Office (CSO), it appears that analysts view average earnings indices as important indicators of domestic economic flows. Aggregate data plays two roles. On the one hand it can supply information on general incomes and overall living standard trends, and on the other it can offer information to the economy on labour costs.

There are at least three problems that come up when handling aggregate wage data as *income indices*. (Not to mention the fact that the basis for projection of an income index should not be the employee but the household. First of all, the source of wage data is the set of institutional labour statistics issued by the CSO, which is not representative of the whole of the population, since the probability of inclusion in the sphere measured by institutional statistics is itself dependent on income. Another problem in calculating net wages is the Hungarian personal income tax table, where rates are progressive by bracket, the personal income tax is still a tax on the entire income. That means net incomes cannot be calculated from gross *overall wage* data, because there is no way of determining the tax rate valid for a given earnings component – monthly wage, bonus, or other. Calculating net average wages from gross *average wages* raises similar problems because of the non-linearity of the tax system.

Considering that none of the advanced countries regularly publish net wage categories, we need to ask why we report it in Hungary. Today, the pension system is the factor that has the strongest interest in net wage indices. Using what we call Swiss indexing, pensions granted and distributed by the system are partly pegged to changes in net wages. The factor behind this is that when the personal income tax was introduced wages were "grossed up" (increased to compensate for the new tax levy). Pensions were left at

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net value on the one hand, and on the other, as a measure of social solidarity it was thought that pensions also should follow the rise in income that exceeded the inflation rate.

Wage costs on the employer side are made up of several components. There are significant add-on costs to employers in addition to wages they actually pay employees in the form of fringe benefits and other costs (for instance, cash or in-kind support to employees for travel, meals, holidays, or cultural activity). Although international experience suggests that changes in direct wages and other items of remuneration are often closely correlated, meaning that we will not make a systematic error by only monitoring wage indices instead of total labour costs, that is not necessarily true on short term. In the 1990s, directly paid gross wages in Hungary were augmented by an additional 44–53 percent in wage-related payments to make up the total cost of employment. There was one year, 1992, when the ratio of these ancillary costs to actual wages shot up by 7 percent. At times like this, using gross wage indices as labour cost indices can be misleading, as is shown in Table 1.3.

TABLE 1.3: GROSS WAGE INDICES AS LABOUR-COST INDICATORS: LEVELS OF DISTORTION

	Yearly Growth	Rates(percent)
	Gross wages	Wage costs
1991	20.6	20.6
1992	29.8	36.6
1993	24.8	25.7
1994	24.9	24.9
1995	21.5	19.1
1996	21.5	20.3
1997	21.9	19.1
1998	16.9	16.9

Source: CSO data

By introducing the concept of *wage inflation* we can set up a clearly defined framework for interpreting and calculating gross average wages and their indices. Wage inflation is interpreted to mean the net changes in the price of a unit of work – set by pricing decisions. In addition, average wage trends are affected by alterations in the composition or quality of staff. The methodology of wage inflation can be derived from the definition. When calculating wage inflation indices, our goal is to discover the net pricing changes and separate them from the other influences reflected in average wages. One "disturbing" factor that moves average wages is the change in

the employment pattern. When, for instance, it shifts toward a group with higher wages or wage indices, the composition effect distorts the average wage and the growth indices in an upward direction. Table 1.4 quantifies the distortions caused by the composition effect in manufacturing in 1995–98. Both the rise in the significance of low wage index sectors – particularly the engineering industry – and the decline in the ratio of high wage index professionals distorted wage growth to below what it really was. We also can see that most of the distortion was the result of employment ratios that shifted from one sector to the other.

TABLE 1.4: THE LEVEL OF DISTORTION CAUSED BY THE COMPOSITION EFFECT IN MANUFACTURING (1995–98)[a]

Blue collar/White collar	Structure by sectors	
Ratio	Pre-set	May change
Pre-set	0.0	–1.0
May change	–0.3	–1.3

a Total deviation of annual average wage indices between 1995 and 1997 from a set (1995) weighted index, in percentage points.
Source: CSO data, own calculations.

To filter out the composition effect, statistics generally use standardised indices, where the weighting used as a basis (the consumption basket for the consumer price index or the employment pattern for wage indices) is identical for both the base period and the period under investigation.[3] What are the consequences of this when measuring wage inflation? Measuring wage inflation with standardised and particularly with set weight indices ignores three mechanisms that establish a systematic relationship between relative wages and changes in the employment pattern. The pure *substitution* effect enters a negative correlation between the relative wage of various labour market groups and the employment weight, while *relative productivity* and *relative product demand* changes introduce a positive one.

Looking at these factors one by one, first of all we know that when calculating price inflation, the fact that standardised indices ignore the negative relationship between changes in price and demand – in other words, the pure substitution effect – is a major disadvantage.[4] On short term (as long as the weighting is fixed), these price indices ignore the fact that for most products a price increase that exceeds average reduces consumption.[5] Above and beyond the labour demand reaction manifest in substitution, under the mechanism of relative productivity changes in the supply side, if the relative productivity of certain labour market groups suddenly jumps –

3 The basic types of standardised indices are the Laspeyres index that relies on past weighting and the Paasche index that relies on current (time of the investigation) weighting. The weighting used as a basis in the price index can be set for all time periods or can be variable. When using a set weight Laspeyres wage index, we weight the "individual" wages measured in the period under investigation for each month or each quarter with a set employment pattern from a past period, generally a calendar year. This is similar to the way domestic consumer price indices are calculated, when we weight individual price changes for every month with the consumption basket of an earlier year. When using fixed weighting, we also change the weights from time to time, once a year for instance for domestic price indices, while the US Bureau of Labor Statistics changes the weighting of its ECI index every five years. For the economic significance and consequences of selecting the type of weighting, see *Lettau et al (1997)*.

4 For the USA, see the Boskin Report, the essence of which is reviewed by the *National Bank of Hungary (1999b)*.

5 This was observed when the system of subsidies on pharmaceuticals was changed in the summer of 1999, and demand for certain medications soared. Consumers – who are quite aware of expected price changes and, most likely, also know the relative prices – ended up with a lower inflation rate on pharmaceuticals than the nearly 65 percent appearing in the CSO consumer price index for July and August, presumably because they shifted to relatively less expensive pharmaceuticals after the price increase, in other words, they chose substitutes.

which includes relatively higher wages – it will trigger a labour supply reaction that increases the employment significance of the given segment. Under the relative product demand mechanism, the motor of the rising relative productivity of the given segment is increased demand for the product involved, manifest in a rise in the product price. In other words, these mechanisms imply that there is a positive correlation between relative wages and changes in the significance of the employment segment.

Standardised wage indices ignore all three mechanisms that result in substitutions of one segment of the labour market for another, at least on short term. However – in contrast with price inflation – the regularly published aggregate level wage data published in Hungary do not consider this a problem. As far as the labour market is concerned, the ability of one employment group to substitute for another can be ignored on short term for all practical purposes. That is because technological constraints do not make it possible to effect any rapid changes in the blue-collar/white-collar ratio, and there is even less chance of altering the inter-sectoral pattern of economic activity. When using an index of wage inflation revised from time to time, but based on fixed weights between revisions, ignoring short-term substitution does not cause any harm.

If properly standardised – essentially by simple weighting – the gross wage data and wage indices, which are published regularly, could be shaped into wage inflation indicators. Under our theoretical definition, or in the light of practices in certain advanced countries, interpreting the wage indices calculated in this way have problems of their own.[6] Nevertheless, use of a wage inflation index based on gross wages – in contrast with simple net or gross average wages – will ensure consistency between methodology and the interpretation framework.

Differences in Company-Supplied and Self-Reported Earnings Data
Gábor Kézdi

There are significant systematic differences between earnings data based on self-reporting (on individual tax returns) as opposed to the data coming from company sources. To measure the distortions we need to have both types of data available at the same time, but they are almost never available in one and the same survey. One exception is an income survey conducted by the Central Statistical Office in 1988, which offers an opportunity to study the direction and nature of the differences *(Kézdi 1998)*. The conclusions drawn from the data only can be considered valid under today's conditions with strong reservations, but the current mission is not fact-finding, but to present the problems stemming from the differences.

Self-reported data on average earnings is about 20 percent lower than company-reported figures. In addition, self-reporting tends to "shrink" earn-

6 One shortcoming on basic data level that needs to be remedied, for instance, is that wages for blue-collar labour are not projected to number of hours worked. For more on this see *National Bank of Hungary (1999a)*. Another problem is interpreting annual indices that are used instead of seasonally adjusted ones, since as long term base indices, they do not illustrate actual processes. For more information on wage statistic practices employed in the advanced countries, see, for example, Chambers and *Holmes (1998)* for Great Britain or *Ritter (1996)* for the United States.

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ings data differences. It makes dispersion appear to be only half as large – despite the lower average – yielding about 10 percent lower values of relative standard deviation. Other relative gauges of dispersion show similar differences. For instance, based on company data the value of the Gini coefficient is 0.233, while it is 0.207 for the individual (self-reported) data. One factor in the differences is systematic. The higher the earnings shown by company statistics, the lower the ratio of self-reported and company reported earnings. There also are significant distortions triggered by gender, age, and education level, though they are far weaker than the one connected to the earnings level. It is hard to decide whether the earnings data reported by the company or the individual should be considered valid. The former is accurate in the accounting sense, but for reasons discussed in the previous sub-section, it does not always coincide with the amount actually received by the employee as remuneration for work. The latter can be distorted by uncertainty or mistrust on the part of the respondent, but it also may contain items that do not appear in official accounting. (One suggestion that this may be the case is that a more than negligible portion of respondents self-reported a higher income than the figure given by the company.) Even if everyone agrees on how to define earnings in theory, available data really comes from imperfect observation of a *latent variable*. In this subsection we would like to briefly discuss some of the consequences of this, which influence research results.

We know that a given person earns a clearly definable amount (x* latent variable) but we have no way of observing it directly. Instead of that, we have an observed earning amount available: x. This amount is dependent on the latent variable and possibly on other variables, but for systematic reasons and for "random" reasons independent of them it differs from x*. If there is no systematic deviation (and if the random component is independent of every other element in the model we wish to estimate) then we can say that the difference between x and x* is pure measurement error. Depending on the direction of the investigation, the data used for the empirical analysis and the model, both systematic deviation and pure random error can distort the results.

Estimates of *mean* earnings become distorted if the measurement error contains any systematic elements. As the previous subsection noted, company earnings data are systematically distorted, while self-report data systematically deviate from company data (and, it is believed, also from actual wages although that cannot be observed directly.) Even pure measurement error distorts estimates of the earnings *deviation*, as shown in Note J1.1, formulas (2) and (3). In statistical analyses *conditional expected values* are generally more important than means and deviation, which in our case means determining how one unit of change in a factor influences earnings.

The method used most often to analyse this is a linear regression estimate of conditional expected value.[7]

If earnings are the *dependent* variable of the regression model, estimates of the coefficients of a model using the x earnings variable actually observed will only be distorted if there is a systematic measurement error. At the same time, the estimate is less efficient and less certain than if we could measure the latent variable without error. (See Note J1.1, formulas [6] and [7].) However, earnings observed with the different methods deviate from one another in a systematic way. In the survey mentioned for instance, we can demonstrate that if we use an earnings variable measured through self-reporting in the univariate linear regression model instead of the company data, we receive only 0.65 of the estimated affect of the explanatory variable. If our earnings figure based on self-reporting *is* the *explanatory* variable, then, in the case of a pure measurement error we get a biased result that pulls toward zero. (Note J1.1, formula [13].) If we consider both random and the systematic deviations already discussed and look at the sample studied by *Kézdi (1998)*, we should expect the model based on self-reported earnings to show a roughly 20 percent steeper curve than the function based on company wage data (Note J1.1, formula [12]).

These results demonstrate that in a given case, imperfect measurement of earnings as a latent variable can lead to very significant distortions. In multi-variable models, imperfect measurement of a single explanatory variable also will distort estimates of the parameters of all the other variables *(Greene 1993, Chapter 9.5)*.

In most cases we cannot estimate measurement error, but when interpreting the results it is always expedient to remember that earnings is a latent variable and when estimating it we only can rely on observations, some of which are better and some of which are worse. If the research is focused on trends in overall budget revenues from earnings, data coming from administrative sources (tax returns, social security contributions) will probably be satisfactory. Workplace data is appropriate for analysing gross earnings from full-time jobs. If the goal is to analyse net wages, it is worth investigating the effects of not knowing the other variables that determine taxes. Earnings data from household questionnaires based on self-reporting also contain non-negligible errors. Means and deviation are smaller, and for a more circumspect analysis we also need to consider the degressive (non-linear) relations between declared and official earnings.

7 In the following we have assumed that our model was estimated with the least squares method and that the random factor is independent of the model's explanatory variables.

2. WAGE SETTING: INSTITUTIONS AND PRACTICES

While the regime change restored the principle of bargaining freedom, the actual system of wage setting has changed but gradually. New institutions evolved over a decade, along with practices and procedures that are still taking shape. First we try to evaluate the new institutional set-up and the emergence of collective bargaining, and then we attempt to assess its impact on the evolution of earnings in the light of available data.

2.1 The wage setting system

Jenő Koltay

State controls on wages and employer-employee relations had already been somewhat loosened in the 1980s, but wages still evolved in a force field of a Tax-based Incomes Policy (TIP)-type central control,[8] wage-increase rounds, intermittent corrective wage measures, and informal bargaining *(Kővári, Sziráczki, 1985, Koltay, 1986)*. Formal collective agreements did not play a substantive role in setting wages. Any wage outflow that exceeded central intentions was controlled indirectly by taxing enterprises, in order to set an effective wage ceiling, except for a widening market-oriented segment escaping hierarchical coordination. Meanwhile, with no real wage floor in operation to guarantee at least somewhat of a wage increase, the official wage minimum got lost between the very infrequent adjustments, considered, at most, a by-product of the system.

The transition to a market economy, implementing parliamentary democracy and redistributing property rights, opened up the perspective of collective bargaining and social partnership. A brand new body, the National Interest Reconciliation Council (OÉT), was set up to run tripartite (government-unions-employers) negotiations. It was given the right to negotiate and fix an economy-wide, uniform, statutory minimum wage, subsequently announced in a government decree as a monthly or hourly basic wage or salary for a full-time employment. By contrast, central wage control was even tightened up.[9]

The OÉT, set up in late 1988 as a concession of the outgoing regime, initially was much more an organ of government administration *(Ladó, Tóth, 1999)*. Slightly re-modelled and re-named the Interest Coordination Council (ÉT) after the regime change, it was also charged to negotiate guidelines for average, minimum, and last but certainly not least, maximum wage increases, and on the scope of "tax-exempt" wage increases.[10] In other words, the government held onto central control, but shared the responsibility for macro-level wage setting with its old/new partners. At the same time, it did recognise the growing *de facto* wage-setting autonomy of employers in a private sector starting to flex its muscles.

8 The recipes for a TIP (taxed based income policy) proposed by certain western economists, originally for home consumption, but which had remained untested, suggested a procedure that was quite similar to Hungary's parametric wage regulation, which other economies undergoing transformation saw as a tool in transforming a centralised wage regulation system into a market one. (For features of this, see Flanagan, 1998)

9 In 1989, the nominal wage increase was kept to three percent below the hike in consumer prices, since, if it exceeded the centrally fix level businesses had to pay a profit tax on the full amount of their wage increment.

10 Extended to all businesses where the wage increment was below the growth in value added, where the overall to wage bill was less than 20 million (HUF), and where the share of foreign capital amounted to at least 20 percent. Even agriculture and the railways were included up to a 3 percent wage increment.

Removing all constraints on wage evolution appeared risky. Then, the transformational recession, market loss, deficits, and growing wage costs cut back on firms' willingness and ability to pay. Jobs were lost on a mass scale and union membership eroded, weakening any potential wage demands while galloping inflation made decision-makers cautious. Encouraged by the decelerating trend of wage increases, the government agreed to eliminate definitely the tax threat in case of excessive pay increases and took the risk of relying exclusively on negotiated wage guidelines from 1993 onwards.[11]

Central Level: Tripartite Agreements Replace Wage Control

Once the new legal frameworks – from trade union freedom and strike law to employers/owners autonomy – was in place, the abandonment of wage control removed the last formal obstacle to free bargaining. Nevertheless, problems of the ongoing economic transformation and the asymmetry in industrial relations – with a still powerful state, weak unions and only emerging employers' associations – did not favour large-scale collective bargaining.

The logic of collective bargaining, with the need to set a strict floor on wages and wage increases in employer-employee negotiations, first appeared with the tripartite negotiation on the minimum wage and then with guidelines representing somehow a minima for wage increases, even if not effectively. In a market economy however, unless in exceptional circumstances, the wage-setting power of mostly consultative tripartite negotiations is minimal.

The case of the minimum wage is special in a certain sense. It is statutory, directly sets wages in a confined segment of the labour market, and through bargaining it exerts an influence on attainable increases along the whole wage scale. The (ab)use of the minimum wage as a universal bargaining tool was one reason why it played a prominent role in tripartite negotiations from the very beginning.[12] It became important to the social partners, especially to the unions and the government, to fill the legitimacy gap by regular agreements on minimum wage rise. Minimum wage negotiations using social arguments (in terms of rising subsistence minimum) addressed to a government still deeply involved, served as an *ersatz* to wage negotiations based on market position and bargaining power of employers and unions.[13] In an effort to demonstrate social sensitivity, governments showed more empathy for the employee position than for the employers. The latter, becoming more and more (wage)cost-sensitive, feared the ripple effect, and had a vested interest in not only maintaining but also in widening differentiation along the wage scale. Employers argued that increases should be kept to the ability to pay of the weakest employer and warned of the hazard of killing low-wage jobs. Their attempts to fight excessive minimum wage increases or to get compensation in the form of sinking levies

11 For doubts voiced at that time on just how lasting changes in company wage paying behaviour would be, see *Köllő (1993)*.

12 For more details on the function of the minimum wage and the role it played in Hungary, see *Koltay (1998)*. For more on the minimum wage in Eastern Europe, see *Vaughan-Whitehead (1995)*.

13 The fragmented labour union arm took its cue from the largest union umbrella group, the National Association of Hungarian Trade Unions (MSZOSZ), and only one of the smaller union confederations, the League (LIGA) voiced the possibility of the minimum wage increase having negative effects (on employment levels and on prices).

on wages were more or less unsuccessful, in some sectors they managed to introduce the new minimum with a time lag. Some employers "went on the defensive" by simply not raising wages to comply with the minimum wage.[14]

TABLE 2.1.1: MINIMUM WAGE TRENDS

Year	GMW	NMW	GMW/GAE	NMW/NAE	GMW/SM	NMW/SM
1989	100.0	100.0	34.6	40.3		87.6
1990	137.1	137.1	37.3	44.7	90.1	84.4
1991	133.5	132.6	37.4	46.3	89.9	83.8
1992	119.4	118.9	35.9	45.6	90.2	82.7
1993	114.5	110.2	32.8	42.7	76.0	70.2
1994	116.4	117.0	31.2	39.9	72.2	69.0/93.8
1995	116.2	116.3	31.0	41.2	94.5	89.6
1996	118.7	116.0	30.5	40.9	95.5	89.0
1997	117.2		32.5	39.0	91.4	
1998	114.7	114.7	28.8	37.7	94.1	
1999	115.4	103.6	31.2	34.2	98.3	
2000	113.3	113.3	29.1	35.4	101.3	
2001	157.8	151.9	41.4	49.7	144.7	
2002	125.0	121.8				

Key to abbreviations:
GMW, NMW = Annual gross and net minimum wage as percentage of previous year.
GMW/GAE = Gross minimum wage as percentage of gross average earnings.
NMW/NAE = Net minimum wage as percentage of net average earnings.
NMW/SM = Net minimum wage as percentage of subsistence minimum.
SM = Per capita amounts calculated by the Central Statistical Office for households with two wage earners and two children, with the amounts yielded by the old and the new method of calculation given for 1994, the year the change was introduced.
Source: Central Statistical Office, Ministry of Labour.

14 Meanwhile, the government voiced its understanding for problems of all sides. As a public sphere employer, however, it exempted the public services from minimum wage requirements, despite the fact that the original public sector wage scale had been based on it.

15 Data focused on wage payments showed a decline in the ratio of private sector recipients of minimum or near-minimum wages, dropping from 10 percent in 1991 to 2 percent in 1995. The figures themselves are similar to, or lower than the corresponding ratios in advanced economies.

Not much is known about how widespread underpayment was or how far under the line it went *(see Koltay, 1998)*. There is, however, more detailed information on people actually paid the minimum wage. It turns out that the share of minimum wage earners was comparatively low and showed a declining trend, at least within the sphere covered by the data.[15] A reversal of trends was brought about by the government-initiated "unilateral" (without prior consultation with the social partners) minimum wage explosion in 2001 and 2002, when the resulting instant wage-convergence automatically increased the share of minimum wage earners. Before, paradoxically enough, unions' achievements in minimum wage bargaining were limited. The increases came regularly, but the amount stayed below the rise in aver-

age wages with the difference being more or less offset by the personal income tax treatment of low-wage earners. The minimum wage clearly declined in value compared to the cost of living, with the gap reduced only by changing the method of calculating subsistence minimum.[16]

Central wage agreements had become institutionalised, guidelines for annual wage increases were regularly agreed upon, along with the minimum wage. Repeated – government or trade union initiated – attempts of longer term agreements, engaging unions to a voluntary constraint on wage demands in exchange of government and employers' commitments failed.[17]

16 If the old method is used to run minimum subsistence level calculations for 1995, the year that followed the introduction of the new method, the drop in value turns out to be a significant, 15 percent *(ILO-CEET, 1997)*.

17 For more information on the attempt to reach a socio-economic agreement, see *Héthy (1995)* and *Kőhegyi (1995)*.

TABLE 2.1.2: WAGE GUIDELINES AND THE EVOLUTION OF AVERAGE EARNINGS AND CONSUMER PRICES (AS PERCENTAGE OF PREVIOUS YEAR)

| | Wage guidelines | | | Anticipated | Actual trends | | | | |
| | Gross rise in average earnings | | | Consumer price rise | Gross increase in average earnings | | Consumer price increase | Net increase in average earnings | |
Year	average	min.	max.		Business sector	National economy		Business sector	National economy
1992	123	113	128	120–125	126.6	125.1	123.0	99.8	98.6
1993	118	110–113	125	114–117	125.1	121.9	122.5	98.6	96.1
1994	117–119	113–115	121–123	116–122	123.4	124.7	118.8	105.9	107.2
1995	118[a]			120	119.7	116.8	128.1	89.6	87.8
1996	119.5	113	124	120	123.2	120.4	123.6	96.5	95.0
1997	117.5	114	122	117–119	121.8	122.3	118.3	104.7	104.9
1998	114.8	113	116	113–114	118.9	118.6	114.3	103.9	103.8
1999	113.5	112	115	110–111	115.2	116.2	110.0		102.5
2000	109.8[b]	108.5	111.0		114.2	113.5	109.8	111.4	
2001					118.0	109.2	116.2		

a Government recommendation, no agreement.
b Bipartite agreement of employers' and employees representatives.
Source: Central Statistical Office, Ministry of Labour, National Labour Centre.

Since agreements on wage guidelines actually were reached for every year save 1995 and 2000, the annual "wage-rounds" can be interpreted as a kind of success story for all social partners, except for the government of the 1998–2002 term.[18] A success indicator, from another point of view, is that the overall wage rises in the business sector fluctuated at around the maximum recommended level throughout the whole period. The close match between wage guideline figures and actual wage trends can be interpreted as fulfilment of the agreements, and is an incentive for the partners to conclude future agreements, even if no cause and effect relationship is as-

18 In the year that the stabilisation package was introduced (1995), employers called for a 17 percent wage hike, employees for an 18–20 percent one and the government asked for 18 percent. Despite the fact that the figures appear to be rather close to one another, no agreement had been reached by February, at which point the State Holding Corporation set the maximum income hike for companies where the government was a majority stakeholder at 15 percent. By June, the annual inflation rate had shot up to 31 percent and real incomes sank by nearly 10 percent.

sumed. The third factor, generally considered as a result of tripartite negotiations, is their assumed influence in orienting lower level wage bargaining.

Clearly, the central agreements did not honour union efforts to avoid real wage fall. In the period of the transformational recession and in the decisive years of the shift to a market economy, net real earnings dropped regularly every single year except the 1994 election year, a trend that only turned around in 1997–1998. Obviously, the reason why employees got the worst of the situation was not the "calculation error" made by the social partners, who regularly underestimated inflation when negotiating wage guidelines. Central agreements could not influence the earnings' inequalities either. The growing earning differentials really only could have been influenced by lower level, primarily sectoral, bargaining.

Intermediate Level: Unfounded Expectations

Branch level bargaining, which generally has a more powerful and direct impact on wage evolution, by granting a minimum across-the-board wage increase to large numbers of workers and tending to balance out wage hikes, never really caught on in Hungary. Despite union efforts, government encouragement, and international attention, the wave of collective agreements concluded in 1992[19] in anticipation of free wage bargaining never became a catalyst for establishing widespread mid-level bargaining which remains sporadic and irregular.

Under socialism, the traditional branch level bargaining was eliminated, despite the strong branch orientation of the convoluted planned economy. The only thing retained from the past had been the branch principle of union organisation. Though union coverage is shrinking, weaker or stronger unions are continuously present in branches of the business sector, but most often employers' federations simply do not have the necessary branch organisation to conduct negotiations and the authority to conclude and enforce agreements. The relevant legal frameworks are in place, but when branch agreements come about, generally each of the joining employers signs it separately, because joint committees with equal representation of both sides are still lacking.

Given these conditions, sectoral collective bargaining agreements at that level are reached in cases where unions are comparatively strong, and where there are only few employers (such as in public utilities or in the chemical industry). The actual agreements are few in number, which in itself doesn't tell us much since in the more advanced part of Europe the majority of employees are covered by just a few agreements. In Hungary, however, only about one-tenth of labour in the business sector is covered by collective agreements at that level. The term "multi-employer agreement" (introduced to the Labour Code in 1992) means just that. Most of the agreements thus

19 At this time, responding to an appeal by the ÉT and advice coming from the ILO, the parties to negotiation were guided to the bargaining table *(see Berki, Ladó, 1998)* and by legal incentives (in the new Labour Code) in lieu of any contract.

reached tend to cover groups of companies or specialised sectors (such as the baking industry or water supply), giving them a narrow sphere of influence, not increased significantly even when the, to date rarely used, tool of extension is used.[20] At the same time, there is no "model" agreement in some leading industry (like metalworking), that might influence agreements and wage evolution throughout the economy by its mere existence as opposed to extension.[21]

The potential wage-setting power of mid-level agreements is further weakened in Hungary by their contents which, for the most part, refer only to average wage increase when they include wages at all. In fact, these recommendations tend to follow the central guidelines not binding employers to give a corresponding rise for each employee concerned. Far fewer of the agreements contain a sectoral wage minimum above the statutory minimum wage, and only a few include the extent to which basic wage rates are to be increased and even fewer update wage scales. As they currently stand, wage increases agreed upon do not function as an effective wage floor when setting individual wages in companies within the branch. This means they do not serve as a generally accepted point of departure in company wage bargaining (perhaps they are more used as a selectively applied point of reference).

20 In Hungary, relevant rules allow the Minister of Labour to extend agreements in a way corresponding to accepted practices of advanced countries in which the validity of a branch level collective bargaining agreement is extended to all employers and employees of the branch, whether or not they were represented in the joint committee or in the signing of the agreement. *Neumann (1998)* offers a detailed analysis of the extension of the baking industry and power industry collective bargaining agreements.

21 In the advanced countries ranging from Germany to Australia and Austria to the Netherlands, and most recently including Sweden, this role is played by the metalworking or engineering trades' collective agreement. In Hungary's engineering industry, for instance, the employer organisation does not even cover the multinationals, having a decisive share in production and employment.

TABLE 2.1.3: COVERAGE AND CONTENT OF INDUSTRY/BRANCH LEVEL WAGE AGREEMENTS IN THE BUSINESS SECTOR[a]

	1992	1993	1994	1995	1996	1997	1998	1999	2000
Number of industry/branch level collective agreements	24	12	12	7	10	11	31	41	
Coverage (in percent of employees)	41.9	12.7	11.0	5.0	12.4	13.2	13.5	12.8	11.5
Number of agreements									
– On average earnings' growth	17	6	6	3					
– On wage minima	6	7	7	2					
– On increasing basic wage rates	..	3	2	0					
– On wage scale	12	1	8	50					

a Businesses with more than 10 employees (more than 20 in 1992–1993).
Source: Central Statistical Office, National Labour Centre, Ministry of Labour.

Company Level: Wage Bargaining and Employers' Wage Decisions

Collective bargaining on wages at company level was supposed to replace smoothly the widespread informal bargaining after the regime change, with open negotiations and binding agreements instead of informal and/or hidden bargaining, lawful work stoppages instead of illicit slowdowns, etc.

But, enterprise restructuring, labour market change and asymmetrical industrial relations – with a still oversized state, weak or only emerging employers' associations and unions – did not really favour company-level collective bargaining on wages.

As usual, collective agreements are generally concluded in large(r) companies. Three-quarters of firms employing over 500 people have a valid collective agreement, as do more than half the companies with staffs of 300–500. (Neumann 2000) These agreements are to be found mostly in manufacturing (nearly half of all collective agreements have been concluded there for quite a number of years, Berki, 1996), public utilities (energy, water supply), and commerce. The three prerequisites for keeping the agreements alive are employer willingness, employee organisation, and company size. Initially, the state-owned sector met these conditions, while all three were lacking in the early private sector. As private property became dominant, big firms appeared in the private sector, but the time when some employers began to express willingness to sign agreements meshed with the weakening or absence of the unions. As the process ran, there was little change in the coverage, or in the contents of the agreements. Company wage agreements with a longer lifetime cover roughly 30 percent of private sector employees. It appears that collective bargaining agreements declined among the small(er) firms that were privatised, while they were more or less retained by the large(r) companies that were partly or wholly privatised, even when the new owner was foreign (such as in the telecom and public utilities). However, opposed to takeovers, most new foreign companies remained uncovered.

TABLE 2.1.4: COVERAGE AND CONTENTS OF COMPANY WAGE AGREEMENTS IN THE BUSINESS SECTOR[a]

	1992	1993	1994	1995	1996	1997	1998	1999
Number of company collective agreements, overall:	391	394	490	816	594	598	843	827
Manufacturing industry only	190	179	212	357				
Coverage (in percent of employees)	25.6	32.4	28.5	27.8	31.6	30.5	38.5	24.7
Number of agreements on average income hikes	292	291	293	447				
– On wage minima	71	198	183	253				
– On increasing basic wage rates	255	388	419	664				
– On wage scale	118	177	219	210				

a Businesses with more than 10 employees (more than 20 in 1992–1993).
Source: Central Statistical Office, National Labour Centre, Ministry of Labour, Tóth (1995), Berki (1996).

The potentially strong wage-setting power of the company level collective agreements can not prevail in many cases where they remained a remake of relevant legislation as before the regime change. Some of them do not even include an agreement on wages. Most do, but limit themselves to average wage increase at company level, generally in keeping with central guidelines, or, where it exists, with sectoral recommendations. About half of the agreements called for wage increases slightly in excess of the above. For the employee they have only the value of a recommendation, while for the company, they can orient individual wage decisions. From the point of view of wage-setting, agreements on increasing basic wage rates are more important. Two-thirds to three-quarters of the wage agreements did contain a clause on this, but we have no comprehensive image of how the various agreements grasp basic wage increases. The registry of collective agreements only became complete in 1998 and prior to that it contained no information on the actual contents of the agreements on wages. From *Neumann (2000)* we can learn that nearly two-thirds of the more than 1,200 agreements in force in 1998 included a wage settlement. Eighty percent referred to increases in basic wage rates, sixty percent had passages on average earnings, about sixty percent set the wage minimum that the company could afford, and one-third had some sort of wage-scale settlement.

Even in the areas they covered, Hungarian wage agreements did not guarantee all employees a minimum of increase in wages, binding employers as in developed market economies. Strict wage floors do appear only with company wage minima. Where there are no collective agreements or where they do not include a wage settlement, which is the case for the majority of firms, wages for most employees are determined by unilateral employer's decisions. Often, the labour market and its asymmetric power relations turn even the wage agreements into unilateral ones. In fact, very often employer's wage decisions reflect results of informal on-the-job bargaining still going strong, either in its familiar old form, or in a new type, linked to recent global tendencies of job and wage individualisation.

Hungarian Peculiarities: Decentralised Wage Setting with Signs of Corporatism and Paternalism

The new Hungarian system of wage setting is based on the principle of bargaining freedom, but actual wage evolution is far more dependent on employers' decisions and the immediate impact of market forces than on collective agreements with low coverage and poor contents. The ensuing system is very decentralised where the company level is decisive since employer's wage decisions are made here. This is the level where informal bargaining or individual settlements come into play, and it is also the scene of real but limited collective bargaining, which can have a more or less direct

influence on wages. The central level, which sets the statutory minimum wage and wage guidelines, institutionalised a tripartism of varying shape, where the government-union-employer co-operation can go far beyond the world of labour.[22] Intermediate level tripartism, advocated by some experts and union representatives, failed to establish itself and bipartite collective bargaining remained underdeveloped at that level. The social partners, especially governments and unions, have found it easier and more productive to push central minimum wage negotiations to the forefront of the bargaining scene, even if they had diverging views on the extent and frequency of minimum wage adjustments. Divergences culminated in 2001–2002, when the government embarrassed all partners with its "surprise" minimum wage rise.

Radical economic transformation and a drastic decline in demand for labour, together with just emerging institutions and the absence of routines of collective bargaining explain the peculiarities of the Hungarian system. Under specific circumstances, a mix of minimum wage fixing and wage guideline negotiations on the macro level, and marked-based employers' wage decisions, with some bargaining on the micro level worked probably better than shifting wage-setting to underdeveloped and inefficient institutions of branch level bargaining. In a broader context, what happened, seems to fit the hypothesis *(Calmfors, Drifill, 1988)* that both highly centralised and very decentralised systems are likely to do better from the point of view of macroeconomic performance than intermediate ones. As, what is taking shape in Hungary, is by no means a system somewhere in between, but much more a mix of both extremes.

The wage setting process and the resulting wage evolution did not conflict with economic policy goals, and didn't lead to either exaggerated wage growth or unbearable labour conflict. The frequency and intensity of labour conflicts in Hungary remained extremely low by international comparison throughout the whole period.[23] They did not prevent the internal restructuring of companies, the introduction of new management schemes and the import of new technology, the shift to more flexibility and individualisation in wages, or the establishment of direct employer-employee relations (without union mediation). At the same time, however, this wage setting system could not hamper real wage fall, or set any obstacle to wage competition, or prevent the growth of inter-company, inter-regional or hierarchical wage differentials.[24] It did not facilitate to conclude employment maintenance against wage moderation type agreements known from Western practices. At the same time, flexibility on the wage side of the labour market relaxed somewhat the rigidity caused by the limited mobility of labour.

22 An answer to the question of exactly how corporatist the Hungarian system is can be approximated by measuring the centralisation of wage negotiations, the significance of government participation, the concentration of labour union presence on the various levels, the dispersion of wages, and other factors. For a concise review on the subject see *Cörvers, van Veen (1995)*.

23 Strike activity remained (under the) threshold. Between 1991 and 1995 there were a maximum of five work stoppages a year, lasting an average of less than two days each. The number of participants was less than one percent of the total labour force *(OECD, 1996–1997, Berki, 1999)*.

24 One sign of the absence of higher level collective bargaining agreements and of weak unions is the sharp rise of wage differentials by educational level, though they had been compressed during socialism, that took place in the business sector. This did not occur in the public sector where the unions are much stronger.

In advanced market economies, where company level wage bargaining is important, the point of departure is always the higher level sectoral agreement. Historically, however, everything developed on the lowest level, and only later did higher level bargaining appear. Hungary's experience suggests that it cannot work the other way around here either. No matter what "incentives" are given, sectoral wage agreements of high coverage simply cannot be built without a company-level foundation. (According to *Berki and Ladó [1998]*, there is another, an "interventionist approach" to building sectoral wage bargaining, which would be desirable in many respects for both economic and welfare considerations. Still others claim that the tripartite central agreements could create the incentives needed for company-level wage bargaining to develop *[ILO, 1997]*). Central agreements only can gain a real wage setting power if lower level agreements cover a sufficiently wide area.

What remains an open question is when company level wage bargaining can gain definitive strength, and when can it spread to the next level. Will the time come when increasingly vigorous unions and organised employers shift their bargaining positions to branch level and reach binding agreements that result in coordinated wage evolution? Will there be central agreements that define wage trends for the entire economy? Or will decentralised wage setting, individual bargaining, company agreements and directly market-guided wage fixing, that fit into the global trend of individualisation and flexibility, remain decisive, with pale unionism and loose employer organisation? Will Hungarian practices approach the traditionally higher level wage setting still dominant in continental Europe, or will wage decisions be kept at the company level, following further the Anglo-Saxon line.

2.2 Wage-Setting Practices – Some Indirect Observations

János Köllő

Without convincing research evidence on the real effects of wage setting – minimum wage fixing and collective bargaining on various levels – at the moment of writing we cannot answer questions such as how the offers made during negotiations evolve or whether the agreed guidelines really influence employers or workers' representatives in their decisions. Case studies on collective bargaining are no substitute for broad-scale quantitative analysis since the main issue does not appear to be whether there are segments of the labour market regulated by collective bargaining (there are), but the size and share of sectors covered.

The sporadic data and research results reviewed in this chapter cannot substitute for methodical analyses of bargaining and at most they offer a

basis for wording conjectures and spurring us on to research the issue. The data (also) suggest that company-level factors have shown the strongest growth in influence over the past decade. In some cases – the railways and the energy sector, for instance – industry-level agreements continue to play an important role but this cannot be said on a general scale. Negotiations and agreements at national level unquestionably influence wage setting by determining the minimum wage but it would be hard to go any further in conclusions.

In a top-down look at bargaining levels, the marks left by setting the *national* minimum wage are easily demonstrable in earnings distribution. Figure 2.1 shows this, giving the distribution of low earnings (lower than half of the median) in various years. In 1986, when there was no legally defined minimum wage, we see what is essentially the lower end of a lognormal distribution. The number of persons on the various earnings levels declines gradually as we move towards the lowest salary in the sample. In 1989 – when the minimum wage was already mandatory – there was no substantive change in the situation, but a group of people earning close to the minimum wage did become visible. This trend grew stronger year by year. By 1998 the share of labour earning less than minimum wage had become rather small and so had the group earning more than minimum wage but less than half of the median. The lower end of the distribution was clearly dominated by people paid minimum wage (reported as receiving minimum wage). Kernel density functions of earnings support this. The 1996 data chosen as an example clearly show the comparatively high number of people with earnings in the vicinity of the minimum wage.[25] (Minimum wage is depicted with a vertical line and the lognormal density function is a continuous curve.)

Though true that there were very few people whose gross earnings were below minimum wage (fewer than 2 percent), in itself that doesn't mean that the minimum wage operates as an effective lower limit in setting wages. It is conceivable that the number of persons paid at the lower limit is high because employers are forced to raise wage offers on any level lower than this. But the low number of workers earning a little *more* than minimum wage makes one suspect that the number of wage offers (accepted) at around the legal minimum is really very low. What it may really mean is that employers are practising the well-known method of just reporting workers at minimum wage.[26] Nevertheless, it is beyond doubt that the minimum wage – at least in the latter sense – does serve as a reference point in the lowest salary range. Role and scope of the minimum wage was put in a new context by the government-initiated radical rise of its rate (to 40,000 HUF in 2001 and 50,000 HUF in 2002). Ongoing research should measure and evaluate the economic and social impact of this change.

25 When estimating a kernel (core) density function, we slide a "window" of given width along the range being interpreted, in tiny increments. The estimated function values in the centre of the windows give the continuous curve in the figure. Descriptions of the process can be found in manuals of major statistical program packages.

26 It is worth noting that in the latter half of the 1990s only 1.5–2 percent of people were earning 95–105 percent of minimum wage. In other words, there is no *en masse* registration of workers at minimum wage (in companies employing more than 10 people). All this is valid before the government initiated minimum wage explosion in 2001–2002.

FIGURE 2.1: DISTRIBUTION OF (GROSS) EARNINGS BELOW HALF OF THE MEDIAN IN VARIOUS YEARS
FULL-TIME WORKERS AT COMPANIES EMPLOYING MORE THAN 20 PEOPLE (MORE THAN 10 AFTER 1995)

Earnings below half of the median, 1986

Earnings below half of the median, 1989

Earnings below half of the median, 1998

Kernel density function of earnings, 1996
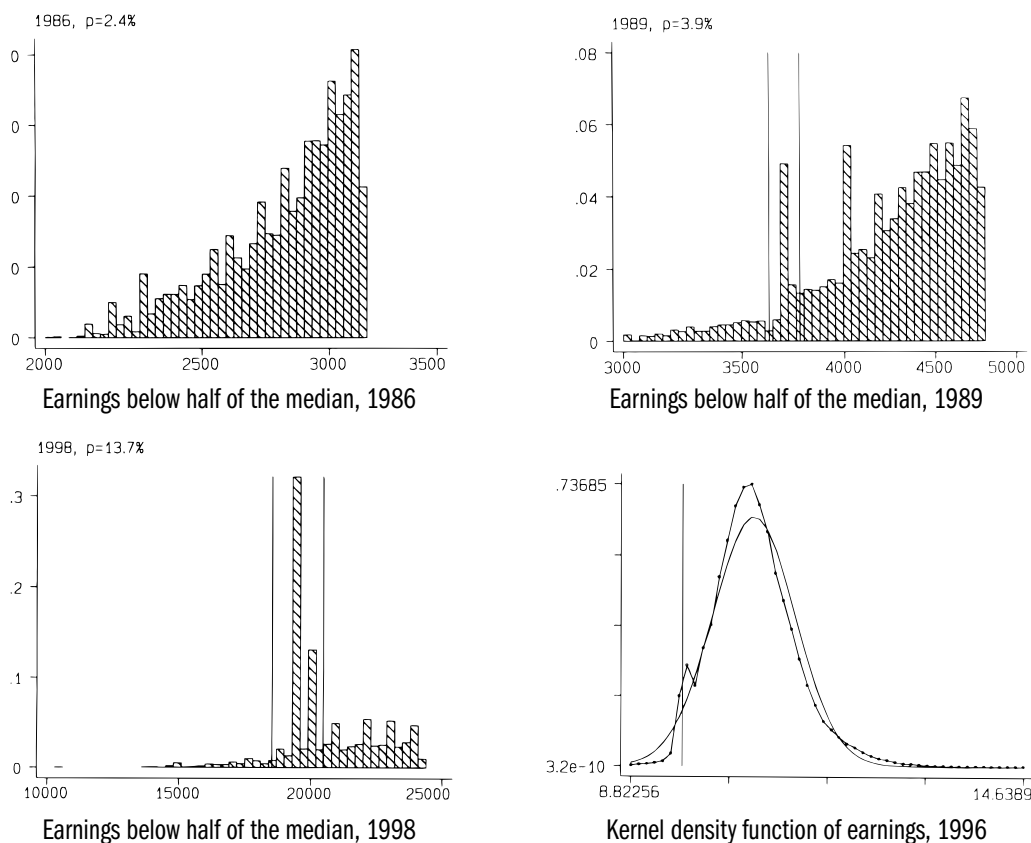
P = Ratio of persons earning less than half of the median.
Vertical lines mark the vicinity of 5 percent of current minimum wage.
Source: Wage Tariff Surveys.

Until recently there has been no research and since there is no appropriate data, there cannot be any either, on whether the wage guidelines centrally agreed influence companies in decisions to raise wages.[27] Researching this requires information on company abilities to increase wages and on actual wage hikes, but company-line earnings data collected by the CSO on the former and input/output records collected by the Ministry of Finance on the latter lack (reliable) information.

A major constraint in analysing the possible effects of *branch level* wage bargaining is that the industry code systems used prior to and after 1993 cannot be compared. *Kertesi and Köllő (1997)* made an attempt to produce

27 The first investigation based on micro-data was recently begun at the Labour Research Institute under the leadership of László Neumann.

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a classification that can be monitored through time – though with many errors – which they used to analyse the role played by the industry/branch level in shaping overall earnings dispersion in 1986–96.

When breaking down the growth in the variance of individual earnings into factors they found that approximately 40 percent of total growth was derived from changes in the *employment share* of branches Most of the effect was caused by a growth in the employment share of branches where there always have been large earning differentials (from one company and from one person to the next), such as commerce and services, and – within industry – the engineering industry. Differentiation among sectoral earnings level explains less than 10 percent of the entire growth in wage differentiation. A far more significant role is played by earnings differences *within branches*, which explain 50 percent of the entire growth in variance.

Section 4. of the study returns to the problems of sectoral level wage evolution. It shows that in some cases branch-specific changes in wages were significant, but in light of the above it appears that, on the whole, changes in sectoral rent played a subordinate role in evolving earnings differences. We reach a similar conclusion whether we investigate the power of being within a given sector to explain earnings levels with ANOVAs or with multi-variable linear regression functions. The explanatory power of models using individual (gender, age, education) and sectoral variables declined significantly between 1986 and 1996, while that of models including company variables (size, productivity, capitalisation, ownership) improved spectacularly *(Kézdi and Köllő 1999)*.

There are a number of signs that the significance of *company level* formal and informal bargaining has grown. First of all, as signalled by basic bargaining models (see, for example *Blanchflower and Oswald 1994, Moene and Wallerstein 1993*) during the period of transition, the relationship between earnings and company productivity (distributable company income) became stronger. At the same time, a robust relationship evolved between wages and local unemployment (the expected "punishment" for unsuccessful bargaining).

The upper curve in Figure 2.2 shows the elasticity of individual earnings *vis-à-vis* company productivity, in other words, the percentage of the probable earnings growth in the business sector triggered by a one percent growth in productivity in 1989–98.[28] Using data from the Wage Tariff Survey, elasticity, estimated with a multivariate regression model, grew by nearly fivefold between 1989 and 1998. From the point of view of the productivity of the employer company, the pure difference – implied by differences in company productivity – between the wages of employees in the first and the fourth quartile was 18 percent in 1989, 35 percent in 1993, and over 40 percent in 1998.[29]

28 In 1986 unemployment was not yet measured.
29 In 1986 the difference between the top and bottom quartiles was still only 11.6 percent and elasticity was only 0.062 in value.

FIGURE 2.2: THE FLEXIBILITY OF INDIVIDUAL EARNINGS BY COMPANY PRODUCTIVITY AND SUB-REGIONAL UNEMPLOYMENT RATES, 1986–98
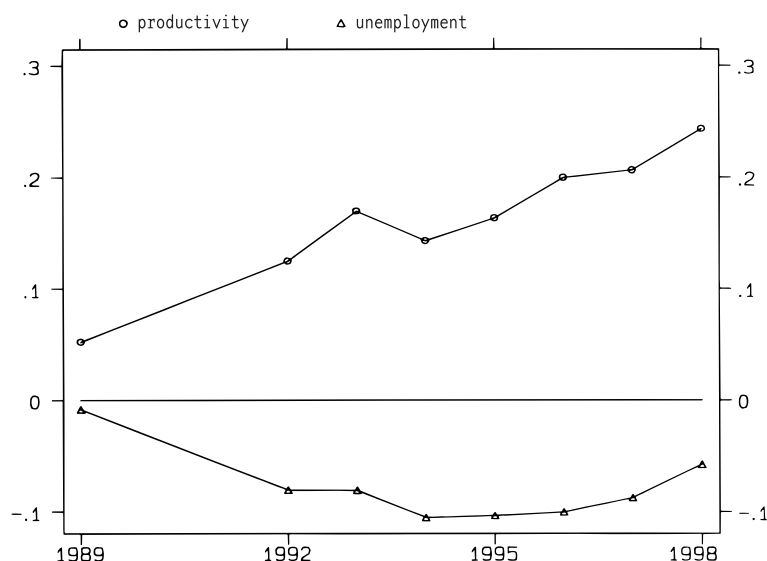
Values are estimated with the regression model reviewed in Note J3.1. Companies employing more than 20 persons (more than 10 after 1994), excluding banks and insurance companies.

It is worth making a few interpretative comments on the increasingly strong relationship between earnings and productivity. The relationship grew closer at the company level. Inclusion of the variable for sectoral productivity leaves the estimated elasticity values essentially unchanged. Investigations within the various sectors suggest that construction was the only area where the correlation between individual and company income did not become stronger, but there it was already quite high before the changeover (elasticity was around 0.15). The change cannot have been caused by the growing share of small businesses either, since the correlation between the two variables became stronger in all *size* categories. When evaluating the connection between company and worker income it might be postulated that the relationship is not cause and effect but the outcome of a third, common factor, the uneven distribution of the quality of the workforce. (If some businesses employ more productive workers that leads to both higher company incomes and higher wages.) This factor really did play a role in evolving simultaneously high or low productivity and wages (as will be discussed in Section 3.).

Another sign of the growth in the influence of the immediate environment is that the affects of unemployment on holding down wages became stronger. The elasticity of individual earnings to sub-regional (registered)

unemployment rates "grew" from –0.015 of 1989 to –0.1, the figure cited as typical in international literature, by 1995–96 (where a one percent rise in joblessness made meant a probability of a 1/10 percent lower wage, with all other factors taken as given). In 1997–98, the correlation between the two variables became a bit more lax. (We shall return to this issue in Section 3, too.)

The third sign of company influences on earnings was the growth in the difference between the wages of small and large companies, shown by the curves in Figure 2.3. The differences were insignificant until 1989, and then gradually increased. They kept growing in the last years observed.

FIGURE 2.3: EARNINGS DIFFERENCES BASED ON COMPANY SIZE, 1986–98
(COMPARED TO COMPANIES EMPLOYING 301–1,000 PEOPLE)
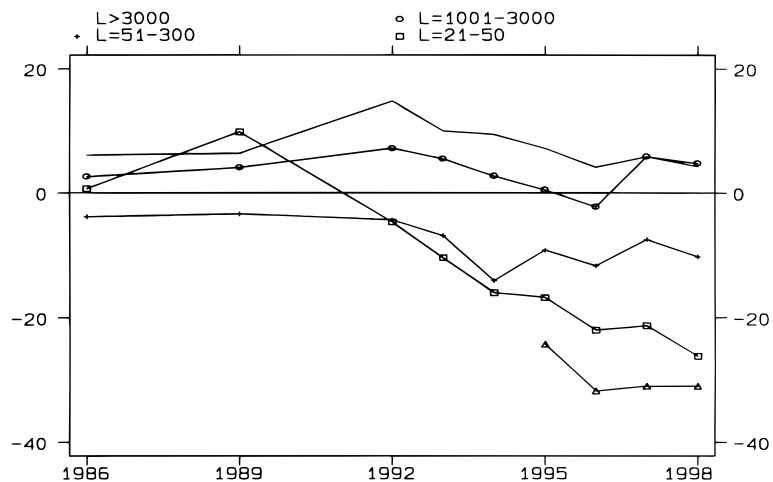
Values are estimated with the regression model reviewed in Note J3.1. Company level for businesses employing fewer than 20 persons (fewer than 10 after 1994), excluding banks and insurance companies.
The lower curve, marked with triangles, is for businesses employing 11–20 people.

As was noted in Chapter 1.2 (which pointed out that in businesses larger than the very smallest, the relationship between the ratio of salaries close to minimum wage and company size is not as close as many believed) Wage Tariff Survey data suggest that the phenomenon of "reporting workers at minimum wage" is not a satisfactory explanation for the low wage level of small businesses. Using a 1998 survey, Figure 2.4 shows how the ratio of employees in small businesses changed within the various wage-level categories. (In the row on earnings, the sample of company employees was broken down into 50 categories. The curves show the ratio of employees in the various earnings groups for businesses employing fewer than 50 people,

using two types of weighting.[30] The vertical line shows Group 2., which was earning an average of HUF 19,500, around the level of the, then, minimum wage.) It is clear that as we move from Category 50 with the highest earnings down towards Category 1, there is a *continuous* increase in the ratio of workers in small businesses, which contradicts the contention that the small business gap is caused by the frequent occurrence of very low earnings.

FIGURE 2.4: RATIO OF SMALL BUSINESS EMPLOYEES BY PROGRESSIONS IN EARNING LEVELS (50 GROUPS, 101,600 INDIVIDUALS)
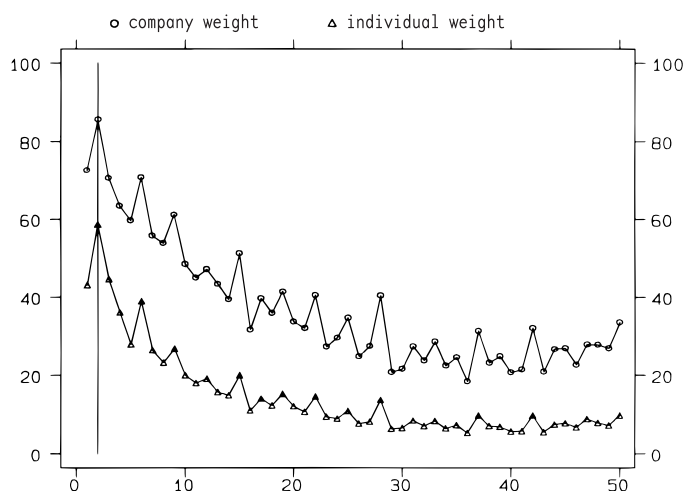
Source: Wage Tariff Survey, 1998. Companies.

Finally, firms in foreign ownership have also had a powerful effect on (company-specific) wages, for they – at least initially – paid higher wages than firms in domestic ownership having similar size, sector, location, productivity, and continue to pay higher wages than the average domestic firms.[31]

To sum up: at the moment of wording this chapter, we have no empirical results on the regulating power of centrally agreed wage guidelines. Sectoral bargaining – as confirmed by data on the number of collective agreements – played a secondary role in shaping earnings differences through the transition period. The growth in inter-company (as well as intra-company) wage differences according to productivity, location, size and ownership has been the deepest-reaching change following the regime change, a sign of the dominance of decentralised (and typically informal) wage bargaining.

30 The Wage Tariff Survey sets weights to individuals determined by the ratio of the sample within the company. The authors designed the weights correcting company refusals to respond as set forth by *Kertesi and Köllő (1997)*. Since there is a high level of no answers from small businesses, the ratio of small business employees calculated with individual weights differs significantly from those calculated with corrected weights (lower and upper curve). Clearly, this does not effect the correlation investigated.
31 Section 4. discusses foreign businesses.

3. EVOLUTION OF WAGES BY MAJOR GROUPS OF LABOUR

We begin a more detailed discussion of trends in income inequality by examining factors that the individual can change only at exorbitant cost, if at all. Changes along this dimension are not only of special importance from the aspect of societal effects, but also with respect to the social costs of shifting to a market economy. Sudden and major changes in earnings (or from the point of view of the employer: in relative prices) by education, age, or region, indicates disequilibrium in supply and demand that can be eliminated only over a long period of time, only at high individual and social costs, with losses stemming from market frictions. With the male or female dominance that has evolved in different occupations, gender-based differences in earnings also might indicate market oversupply or overdemand.

3.1 Earnings Differences by Gender

János Köllő

In the first three years after the political regime change, differences between male and female earnings declined significantly. For business and public sector labour included in the Wage Tariff Surveys, the data suggest that the gap between male and female earnings dropped by half between 1989 and 1992. No change of similar scale occurred after that: the raw gap was stabilised at about 20 percent (Table 3.1).

TABLE 3.1: THE GAP BETWEEN MALE AND FEMALE EARNINGS (PERCENT)

	All sectors[a]	Business sector[a]
1986	136	137
1989	134	136
1992	121	119
1995	123	121
1998	118	119

a Excluding businesses employing fewer than 20 persons (fewer than 10 in 1995 and 1998).
Source: Wage Tariff Surveys, Gross Earnings.

When breaking down the factors of the change in the early period of the transition (1986–1994), *Kertesi and Köllő (1996)* found that three major factors were involved in reducing the earnings gap between the genders. These were: the rise in the relative wages of white collar occupations ; a drop in the gender wage-gap primarily in the low-wage sectors (farming,

food processing, construction, commerce, services, healthcare) and among middle aged workers (age 35–55). At the same time, there was an increase in the gender wage-gap in occupations requiring a high education level. Another factor operating to increase the gap was that drops in wages in regions of high unemployment hit females harder than males.

Background flow, not directly related to setting the value of female and male labour, which affected the raw difference in wages between the two, continued to operate after 1992. There were two contradictory forces in operation to produce an essentially unchanged difference.

Table 3.2 calls attention to two important trends. The gap continued to close in the low earning range, while it continued to grow between males and females with higher education.[32] The wage gap for females with a primary education continued to decline after 1995. Following 1992, earnings for qualified female labour (vocational school or secondary school graduates) grew more slowly than they did for females with at most a primary education. The gap between their earnings and those of unqualified female labour was only a shade higher in 1998 than it had been in 1989. In this category, however, male earnings grew even more slowly and the result was that the gap between the average earnings of the two genders dropped by nearly 10 percent. Among non-college-graduate white-collar workers, the relative wage increase for females was particularly fast – even after 1992 – and in this category the male-female earnings gap declined by nearly 30 percent in the ten years following the political changeover. Among college graduates, however, the gap increased somewhat in 1992–95, then became significantly wider in 1995–98. In the final year, the wage gap between college-graduate males and females was as much as 50 percent.

The row of data for *business sector* employees suggests an even stronger approach in male and female earnings for unqualified labour (with a maximum of a primary education). For skilled workers and non-college-graduate white-collar workers, data for the whole of the economy and the business sector are close to one another. Among college graduates the difference between male and female earnings grow after 1992, but a comparison with data for the whole of the economy clearly shows that the drop in the relative wage level of the public sector bears primary responsibility for the overall increase in the gap. (We return to this issue in a separate section.) In the business sector, college graduate females earned only 18 percent less than males in 1998 – in contrast with the 50 percent measured for all employees.

We analyses the evolution of relative wages using individual wage data, and the contribution of skills to productivity using firm-level information from Hungary, 1986–99.

32 We have ignored 1986 – and will continue to ignore it when comparing groups with sharply different wage levels – because wages between 1986 and 1989 were influenced by increases to establish a "gross wage" in 1988 when the personal income tax was introduced.

TABLE 3.2: MALE AND FEMALE GROSS EARNINGS, 1989–98

	1989	1992	1995	1998
All sectors				
Blue-collar workers with primary education				
Female	100	100	100	100
Male	139	128	131	123
Male/female	139	128	131	124
Blue-collar skilled workers				
Female	109	115	112	111
Male	152	148	149	145
Male/female	140	129	133	131
White-collar labour with maximum secondary education				
Female	136	160	163	169
Male	214	216	222	217
Male/female	157	135	136	129
White-collar labour with high level education				
Female	204	219	247	250
Male	285	313	344	374
Male/female	140	143	139	150
Business sector				
Blue-collar workers with primary education				
Female	100	100	100	100
Male	137	125	127	117
Male/female	137	125	127	117
Blue-collar labour skilled workers				
Female	105	111	106	105
Male	150	144	144	139
Male/female	143	130	136	133
White-collar labour with maximum secondary education				
Female	134	162	156	162
Male	212	213	215	212
Male/female	158	132	138	131
White-collar labour with high level education				
Female	240	296	308	340
Male	303	342	362	402
Male/female	126	115	118	118

Earnings of Blue-Collar Females with a Maximum Primary Education = 100.
Source: Wage Tariff Surveys.

3.2 Differences by Education and Age: The Revaluation of Human Capital

Earnings functions estmated for the post-1989 period reveal two stages of different character in the revaluation of human capital. The first stage starting in 1989 and lasting until the low point of the "transformational recession" brought about a widening wage gap between skilled and unskilled labour and falling returns to experience.

The second stage characterised by rising real wages for high-wage workers and massive skilled job creation had rather different implications for the relative differences. While the skill premium of older workers failed to increase the general devaluation of experience and the appreciation of *new* skills (rising returns to education in young cohorts) got impetus and continued until recently. In the early stage changes were driven by the collapse of demand for unskilled labour rather than technological renewal or permanent systemic change, however. When new technologies actually appeared and the demand for qualified workers began to rise the "appreciation of skills" was restricted to the younger generation.

Kertesi and Köllő (1999) apply two different specifications of earnings regressions. The *benchmark* Mincer-type specification comprises the key variables (schooling and experience) as educational grade dummies and linear, quadratic, cubic and quartic terms of experience.[33] Second, they apply an *augmented interactive* model with group dummies for interactions of gender, education and experience.

The benchmark regressions controlled for a large number of wage determinants suggest a marked increase in the wage returns to schooling, from the onset of transition. Figure 3.1, depicting the time paths of returns to educational grades, suggests that wages relative to the primary school grade grew by 25 percent in the category of higher education, and about 10 percent in the case of secondary school background. The value of apprentice-based vocational training did not change during the transition. Most of these changes took place during the "transformational recession" i.e. between 1989 and 1992/3. The rates of return to education *seem* to be stabilised after 1993.

The numbers presented in Figure 3.1 can be interpreted as lower bound estimates of the "true" change in relative wages because the observed earnings of the unskilled are upward biased by the sorting effect of unemployment.

The rise in return to formal education was accompanied by the devaluation of market experience acquired under socialism. Changes in the rates of return are measured by the formula $\hat{y}_t - \hat{y}_{t-1}$, with the predictions defined as

$$\hat{y} = \hat{\beta}_1 \times \exp + \hat{\beta}_2 \times \exp^2 + \hat{\beta}_3 \times \exp^3 + \hat{\beta}_4 \times \exp^4.$$

33 Higher than second order experience terms are used in order to be able to follow cohort specific changes in the earnings profiles over time.

FIGURE 3.1: RETURNS TO SCHOOLING
(BASE: PRIMARY SCHOOL), 1986–99
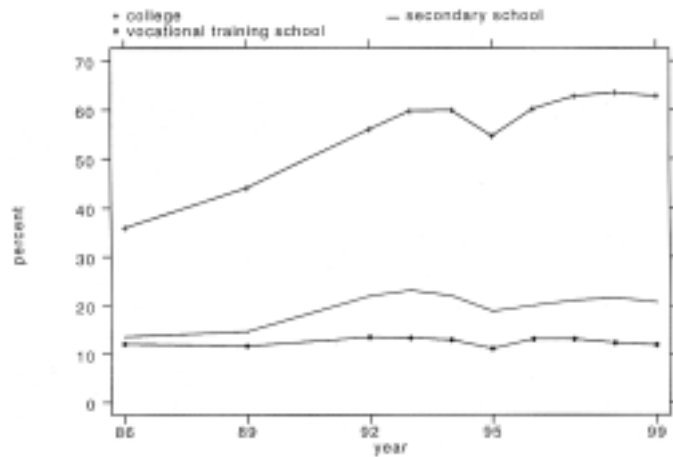
The predicted change in the returns to experience is plotted against the years of experience in Figure 3. 2. Panel *a* suggests that the value of labour market experience slightly increased in the last years of state socialism. The trend reversed in 1989 when experience started to lose its value, especially in older cohorts of the labour force. The relative premium on 20 (or more) years of labour market experience dropped by 4 percent in 1989–92, and 7 percent between 1989 and 1999.

FIGURE 3.2: CHANGES IN THE PREDICTED RETURNS TO EXPERIENCE, 1986–99 (PERCENT)

Whole sample

Separate equations by educational groups
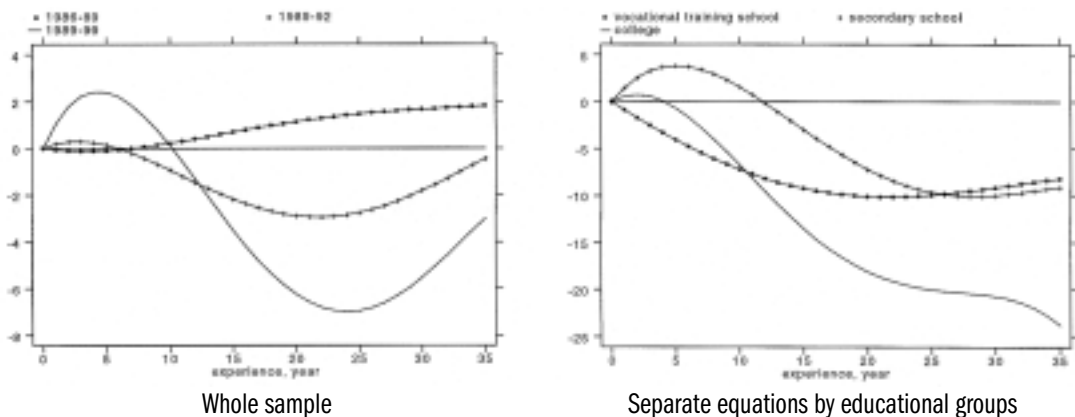
As suggested by panel *b* of Figure 3.2 (separate equations for each educational group), the obsolescence of experience-based skills was stronger in

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the educated part of the labour force, with workers of university or college background suffering the largest losses. A person with a university diploma and 15–25 years of experience lost about 20 percent of his/her former experience-related wage premium.

Panel *b* calls attention to the relevance of an interactive model which allows for the fact that different educational and experience groups were exposed to skills obsolescence to a highly different degree. The main results in *Kertesi and Köllő (1999)* can be summarized as follows.

(i) Workers with college or university background, both males and females, improved their position across *all* experience groups but the value of education increased at substantially higher rates in the young cohorts. As a result, the experience-related wage gap between the oldest and the youngest college cohorts decreased by 20–25 percent by 1999.

(ii) The returns to secondary school increased in, and only in, the younger cohorts of men and (particularly) women. The youngest female cohort managed to improve its position by almost 20 percent, followed by workers with 6–10 years of experience with a 15 percent increase, and older females whose market skills kept their modest value without any further appreciation. This kind of imbalance can be a sign of change in the patterns of demand for non-manual female employees resulting from the expansion of the tertiary sector.

(iii) Workers who completed vocational training school did not get ahead *in general* (neither the females nor the males improved their position relative to the reference category of unqualified workers) but the wages of young skilled workers grew by about 10 percent compared to their older counterparts. Again, we observe that the age-specific changes were taking place *after* 1992.

With the passing of the transformational recession, which brought about the collapse of demand for unskilled labour, substantial changes took place in the evaluation of human capital. As shown by the estimates the skill premium of older workers failed to increase further while the appreciation of new skills got impetus and has continued until recently. *Kertesi and Köllő (1999)* present evidence suggesting that the widening gap between the value of old and new skills are consistent with differences in their relative productivity. These differences began to bear importance when the market for skilled labour started to grow and new technologies appeared in the economy.

They estimate productivity equations (derived from Cobb-Douglas production functions with heterogeneous labour input) of the form:

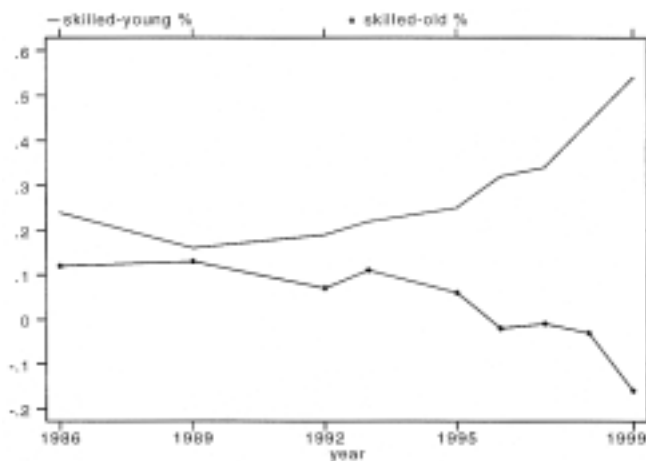$$\log y = \alpha + \sum_{i=2}^{3} \beta_i \log l_i + \gamma \log k + \varepsilon. \qquad (1)$$

y being firm level productivity (value added per worker), l_i the share of the different types of skilled labour within the firm (skilled-young (l_2) and skilled-old (l_3), the base category being the share of unskilled labour: l_1),[34] k stands for the capital-labour ratio approximated with the net value of fixed assets per worker. Parameters of particular interest are the productivity elasticities with respect to l_2 and l_3, that is, the differences between skill groups defined on the basis of educational background and experience.[35]

The equations are estimated for a restricted sample of medium-sized and large firms. *Figure 3.3* shows the time paths of the productivity yields attributed to young and old skilled labour:

$$\beta_i(t) = \partial \log y(t) / \partial \log l_i(t) . \qquad (2)$$

The results suggest that the changes in the skill-related wage differentials at least partly reflect changes in relative productivity levels. The productivity yield that is attributed by the model to young-skilled labour input was rapidly growing in 1986–99 while the productivity of skilled-old labour input was declining in 1992–99, to a point that in the latter year it did not differ significantly from the productivity yield of unskilled labour (that was chosen as the base category).[36]

34 "Skilled" means completed secondary school or incompleted or completed college or university, "unskilled" means incompleted or completed primary or incompleted secondary school. "Young" means experience less than the median experience, "old" means median experience or more.

35 The functional form chosen for the productivity function assumes separability of inputs which may be evaluated as a strong assumption. In a recent study *(Kertesi and Köllő 2001)*, estimating multi-factor demand models derived from the translog cost function, using the same firm sample and the same definition of inputs, we got results supportive of the conclusions drawn here.

36 Different specifications of the model (cross-section ordinary least squares versus fixed and random effects panels using instrumental variables) provide similar qualitative results, and suggest that the productivity gap between young and old skilled workers is wider in foreign owned firms.

FIGURE 3.3: PRODUCTIVITY ELASTICITIES OF SHARES OF DIFFERENT TYPES OF SKILLED LABOUR (RELATIVE TO THE UNSKILLED LABOUR), 1986–99

Regression coefficients from equation 1.
Dependent: log of value added per worker.

3.3 Regional Differences in Earnings and Wage Costs

János Köllő

As already mentioned in Chapter 2, the most important (though not the only) factor shaping regional earning differences following 1989 was the rise in unemployment. In 1989 a one percent increase in the jobless rate reduced earnings by 1/60th of a percent, while in 1996 it cut earnings by 1/7th percent, with the other factors that defined wages remaining constant.

Each year, unemployment-related wage cost differences were lower than earnings differences, which was an outcome of the lower productivity level of regions hit by high unemployment. Identical earnings in a "poor" region gobbled up a larger portion of company revenue per unit of production than it did in a "good" one. According to the estimate, in 1994–96 with a one percent rise in unit of production were about 1/10th of a percent lower, with all other factors remaining the same.[37] The unemployment-elasticity of wages began to decline following 1996. Earnings elasticity remained in the vicinity of the –0.1 value described in literature *(Blanchflower and Oswald 1994)* as typical, but the correlation between wage costs and joblessness relaxed. We are not seeking the causes of that outcome in this study, and will only list some possible explanations. The pressure of unemployment on wages can be reduced by the accumulation of long-term unemployment and inactivity in the "poor" regions if the persons affected are unable or unwilling to compete for jobs. This can happen if people with jobs increase their wage demands when business improves and the risk of job loss is reduced, even if the unemployment rate is high *(Nickell 1995)*. The factor increasing the difference between wage costs and earnings could be a growing productivity superiority of regions qualifying as "good" from the point of view of unemployment, as against the "poor" ones (Figure 3.4).[38]

One possibility that needs to be mentioned is that the variable measuring sub-regional joblessness (registered unemployed divided by the economically active population of 1990) becomes less accurate in approximating the real number of competing job seekers as time goes on. This measurement error alone pushes the estimate elasticity coefficient towards zero. This is one reason why we have not used the unemployment rate in studying regional earnings and cost differences below. The other, more important, reason is that although exposing the relationship between unemployment and wages is an important step towards understanding the mechanism of regional earnings differentiation, if we are interested in the consequences of the given situation it is better to examine the total difference of wage and labour costs between regions because that is what is important to employers or investors considering a move, and not the joblessness-specific portion of total wage differences.

37 Wage cost and earnings differences were estimated with the model reviewed in Endnote J3.1. For the latter we did not include the company productivity variable.

38 It should be noted that the correlation between joblessness and the productivity level raises specification issues (discussed by *Kertesi and Köllő* 1998b), but they are not as serious as to affect the conclusions drawn here.

FIGURE 3.4: ELASTICITY OF EARNINGS AND LABOUR COSTS
AGAINST THE SUB-REGIONAL UNEMPLOYMENT RATE, 1989–98
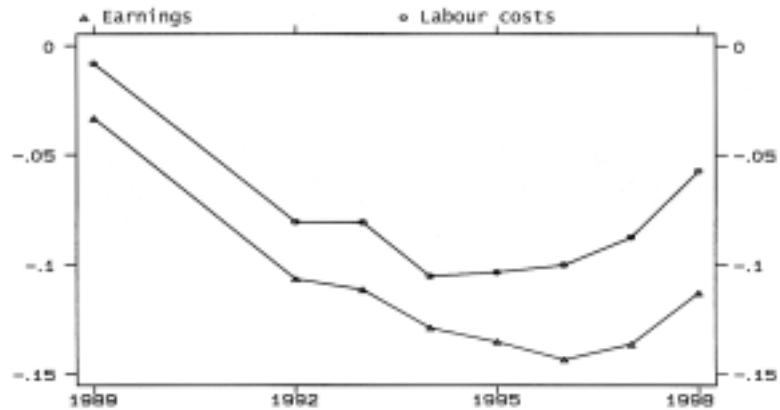
Estimate from Wage Tariff Surveys. Business sector without banks and insurance.
(Endnote J3.1.)

We investigated regional differences with wage functions such as the one shown in Endnote J3.1, that do not include the sub-regional unemployment rate. Instead, we have included regional effects with variables that distinguish between three settlement levels (Budapest, other urban area, village) and major regions. The six are: 1) Budapest, 2) Central (Pest, Fejér and Komárom-Esztergom Counties), 3) North-West (Győr-Moson-Sopron, Veszprém, Vas, Zala Counties), 4) South-West (Baranya, Somogy, Tolna Counties), 5) South-East (Bács-Kiskun, Csongrád, Békés, Jász-Nagykun-Szolnok Counties) and North-East (Hajdú-Bihar, Szabolcs-Szatmár-Bereg, Borsod-Abaúj-Zemplén, Neves and Nógrád Counties). Figure 3.5 shows that earnings and wage cost differences between the settlement levels grew significantly between 1986 and 1992. Then the trend turned around. The 12 percent higher wage in Budapest compared to other urban areas in 1992 dropped to 6 percent, and the difference between urban area and villages also declined. When studying wage costs (comparing earnings levels of companies with identical productivity), we see an even more radical change in direction. Using this measure, by 1998, differences between settlement levels had disappeared for all practical purposes. The difference between earnings and wage-cost trends suggests that an increase in the productivity advantage of Budapest companies compared to other urban areas (and of other urban areas compared to villages) has played an important role in the process.[39]
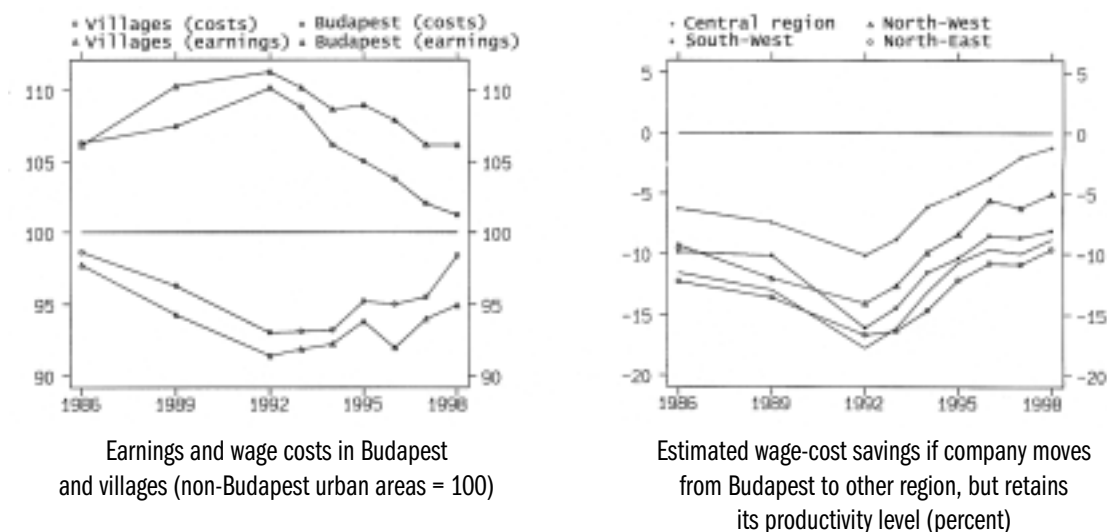
A similar flow occurred on a regional basis, too. In 1992 estimates suggested 8 percent lower wage costs in the central region and 13–17 percent

39 The Wage Tariff Survey lists the location of the given production unit and not company headquarters as the place of employment. For this reason, it would be more accurate to speak of "companies employing people in Budapest, other urban areas, and villages."

lower ones in the others. We might say that a business moving from Budapest would have found labour similar in gender, age, and education level for that much less if

   a) the move didn't entail a drop in productivity,

   b) the quality of rural labour with the same education level, and of the same gender and age was no different from Budapest, for instance regarding factors not included in the estimate such as foreign languages or computer skills. (See Figure 3.5, right-hand panel.)

FIGURE 3.5: REGIONAL EARNINGS AND WAGE COSTS COMPARED TO BUDAPEST

Earnings and wage costs in Budapest
and villages (non-Budapest urban areas = 100)

Estimated wage-cost savings if company moves
from Budapest to other region, but retains
its productivity level (percent)

Estimate from Wage Tariff Surveys: see text. Strict company sphere.

However, it is probable that neither assumption (a) nor (b) are true. Better infrastructure, higher business density, the proximity of government decision-makers and financing sources – all other things being equal – puts Budapest businesses at an advantage, and the relatively rich metropolis with its broader opening upon the world is an advantage to the workforce. For that reason the savings in labour costs actually realisable are likely to be below the level shown in Figure 3.5. The wage-cost equations indicate a savings opportunity of only around 5–10 percent by the end of the 1990s (even less for the central region), and it was then already doubtful whether the business moving to a rural region in our conjecture would find cheaper labour at all. This is true despite the fact that earnings differences have stayed comparatively significant (Figure 3.6).

FIGURE 3.6: EARNINGS AND WAGE COSTS DIFFERENCES COMPARED
## TO THE CENTRAL REGION, 1998 (PERCENT)
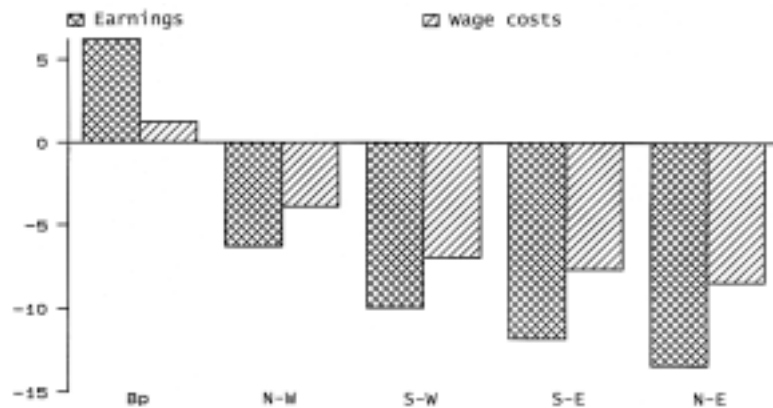
Estimate from 1998 Wage Tariff Survey: see text. Strict company sphere.

In several cases wage-cost differences between rural regions increased, Though they have remained quite modest, as shown in Figure 3.7. Estimated differences between the South-West, South-East and North-East regions are barely 1–2 percent, and in most cases are statistically insignificant. There was a slight increase in differences in the Central Region (Pest,Fejér, Komárom-Esztergom Counties) and the south-west and eastern counties, but even at the end of the period they had not exceeded 7–8 percent. A company (imaginary) moving from the advanced counties of western Hungary to the east-central or northern regions might hope for increasingly large savings, but we estimate that by the end of the decade even those would not exceed 5 percent.

The data suggest that regional differences in wage costs within the country were moderate (or returned to moderate) at the turn of the century and that differences between settlements have disappeared for all practical purposes after a transitional and significant increase. In itself, this does not put the more backward regions competing for investments in a hopeless situation. Since recruitment and filtering costs are lower because of a comparative wealth of available labour, moving an industry to the region can pay off, even if wages are identical and externalities are negative. At the same time, the fact that savings in wage costs attainable through relocation are almost negligible is important when considering rural development. It should be considered, for example, that motorway construction (which Hungarian regional policy has assumed will reduce inequalities though no real study has been made) might not lead to rural job creation considering modest

relocation profits (or even relocation losses). Instead, reduced transport costs might increase shipments of finished products from the centre to the periphery, as discussed in theory by *Krugman (1991, 1994), Kilkenny (1998),* and *Nerlove and Sadka (1991),* and supported by *Markusen (1994)* using the example of Brazil.

FIGURE 3.7: ESTIMATED CHANGES IN WAGE COSTS IF A BUSINESS MOVES FROM A REGION, 1986–98
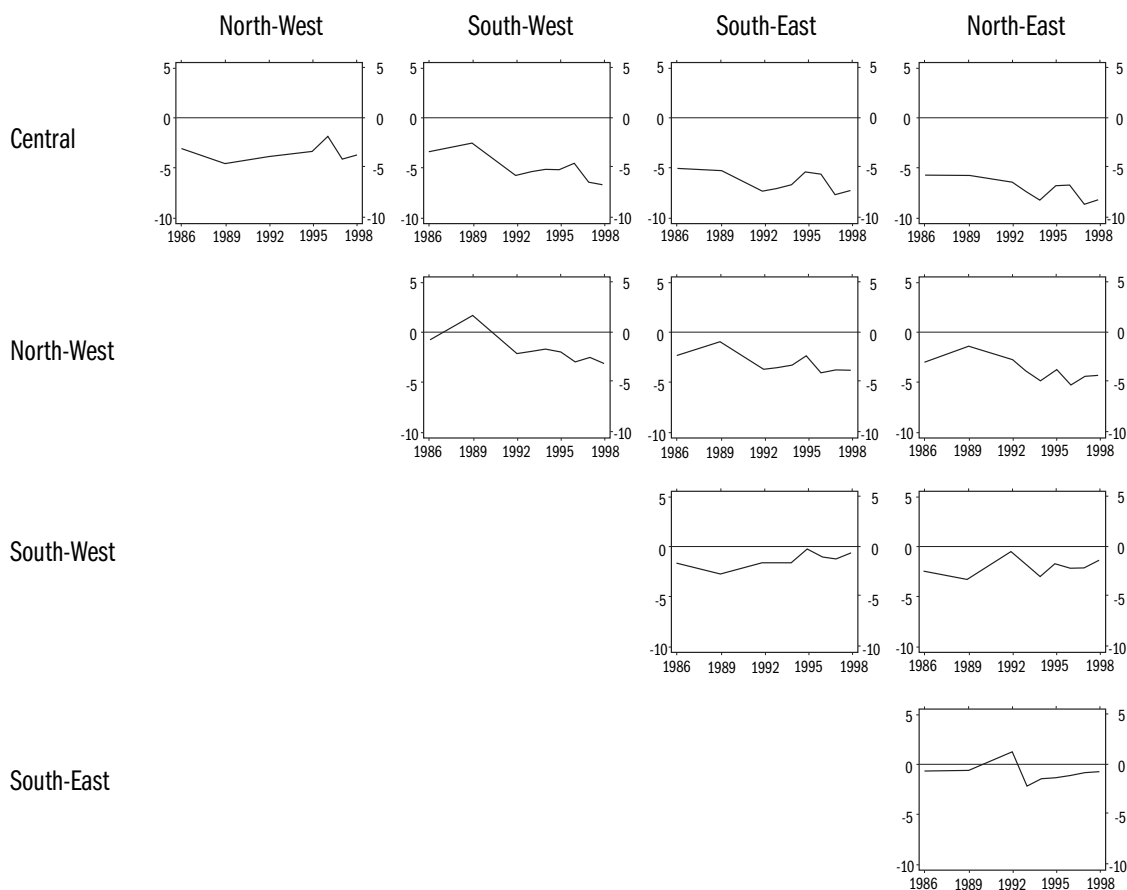
Source: Estimated from Wage Tariff Survey, in manner reviewed in text.

4. WAGE EVOLUTION BY ECONOMIC SECTOR

This Chapter first discusses changes in earning and wage-cost differences within the business sector, and then looks at the sectors by ownership in greater detail (particularly at foreign-owned companies.) This is followed by a comparison of the public (defined later) and private sectors. The last item is a sub-section on wages in the informal economy.

4.1 Business Sector

János Köllő

Attempts to monitor industry development of relative earnings at branch level in a decade of transformation are very inaccurate, because in 1993 the Central Statistical Office introduced a new industry code system that corresponds to western norms. The old and new labels and codes encompass different groups of businesses. *Kertesi and Köllő (1997)* designed a uniform two-digit classification for the businesses based on real shifts when moving from the old codes to the new ones, which gives roughly the same groups the same label, both prior to and following 1993. (The article contains an itemised list of the errors.) Using this classification, we will now show trends in industry-specific earnings differences. This code system is not suited for a more refined analysis (nor are any of the others), so we only can give a brief overview of the most radical changes. To do this we have applied the industry parameters of the regression model discussed in Note J3.1, reviewed in an earlier part of this study. We measure differences in earnings resulting purely from the industry in which they operate, workers being identical in gender, age, and education level, and working for firms of similar size, regional location, and ownership configuration. We identify this difference as a "industry-specific rent".

This changed rapidly prior to and during the political regime change, and to a lesser extent following the transformational recession as shown in Figure 4.1, where the points marking the various years show how strong the correlation was between the estimated rents for the given year and the 1986 and 1998 rents. We can see that by 1992, the economy had bridged most of the distance between the rent patterns prior to the regime change and following it. This was the time sectoral differentials moved away from the initial position at high speed, and approached the "final state," the one valid at the time of the last observation.

Table 4.1 shows changes in the positions of the various industries between 1986 and 1997 (in 1998 the industry code system was changed again, and the reliability of "uniform" industry codes became even more doubtful than before.)

FIGURE 4.1: LINEAR CORRELATION BETWEEN INDUSTRY-SPECIFIC RENTS IN YEAR (T) AND BETWEEN RENTS FOR 1986 (VERTICAL AXIS) AND 1998 (HORIZONTAL AXIS)
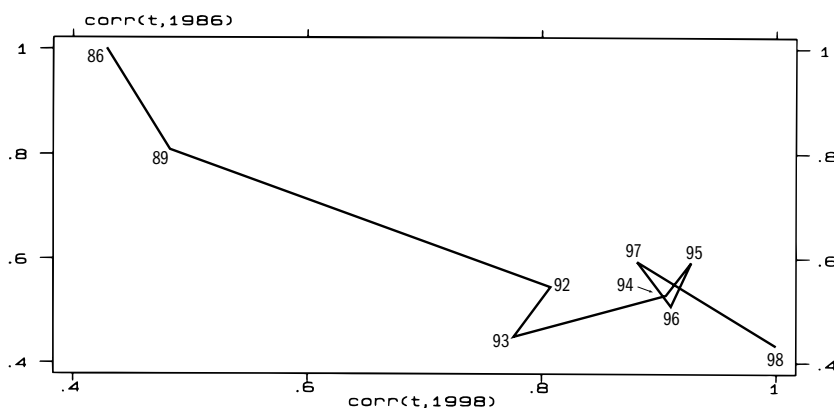
TABLE 4.1: CHANGES IN SECTORAL RENTS BETWEEN 1986 AND 1997 (CHANGES IN THE ENGINEERING INDUSTRY = 0)

Industry/Branch	Earnings	Labour costs
Local transport and communication	25.1	26.1
Energy production and distribution	17.2	6.9
Foreign trade	16.2	11.4
Iron and steel	15.8	1.3
Post and telecommunication	15.2	7.4
Mining and quarrying (excluding coal and petrol)	9.7	–0.6
Non-ferrous metal products	8.7	7.3
Coal-mining	6.0	1.3
Transport and communication (excl. railway and local trans.)	5.6	–1.5
Paper industries	1.5	–0.1
Chemical industries	–0.4	–6.5
Water supply	–0.9	–7.5
Agriculture and food processing	–4.4	–4.2
Trade	–6.3	–6.4
Forestry and wood processing	–7.6	–5.1
Construction	–8.4	–9.8
Furniture and metallic products	–8.9	–0.4
Textiles, clothing, leather and fur products, shoe making	–11.2	–6.6
Other services	–11.8	–7.7
Restaurants and hotels	–15.2	–14.3
Printing and publishing	–15.6	–13.4
Data processing and computer services	–17.9	–19.9

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Table 4.1 estimates using the Wage Tariff Survey waves of 1986 and 1997, as specified in J3.1, including the company productivity variable (wage costs) and excluding it (earnings). Strict business sector without railway transport and the petroleum industry.

Limiting our attention to significant changes, we can observe a significant decline in earnings in light industry and the part of the tertiary sector with keen competition. There was also a decline in wages, though to far less of an extent, in agriculture, forestry, and construction. Compared to the engineering industry, used as a reference in the estimates, rents increased in the extracting industries, the energy sector, in postal and telecommunication services, in local transport and in foreign trade. (We need to note that railway transportation and petroleum industry data have not been included in the table for data protection reasons.)

In many cases changes in earnings and labour costs differ from one another. For instance, in the textile industry, relative wage costs dropped by only 6.6 percent despite an 11.2 percent decline in relative earnings, while in the energy sector a 17.2 percent increase in wages increased unit labour costs by only 6.9 percent. Figure 4.2 shows the location of the industries based on the relationship between the two indices. The horizontal axis shows changes in relative earnings between 1986–97 ($dw=w^{97}/w^{86}$, where w is the earnings for workers in a given sector compared to earnings for workers in the engineering industry, assuming similar gender, age, etc.).[40] and where the vertical axis contains the dc/dw values of relative wage cost changes (dc) that are a concomitant of the earnings change.[41] Lines indicate the constancy of relative earnings (dw=1) and cost changes proportionate to wage changes (dc/dw=1). Most of the industries are located in the upper left or lower right corners of the plane divided by the lines. The earnings for light industries and the services that are in the left upper quadrant of the space had to drop radically for labour costs to decline by a unit. For the sectors in the lower right corner, mainly extraction industries – and the telecom, energy sectors, foreign trade, and transportation – the rise in wages partly (in some cases completely) offset the rapid rise in company revenue compared to the engineering industry, thanks to which relative wage costs per unit showed little if any increase. In other words, the industries/branches in the upper left quadrant, all of which were subjected to keen competition, were unable to increase company revenues – prices and/or productivity – sufficiently to reduce labour costs without an extraordinarily large cut in earnings.

Local transport companies hiding on the right side of the figure are the "odd men out", for here both wages and labour costs increased significantly (meaning a major drop in profit), as are computer services in the lower right corner, where exactly the opposite occurred.

40 To put it another way, $w=e^{b}$, where b is the coefficient of the given industry parameter in the J3.1 regression model.

41 $dc=c^{97}/c^{86}$, where c is the earnings of workers of similar gender, age, etc. in a given industry compared to that of workers in the engineering industry, in a comparison of companies with identical productivity.

FIGURE 4.2: LOCATION OF INDUSTRIES COMPARED TO ENGINEERING REGARDING EARNINGS CHANGES AND THE RELATIONSHIP BETWEEN LABOUR COST CHANGES AND EARNINGS CHANGES, 1986–97[a]
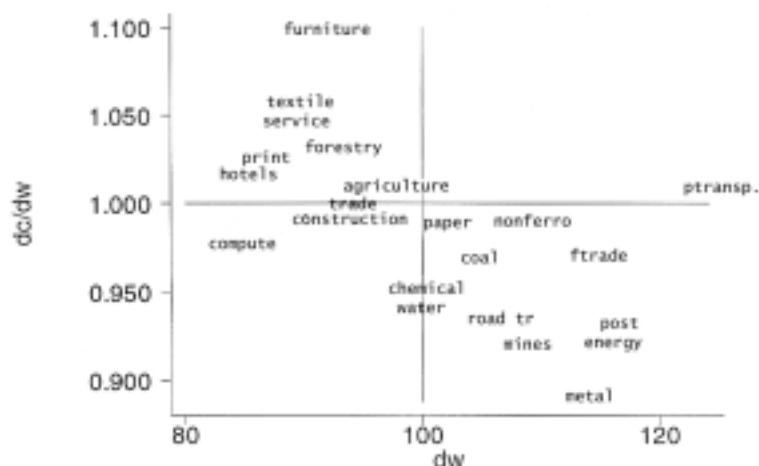

a Excluding petroleum extraction and processing, and railway transport
Estimate using Wage Tariff Survey, 1986 and 1997 waves, as specified in J3.1, including the company productivity variable (wage costs) and excluding it (earnings).

This is where we will discuss banks and insurance companies which we have ignored in earlier calculations. Based on the Wage Tariff Surveys it is hard to glean an image of the earnings position of insurance companies. There have been drastic changes in the industry rent from one year to the next in the period under observation, presumably depending on how many of the insurance firms operating with an agent system were included in the sample. (The "earnings" slot for agents generally contains an amount near to minimum wage, with the rest of their income coming from commissions.)

Changes in the situation of bank employees are easier to follow. Using the model discussed in Note J3.1 from which we excluded the productivity variable, and introduced a dual value sectoral variable called "bank employee – non-bank employee", we ran an estimate by education groups which gave us the curves in Figure 4.3 for 1989–98. (In 1986, banks and insurance companies were not included in the Wage Tariff Surveys.)

The industry-specific rent of secondary school graduates, who made up the backbone of bank employees, rose from 20 percent to 50 percent. Employees with a maximum vocational education (maintenance staff, guards, reception personnel, cleaning staff) had a slightly higher increase. Bank employees with college decrees were earning about 20 percent more than college graduates similar in gender, age, and place of residence in 1989, while in 1998 they were earning nearly 100 percent more.

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FIGURE 4.3: WAGE ADVANTAGE OF WORKERS WITH VARIOUS EDUCATION LEVELS EMPLOYED BY FINANCIAL INSTITUTIONS COMPARED TO WORKERS WITH SIMILAR EDUCATION LEVELS IN ALL OTHER INDUSTRIES, 1989–1998 (PERCENT)
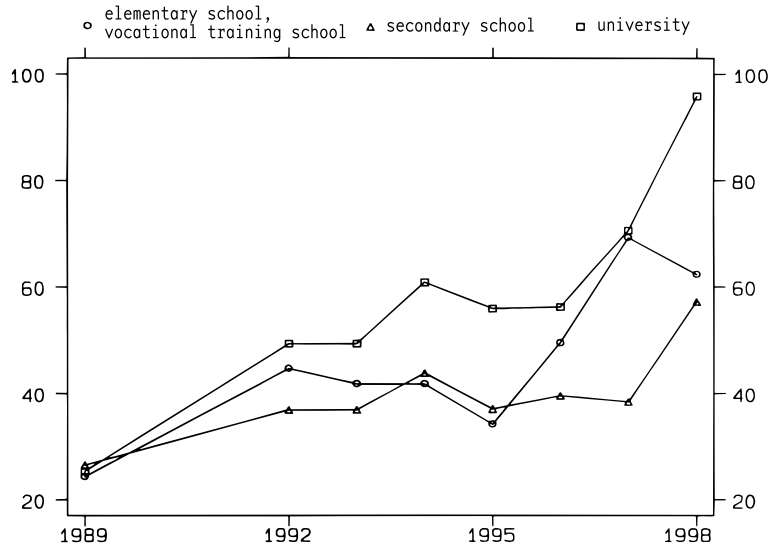
Estimate based on Wage Tariff Surveys, as described in text. Company sector.

4.2 Effects of Ownership

János Köllő

The rapid spread of foreign-owned business was one of the most spectacular (and most hotly debated issues) of the Hungarian transformation, playing an important role in the transformation of the "price system" of the Hungarian labour market. Wages paid by foreign-owned business significantly exceeded – by over 50 percent in 1998, for instance – the average for business where the majority ownership was domestic. However, if the differences in the averages are broken down into their components we notice structural differences (compositional effects) on the one hand, and differences in the capitalisation and solvency of typical domestic and foreign businesses on the other.

Table 4.2 shows the results of breaking down the difference in average earnings into its factors, using 1998 data from the Wage Tariff Survey. This was a two-step procedure. First, we estimated earnings functions for businesses with a majority foreign ownership, and for other (hereinafter: domestic) businesses. In other words, we estimated the extent to which wages in the two sectors were influenced by education and age, the sector and region in which they operated, productivity, and capitalisation.[42] The sec-

42 For specifications, see Endnote J4.1.

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ond step was to break down the differences in estimated average earnings into three components (equal to $b^K X^K - b^H X^H$) on the basis of the estimated coefficients for "foreign" and "domestic" employees (b^K and b^H), in keeping with the explanatory variables of employment (X^K and X^H). The ($X^K - X^H$)b^H component measures the effects of the differing *compositions* of employment, the multiple ($b^K - b^H$)X^H measures the *parametric effect* that would result from sectoral allowances that might be different or from the accumulation of human capital, while the ($b^K - b^H$)($X^K - X^H$) factor measures the *interactive affect* derived from intra-sectoral relations that are different in compositional and parametric effects. By projecting these components to logarithmic wage differences in the two sectors, we can determine the percentage of the total earnings differences made up by each effect.

TABLE 4.2: FACTORS SHAPING EARNING DIFFERENCES BETWEEN MAJORITY FOREIGN AND DOMESTIC OWNED COMPANIES, 1998

Kind of effect	Different structure	Different valuation	Interactions
Male-female	–2.4	7.7	–0.8
Schooling and age	0.7	4.5	2.1
Region	1.9	–0.6	1.6
Sector	4.4	25.8	–5.4
Size	20.3	3.3	–7.4
Productivity, capital intensity	47.9	4.1	6.8
Constant	–	–14.5	–
Total[a]	72.9	30.3	–3.2

a Since figures are rounded, the total of the columns may differ from the Total line. The latter was rounded out from components worked out to 8 decimals. Source: Wage Tariff Survey, 1998. Strict business sector For details, see Note J4.1.
Mean earnings in domestic firms: HUF 59,232, in foreign firms: HUF 90,470.
The difference in the logarithm of average earnings = 0.4189 = 100 percent.

Table 4.2, which contains the results, shows that the most important factor shaping earnings differences is the significantly higher *productivity* of the foreign businesses, which pushes up the foreign-domestic difference by nearly half (47.9 percent) of the total average wage difference. The positive relationship between productivity and wages deviates only slightly between the two sectors. In other words, given similar productivity levels, labour in domestic businesses could count on proportionately higher salaries. Other important roles are played by
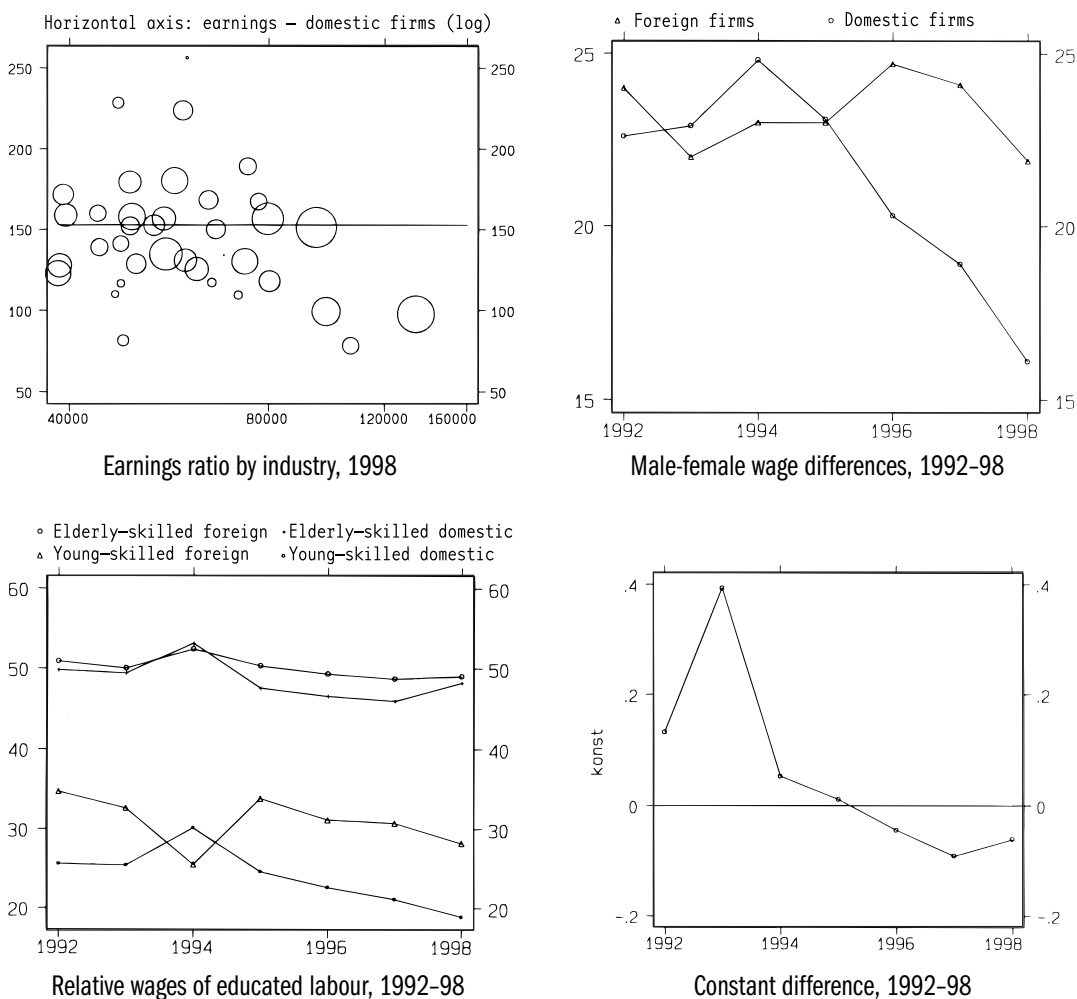
  (a) the composition effect of company size, in other words low-wage small businesses are essentially absent from the foreign-owned sector;

(b) economic sector-related relative earnings differ for the two ownership sectors (sectoral parameter effect),

(c) a non-negligible though far more modest influence is exerted by sector-specific differences in gender, education, and age-related wage ratios, and

(d) there is a constant element of foreign-domestic wage differences which operates as a reducing factor (which we will interpret a bit later).

The difference in industry rent is not random. It would appear that foreign businesses pay comparatively high wages in the low-wage sectors, or in other words, within the foreign-owned sector differences by industry/branch are much smaller than for domestic companies. We can see this in the left upper panel of Figure 4.4, where we measure the average earnings for domestic businesses in various branches on the horizontal axis, while on the vertical axis we have shown the wage advantage of foreign businesses for the various economic sectors. The economic sector circles show the ones that are proportionate in size to the ratio of employment in foreign firms within the branch. We clearly see that as we move towards the high-wage, the difference between foreign and domestic wages declines (especially if we restrict our attention to the sectors where there is a significant foreign presence).

Most likely it is not a question of foreign businesses not paying the rent that evolved historically on the Hungarian labour market, since with the exception of some branches, they tend to pay more than the domestic firms. Instead, it is simply that the foreign businesses operate in the top segment of the lower-wage branches (catering, commerce, some services, farming, and the food processing). In these areas Hungarian capital tended to bring about small businesses: mom and pop stores compete with foreign department store chains, bed and breakfasts with hotels, and village butchers with meat combines. This makes it very likely that what we estimated as a "parameter effect" through an extensive data survey with simple variables is really also the result of differences in composition.

The upper right panel shows trends in male and female earnings differences from 1992 to 1998. Throughout the period, the male wage advantage stayed in the 22–24 percent range in foreign companies (despite the fact that during this time the number of foreign firms increased and changed in composition.) Meanwhile, in domestic companies, the difference dropped from 22 percent to 16 percent. We can do no more than guess at the reasons, keeping in mind the possibility that here too it is a composition effect (this one being temporal). Many activities in which the difference between male and female earnings were comparatively large to start with (such as industry, where the two genders were employed in quite different types of activity) shifted gradually from domestically owned to foreign owned businesses. Further research is needed to clarify this.

FIGURE 4.4: THE DIFFERENCE BETWEEN "FOREIGN" AND "DOMESTIC" WAGES BROKEN DOWN BY VARIABLES

Horizontal axis: earnings – domestic firms (log)

Earnings ratio by industry, 1998

△ Foreign firms   ○ Domestic firms

Male-female wage differences, 1992–98

○ Elderly–skilled foreign · Elderly–skilled domestic
△ Young–skilled foreign   ○ Young–skilled domestic

Relative wages of educated labour, 1992–98

Constant difference, 1992–98

Estimates are from Wage Tariff Surveys in accordance with Note J4.1, except figure for sectors which is based on raw data of 1998 survey. Also see text.

Different evaluations of age-dependent education levels appear in the lower left part of the figure. The curves show how much more old educated and young educated employees made than "uneducated" (with a maximum of a vocational education) workers, with all other earnings-shaping factors given, and separate examinations of the issue for foreign and domestic businesses.[43] The relative earnings of old educated workers were not different in the two sectors, but with time the earnings of young educated workers became significantly higher in the foreign companies than in the domestic ones. The

43 We used the same classification as the one introduced in subsection 3.2: a person was considered "young" with less than 22 years of experience, and high school and college graduates were considered educated.

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figure showing the high remuneration corresponds to observations that foreign businesses are more effective in combining young, qualified labour and modern technology. Estimates by *Kertesi and Köllő (1999a)* for 1992–96 brought out higher productivity yields for young educated workers employed by foreign businesses than for domestic ones. In fact, they found that the general growth in the productivity of this part of the workforce – as noted in Chapter 3.2 – was basically the result of the growth of foreign business. Neither with respect to domestic nor to foreign business can it be demonstrated that productivity yields connected to young educated labour had increased, but they always were higher among the foreign businesses. It would appear that there really was a fortunate meeting between the portion of the workforce with more modern qualifications and the inflow of foreign capital, which in 1998 employed 28 percent of the young, educated workforce, 32 percent of college graduates with less than 22 years of employment, and 41 percent of the college graduates with a maximum of 10 years of employment.[44] At this point – in connection with the issue of productivity and wages – we need to say that it appears hopeless to try to discover any causal relationship between the quality of labour, earnings, and company productivity. We simply do not have sufficient information on the demand side of the labour market and on the specialised knowledge of workers. Causes might range from up-to-date technology through higher productivity to higher ability to pay, but it also is conceivable that new companies offer higher than market prices in wages to cream the workforce, which then bears fruit in higher yields.

The lower right panel in Figure 4.4 offers a type of crutch if not a sure support in trying to decide on the matter. It shows the constant difference between the earnings of people employed by foreign and domestic businesses from 1992 to 1998. The constants measure wages evolving at the zero level of all explanatory variables for the two types of ownership.[45] In our case, the constant measures the difference for a female with a maximum of a vocational education working for a medium sized engineering company in a south-eastern small town when comparing businesses in which HUF 1 million per capita capitalisation produces a value HUF 1 million per capita value added. The figure for this situation has no particular significance in itself, but its field of reference can be expanded (at the expense of accuracy). Considering that the earnings effect of productivity and capitalisation are only slightly different for the two ownership categories, and that the regional parameter effect is insignificantly small – as decomposition results have shown – the constant difference can be accepted as a gauge that measures the difference in earnings between *females employed in medium sized engineering companies* independently of productivity, capitalisation, and regional differences.[46] This is one of the most typical group of

44 The data is for businesses with a majority foreign ownership, and show ratios within the strict company sector.
45 The b^K and b^H parameter vectors differ and for that reason, if we subtract the two w=bX+c shaped functions from one another assuming identical X values, we only receive the difference in the c^K- c^H constant computed from regression estimates if $X^K=X^H=0$.
46 In this case, the parameters of the dummy variables of productivity, capitalisation, and region are treated as identical.

workers employed by foreign-owned businesses, whose wages most likely make up the floor of the point of reference when shaping the earnings hierarchy.

The constant difference interpreted as above, as can be seen in the diagram on the lower right part of the Figure, was quite high in 1992–93 when large numbers of foreign firms first appeared, but later it gradually dropped and from 1995 on it essentially can be considered zero in value. (In 1998 the estimated value for females working in the engineering industry would be –7.6 percent and for males it would be –1.6 percent, considering that males working for foreign firms earn 22 percent more than females while males working for domestic ones earn only 16 percent more. The estimate also tends to approach zero if we consider a branch sector other than the engineering industry, since the difference between foreign and domestic firms is comparatively low in the engineering industry itself.)

One reason behind the constant difference that cannot be explained by other factors (with models similar to the above) and for that reason, which appears to be rent-like in nature, could be that foreign businesses were willing to pay a risk surcharge when they first entered the unknown Hungarian labour market. This gave them an opportunity to pick and choose during the tricky time when they had to build up their staff from scratch. The disappearance of the surcharge – if it was more than just an apparition brought about by changes in complex composition – can suggest that this special situation has come to an end and that wages have dropped to market level.

What does appear certain is that today foreign businesses really do not pay their blue-collar labour better than domestic firms with the same productivity level. When evaluating the high wages of comparatively young educated workers, the over-average productivity of the foreign-owned businesses needs to be considered. It also is probable that a part of the productivity advantage of the foreign businesses is the result of the higher quality labour that evolved as a result of their initial high- wage policy.

We will be brief in comparing the wages of the *domestic private sector* and other firms in domestic ownership. In Table 4.3 the two groups are broken down into the same factors as Table 4.2, showing a 23.9 percent earnings differentials (in 1998).

Most of the differences are explained by company size, economic sector, and productivity. Among private businesses the male-female wage gap is lower (15 percent as opposed to 21 percent), and young educated labour has less of a wage advantage (16 percent as opposed to 29 percent), but these differences correspond to no more than 4–5 percent of the difference between the two sectors. The higher ratio of small businesses and lower productivity play a more significant role, and earnings differences related

to company size are greater in the private sector. The sectoral parametric effect – or what appears to be that effect – probably stems from differences in internal structure of the same sort as already discussed in connection with the foreign-domestic wage difference. The constant differences reduce the private sector gap to 4.5 percent, probably because in the lowest earnings range there isn't enough room for additional wage differentiation. When evaluating these numbers, Section 1.2 needs to be kept in mind. In other words, data for businesses with a majority domestic ownership are distorted downwards by wage and accounting practices employed to avoid taxes.

TABLE 4.3: FACTORS SHAPING EARNINGS DIFFERENTIALS BETWEEN FIRMS IN MAJORITY PRIVATE OWNERSHIP AND OTHER FIRMS IN DOMESTIC OWNERSHIP, 1998

Kind of effect:	Different structure	Different valuation	Interactions
Male-female	2.1	14.7	–0.7
Schooling and age	5.3	14.2	–0.2
Region	1.0	–0.1	0.2
Sector	5.5	17.9	16.8
Size	32.1	17.9	20.7
Productivity, capital intensity	22.4	–5.4	–6.2
Constant	–	–20.5	–
Total[a]	68.3	1.1	30.7

a Since figures are rounded, the total of the columns may differ from the Total line. The latter was rounded out from components worked out to 8 decimals. Source: Wage Tariff Survey, 1998. Strict company sphere. For details, see Note J4.1.
Mean earnings in domestic firms: HUF 43,403, in foreign firms: HUF 56,970.
The difference in the logarithm of average earnings = 0.272 = 100 percent.

4.3 Business Sector and Budgetary Institutions[47]

GÁBOR KÉZDI

During a decade from 1987 to 1996, the size of labour employed in public administration, healthcare and education changed very little. It has ranged from 750,000–800,000 throughout the period. Over this same time, employment in the other economic sectors dropped by one-third, from 4 million to 2.7 million. Meanwhile, the average earnings in the public sector dropped moderately, by 5–10 percent, compared to the average earnings in other sectors. The changes in average earnings are probably covering up the really important developments that determine how much one and the same person might earn in the public and in the business sector.

47 For a longer and somewhat different version, see Kézdi 1998c.

The section below explores earnings flows for the 1986–1996 time frame in somewhat greater detail. It is essentially descriptive in nature. It does no more than mention issues that are interesting from the economic and social policy point of view, such as what motivates people when choosing an occupation (or sector in which to work), how those decisions affected the changes that accompanied the transition, and what were the consequences of all this on the quantity and quality of work in the public and business sector. The study consists of three parts. First, we investigate trends in employment and average earnings sector by sector. Then we attempt to break down earnings differentials into observable components, concluding with a brief discussion of the probable consequences.

Employment and Average Earnings

For purposes of this study, we consider public administration, healthcare, and education as the public sector, or budgetary institutions. This definition is clearly oversimplified on the one hand (for it excludes cultural institutions and the state-owned railways). On the other, it is more extensive than, for instance, the Anglo-Saxon definition (which includes only public administration). For more information on definition problems, see *Kézdi (1998c)*. When analysing earnings we conducted a separate study of higher education, while we use the term public education to cover the rest of the education sector and the term business sector to cover the rest of the economy even though it is clearly inaccurate when describing the former socialist economy.

TABLE 4.4: NUMBERS OF PERSONS EMPLOYED IN THE PUBLIC SECTOR AND THE BUSINESS SECTOR, 1987–96 (IN THOUSANDS)

Year	Public admin.	Health care	Education	Public sector (total)	Business sector	All sectors
1987	245	217	282	744	4,094	4,838
1996	257	218	312	786	2,719	3,505
Change (percent)	+5	+0	+11	+6	–34	–28

Source: Central Statistical Office data

Between 1987 and 1996 employment rose slightly, by a total of 6 percent, in the public sector, while it dropped by 34 percent in the business sector. The largest rise in employment was in education. Healthcare remained essentially unchanged. *Kézdi (1998c)* shows that changes in employment in budgetary institutions were quite mixed but not very different when looked at from the point of view of groups with various education levels. In the business sector, however, there are systematic differences. Employment

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of persons with less than secondary education dropped by 43 percent, of secondary school graduates by 14 percent, and of college graduates by only 4 percent.

Table 4.5 shows average net real and relative earnings trends for 1986–96. The data contains only the wage and other cash benefit components, but not the other elements of compensation. The significance of these components probably grew to a greater extent in the business sector than in the public sector over the period of economic transition, so real differences probably increased to a greater extent than shown by the data.[48]

TABLE 4.5: REAL AND RELATIVE EARNINGS OF PERSONS EMPLOYED IN THE PUBLIC AND THE BUSINESS SECTOR, 1986–96 (HUF OF YEAR 1989, BUSINESS SECTOR = 100)

Year	Public admin.	Health care	Education	Higher education	Business sector	All sectors
1986	9,972	9,073	9,336	10,292	9,898	9,829
1996	6,046	5,220	5,294	6,102	6,337	6,150
Change (percent)	–39	–42	–43	–41	–36	–37
Relative Earnings						
1986	101	92	94	104	100	–
1996	95	82	84	96	100	–
Change (percent)	–5	–9	–11	–8	–	–

Real earnings declined significantly in all sectors. The important thing to us is that this drop differed to a slight but not negligible extent from one sector to the next. The relative earnings in the public sector were down by 5–11 percent compared to the average for the business sector.

Components of Earnings Differentials

As mentioned in the introduction, changes in average earnings probably cover up the really interesting developments because of significant differences in the employment pattern. There is a far higher ratio of highly qualified labour in the public sector, because of its very nature . So, if the wages of highly qualified labour in the business sector showed a relative increase, average changes would reflect only part of this because average earnings in the business sector are pulled down by the wages of labour with lower qualifications. We can control for this in a comparatively simple manner by comparing the (observable) earnings of employees whose observable characteristics are similar for the various sectors. Figure 4.5 shows the relative earnings of employees that are similar in this sense, in other words, it gives a picture of how the earnings in a given area of the public sector relate to earnings of similar employees in the business sector.[49] The figures show ten

48 Earnings data refers to annual net earnings from an employers and includes all cash payments for full time employees. The personal income tax had not yet been introduced in 1986. Data for 1996 net earnings are estimated and the base data contain gross earnings components. The net earnings derived from them probably contain systematic and random deviations from unobservable "real" earnings data. The two collections of data differ only in minor factors. For more information see *Kézdi (1998c)*. The analysis of earnings has been limited to employees as opposed to all working people, which probably affects non-public employees to the greater degree. In the 1980s about 20 percent of people in the "competitive" sphere worked part time, while in the mid-1990s roughly 25 percent were part-time workers. The structure of self-employment also changed. For somewhat more detail on this see *Kézdi (1998c)*. All these issues are likely to show wage differences that evolved in the 1990s as smaller than they really are.

49 I have estimated relative earnings according to gender, three education categories, and age divided into 5-year periods. These assumptions yield expected non-parametric values.

groups of employees put together on the basis of their earnings in the business sector. They range from the 10 percent with the lowest earnings to the 10 percent with the highest.

If earnings depended only on observable features of people, the figures would tell us how much more labour in a given area of the public sector could be expected to earn if they changed jobs and went to work in the business sector. In addition, if working conditions were the same everywhere, these differences could not be maintained on long term. But, we know that people in the compared sectors work under very different conditions, and that this is probably to the advantage of labour in the public sector – with shorter real working hours, foreseeable advances, and greater job security – as targeted by laws for public employees and public servants. In addition, we know that there are non-observable features alongside the observable ones that also play a significant role, particularly in the business sector. Table 4.6 shows that in 1996 earnings dispersion related to non-observable features in the business sector were double the level of dispersion based on observable features, which is principally the result of the transformation. These features play less of a role in the public sector, and the direction of the change is also unclear, with the exception of public administration. This is either a sign that the role of individual performance has increased in the business sector (and to a lesser extent, in public administration), or suggests that differences between positions, jobs, or the various (specialised) sectors of operation have grown, and not necessarily in conformity with performance. For public administration, the latter is suggested by the fact that it is far more diverse than healthcare or education (for more details, see *Kézdi 1998c*).

We see from the figures that changes in average earnings as observed in Table 4.5 cover up very significant differences. Based on observable characteristics, earnings in (almost) all groups within the public sector declined. Even more important, the higher the earnings category the greater the decline.

The relative earnings of the lower third of public administration went down to only a very slight degree if at all, while in the upper third, they dropped from 0.9 tenths of the business sector to 0.7 tenths. The same was true for healthcare though to an even greater degree. Prior to the political regime change, relative earnings of the upper third roughly coincided with workers in the business sector but by 1996 they had dropped to 0.6 tenths. In public education and higher education, the lower third also suffered a tangible loss while the relative earnings of the middle and upper third dropped to roughly the same extent (from 0.85–0.95 hundreds to 0.50–0.65 hundreds in public education and from 0.75–0.85 hundreds to 0.50–0.65 hundreds in higher education). By 1996 it was typical of all budgetary

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institutions that *the higher the potential productivity of a public employee or public servant (estimated on the basis of observable characteristics) the lower the ratio of her/his earnings compared to similar labour in the business sector.*[50]

TABLE 4.6: RELATIVE STANDARD DEVIATION OF EARNINGS IN THE PUBLIC AND BUSINESS SECTOR, BROKEN DOWN INTO EXTERNAL (GENDER, AGE, EDUCATION) AND INTERNAL (NOT EXPLAINABLE BY THESE) COMPONENTS, 1986–96

Year	Public admin.	Health care	Education	Higher education	Business sector	All sectors
Coefficient of variation (total)						
1986	0.48	0.49	0.39	0.39	0.42	0.42
1996	0.60	0.46	0.40	0.42	0.75	0.72
Change	+0.13	–0.03	+0.01	+0.03	+0.33	+0.29
Coefficient of variation (external)						
1986	0.29	0.27	0.26	0.24	0.14	0.16
1996	0.25	0.21	0.22	0.28	0.21	0.22
Change	–0.03	–0.07	–0.04	+0.04	+0.07	+0.06
Coefficient of variation (internal)						
1986	0.19	0.21	0.13	0.15	0.28	0.27
1996	0.35	0.25	0.18	0.14	0.54	0.50
Change	+0.16	+0.04	+0.05	–0.01	+0.27	+0.24

Source: Wage Tariff Surveys

FIGURE 4.5: RELATIVE EARNINGS OF PERSONS SIMILAR IN OBSERVABLE CHARACTERISTICS (BUSINESS SECTOR = 1) IN TEN HIERARCHICAL EARNINGS CATEGORIES OF THE BUSINESS SECTOR
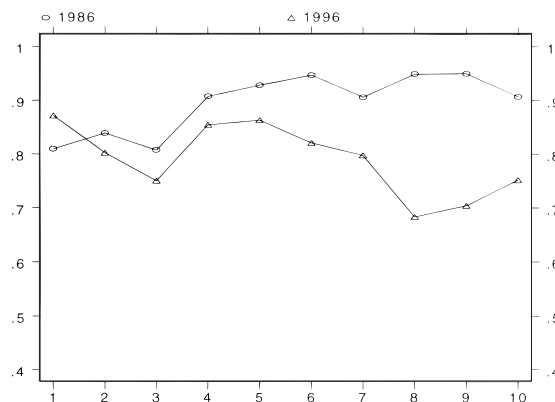
50 When speaking of the lower, middle, and upper earnings thirds, we clearly mean a comparison to see whether the earnings of persons similar in gender, age, and education level to people in the public sector are in the lower, middle, or upper third of the *business sector.*

We can see some very interesting objective factors through a close look at these flows. The lower third of the potential business sector earnings distribution contains a majority of ancillary staff (maintenance, drivers, administrative staff), who would probably be doing similar work in the two sectors. Similarly, the work done by people in public administration is probably more similar to the work done by people in the business sector than that of doctors or teachers. Therefore, in the former case, the public sector tends to "compete" more with the business one than in the latter, where people would not really be able to sell their specialised knowledge. On short term, therefore, it suggests rational government behaviour that the wages of the former group declined to far less of an extent than those of the latter. Even though doctors, qualified nurses, and teachers have suffered substantial wage cuts, they simply have no place else to go. On long term, however, this is not the case, because though they may not be able to find work elsewhere, the public sector is competing for valuable labour when career decisions are made.

Consequences

The growth of the public sector's employment share was higher than the decline of relative average earnings there. With a rough estimate, we might say that the total *gross* earnings paid in public administration, healthcare, and education represented 19 percent of the amount paid in the business sector in 1986, and 22 percent in 1996.[51] In other words, these changes increased the burden of those working in the business sector.

At the same time, earnings for employees in the public sector declined significantly compared to similar labour in the business sector, and the higher the (competitive sector) earnings, the bigger the decline for public sector workers. This – together with differences that increased dramatically within the competitive sphere – demonstrates what we already knew based on day to day experience: that earnings opportunities for really good labour increased significantly outside the public sector. Among people with knowledge and experience that is more convertible (lawyers, teachers in higher education) this will certainly lead to a shift in valuable labour out of the public sector. Among the less flexible occupations (doctor, nurse) it is harder to shift, but the results will be the same on long term because of career decisions. All this is, of course, only valid if there are no major changes in working conditions compared to the business sector, changes that would keep the public sphere attractive despite the increased earnings differences. We know that demands on labour in the business sector have increased quite significantly, and that laws on public employees and public servants were designed precisely to provide attractive conditions. It is essentially an empirical matter to decide the extent to which this modifies the above

51 Total earnings paid are easiest to estimate by multiplying (*gross*) average earnings per sector by the number of persons employed in the sector. In 1986 this amounted to HUF 5,309 billion at current prices, while in 1996 it totalled HUF 30,949 billion. The estimated figures for the business sector were HUF 28,670 billion and HUF 141,024 billion. The estimates are probably distorted upwards since earnings data includes only full time employees and the growth was probably more than estimated. For more information, see *Kézdi (1999).*

conclusions. However, it does appear that some of these circumstances are making life for public employees more pleasant precisely at the expense of performance.

4.4 Informal Economy

Endre Sik

Work in the informal (or as it was called under socialism: the second) economy has always been of interest to income and labour market regulation. Nonetheless, prior to 1995 wage trends in the informal economy were never investigated. In fact 1995 was the first time when monitors in supervisory organisations investigated the minimum and maximum wages in the occupations typical of the informal economy. (See Note J4.2 and *Sik and Tóth 1998*) The investigation was repeated in 1997 and 1998. In 1998, the third wave of the TÁRKI Social Research Institute Local Government Data Bank had specialists in various mayors' offices to estimate the minimum and maximum wages of the three areas of the informal economy typical of the given settlement. (Note J4.3) Based on these estimates it appears that in the mid-1990s wage trends in the most typical informal economy occupations reflected a deteriorating labour market situation (Table 4.7). From 1995 to 1998, the largest growth in minimum and maximum wages was for bricklayers. For this group, the wage increase was 50–60 percent, which resulted in a maintenance of the real value of the wages. The wages of persons handling loading and unloading at markets and of street vendors showed an opposite trend, increasing by 10–20 percent only over the entire period. Unskilled labour in farming and building was somewhere in the middle with a growth of 33–40 percent.

TABLE 4.7: LOWEST AND HIGHEST HOURLY WAGES*
FOR THE MOST TYPICAL OCCUPATIONS OF THE INFORMAL ECONOMY (HUF)

	Bricklayers		Loading and unloading		Day labourers in agriculture		Unskilled workers in building		Street vendors	
	min	max	min	max	min	max	min	max	min	max
1995	170	325	136	229	110	189	127	218	131	220
1997	222	427	131	225	122	207	141	233	123	211
1998	258	524	143	270	147	262	170	306	152	271

Source: Monitor research, 1995–97. (Note J4.2). *Inquiries into wages included hourly and day wages. The latter were transformed into hourly wages by assuming a six-hour workday, which is probably shorter than the real one, so in these cases hourly wages have been overestimated.

Between 1995 and 1997, even the nominal average minimum and maximum hourly wages of loaders at markets and street vendors declined. Wages of unskilled workers (both in construction and farming) went up by 10 percent, which was below the annual growth rate of inflation. The wage increase for clandestine work by stonemasons showed a different trend in the informal sector, with a roughly 30 percent growth rate, even between 1995 and 1997.

The increase in the case of wage minima was lower than the rise in the maximum rate, suggesting that wage differences are growing in all employment groups within the informal economy. The growth rates of the wage increases exceeded the inflation rate in all cases, excepting minimum wages for stonemasons and vehicle loaders. The highest increases were in the maximum wages of unskilled labour in construction and street vendors.

Comparing wages in the informal economy with average wages in identical occupations of the formal economy would be misleading, since it is impossible to compare either working hours or taxes and social security contributions on wages.[52] It does appear possible however, to compare wage trends for people in similar occupations within the two sectors as well as wage ratios from one occupation to the next. An analysis of the gross monthly wages of persons working in crop growing, of unskilled workers, and of stonemasons in 1996–1998, using the Wage Tariff Survey, seemed to be the best way of doing this.

The first conclusion is that within the formal economy the wage advantage of stonemasons compared to crop growers and unskilled workers was lower than in the informal economy. In 1996, stonemasons were making 25 percent and 14 percent more than crop growers and unskilled workers. In 1997 and 1998 the gap declined slightly (to 21 percent and 12 percent in 1998). In contrast, the data in Table 4.7 shows that in 1995 the minimum and maximum hourly wages of stonemasons were 55 percent and 72 percent higher than those of day labourers, and 34 percent to 49 percent higher than those of unskilled labour in construction. This gap, which was significantly higher than wage differentials in the formal economy, increased in 1998. At that time, the minimum hourly wage of a stonemason in the informal economy was 100 percent higher than the minimum hourly wage of a crop grower. The corresponding ratio for maximum hourly wages was 71 percent. The wage gap between stonemasons and unskilled labour in construction was also much higher than in the formal economy (34 percent and 49 percent in 1995, and 75 percent and 52 percent in 1998).

The rate at which wages increased in the formal economy in 1996 and 1997 was 13–15 percent, and from 1996 to 1998 it was 20–22 percent for stonemasons, day labourers and unskilled workers. So, in this respect there was no significant difference between the formal and informal economies, at least as far as trends were concerned.

52 The wage level of the informal economy for 1998 can be estimated for three types of "clandestine" labour, using TÁRKI's Local Government Database. If we assume that people working in the informal economy work 14 days/month, calculating with an average daily wage received by taking the mean of the minimum and maximum daily wage, the stonemason would be earning HUF 36,400/month, the day labourer HUF 16,800/month, and the building industry unskilled worker in construction HUF 21,000/month. All groups are below the gross income level of the formal economy, but the net might be higher.

TABLE 4.8: FACTORS INFLUENCING MAXIMUM DAY WAGES IN THE MOST TYPICAL INFORMAL OCCUPATIONS (MULTIVARIATE LINEAR REGRESSION[a,b])

	Bricklayers	Day labourers in agriculture	Unskilled workers in building
Town and village	–	–	–
Small village	+	+	+
Northern Trans-Danubia	+	+	+
Southern Trans-Danubia	+	+	–
Northern Region	–	+	+
Northern Great Plain	+	+	–
Southern Great Plain	–	–	–
Border Region (to Austria)	0.17 (2.0) 0.05	0.28 (4.4) 0.000	
Border Region (to ex-Yugoslavia)	+	0.19 (3.1) 0.002	0.23 (3.3) 0.001
Border Region (to Ukraine)	–	–	–
Border Region (to Romania)	+	+	+
Border Region (to Slovakia)	–	–	–
Labour working at the location	0.18 (2.0) 0.05	+	0.38 (4.0) 0.000
Is there foreign labour?	+	–	+
Is there labour commuting abroad	–	–	+
Share of inland commuters	–	+	+
Registered unemployed (percent)	+	+	+
Unemployment assistance (percent)	–	–	–
Without unemployment assistance (percent)	–	–	–
Adjusted R-square	0.03	0.13	0.12

a The analysis refers only to those settlements where local government specialists believe there is extensive work being done in the informal economy. That includes approximately 200 settlements for stonemasons, and about 300 for day labourers in farming and for building industry unskilled labour. Using the CSO T-star database for weighting does not guarantee nationwide representation for sub-samples this small.

b We only have used a plus/minus sign to indicate non-significant variables. For significant variables we have given the beta value, the T value in brackets, and the level of significance.

We analysed regional differences along three cross-sections: type of settlement (towns and villages – with the latter distinguished by size), regions (six major regions), and border regions (shaped from the sub-regions set up by the CSO in its T-star survey of 1996, see *Sik 1997a*). In addition, we designed approximation variables to characterise the labour market situation of the given settlements. The dependent variable was the maximum wage for the three occupations in the informal economy. Explained variance is small, suggesting that wage trends in the informal economy are not primarily a function of settlement specifics. As far as the effects of the different variables are concerned.

Type of settlement and region was not found to be significant for any occupation. The effects of border regions appeared stronger than the other two regional configurations. Working close to the Austrian and Yugoslav borders increases wages for work in the informal economy *(Sik 1999a)*. In contrast, working near the Ukrainian and Slovak borders (slightly) reduces the wage level in the informal economy.

The number of people working in a given area expresses *the size of the local labour market*. We can see that the larger the number of people working in a given area, the higher the wages in the informal economy, particularly in construction. This relationship can be interpreted on the supply side (more people working in a given place mean more people willing and able to do occasional jobs) and on the demand side (a local economy able to create [maintain] jobs has the same demands and abilities regarding informal work).

The existence and larger ratio of foreign labour and registered jobless people slightly increased the wage maximum, while a larger ratio of people receiving unemployment assistance or not even that slightly pushed down the maximum, but for the given sample size, these effects were not statistically significant.

5. INEQUALITIES IN EARNINGS AND INCOME

Péter Szivós, Márton Medgyesi

Public thinking has come to accept a view that the role of full-time job earnings in defining income inequalities declined during the transition period because of a growing income from capital, social transfers, and extra incomes. A variable like this might affect decisions to participate in the labour market and can influence the incentive force of wages. This chapter based on relevant publications and calculations by various authors investigates trends in the relationship between employee earnings and overall income in the 1990s.

The effect of a given income component on the inequalities in total income depends on its share, on the extent to which the given component is unequal, and on how it is correlated to the other income components and to total income.[53] This chapter discusses the relationship between earnings and household income. First, we investigate inequalities in incomes and earnings and other income components during the transition period. Then we discuss income patterns, investigating trends in the ratios of the various components that make up total income, stressing the role of earnings. Finally, we will focus on the relationship between the size of earnings and of household income and study the demographic factors that determine the relationship between earnings and household income.

The most important sources on this subject are *Kattuman and Redmond (1997),* and *Milanovic (1998, 1999),* who investigate the effects of the various types of income – including earnings – on inequalities in total household income in Hungary over the transition period, by breaking down the inequality indices into components. The authors used data from the Central Statistical Office Household Budget Surveys (hereinafter: HBS) as their bases. *Flemming and Micklewright (1999)* and *Milanovic (1998, 1998)* do not delve into the issue to quite the same depth, but they do give a detailed overview in an attempt to offer a comprehensive picture of income inequality trends in the former socialist countries. Studies analysing income inequalities and poverty have been completed using Hungarian Household Panel (hereinafter: HHP) data (such as *Förster and Tóth 1997, Galasi 1998, Kolosi, Bedekovics, and Szivós 1998, Medgyesi, Szivós and Tóth 1998b, Szivós and Tóth 1998, Habich and Spéder 1999*), as have analyses on earnings dynamics *(Tóth 1997, Szivós and Tóth 1998a, Rutkowski 1999),* but none were focused primarily on analysing the relationship between earnings and income.

We put the results of the analysis of the two surveys side by side, and attempt to add a picture of the relationship between earnings and income during the transition period. Using available data from the HBS for the late

53 For instance, social benefits can reduce inequalities of income for, although they are quite unevenly distributed among the various social sectors, they are targeted at groups with no earnings or low earnings in keeping with welfare policy goals (negative correlation to earnings and total income). Generally, though, their role in reducing inequalities is not particularly significant because the sharer of social benefits in total income is low.

1980s and HHP and the Household Monitor which succeeded it, we can follow changes all the way through to the mid or late 1990s. With respect to the HHP and the Household Monitor surveys, we have investigated 1991/92 and 1997/98 data and also have taken a closer look at 1993/94 and 1995/96. The former was significant because that was when unemployment peaked and the latter is significant because it marked the start of the austerity measures of the "Bokros Package". We also need to point out that investigations of income using questionnaires generally are unable to give an accurate picture of the bottom and top categories in the distribution. This must be kept in mind when evaluating all results. (For sources, see Endnote J5.1)

Inequalities of Earnings and Incomes

All studies on income distribution[54] during the transition period conclude that inequalities grew. The following tables show the income inequality indices calculated from the two surveys suitable for investigating household income. Table 5.1, with indices estimated from the HBS, shows that the distribution of household incomes was less equal in 1993 than in 1987, but that the process of differentiation was not continuous. Between 1987 and 1989 the value of the Gini[55] coefficient increased by 1.2 percent, while between 1991 and 1993 it grew by 3 percent, and in the two-year period in between there was a slight decline.

The P90/P10 index, which expresses the ratio of the 90th to the 10th percentile follows the same course. The percentile indices also allow us to observe that while in both 1987 and 1993, the median was 1.61 times the value of the tenth percentile, inequalities on the upper portion of the distribution increased.[56] Data from the HHP also show a rise in the Gini coefficient in the first half of the 1990s (see Table 5.2), although this rise appears to be stronger in the Household Budget Survey.[57]

During this same period, the inequality of earnings[58] showed a continuous growth and exceeded the rise in the inequality of total income throughout. Using HHP data the value of the Gini-coefficient for full-time jobs rose from 0.33 in 1991/92 to 0.36 in 1995. For this same period various income transfers also showed an increasing inequality that corresponded to earnings by order of magnitude. Meanwhile, the inequalities of entrepreneurial incomes dropped slightly by the middle of the decade, and then

54 Various concepts may be applied to measure income. One question is whether we are looking at net available income or gross, pre-tax income. Another issue that has to be decided is whether we want to present annual or monthly incomes. Two other matters requiring decisions are related to number of persons in a household. When calculating the index characterising the welfare level of an individual within a household based on total household income, we can include economies of scale resulting from number of persons in the household. To do this, we give the second, third, etc. household member progressively lower weight. We calculate the equivalent income measuring individual welfare with the equation $Y_e = Y/S^e$, where Y is total household income, S is number of persons in the household, and e is the elasticity coefficient. We also need to decide whether to include every household once in the analysis or to study the person-by-person breakdown of incomes, which means attaching household incomes to every single household member. (For more on this, see *Burniaux et al. 1998*.)

55 Gini = $\{(2/\mu n^2)\ \Sigma_i y_i \times i\} - \{(n+1)/n)\}$, where n equals the population and i = 1.....n, where yi equals the income of the i-th person, and where m equals the average income. The Gini can take values between 0 and 1, and the larger the value the greater the inequality. The coefficient is less sensitive to changes on the perimeters of the distribution than the other indices, meaning that it is relatively sensitive to the centre of the distribution *(Burniaux et al. 1998)*.

56 When estimating their income distribution density functions, *Kattuman and Redmond (1997)* and *Spéder (1999)* also demonstrated the importance of increasing differences along the top of the distribution.

57 It also can be seen that research based on the Household Budget Survey estimated a Gini-coefficient fluctuating between 0.20 and 0.24, while the Household Panel yielded a higher. 0.28–0.29, value. This might be because representation at the top of the distribution in the HHP is better than in the HBS *(Andorka-Ferge-Tóth 1997)*.

58 *Earnings (Milanovic 1999):* wages at full-time job, fringe benefits (meals, car use, other), earnings from part-time job. *Earnings (Kattuman and Richmond 1997)*: wages at full-time job, fringe benefits (meals, car use, other) tips, earnings at part-time job, wages and profits from businesses that were and were not legal entitlements, earnings from occasional work. *Earnings (HHP)*: wages at full-time job, fringe benefits (meals, car use, other), irregular incomes connected to full-time job (bonuses, per diems, travel fees, severance pay, other).

rose again, significantly. The distribution of income from capital varied, at times showing a more concentrated and at times a more even distribution.

TABLE 5.1: PERSON-BY-PERSON DISTRIBUTION OF EQUIVALENT HOUSEHOLD INCOME: GINI-COEFFICIENTS AND PERCENTILE INDICES

	Gini[1]	Gini[2]	P90/P10	P90/P50	P50/P10
1987	0.22		2.61	1.62	1.61
1989	0.23	0.225	2.69	1.64	1.64
1991	0.21	0.209	2.45	1.58	1.55
1993	0.24	0.231	2.75	1.70	1.61
1995		0.242			
1997		0.254			

Source: Gini[1]: percentile indices: CSO HBS, equivalent (e=0.73) based on person-by-person distribution of monthly net income (Kattuman and Redmond 1997) Gini[2]: based on per capita household income (Flemming and Micklewright 1999).

**TABLE 5.2: GINI-COEFFICIENTS OF VARIOUS TYPES OF INCOME**

	1991/92	1993/94	1995/96	1997/98
Total household income	0.29	0.30	0.29	0.28
Earnings from main job	0.33	0.36	0.36	0.37
Capital income	0.67	0.71	0.64	0.71
Entrepreneurial income, earnings from secondary job and occasional work	0.65	0.66	0.64	0.72
Social security and other social transfers	0.36	0.36	0.39	0.37

Source: own calculations based on HHP and Household Monitor. Gini-coefficients are based on the equivalent annual net comes (e=0.73) for persons with the given type of income.

A study of total household income and earnings *in a stratum by stratum distribution*, in addition to the aggregate inequality statistics, is also very informative. Using HHP data as a basis, we set up personal deciles of equivalent household income and used them to study the distribution of total income and the various types of income. In the first wave of the Panel study, 15.4 percent of income was concentrated in the three lower deciles, 35.2 percent were in the middle four deciles, and nearly half was in the uppermost three deciles. In 1993/94, the Lorenz curve illustrating the deciles showed somewhat of a shift from the conditions of two years earlier, beginning with the fourth decile, which illustrates the growth in income inequality mentioned earlier. At this time the people in the upper three income deciles received over half (50.3 percent) of the total income, meaning that their share had increased somewhat.

The shift in household incomes was even sharper in a distribution based on the earnings deciles of full-time jobs. The uppermost three income deciles received 55.5 percent of total earnings in 1991/92, a ratio which climbed to 59.8 percent in 1993/94. The 1993/94 quasi-Lorenz curve was below the 1991/92 one throughout this range, and from the fifth income decile upwards, the deviation between the two curves appears to be significant. However, later investigations do not show this significant a difference. The quasi-Lorenz curves are quite close to one another and even intersect. In other words, on the whole it would appear that from 1987 to 1993, the inequality in earnings grew in a definite and continuous manner, while after 1993, it continued growing to a lesser extent.

FIGURE 5.1: STRATUM-BY-STRATUM DISTRIBUTION OF INCOMES AND EARNINGS, 1991/92 AND 1993/94
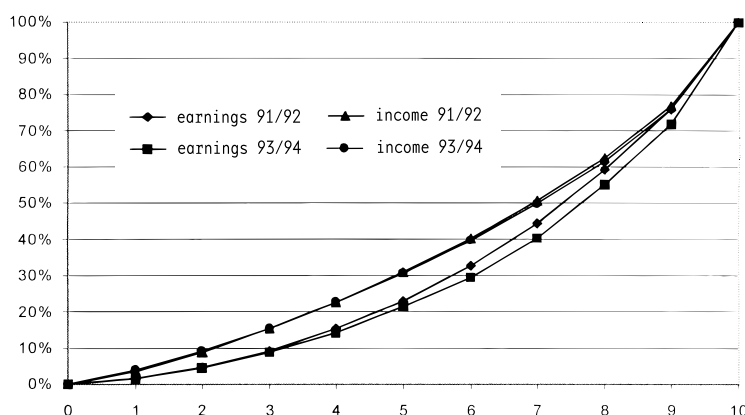
Source: own calculations based on HHP. Note: equivalent household incomes and earnings (e=0.73). Deciles were set up on basis of household incomes not equivalent to zero.

Income Patterns

HBS data show a decline in the share of earnings. According to *Kattuman and Redmond (1997),* the share of earnings made up nearly seven tenths of net income at the end of the 1980s, while in 1991 it had dropped to 63.9 percent, and to 56.2 percent by 1993. *Milanovic (1999)* reports lower ratios, also using the HBS data. In 1993 he reports a 50 percent ratio, very similar to the HHP.[59] According to HHP data, in the early 1990s 48.8 percent of household income came from earnings at a full-time job, and the ratio dropped still further by the middle of the decade.

The share of social and welfare payments grew in parallel. In 1991/92 it amounted to 30 percent of income, and two years later it made up 36.2 percent. The share of capital income and profits was about 6–8 percent throughout this time and it did not change significantly.

59 The likely reason for the difference is that *Kattuman and Redmond (1997)* included wages or profits from business ventures founded by individuals in their earnings data.

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TABLE 5.3: PATTERN OF HOUSEHOLD INCOMES (AT CURRENT PRICES)

	1991/92		1993/94		1995/96	
	HUF	percent	HUF	percent	HUF	percent
Income from main job	160,443	48.8	195,744	45.9	270,721	46.3
Income from secondary work	23,151	7.0	29,037	6.8	49,012	8.3
Small-scale agricultural activities	21,462	6.5	16,110	3.7	23,294	4.0
Capital income. profits	21,352	6.5	28,156	6.6	49,904	8.5
Social security payment	78,498	23.9	123,357	28.9	150,710	25.8
Social transfers	22,709	6.9	31,052	7.3	37,664	6.5
Private transfer income	1,460	0.4	2,710	0.6	3,376	0.6
Total income	329,075	100.0	426,166	100.0	584,681	100.0

Source: Kolosi, Bedekovics, and Szivós (1998) Annual Net Household Incomes.

Using HHP data, we also investigated the share of earnings within household income *for the various income deciles.* Looking at the whole of household income, the ratio of earnings for the portion between the fourth and the eighth decile dropped between the beginning and end of the 1990s. Looking at only the households with a head who was of economically active age (see Figure 5.2), the ratio of earnings dropped for every decile up to the eighth, and it also appears that the decline was about the same for every decile. The curves in Figure 5.2 are parallel for all practical purposes.

FIGURE 5.2: SHARE OF EARNINGS FROM FULL-TIME JOBS WITHIN TOTAL INCOME OF POPULATION OF ECONOMICALLY ACTIVE AGE (BETWEEN 18 AND 60)
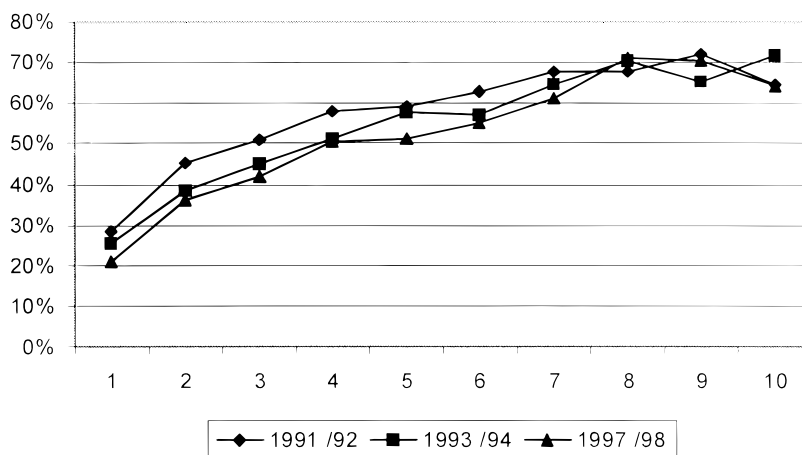
Source: HHP, own calculations. Note: equivalent household incomes and earnings (e=0.73). Deciles were set up on basis of household incomes not equivalent to zero.

The decline in the share of earnings could be the result of a double impact. It could depend on the relationship between earnings and total income or on the number of persons with earnings. Employment dropped significantly in Hungary during the transition period. This could amplify the income differentiation effect of a widening gap between earnings, in which the earnings gap most strongly affected the group at the bottom of the earnings distribution. The situation is even more serious if there is a concentration of job loss or inactivity by persons of active age within a household *(Flemming, Micklewright 1999).* The result is a growth in the ratio of households that do not have a single employed person. In other words, the distribution of employment between households becomes polarised. Table 5.4 shows the distribution of households according to number of persons with jobs in the 1990s, using HHP data. Compared to the 42.1 percent of total households in 1991/92, the ratio of households without an employed person had increased by 5 percent at the end of the decade. It also is clear that this is not only the result of an ageing population, since the process occurred among households with a head of economically active age too.

TABLE 5.4: BREAKDOWN OF HOUSEHOLDS BY NUMBER OF EMPLOYED (PERCENT)

Number of persons employed	1991/92		1993/94		1995/96		1997/98	
	With a head of econ. active age	All house- holds	With a head of econ. active age	All house- holds	With a head of econ. active age	All house- holds	With a head of econ. active age	All house- holds
Zero	21.4	42.1	24.0	44.4	25.6	44.8	29.0	47.5
One	42.3	32.3	40.7	30.7	42.6	32.5	38.2	28.9
Two	31.0	22.1	30.5	21.3	27.4	19.5	26.0	18.9
Three or more	5.0	4.0	4.9	3.6	4.5	3.2	6.7	4.8
N	1,356	2,047	1,311	1,961	1,275	1,858	1,329	1,922

Source: Own calculations based on HHP and Household Monitor.

This shows that at the start of the decade there was no employed household member in 21.4 percent of households where the head was of economically active age (18–60) at the start of the decade, with a continuous increase in this ratio until it was 29.0 percent in 1997/98. In parallel, the share of single earner and dual-earner households both dropped by 4–5 percent. In other words, the number of persons employed became more and more unevenly distributed between the households. On person-by-person level, this means that the share of people residing in households without a single employed person rose from 31.5 percent of the total population to 35.3 percent, while it increased from 20.1 percent to 24.5 percent among the population of economically active age. Table 5.5 shows the relative income

status of households grouped by the number of people in them with jobs. It is clear that although the ratio increased within the total number of households, the relative income position of households without an employee did not deteriorate, and in fact improved when compared to both total households and households with a head of economically active age.

TABLE 5.5: RELATIVE INCOME IN CATEGORIES BASED ON NUMBER OF EMPLOYED

Number of persons employed	1991/92		1993/94		1995/96		1997/98	
	With a head of econ. active age	All house-holds	With a head of econ. active age	All house-holds	With a head of econ. active age	All house-holds	With a head of econ. active age	All house-holds
Zero	0.73	0.77	0.71	0.78	0.74	0.78	0.77	0.81
One	0.99	1.08	0.99	1.07	1.00	1.08	0.98	1.05
Two or more	1.17	1.27	1.19	1.28	1.16	1.25	1.16	1.24
Total	1.00	1.00	0.99	0.99	0.98	0.98	0.98	0.98

Source: own research based on HHP and Household Monitor. Note: based on equivalent household income (e=0.73) with composition affects filtered out.[60]

The effects of the polarisation of persons within a household who were employed was determined by breaking down the inequality by number of persons employed. If the population investigated were ordered into groups using some characteristic, then an MLD[61] income inequality index is the sum of inequality between population groups (deviation in the average incomes of the groups) and the weighted mean of inequalities within the group. The portion of inter-group inequality within total inequality is considered the portion explained by the given factor. As Table 5.6 shows, the inequality of groups based on number of employed persons in the households measured with the MLD index explains about one-tenth of the inequality in income. The largest part was measured in the 1993/94 survey, when the ratio of inequality between the groups based on number of persons employed was about 12 percent. Table 5.6 shows that each year, the power to explain the difference was stronger for number of children than number of persons employed, while that of education level of the head of household was less strong.

Kattuman and Redmond (1997) note that when we explore the effects of only one characteristic, we are ignoring the fact that the various characteristics of the households (individuals) are not independent of one another. For instance, when, in the above we calculated the portion explained by education level, we ignored the fact that people with higher education levels have a higher probability of working. In other words, the ratios given in Table 5.6 cover up the effects of education level and employment (and

60 The effect of changes in the distribution of households by number of persons employed was filtered out by assuming the distribution of the 1991/92 study as constant.

61 To calculate the MLD (mean log deviation) index: $MLD = (1/n) \Sigma_i l_n(\mu/y_i)$, where n is the population number, $i = 1....n$, y_i is the income of the i-th individual and μ, is the mean of incomes. This index is more sensitive than others to changes at the bottom of the income distribution *(Burniaux et al 1998)*.

many other factors). Therefore, we have employed the method proposed by *Kattuman and Redmond (1997)* and *Fields (1997)* based on a multivariable regression model to explain income, which allows us to quantify the effects of the explanatory factors in a manner that is independent of the other factors.[62] On this basis we find that the share of inactive household members explains a growing portion of the inequality. In 1987, 40 percent of the explained dispersion in the regression model was caused by the education level of the head of household, and the labour market status and age of the head of household gave a better explanation of the variation in incomes than the ratio of dependants. The role of the latter factor grew by 1993, and by then the ratio of dependants was equal in explanatory power to education level and labour market status of the head of household. When analysing changes in the inequality, we found that the ratio of dependants strongly increased the inequality between 1987 and 1993, though it was compensated for by the effects of education level and age *(Kattuman and Redmond 1997).*

TABLE 5.6: PORTION OF THE MLD INDEX EXPLAINED BY VARIOUS FACTORS (PERCENT)

	Number of employed	Number of child(ren)	Schooling of the head of household
1991/92	11	1	16
1993/94	12	3	25
1995/96	11	4	25
1997/98	10	6	18

Source: own calculations based on HHP and Household Monitor. Based on annual, net equivalent household incomes in person-by-person breakdown. (e=0.73)

Relationship Between Earnings Level and Household Incomes

As explained earlier, the effect of a given type of income on the inequality depends partly on the inequality of its own distribution, and partly on its weight within total income. From the above we can see that the distribution of earnings became more unequal, which had the effect of increasing income inequality, while at the same time it was observed that the ratio of income from work declined within household income. The question is, what is the combined effect of the two processes. This chapter discusses how big a portion of the overall inequalities in income are the result of earnings *at a given moment in time*, and how *changes* in the earnings distribution affected *changes* in inequalities of income. We are using decomposition processes to answer this question, which, however break down the total inequality of income into types of income rather than population

62 This distribution is based on a regression model with various individual and household characteristics of incomes (Y) (or rather, their logarithms). The affect of an explanatory variable (x_j) is $s_j = \beta_j \sigma(x_j) cor(x_j, lnY) / \sigma(lnY)$, where β_j is the regression coefficient of the j-th explanatory variable, σ is the deviation, and *cor* is the correlation *(Fields 1997).*

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categories. The Gini-coefficient[63] and relative dispersion[64] are used most often to break down income into types. *Milanovic (1999)* has used the former in a study on Hungary, while *Redmond and Kattuman (1997)* have used the latter.

TABLE 5.7: BREAKDOWN OF GINI-COEFFICIENT AND CHANGES IN IT (PERCENT)

	1987	1993	Change 1987–1993
Change in composition	–	–	–117
Earnings	72	75	239
Non-earned private income	20	18	–26
Pension	13	17	61
Other transfers	–4	–10	–9
Interaction	–	–	–48
Total	100.0	100.0	100.0
Gini	20.7	23.0	2.3

Source: own calculations based on Milanovic. Per capita net household income.
Note: non-earned private income = entrepreneurial income, profit, capital income, private transfers (Milanovic 1999).

Using HBS data, both analyses show that earnings play a decisive role in income inequalities. As Table 5.7 shows, on the basis of the breakdown of the Gini-coefficient, in 1987 the earnings distribution made up 72 percent of the inequality in income, and in 1993 it accounted for 75 percent. Based on the breakdown of relative dispersion (Table 5.8) the role of gross income on generating inequalities of income is even stronger. At the start and end of the period under investigation, gross earnings made up 100 percent of the total inequality, while in 1980 and 1991 it was even higher than that. If, however, we look at net earnings, meaning that we subtract the value of social insurance contributions and income tax from gross earnings, it becomes lower, similar to the values received with the Gini distribution. However, the two studies draw different conclusions on trends in the share of net earnings. While the Gini observed only small changes through the period under investigation, the relative dispersion showed a definitely declining trend. From 1991 to 1993, the role of net earnings in determining inequalities of household income dropped from 82 percent to 69 percent *(Kattuman and Redmond 1997)*. The reason for the difference might be the differing definitions of earnings already mentioned, since in principle the method used by the studies discussed to break down the inequality into portions of income is independent of the inequality index applied *(Shorrocks 1982)*.

63 The Gini-coefficient of household income can be described as the weighted average of the concentration coefficients of the various portions of income, where the weights are the ratios of the given types of income within total income *(see Shorrocks 1982, Milanovic 1999)*. The concentration coefficient is also the multiple of a member of the Gini-coefficient that expresses the correlation between portion of income and total income. The problem with this method of distribution is that the concentration coefficients are not indices of inequality, and without further assumptions they cannot fully explain the role of the various types of income *(Cowell 1998)*.

64 The method of calculating CV^2 (coefficient of variation) is: $CV^2 = 0.5 var(y_i)/\mu^2$, where *var* is variation, and the rest of the symbols are as above. This means that the CV^2 coefficient equals one half of the relative deviation. For the sake of simplicity, we will use CV^2 for relative deviation. Compared to other inequality indices, this index tends to be more sensitive to changes at the top of the income distribution. The relative deviation of the various portions of income can be described by the relative deviation of total income based on the well-known characteristics of variance distribution, and as the sum of the member expressing the correlation of the various portions of income. If we want to attach a number to each portion of income showing the portion of its responsibility for the total inequality, we have to divide the correlation member among the components of income, which can be done using the method proposed by *Shorrocks (1982)*, when *k* is the contribution of the portion of total income equality, calculated as follows: $S_k = cov(Y, Y_k)/\mu^2$, where *cov* is covariance, Y_k is the given portion of the income, and μ is the mean of the incomes *(Burniaux et al 1998)*.

TABLE 5.8: BREAKDOWN OF THE RELATIVE DISPERSION AND CHANGES IN IT (PERCENT)

	1987	1989	1991	1993	Change: 1987–1993
Gross earnings	98	111	124	96	89
Earnings from agriculture	7	3	3	5	–2
Entrepreneurial income	n.a.	5	3	7	32
Social security and other social income	–5	–5	–5	–2	9
Other incomes	11	11	13	27	83
Social security contributions					
Personal income tax	–11	–26	–38	–33	–110
Net earnings	100.0	100.0	100.0	100.0	100.0
CV^2	0.098	0.115	0.087	0.126	0.028

Source: Kattuman and Redmond (1997), a: own calculations based on Kattuman and Redmond (1997). Based on equivalent household income in person-by-person breakdown (e=0.73).Other income: interest and dividends, private transfers, etc. (Kattuman and Redmond 1997)

In the breakdown of the Gini-coefficient we see that alongside earnings inequalities, non-earnings private income makes up roughly one-fifth of total income inequality. Pensions played a steadily increasing role in the total inequality. It was only the other transfers, made up decisively of social benefits, which reduced inequalities, and they did so to an increasingly dominant degree. A breakdown of the relative dispersion also indicates the role of transfers in reducing inequalities, but it shows the role of taxes to be even more important than this. While transfer incomes reduced income inequalities by only 5 percent in 1991, taxes reduced them by 38 percent.

We also investigated the role of *changes* in earnings on income inequalities. We see from the breakdown of the Gini-coefficient that in itself the rise in the earnings concentration coefficient should have caused more than double the rise in the Gini-coefficient than the amount that actually occurred. The differentiation effect was reduced by a decline in the ratio of earnings, a more even distribution of non-earnings-type private incomes and other transfers, as well as by the interaction term.[65]

It can be seen from calculations on relative dispersion that earnings are responsible for nine-tenths of the growth in the inequality of income that actually occurred. At the same time, other income also played a significant role in increasing inequality of incomes, while the role of entrepreneurial income was somewhat weaker. However, taxes and social insurance contributions significantly reduced the growth in the inequality.

We also investigated the relationship between earnings of employed persons and total household income on individual level. The correlation coef-

65 The decomposition of the variables in the Gini-coefficient breaks down the change in the index to three types of factors. First, modifications in the income pattern with a constant inequality of portions of incomes influences changes in the index. The second affect is the change in the inequality of the various portions of income, if the ratios of the various income components are taken as constant. However, it is possible that both the ratio and the inequality of the various types of income change, in which case the change in inequality per change in ratio of components has to be portrayed with a third factor, the interaction member *(Milanovic 1999)*.

ficient for quintiles set up on the bases of earnings and household income for 1991/92 was 0.36, and beginning with 1993/94 it was somewhat stronger at 0.41. We studied employees who were in a lower income quintile compared to their earnings position. They made up about one-fifth of employed persons throughout the period under investigation. Table 5.9 shows that for all four years under investigation, households with two or more children were significantly over-represented within this group. Among earners with relatively low equivalent household incomes, the ratio of households with two or more dependant children was over 20 percent higher than average in all four years studied, and even the ratio of households with one child within this group grew. Other groups that were over-represented among household incomes that were low compared to earnings were the 30–40-year-old age group, and the group with a maximum of a vocational education.

TABLE 5.9: BREAKDOWN OF PERSONS WITH LOW HOUSEHOLD INCOMES COMPARED TO EARNINGS BASED ON NUMBER OF CHILDREN IN HOUSEHOLD (PERCENT)

	1992		1994		1996		1998	
Number of children in the household	Relatively low income	Total	Relatively low income	Total	Relatively low income	Total	Relatively low income	Total
No children	15.3	43.6	16.8	45.7	13.2	46.1	22.4	54.2
One	29.3	26.0	26.7	23.9	28.8	22.1	34.7	25.3
Two or more	55.5	30.4	56.5	30.4	58.0	31.8	43.0	20.5
Total	100.1	100.0	100.0	100.0	100.0	100.0	100.1	100.0
N	458	2,021	352	1,669	319	1,522	277	1,357

Source: own calculations based on HHP and Household Monitor
Note: based on equivalent household income (e=0.73)

Studies investigating the distribution of incomes agreed that between 1987 and 1993 the distribution of earnings became increasingly unequal, and that incomes became more concentrated. However, the distribution of income was less unequal than that of earnings, and the inequalities did not grow during all parts of the period under investigation. No further increase in inequalities of income was observed between 1993 and 1997 though the inequalities of earnings continued to grow slightly. In the first half of the period under investigation, the rise in income inequality for the total of households was not less than it was found to be, partly because the share of earnings within income declined, and partly because the effects of certain types of income (non-pension-type transfers, non-earnings-type private incomes) on increasing inequalities also declined. An analysis of gross in-

comes showed that taxes had a significant impact on reducing inequalities. On the whole however, the earnings distribution was the income factor with the strongest influence on income-inequality. Nevertheless, the studies discussed have offered different evaluations of the effects of earnings trends over the period of time discussed.

6. WAGES – CLOSING THE GAP BETWEEN HUNGARY AND EUROPE

Barnabás Ferenczi

With the deepening of European integration and the approaching of Hungary's accession, more and more frequently the question is raised: how the gap between the domestic and European wage levels will reduce or how should it be reduced. The question becomes one of whether there will be an "autonomous", essentially market driven adjustment, and if so, what will make it happen, and what are the mechanisms through which it will occur. To try to come up with possible answers we take a look at some possible triggers and the possible courses the gap reduction might follow.[66] We study expected trends in consumer price-based real wages that are relevant to general welfare and production price-based real wages – real wage costs – of interest to competitiveness. Since economic flows in Hungary through the 1990s were dominated by one-time transition shocks and major structural change, data from the past – often incomplete and loaded with methodological problems – yield little useful information on future flows. So, instead of investigating available data, we concentrate on presenting a general, stylised theoretical model of the triggers and mechanisms behind the gap-reduction flows.[67]

The Point of Departure

Data shows that during the 1990s, *at the official exchange rate* the Hungarian wage level in manufacturing dropped from one-fourth of the Austrian level to one-seventh. Roughly the same is true for hourly wage costs. By the end of the 1990s the domestic processing industry wage-cost level had risen to about USD 3, which was roughly one-tenth of the Austrian one. Distortions caused by official exchange rates can be sidestepped by using *exchange rate indices calculated at purchasing power parity.* Using purchasing power parity exchange rates published by the World Bank, the difference between the Hungarian and Austrian wage levels is smaller: dropping from 60 percent of the Austrian level in the late 1980s to about 20 percent in the 90s. See Figure 6.1. Table 6.1. shows Hungary's relative position from other aspects important to the subject.

Expectations

What are the mechanisms that can lead to wage convergence? There are two possible approaches to this issue. Our point of departure might be that Hungary will completely integrate into a huge European free trade zone in the near future. The process of joining the European Union might be treated as a powerful commercial opening toward these regions. In that case, the

66 Special thanks to Mihály András Kovács (National Bank of Hungary) for his critique of the analyses in this section.

67 Studies in *Commander and Coricelli (1995)* give a good picture of labour market flows through the 1990s transition period. For issues of wage convergence, see *Havlik (1996)* and *Godfrey (1994).*

convergence of wage levels would be defined by trade, fundamentally by commodity movement. Or, we might start off from the assumption that by the end of the 1990s Hungary's international trade integration into the advanced European countries had already attained its "equilibrium" level – based on the dominant role of the advanced European countries in Hungary's trade as calculated by some economic models *(Jakab et al 2000)*. If we use this assumption, wage convergence will not be based on an international trade opening but on other factors – economic growth, technological convergence and capital inflow.

TABLE 6.1: HUNGARY'S ECONOMIC INDICATORS COMPARED TO AUSTRIA IN THE 1990S

	Period	Hungary's relative position (percent)
GDP per capita[a]	1988–1998	44
Capital stock/GDP	1998	49
Undervaluation of the Forint[b]	1989–1997	49
Wage level[a,c]	1988–1996	36
Indirect wage cost / gross wages[a,d]	1990–95	26
Value per employee[c]	1988–1996	30
Total factor-productivity[c]	1998	67
Unit labour cost[a,c]	1991–1996	21

a At purchasing power parity exchange rates.
b Ratio of official and purchasing power parity schilling/forint exchange rate: the official exchange rate of the forint was an average of 49 percent undervalued compared to the purchasing power parity rate.
c Data are for manufacturing.
d Difference in percentages. Indirect wage costs over and above the direct ones. In Hungary this amounts to 44–53 percent. In Austria they fluctuated at around 23–24 percent, so the mean difference was 26 percent.
Source: Darvas-Simon (1999) and OECD and World Bank data.

Let's take a brief look at various theoretical considerations behind wage level convergency. Traditional international trade reasoning says that wage levels will converge as a factor of increasing trade integration, through the free flow of commodities and/or labour. First, we'll look at the flow of *commodities.* It follows from the tenets of *comparative advantage* known since Ricardo that free trade can substitute for the international mobility of production factors, including labour. According to the tenet of comparative advantage, when free trade is established, every country specialises in products that it can produce with a greater relative efficiency than any other country. In the modern version (Hecksher-Ohlin model) of the Ricardo model, the intensification of integration in international trade leads to wage

convergency. The relatively low wage level in an undeveloped county is related to a relative poverty of capital, while free trade makes it advantageous to use relatively cheap labour to increase production of labour-intensive products, which increases the wage level by pushing up demand for labour. Using the same argument, in countries with a wealth of capital and a high wage level, the wage level will decline. Thus, convergence is ensured, even if the workforce is internationally immobile. When adding *the free flow of labour* we have to see that it directly results in a convergence of wages, since when labour flows from a lower-wage country to a higher-wage one it increases the capital intensity of production in the home country that was poor in capital and reduces the capital intensity of production in the target country that was rich in capital, leading to the disappearance of wage differences.

FIGURE 6.1: HUNGARIAN HOURLY WAGES IN MANUFACTURING COMPARED TO AUSTRIAN ONES (AT OFFICIAL AND PURCHASING POWER PARITY EXCHANGE RATES)
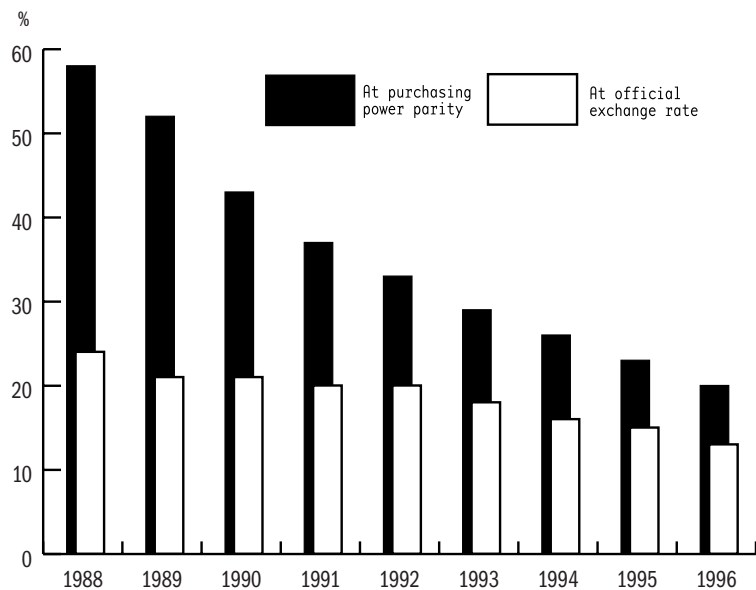
Source: International Statistical Yearbook, 1999, UN-UNIDO data base

However, the traditional international trade argument does not really mesh with certain phenomena observed in the real world. Wage convergence realised through product prices assumes that production factors are immobile. The assumption that the convergence will take place through the free flow of labour is based on the postulates that capital is immobile and that labour is internationally mobile. In contrast, Hungary's integration into the advanced world is typified by an internationally immobile labour and

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the free flow of capital. Therefore, we cannot expect the mechanisms discussed above to accurately describe the possible course of wage convergence.[68]

If the international trade reasoning does not yield the information we need on expected wage-convergency mechanisms, let's take a look at neoclassic growth considerations as they related to open economies and real exchange rate factors discussed in literature.[69] We are interpreting the international convergence of wages for nominal wage levels expressed in a common currency, which coincides with a multiple of the real exchange rate of the domestic real wage level:

$$(1) \qquad \frac{W/CPI}{W^*/CPI^*} \times \frac{CPI}{eCPI^*} = \frac{W}{eW^*} \quad ,$$

where W is the nominal wage level, CPI is the consumer price index, e is the nominal exchange rate, and the asterisks on the variables refer to the foreign country. This formula compares domestic and foreign *consumer* real wages, which corresponds to the welfare approach of wage convergency. In addition, we can study *product price (PPI) based real wages* which make it possible to compare competitivity, as in the formula

$$(2) \qquad \frac{W/PPI}{W^*/PPI^*} \times \frac{PPI}{ePPI^*} = \frac{W}{eW^*} \quad .$$

We see that by choosing appropriate real exchange rate indices, in the final analysis the international comparison of both consumer and producer real wages are ratios of the same numerator – on the right side of the formula. Thus, after some assumptions to simplify, wage convergence is a function of three factors. If we assume that the relationship between producer price levels expressed in a common currency, that is that the *(PPI/ePPI*)* ratio is constant in value,[70] then the three factors left to investigate are expected trends in real consumption wages, real producer wages, and consumer price-based real exchange rates.

Let's begin with a general stylised model that distinguishes traded and non-traded goods, and assumes only domestically mobile (between regions and economic sectors) labour and completely (both domestically and internationally) mobile capital.[71] To simplify, let us name two types of products or more precisely, sectors: manufactured goods and services.

(a) The Convergence of Producer Wage Costs

In this world, the convergence of producer real wages (real wage costs) is determined by the technology used to manufacture goods. Convergence is

[68] We cannot, of course, preclude a large scale migration from Hungary when integrated in the European Union. However, empiric literature reports that in itself this does not always contribute to wage-level convergence. According to research summarised by *Rappaport (1999),* the flow of labour explains only a small portion of regional wage differences. And vice versa, it also is true that the speed of income convergence was similar in rate between regions with very different labour mobility, which suggests that the mobility of labour is not the key to understanding income convergence.

[69] See *Obstfeld and Rogoff (1996), Halpern and Wyplosz (1996),* and *Krajnyák and Zettelmeyer (1997).*

[70] We assume that the weakened, i.e. the relative form of purchasing power parity is valid for the producer price levels, which describes the convergence in price changes on the long term and not the price levels themselves ("principle of one price").

[71] For derivation, see *Obstatfeld and Rogoff (1996),* Chapter 4.

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expected trends in *total factor productivity*[72] and technological *capital intensity* (the capital/labour ratio:

$$(3) \qquad \frac{W/PPI}{W^*/PPI^*} = f\{TFP^T, TFP^{T^*}, k^T, k^{T^*}\} \ ,$$

where *TFP* is total factor productivity, *k* is the capital/labour ratio, and *T* refers to the goods (Traded). In the model, convergence is reinforced if the rate of productivity improvement in Hungary is higher than the foreign one or if the capital intensity of domestic technology increases. What can we say about expected trends in these flows? Let's use *Darvas and Simon's (1999)* estimates on a possible gap-reduction course between the Hungarian and Austrian per capita national incomes as our basis. In the initial state, according to their estimate, at the end of the 1990s, Hungarian *total factor productivity* was only two-thirds of Austria's, while the per capita GDP – at purchasing power parity – was less than half. According to their calculations, for the per capita GDP to climb to 70 percent of the Austrian level by 2030, in the next two decades the domestic total factor productivity will have to exceed the Austrian level by 0.8–1 percent/annum. In the next 20 years this would be equivalent to an annual efficiency improvement of 2.2–2.4 percent (given certain expectations on expected Austrian developments). In light of the fact that the domestic improvement in efficiency is estimated to have climbed at an annual rate of about 3.4 percent, and knowing that emerging countries are able to achieve higher productivity improvements than advanced countries for longer periods of time, this appears to be a realistic assumption.

In addition to a growth rate in total factor productivity that exceeds the foreign one, a rise in the *capital/labour ratio* of domestic output leads to the convergence of the productivity of labour, which is followed by wages. Studies on economic growth in various countries and regions have led to acceptance of the fact that a rise in the capital intensity of production is combined with a reduction in the economic gap. All indices show that in Hungary the capital input/labour input ratio in production is below the level customary in advanced countries. According to 1996 data, in manufacturing the share of capital input in production of the GDP was less than 27 percent, a ratio that was 33 percent for the rest of the economy. This calls attention to the surprising fact that while in the non-manufacturing sector the share of capital corresponds to the one-third ratio found in literature, in manufacturing the value of the index is lower. In other words manufacturing uses a less capital-intensive technology than the other sectors. We believe this to be a transitional factor since in every country in the world, manufacturing uses more capital-intensive technology than serv-

72 Total factor productivity is a "pure" index which filters out apparent improvements in efficiency coming from increased use of labour or capital inputs. Since it is difficult to measure in practice, most often the labour productivity index – which also includes the positive effects of a rise in the capital/labour ratio – is used in publications and analyses.

ices. An investigation of the *capital stock/GDP* ratio confirms the belief that the capital intensity of domestic production technologies will increase as a trend. According to research cited in *Darvas and Simon (1999),* the capital stock/GDP ratio in the advanced countries is about 3–4, while in Hungary the authors estimate that the index is less than 2.

In other words, we see that there is a major gap between Hungary and the advanced countries in capital intensity, so we expect that the supply of capital to the country will increase significantly while converging. In a closed economy the only mechanism that would trigger this is a sharp rise in domestic accumulation, but in an open country it is possible to use foreign resources. According to all indices, there has been a significant inflow of foreign capital to Hungary in the past decade. Our data shows, for instance, that between 1993 and 1997, almost one-fourth of all foreign direct investment (FDI) that came into East-Central Europe was invested in Hungary. The influence of the FDI on the production pattern can be seen in that according to World Bank data the share of high-tech products within manufacturing exports climbed from less than 20 percent to nearly 40 percent by 1997, a figure above the Austrian level. According to another index, between 1993 and 1998, foreign ownership in Hungarian ventures doubled. As far as the overall national economy is concerned, the share of foreign capital in equity went up from 15 percent to 40 percent, while in manufacturing it climbed from 30 percent to nearly 60 percent. As a result, the capital and R&D intensity of the domestic export-oriented sectors grew dynamically between 1988 and 1995 *(Oszlay 1999)*. On long term the sharp inflow of capital will lead to a powerful increase in the capital intensity of production. This will appear in a further improvement in the productivity of labour, which will see to it that the domestic real wage level and real wage costs will gradually approach the western levels.

(b) Convergence of Real Exchange Rates and Consumer Real Wages

From the formulas given above, we can see that the convergence of consumer real wages is derived from the convergence of producer real wages and trends in real exchange rates. The convergence of consumer real wages will occur through a higher rate of productivity growth than abroad and the rise in capital intensity. Expected trends in the real exchange rate can be outlined knowing the *Ballasa-Samuelson effect.* According to the Balassa-Samuelson effect, if the growth in productivity is higher for manufactured goods sold internationally than for services, this will lead to a systematic increase in the relative price of services compared to manufactured goods, assuming that wages are equalised domestically and capital yields internationally. Since the consumer price index contains both manufactures and services, the services will become more expensive than the manufactures

whose prices are determined by international trade, which will raise the domestic price level. If the difference in productivity between manufactures and services (to the benefit of the manufactures) is higher domestically than internationally, the real exchange rate of the domestic currency will show a rising trend. The Balassa-Samuelson effect on the real exchange rate can be defined in the following way on a general model.[73]

$$(4) \qquad \frac{CPI}{eCPI^*} = (1-\gamma)\left[\frac{\mu^N}{\mu^T} \left(TFP^T - TFP^{T*}\right) - \left(TFP^N - TFP^{N*}\right) \right] \ ,$$

where γ is the weight of goods not entering foreign trade within the consumer price index, and μ is the level of labour intensity in two sectors of production (T and N). The long-term conclusion that can be drawn regarding the expected values of the parameters[74] – with imaginary differentiation between the formula – is that real exchange rates will firm if the *growth surplus* of total factor productivity in Hungary compared to the advanced countries is at least as high for manufactures as for services. This indicates that as far as closing the gap between Hungary and the advanced world insofar as national income indices are concerned, it will depend primarily on an improvement in the productivity of goods sold in foreign trade. Transition literature on real exchange rates[75] mention other factors with implications on a lasting real revaluation, in addition to the Balassa-Samuelson effect. These include significantly overestimating the consumer price index because of new products and improving quality of old ones, the expansion of services that had previously been held down artificially, which results in a higher-than-average growth in wages, a "surplus wage component" that exceeds the marginal product of labour, rapidly disappearing, sooner in marketable services, and price liberalisation. Although there is no agreement on the precise mechanisms and size of the real revaluation, in other words, on equilibrium real exchange rates, both general models – based on the Balassa-Samuelson effect in rapidly advancing countries – and models which treat the specifics of the transitional countries in an explicit manner, project a revaluation of the Hungarian exchange rate on long term. In fact, since 1989, consumer price-based real exchange rates have gone up by about 40 percent compared to Austria, and have done so by rising steadily in every single year except 1995.

According to the formula given earlier, as a result of the relative purchasing power parity assumed of producer prices, if producer real wages converge and real exchange rates go up, then consumption real wages also will converge. Therefore, according to our analysis, the consumption real wage level of Hungary is expected to converge towards that of the advanced countries. The potential channels of convergence are an expected more rapid

73 Derivation of the formula can be found in *Obstfeld and Rogoff (1996)* pp. 210–212.

74 The value of goods not entering foreign trade is (1-g) within the consumption basket, and by definition is actually less than this (in Hungary it was around 0.7 at the end of the 1990s). The key regarding relative labour intensity is to assume that on longer term services will apply more labour intensive technologies in Hungary, too, in other words, that the value of relative intensity in the formula will become greater than one (and not 0.91 as it currently stands as shown by domestic data).

75 Primarily *Halpern and Wyplosz (1996)* and *(1998), Grafe and Wyplosz (1997),* and *Krajnyák and Zettelmeyer (1997).*

increase in productivity than abroad and the continued revaluation of the real exchange rate, triggered by a rise in total factor productivity and capital intensity.

According to our overall stylised model, in themselves, autonomous economic flows also show an approach between the domestic wage level and that of the advanced countries. The inflow of foreign capital, the rise in productivity, the increase in capital intensity, the approach in price levels, and economic growth in general all lead to being able to count on a decline in the enormous difference between the domestic and the western wage levels on longer term. The process has already begun with a strong inflow of FDI, an industrial boom and the steady firming of the real exchange rate. There is no need for government or any other intervention to promote the convergence – the market itself will close the gap for wages and earnings.

7. ENDNOTES

J1.1 The measurement error can be approached most easily as follows:

$$x=\gamma+\delta x^*+v, \text{ where } E[v|x^*]=0 \text{ és } Var[v|x^*]=\sigma_v^2 \tag{1}$$

For pure measurement error $\gamma=0$ and $\delta=1$. In general, expected value and variance

$$E[x]=\gamma+\delta E[x^*] \tag{2}$$

$$Var[x]=\delta^2 Var[x^*]+\delta_v^2 \tag{3}$$

The assumed expected value if x is a dependent variable: $E[x|z]$ és $E[x^*|z]$. To simplify, we are considering a linear approach to the conditional expected value. The theoretical model:

$$x^*=\alpha+\beta z+u, \text{ where } E[u|z]=0 \text{ and } Var[u|z]=\sigma^2 \tag{4}$$

In this case, instead of $E[\beta] = Cov(x^*,z)/Var(z)$. (4), we estimate the following model if we consider the linear regression of x and z:

$$x=a+bz+w \tag{5}$$

Our goal is to investigate the relationship between $E[b]$ and $E[\beta]$. The result of an OLS estimate is $E[b] = Cov(x,z)/Var(z)$.

$$Cov(x,z)=Cov(\gamma+\delta x^*+v,z)=E[(\gamma+\delta x^*+v)z]-E[\gamma+\delta x^*+v]E[z]=$$
$$= \delta E[x^*z]+E[vz]-\delta E[x^*]E[z]=\delta Cov(x^*z)+E[vz] \tag{6}$$

If $E[vz] = 0$, in other words if the random (independent of x) component of the measurement error is independent of z,

$$E[b]=\delta Cov(x^*z)/Var(z)=\delta E[\beta] \tag{7}$$

The conditional expected value if x is an independent variable is $E[y|x]$ and $E[y|x^*]$. The theoretical model:

$$y=\alpha+\beta x^*+u, \text{ where } E[u|x^*]=0 \text{ és } Var[u|x^*]=\sigma^2 \tag{8}$$

In that case $E[\beta] = Cov(y,x^*)/Var(x^*)$. Instead of (8) however, we estimate the following model if we consider the linear regression of y and x:

$$y=a+bx^*+w \tag{9}$$

Our goal is to investigate the relationship between $E[b]$ and $E[\beta]$. The result of an OLS estimate is $E[b] = Cov(y,x)/Var(x)$.

$$Cov(y,x^*)=Cov(y,\gamma+\beta x^*+v)=E[y(\gamma+\delta x^*+v)]-E[y]E[\gamma+\delta x^*+v]=$$
$$=\delta E[yx^*]+E[yv]-\delta E[y]E[x^*]=\delta Cov(y,x^*)+E[(\alpha+\beta x^*+u)v]= \tag{10}$$
$$=\delta Cov(y,x^*)+E[uv]$$

Based on (3) we know that $Var(x)= \delta^2 Var(x^*) + \sigma v^2$. So, the OLS estimate of (9) is:

$$E[b]=\{\delta Cov(y,x^*)+E[uv]\}/\{\delta^2 Var(x^*)+\sigma_v^2\} \neq E[\beta]=$$
$$=Cov(y, x^*)/Var(x^*) \tag{11}$$

If E[vu] = 0:

$$E[b]=\delta Cov(y,x^*)/\{\delta^2 Var(x^*)+\sigma_v^2\}=\delta E[\beta]Var(x^*)/\{\delta^2 Var(x^*)+\sigma_v^2\} \quad (12)$$

If E[vu] = 0 and δ = 1, in other words in the case of a purely random error:

$$E[b]=Cov(y,x^*)/\{Var(x^*)+\sigma_v^2\}=E[\beta]Var(x^*)/\{Var(x^*)+\sigma_v^2\} \quad (13)$$

Estimating the approximate measurement error in the 1998 income survey sample. There is a more detailed analysis in Kézdi (1998), although the subject of the investigation is not the consequences of measurement error, but the immediate causes of standard deviations in self-reports. The latent variable itself cannot, of course, be observed, and in the estimate it is replaced with data provided by the workplace. As the study shows, we cannot consider the linear specifications of (1) to be correct, since estimation with Ordinary Least Squares only makes it possible to draw approximate conclusions on orders of magnitude. The number of cases in the estimate: 17,263, R^2=0.78. Estimates of the most important parameters: γ=1096, δ=0,65, σ_v=1106, Std(x*)=3190. Therefore, Var(x*)/ $\{\delta^2 Var(x^*)+\sigma_v^2\}\approx$1,85.

J3.1 The National Labour Research and Methodology Centre issued its Wage Tariff Survey data once every three years up to 1992, and since then it has been publishing it annually, generally in May. The sample includes all businesses employing more than 20 people (more than 10 since 1994), and public sector employees. It is done by taking approximately 10 percent random samples of full time employees in the companies selected on the basis of the quota and within public sector institutions. In addition to the personal and earnings data of the employees in question, there is also a great deal of information available on the location of the facility, and on the company. The samples are regularly analysed by the Institute of Economics, Hungarian Academy of Sciences. They are weighted to account for companies refusing to participate, and the weighted samples include 150,000–160,000 cases.

The significant part of the tables and figures shown in the study are for the strict business sector excluding banks and insurance companies, principally because some company-level data in the financial sector (for instance, productivity) cannot be measured in the same way that it can be for other companies. We have noted all differences. We had only business sector data available from the 1993 wave. Unless otherwise indicated, the regression results are derived from the following specifications. Gross earnings in May and 1/12th of all bonus of the previous year, in a logarithm, is a dependent variable. Dependent variables:
• male
• years on the labour market (estimated on the basis of age and education level) and the square of that number
• skilled worker, secondary school graduate, university or college graduate (reference: elementary school graduate)
• unemployment rate for the second quarter of the year in the local labour office-region where the company is located, in logarithmic form. The numerator of the rate is the active population in the regions of the 170 local offices, as of 1990.
• Budapest, village (reference: location is in a town)
• 27 sectoral dummy variables

• company size (11–20 workers, 21–50, 51–300, 1001–3000, and more than 3001. Reference is 301–1000)

• productivity: logarithm of net revenue per worker excluding costs of materials and procurement price of goods sold

• ownership: predominantly private, predominantly foreign or jointly owned based on registered equity (reference: majority government, local government or co-operatively owned)

Estimates were made with the Ordinary Least Squares method. The parameters in the study are significant at 0.0001 based on standard error resistant to heteroscedasticity. The small number of deviations are indicated. For results of specifications similar to the estimates referred to here see, e.g. Kertesi and Köllő (1997, 1998a, 1999a, 1999b).

J4.1 The estimates were made with the following model. The logarithm of gross earnings in May plus 1/12th of bonuses paid the previous year is a dependent variable. Dependent variables:

• male

• young-educated (at least secondary school graduate with a maximum of 22 years work experience)

• old-educated (at least secondary school graduate with a minimum of 22 years work experience)

• 16 region dummy (6 regions x 3 settlement levels + Budapest)

• 27 sectoral dummy variables

• company size (11–20 employees, 21–50, 51–300, 1001–3000, and more than 3,000; reference is 301–1000).

• productivity: net revenue per worker minus costs of materials and procurement price of goods sold (HUF m), in logarithm

• capitalisation: value of net assets per worker (HUF m), in logarithm

Prior to 1992 there is no information on the breakdown of company ownership. Three considerations were behind the deviation from the model reviewed in J3.1:

(1) the major difference in the capitalisation of domestic and foreign businesses,

(2) when considering education level and age, the effort to produce a classification similar to the productivity estimates in sub-section 3.2,

(3) more precise consideration of regional location.

Detailed results of similar estimates with similar specifications are reported in Kertesi and Köllő (1999a).

J4.2 Monitor research. The organisations participating in the research were the ones charged with monitoring some segment of the informal economy. In 1995 it was the Public Space Authority, the Budapest Indoor and Outdoor Market Management, and the groups of the county Labour Centres charged with monitoring. In 1997, in addition to the above, monitoring was done by the Consumer Protection Authority, the Hungarian Betting and Gaming Board, the National Health Insurance Fund Administration and the Tax and Finances Supervisory Office. In 1998 the Betting and Gaming Authority did not participate, but the group was joined by the Customs and Excise Authority, the National Police Force, and the Pension Insurance Monitoring Organisation. We

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considered the field staff of these monitoring organisations to be experts with more information on the informal economy than an average Hungarian – and not only within the area where they actually worked. The biggest constraint on the validity of the research is that the 1,500 questionnaires returned by the monitoring organisations participating in the research was far greater than the number of questionnaires filled out in the previous two waves (about 500–600 each), but despite that, the questionnaires do not represent the opinions of all the monitors, since we did not weight the data with the number of organisations that did not respond, or to "correct" regional distribution.

J4.3 Mayor research. In the spring of 1998, at the request of the Coordination Committee for Economic Protection and the Working Group for Integration Strategy we sent out questionnaires to be filled in to the more than 3,000 mayors' offices in the country. We had two targets: to learn whether there was a "Comecon market" or a "man market" (hiring fairs for casual labour) in the areas of the local governments, and if so, what were the characteristics of these institutions of the informal economy.

The questionnaire was simple and appropriate for filling in by a respondent. It was quite similar to ones we had already used in 1995 and 1997. In 1995 about 800 mayors' offices returned the questionnaire, in 1997 it was returned by 1,200 offices, and in 1998 by 1,000 offices. Breaking down the returned questionnaires by region, type of settlement, and, for the villages, by number of permanent residents, and comparing them to 1995 (the latest available) official data, we found that we had information on 32 percent of the local governments (within that, on 48 percent of the towns, 38 percent of the large villages, on 35 percent of the medium sized villages and 27 percent of the small villages). In itself, the 32 percent return rate was not a bad result, but what was even more important was the high return rate from the towns and larger villages, since these are the places where "Comecon" and "man markets" are most likely to occur. As our first step in the analysis, we prepared a weighted sample from the responses, which was representative of all Hungarian settlements in 1995.

J4.4 Moscow Square (Moszkva tér) man market research. The research technique was non-participant observation. The same two qualified observers observed the man market all year long, after prior participation in preparing the observation and designing the technique.

The dates of the observations (84 observations) were divided from April 1995 to March 1996, in such a way that they were representative of the day of observation, of the season, and of the time of day. We broke down the latter into three groups: dawn (around 6 a.m.), morning (around 8 a.m.), and forenoon (around 10 a.m.). Each period of observation lasted for two hours. At the start and termination of each observation period (using a maximum of 5–10 minutes) they registered the number of people seeking work who were at Moscow Square, and the observation conditions (weather, presence or absence of police).

For the rest of the time (over an hour-and-a-half) the observers had two additional tasks: (a) to make a random selection of 20 job-seekers each, and to record their observable characteristics, and (b) to observe as many transactions as possi-

ble (offer, bargaining, agreement, observable characteristics of participants in the transaction).

J5.1 The Household Budget Survey (HBS) included 12,000 households from 1987 to 1991, and 8,000 starting in 1993. It does a detailed investigation of household incomes and consumption. Between 1987 and 1991, proportionate selection was not made and this was not properly corrected by weighting. For this reason Kattuman and Redmond (1997) re-weighted the sample. Milanovic (1998, 1999), however, used the data published by the Central Statistical Office for those years. In 1993, though, he corrected the weights used by the CSO to filter out distortions for refusals to respond. The households in the survey were required to prepare a detailed journal of their consumption and income (for two months between 1987 and 1991, and for one month from 1993 on). Beginning in 1989, at the start of the year following the survey, all respondents were required to total their annual incomes and the personal income tax paid along with social security contributions, which made it possible to investigate both gross and net incomes on the basis of the survey.

The main goal of the Hungarian Household Panel (HHP) organised by the TÁRKI Social Research Institute and the Sociology Faculty of the Budapest University of Economics was to monitor the change of the labour market and income, and to observe poverty trends during the years of transition. The initial sample included 2,600 households, a representative sample of households in Hungary. The initial panel sample was established using a four-tiered stratified sample. The first period of questioning was in April-May 1992, and income questions were for the prior month and/or year. The size of the sample declined steadily because of dropouts, and thus, the investigation had to be concluded in 1997. Beginning with the following year another project was begun using similar questionnaires and a methodology that was similar to the Panel, with the (not-negligible) difference that it was cross-sectional and not panel research. Respondents to the individual questionnaires of the HHP and the Household Monitor which followed, had to fill in a detailed income table, and then the most competent member of the household responded to a household questionnaire which included separate questions on household-level incomes. All questions referred to the after-tax, net income.

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