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First Draft !

The Birth of the 'Wage Curve' in Hungary 1989-95*

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Abstract. The paper investigates linkages between regional unemployment and regional wages in Hungary. The evolution of a 'wage curve' is followed from 1989 to 1995 using surveys of employees, employers and unemployed job seekers. Cross-section earnings functions are estimated to measure the impact of unemployment on wages. Data on enterprise performance, capital inflows and labour mobility are used to evaluate the scope for change.

1. Introduction

This paper would like to show how regional unemployment and regional wages were linked during the transition to a market economy in Hungary. We observe the *status quo* under state socialism and follow region's paths in a period when open unemployment grew from virtually zero to two-digit levels.

The expectation is that regions move to states where high unemployment is associated with low wages, and vice versa. Such an outcome is likely when idiosyncratic shocks to wages and employment occur. Due to differences in their industrial structure and resource endowments regions are hit unequally by recessions (such as the 'tranformational recession'). Following the shock some regions may suffer of high unemployment and low wages while others can almost preserve their employment and wage levels. This hardly comes as a surprise - what is of greater importance from both practical and theoretical point of view is what happens afterwards.

Traditional competitive theory predicts that though we can observe regions along a downward-sloping wage curve *at any point in time* it is simply so because adjustment (in terms of wage cuts, emigration and capital inflows) takes time. The mutual adjusment of supply, demand and wages drive the regions towards an equilibrium state where employment and wage levels are similar.

Others argue that this prediction is inconsistent with a massive body of evidence suggesting that, even if we look at long-run averages, higher *levels* of unemployment imply lower wage *levels* rather than faster wage *decline*. Econometric estimates of the elasticity of wage levels with respect

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to unemployment levels suggest, as a main rule, a slope of -0.1. (Though extreme values such as -0.01 or -0.25 do occur)[1]. As discussed in depht in a series of works by Blanchflower and Oswald (1990, 1994, 1995) both *bargaining theory* and *efficiency wage theory* predict high unemployment associated with low wages, and vice versa. In the former case worker's readiness to accept lower wages varies with the state of the local labour market, while in the latter the critical wage level (that is sufficient to deter workers from shirking) decreases with the level of unemployment.[2]

Furthermore, in high-unemployment regions we (most probably) find a higher proportion of employees having experienced at least one spell of unemployment. If 'underbidding' is a general rule - and the pay cuts taken by the unemployed are persistent - a higher proportion of 'sub-standard' reemployment wages can further decrease the overall mean. Both theoretical considerations (Solow 1985) and the empirical evidence (Agell and Lundborg 1993) call for caution with this argument since they suggest that the scope for 'underbidding' is limited by cultural tradition, efficiency wage considerations, ostracism by insiders, and asymmetric information.[3] Nevertheless we can not *a priori* exclude this possibility.

We have several reasons to expect, therefore, the emerging of a downward-sloping wage curve during the transition to a market economy. The first part of the paper (Section 3) will be concerned with the shape, slope and stability of this curve. We can anticipate that we find significant connection between regional unemployment and regional wages in Hungary; the estimated elasticites fall to a range found typical in mature market economies. We observe the wage curve emerging in 1989-92, turning slightly clockwise until 1994 and stabilizing in 1995.

A rough-and-ready answer to the question 'what happens afterwards' (in the particular case of Hungary) might therefore be: nothing spectacular. Unemployment and wage differentials and their relation were rather stable following the early stage of transition. The nature of stability (whether it hints at an steady state or just a low speed of adjustment) bears relevance for the future of the Hungarian society and we beleive that the empirical evidence can also contribute to the 'wage curve debate'. Therefore Sections 4 and 5 will look at the working of potential equilibrating mechanisms: two ways in which regional differences can be alleviated.

(i) *Impact on profits.* Low wages in high-unemployment regions *can* imply higher profits and higher accumulation *can* result in more jobs, higher wages or both. In this sense low wages are necessary (albeit insufficient) for the recovery of high-unemployment regions. The line of argument

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[1] See Winter-Ebner (1996) for the former and Blachflower and Oswald (1994a) for the latter.
[2] For an exposition of the bargaing approach see Blanhflower and Oswald (1990) . The seminal paper of Shapiro and Stiglitz (1984) presents the efficiency wage argument.
[3] A low offer on the part of an applicant is often meant as a signal of low quality.

is similar to that applied for the cathing-up process of South-Asian economies: low wages and benefits lead to high accumulation conducive to higher wages and employment on the long run.

Dwelling on the debate whether higher accumulation can lead to higher employment and wages at all would take us far from the central issue of the paper.[4] We see the problem with this scenario elsewhere. Lower wages imply higher profit as long as we compare identical firms. When we compare regions we can easily find lower wages associated with lower profit. To see why we might recall the optimum criteria of basic bargaining models. If wages are set in a bargain while employment is set unilaterally by the firm the outcome will solve:

$$(1) \qquad \max_{w} (w-w^*)^{\beta}(\pi-\pi^*)^{1-\beta}$$
$$\pi = \max_{n} Y(n) - wn$$

where w is wage, π is profit, Y is value added (Y'>0), n is employment, $0<\beta<1$ is a parameter capturing the bargaining power of workers and the asterisks denote reservation levels.[5]

The first-order condition for the maximum of the Nash-product subject to the maximum profit function is:

$$(2) \qquad w = w^* + \frac{\beta}{1-\beta} \cdot \frac{\pi - \pi^*}{n - dY/dn \cdot dn/dw}$$

Assuming $\pi^*=0$, recalling that the employer sets employment so that $dY/dn=w$, and denoting the average product with $y=Y/n$ we can rewrite (2) to get:

$$(3) \qquad w = w^* + \alpha (y-w)/ (1 - \gamma)$$

where $\alpha=\beta/(1-\beta)$ and γ is the elasticity of labour demand with respect to the wage. Since we are interested in the implications for labour's share we can find comfortable to write (3) as:

$$(4) \qquad w/y = \frac{\alpha}{1-\gamma+\alpha} + \frac{1-\gamma}{1-\gamma+\alpha} w^*/y$$

$$\lim_{\alpha\to 0} w/y = w^*/y \qquad \lim_{\alpha\to\infty} w/y = 1$$ [6]

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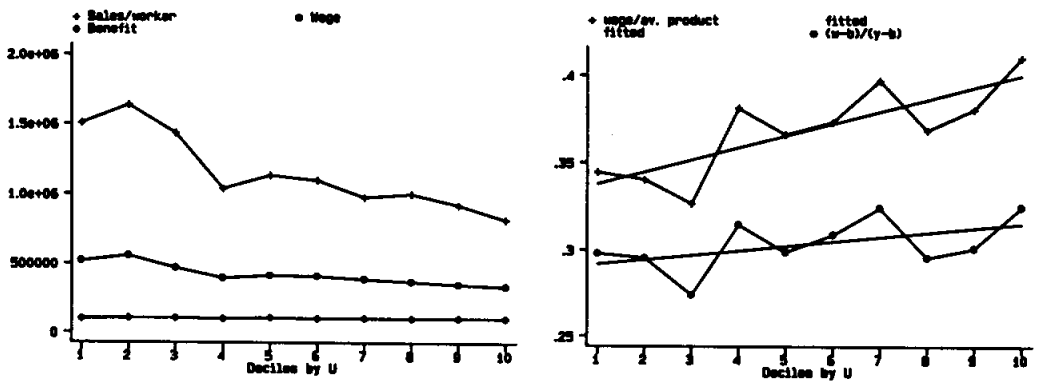
[4] If capital and labour are complements the expansion of the capital stock can induce simultaneous employment and wage growth because the marginal product of labour increases (by definition of complementarity). Normally, at the end of business cycle recessions the condition of complemetarity is met in many firms: idle plants and machines can be restarted and workers recalled. (Snower 1995, 121-123). If high-unemployment regions have huge excess capacities this line of argument certainly bears relevance. We think that the nature of regional crises in CEEs is different.

[5] The formulae implicitly assume a small group of risk-neutral insiders taking part in wage bargaining. The assumption seems consistent with the observation of dramatic employment losses during Hungary's transition without remarkable industrial action. .

What are the implications for regional wage differentials? As suggested by equation (4) and intuition, labour's share is increasing in its bargaining power and the reservation wage relative to the firm's average product. Bargaining power and reservation wages are decreasing functions of unemployment so profits are expected to increase as we move to higher unemployment rates.

Empirically the case is more complex. The relation between regional unemployment and regional w*/y depends on how *strongly* w* is affected by unemployment and how *strong* is the correlation between regional unemployment and productivity. Some regions may have both high unemployment and low revenues as an obvious consequence of price shocks, for instance. In the same time the connection between w* and local unemployment is often loose because of flat-rate social transfers or floors and caps set for UI benefits. As a result, *statistically* w*/y can even be an increasing function of regional unemployment. Workers in high-unemployment regions may be worse off in terms of wage levels than their more fortunate compatriots but their employers may also be worse off, in terms of share from firm revenues, compared to employers in low-unemployment areas. This is shown for sake of illustration on Figure 1 using *raw data* from Hungary, 1994.

Figure 1: Average product, wages, benefits and indicators of labour's share by unemployment



Notes: Horizontal axis: 170 regions ranked by the 1994 March rate of unemployment and attached to 10 groups. (1: lowest unemployment, 2: highest unemployment). Vertical axis, left panel: Average product (y): sales per worker net of consumer tax and price subsidy minus material cost and outlays for subcontractors,1994. Wage (w): average earnings, May 1994. Benefit (b): average UI benefit, March 22, 1994. Vertical axis, right panel: Labour's share (i) w/y (ii) (w-b)/(y-b)

The wage pressure of unemployment sets the foundations of recovery (through higher investment) if it also leads to higher profits which is not *certainly* the case as long as we compare regions with different levels of productivity. The relevance of this problem is analysed in Section 4.

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[6] If we allow $\pi^*>0$ w/y will fall between w*/y and $1-\pi^*/ny$: the upper limit is set by the average product net of reservation profit per worker.

The data suggest that worker's share (their wages relative to the firm's average product) became responsive to the state of local labour markets but this process took a relatively long time and was apparently subject to limits set by reservation wages.

(ii) *Capital and labour mobility.* The coincindence of low wages and high unemployment can foster emigration and stimulate capital inflows. As capital and labour mobility are costly they cannot *fully* eliminate the 'wage curve' but can reduce the range over which unemployment and wage differentials are dispersed. Section 5 will summarise empirical findings on the capacity of migration, commuting and capital inflows in reducing regional differences and conclude that there are severe impediments to 'inward' shifts along the wage curve in the particular case of Hungary.

Before starting it need to be mentioned that several attempts were made to capture the effect of unemployment on wages using regional data in CEE countries but they generally did not suggest strong linkage between these variables. Recent estimates by Boeri and Scarpetta (1996) for the Visegrad countries resulted in correctly signed but insignificant parameters in equations relating regional wage change to the level and/or change of regional unemployment. Similarly, Commander and McHale (1995) reported ambigous results from these countries. For Hungary, both Boeri and Scarpetta (1996) and Commander, Köllõ and Ugaz (1994) estimated insignificant wage effects using unemloyment statistics from 20 counties.

The estimates published so far may have been strongly affected by a too high level of aggregation. In Hungary 1992, distinguishing between the 20 counties and the 170 labour office districts (LODs) suggests that only 49% of the variance of LOD-level unemployment rates and 19% of the variance of LOD-level average wages were accounted for by between-county differentials. This paper can help to revise the findings by using sufficiently large and rich data sets.

2. Data

The analysis basically relies on cross-section regressions using data from the National Labour Centre's Wage Survey, waves 1989 and 1992-95. The survey covers a representative sample of firms and 10% random samples of their workers.

Unfortunately, the survey excludes small firms (20 or less employees in 1986-94, 10 or less employees in 1995). We restrict the analysis to workers in the business sector by choice because wages in the public sector are constrained by quotas prescribed in the Acts on Civil Servants and Public Employees.

The cases are weighted to ensure representativity. An individual weight (w_1) stands for the number of workers represented by a respondent given the sampling quota within his/her firm. The

original survey did not contain information on firm-level non-response. Comparing the composition of the target population and the samples by firm size and two-digit industry we attached weights (w_2) to firms as well. The final weights ($w_1 \cdot w_2$) restore representativity under the assumption that non-response is uncorrelated with variables in our calculations.

The variables observed include gender, experience, education, job characteristics, two-digit industry, location (on the settlement level), firm size, ownership, revenues and costs, fixed assets and other firm-level indicators. Unemployment is measured at the Labour Office District level by dividing the number of registered unemployed by the labour force in 1990. A justification for this second-best solution and an accounting of the resulting bias is given by Ábrahám and Kertesi (1997). We distinguish 170 LODs.

We also estimate wage change regressions for reemployed workers using a part of a sample analysed in detail in Köllõ and Nagy (1996). In the Köllõ-Nagy paper it was argued that workers returning to employment in high-unemployment regions within 6 months do so at the cost of additional wage cut. In the case of long spells the paper found no significant link between local unemployment and wage recovery. We reestimate the equations distinguishing between two types of long spells (and get significant results for at least a part of the long-term unemployed).

The data refer to 6931 previously displaced workers leaving insured unemployment for a job in April 1994. (Temporary layoff spells are excluded). All workers whose benefit payment was terminated for the reason of finding employment in this period were interviewed by officers in charge of benefit administration. The pre-unemployment earnings figure (w^0) considered is average gross monthly earnings in the four, full calendar quarters preceeding registration, as registered in the UI records. Post-unemployment gross monthly earnings (w^1) are expected ones in the first months following reemployment, reported by the interviewed workers. Earnings gains and losses are adjusted for wage inflation between the date of registration and exit (both w^0 and w^1 are expressed in 1994 March values).

The calculations presented here deviate from those in Köllõ and Nagy (1996) in that they divide the completed long spells into two categories. First the probability is estimated that a worker is observed after a long as opposed to a short spell. The estimation is made with binary probit using gender, education, experience, seniority, location, industry and firm size of origin, as predictors. Type A long spells are those with a predicted probability *Prob (spell length > 6 months) > 0.5* and Type B spells are those where $P<0.5$. Simply stating, Type A spells lasted long and it was expected on the basis of the worker's attributes. Type B spells lasted long despite favourable personal attributes (ones which generally imply a short spell). The intention to make this distinction stems from the conjecture that some Type B spells may have lasted long for reasons other than the lack of

adequate job offers. Wage change regressions are presented for short spells and Type A and Type B long spells.[7]

Finally, at one point we refer to data from the National Labour Centre's Forecast Survey: a panel of 1247 firms interviewed in 1992, 1993 and 1994. Detailed descriptions of the survey are given by Székely (1992-97).

3. Estimates of the wage curve

Before going to statistical details we might start by Figure 2 that simply but rather precisely depicts the formation of the wage curve. Regions are ordered by their unemployment rate in March 1992 and attached to ten groups (each containing 17 regions). The best region group is denoted with 1 and the worst with 10. The chart shows how these groups were located on the wage-unemployment plain in 1989 and 1992. Wages are measured taking the national mean as unity.

In 1989 unemployment was yet zero and wages fell to a relatively narrow range. By 1992 unemployment reached levels far beyond 10%, wage differentials increased, and were closely correlated with the level of unemployment.

A part of this correlation stems from compositional effects because high-unemployment regions have less educated labour force and unfavourable industrial structure. Rising returns to education or productivity widen the gap between low- and high-unemployment regions *per se* but explain only a part of the total change. The following sections will show that unemployment had a significant negative effect on wages even after controlling for compositional effects.

Figure 2 also calls the attention that high-unemployment regions (as measured in 1992) had lower wages already in 1989. The observation may hint at common causes behind low pre-transition wages and high post-transition unemployment but we beleive it is at least partly explained by the level of hidden unemployment under socialism. Getting a job in the North-Eastern part of the country was clearly more difficult, even in the 1960s or 1970s, than in the affluent North-Transdanubian regions or in Budapest. By having the expected duration of spells between two jobs, or other measures of the disutility from jobloss, the wage curve of 1989 would hardly be vertical.[8]

Figure 3 is similar in that it shows the same picture for 1992-95. Though minor changes occured, the wage curve - as appears when we use raw data - basically stayed where it was.

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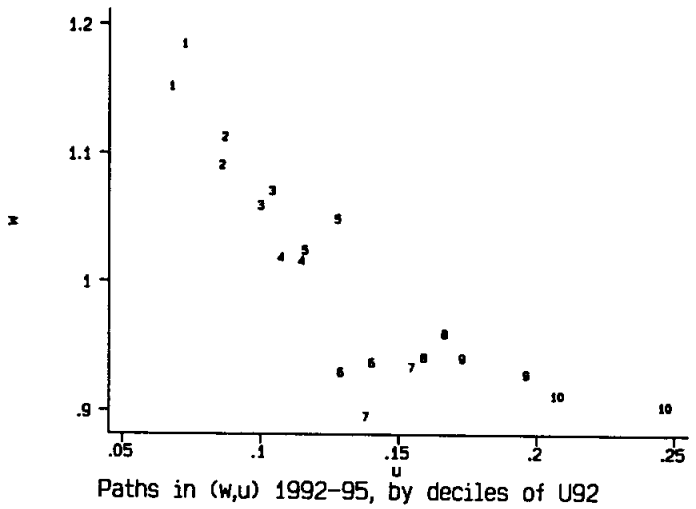
[7] We note here that the standard Heckman-type model (with probit for exit during the month under examination) indicated no selectivity bias in this sample. (op.cit. p 286).

[8] In both efficiency wage theory and in at least some bargaining models the duration of job search rather than the unemployment rate is what affects worker's choice..

Figure 2 : Regions in 1989 and 1992. Wage and unemployment

Figure 3 : Regions in 1992 and 1995. Wage and unemployment



The impressions from Figures 2 and 3 are supported by results from multivariate regression models:

$$ln(w) = f(X, J, I, F, R, U)$$

w: gross monthly earnings in May + 1/12 of previous years bonuses and premia
X: gender, experience, experience squared, education dummies
J: job characteristics (manual, non-manual non-managerial, managerial)
I : 27 industry dummies
F: 5 firm size dummies, log of the fixed assets/worker ratio; 3 ownership dummies
R: 15 region dummies standing for interactions of 5 regions and 3 settlement types
U: measures of the local rate of unemployment
***Sample**: Workers in the enterprise sector (banking and insurance excluded)*
***Years**: 1992, 1993, 1994, 1995*
***Number of observations**: 87,754, 86,785, 96,831 and 91,510 respectively*

The equations are estimated with OLS for each year. In this paper we restrict ourselves to the effect of U. Kertesi and Köllõ (1997) discuss other aspects of the changing wage distribution.

As shown in Table 1 the estimates of the slope of the wage curve are similar to those presented for Western eeconomies elsewhere. The slope of the curve was around -0.09 in 1992-93 and around -0.11 in 1994 and 1995. In these years earnings were expected to decrease by 26-29% as we moved from the lowest (5%) to the highest (35%) district-level unemployment rates, other things equal.

Table 1 : The coefficients of regional unemployment rates in earnings regressions

Dependent variable: ln(gross monthly earnings)

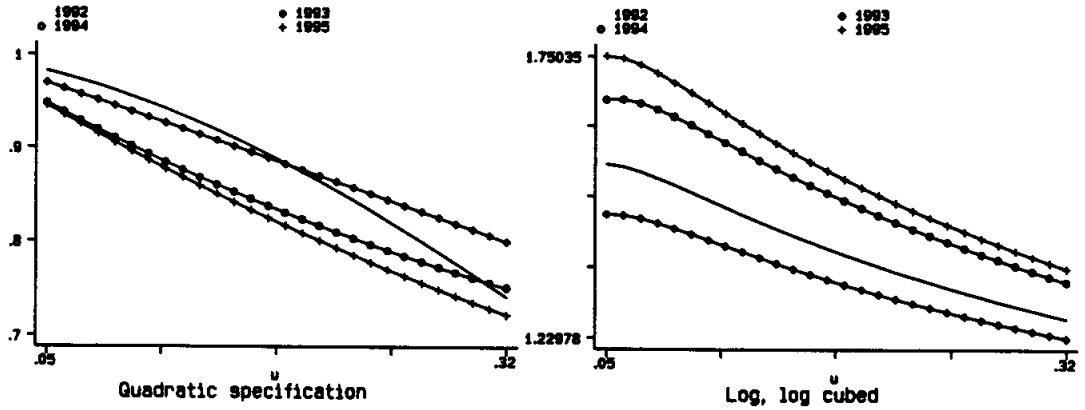
Coefficients of:	1992	1993	1994	1995
ln(u)	-0.0877	-0.0904	-0.1108	-0.1094
u	-0.2488[n]	-0.6084	-1.1074	-1.1439
u^2	-2.1491	-0.2831[n]	0.6597[n]	0.3969[n]
ln(u)	-0.2172	-0.1908	-0.2664	-0.2824
$[ln(u)]^3$	0.0079	0.0073	0.0106	0.0106

The coefficient are significant at the 0.001 level except n: not significant at the 0.1 level. OLS equations adjusted for gender, experience, education, job characteristics (manual, non-manual, managerial), 27 industrydummies, firm size, firm-level capital-labour ratio, type of ownership, Budapest dummy, 14 region dummies standing for interactions of 5 macro-regions and 3 settlement types.

Tests of the curvature of the wage curve suggest nearly constant elasticity throughout the range of unemployment. This is easiest to check on Figure 4 where the wage curves estimated with the quadratic and 'log, log cubed' specifications are simulated. With the exception of 1992 the

curves are nearly linear and do not bend upwards at higher rates of unemployment (as sometimes proposed in the literature).

Figure 5: The curvature of wage curves in 1992-95 as estimated with the quadratic and log, log cubed specifications of Table 1 (Unemployment range: from 5 to 32%)



The interpretation of the wage curve in various segments of the labour market is inevitably uncertain. On the one hand the higher the rate of unemployment in a region the higher unskilled relative to skilled unemployment. This implies steeper wage curve for the unskilled (or high-risk, low-wage groups in general) as a function of the overall unemployment rate. On the other hand, a lower replacement ratio for more qualified workers (Micklewright and Nagy, 1994) works to the opposite direction: high-wage, low-risk groups can be more interested in trading off wages for employment.

Table 2: The wage curve in some groups: elasticities

	1992	1993	1994	1995
Men	-.075	-.078	-.098	-.093
Women	-.100	-.112	-.106	-.125
Primary	-.071	-.077	-.108	-.072
Vocational	-.101	-.100	-.093	-.132
Secondary	-.086	-.112	-.135	-.130
Higher	-.087	-.069*	-.049**	-.026***
Agriculture	-.075	-.094	-.081	-.088
Industry	-.091	-.085	-.073	-.079
Tertiary	-.086	-.114	-.119	-.124

Sample and specification as in Table 1. All coefficients are signi-ficant at the 0.0001 level except *(0.05) ** (0.13) and *** (0.42)

Keeping these caveats in mind Table 2 gives a brief summary for some groups. The wage effect of unemployment seems to be stronger with women, tertiary sector employees but - at least

from 1993 onwards - significantly weaker or even insignificant in the case of university graduates. We might also add that wage curves seem particularly weak in the public sector, banking or in some large economy-wide organizations like the state railways (slopes around -0.04). The results for women (having both low wages and low unemployment) and low-educated workers (facing high U and low w) are not easy to interpret. In this paper focussing on region-level developments we rest content with the main message of Table 2: the state of the local labour market seems to exert significant (but not necessarily equal) influence on wages in all major groups and branches.

Reversing the question we may ask *whose* unemployment affects wages. A number of disputable ways are open to measure the effect of short-term versus long-term unemployment (STU, LTU). The difficulty stems from strong correlation between the level of unemployment and the share of long-term unemployment. Hungary is no exception: the share of unemployed with more than one year duration is around 35% at U=10%, about 55% if U=20% and over 70% in case U=30%. The assumption of independence implicit in a regression model is hurt if we have both U and the long-term share on the right hand. Entering the LTU and STU rates one by one solves the problem but in this case the model ignores one or the other part of the unemployed. Table 3 gives an overview of results from alternative specifications. (Data on LTU are available from 1993).

The quadratic and log specifications indicate weak negative effect on the part of the LTU share in 1993, zero in 1994 and a weak positive one in 1995. When the measures are entered alternately we get markedly stronger effect with STU - elasticities from 1.5 to 3 times higher than with LTU.

Table 3: Attempts to distinguish between the wage effect of long-term versus short-term unemployment

Dependent: ln(monthly earnings)	1993	1994	1995
Quadratic			
U	-.623	-1.404	-1.581
	(-3.3)	(-6.0)	(-6.0)
U^2	-.118	1.252	1.150
	(-0.2)	(1.8)	(1.2)
LTU share	-.102	.0311	.089
	(-2.5)	(0.9)	(3.1)
Log			
ln (u)	-.088	-.111	-.132
	(-12.1)	(-11.4)	(-15.2)
ln(LTU share)	-.022	-.003	.027
	(-2.0)	(-0.3)	(2.9)
*Measures entered alternately**			
ln(STU rate)	-0.094	-0.144	-0.148
ln(LTU rate)	-0.063	-0.067	-0.054

*The coefficients are significant at the 0.0001 level.

The fact that they try to test a barely existing event (higher LTU share while U is held constant) is a strong argument against the first and the second specifications. Inasmuch as we regard the LTU and the STU *rates* as alternative proxies for what we really want to measure (the number of workers competing for jobs) the results from the third specification appear to be instructive. They certainly suggest that STU is a better proxy.

3.2. Pay cut by the unemployed

The results on unemployed workers are summarised in Table 4. The estimated elasticities of real wage change with respect to the local unemployment rate are around -0.04 in the case of short spells, and -0.08 in the case of the majority of long spells. However, with Type B long spells (cases where we would normally expect a short rather than a long spell) the coefficient is positive and only significant at the 10% level. In the case of these spells we also observe mean earnings *gain* from unemployment and a low seniority-age ratio that hints at a group of highly mobile workers.

Table 4 : Results on workers leaving the UI register for a job (April 1994)

Spell length: Actual Expected	Short Short	Short Long	Long Long	Long Short
Elasticity of wage change with respect to local unemployment rate*	-0.045 (-2.6)	-0.043 (-1.7)	-0.083 (-3.7)	+0.042 (1.6)
Nobs:	2508	1331	1932	1160
Memo items:				
Mean real wage change (%)	+0.7	-3.3	-9.9	+2.3
Average age	36.3	34.6	36.3	34.3
Tenure at last job (years)	1.5	7.9	9.8	2.5

*From OLS regression. The estimated equations are identical with those presented in Köllő and Nagy (1996, 289) except for taking log of the unemployment rate and making distinction between four rather than two groups of job losers. Controls are gender, experience, years in jobs other than the last one, duration, education, change of travel time, change of worktime, change of job characteristics, change in industry-specific wage returns associated with inter-industry shifts, change of firm size, ownership of new employer.

These results reinforce the conclusion drawn in Köllő and Nagy (1996) in that workers returning to employment after a short spells do so at the expense of larger wage cuts in high-unemployment regions. This, in fact, also seems to hold for some long spells if we control (roughly as we do) for waiting behavior.[9] Table 4 also suggests that workers facing a long spell - on the basis

[9] We note again that the standard Heckman-model could not capture significant selectivity bias in wage change. It seems that the difference between those exiting UI in April 1994 and those remaining in the stock was not as enhanced as heterogeinity within the outflow sample.

of their attributes - but returning to employment within a short time do not accept exceptionally low offers. Similarly, the data do not support the assumption that taking huge pay cuts in high-unemployment regions - in order to speed up reemployment - is wide-spread. Severe losses are observed when the worker has unfavourable reemployment prospects, unemployment is high and the spell actually lasts for a long time.

Rough calculations suggest that the contribution of pay cut to the overall decrease of wages in high-unemployment regions could not be decisive. We may draw some useful benchmark figures from various data sources. The above-mentioned survey suggested zero wage change on average in regions at or below 10% unemployment and -5% in regions where the rate was above 20%. Calculations from the Labour Force Survey suggest that the intertemporal average of the inflow-to-unemployment rate was 1.1% in the former group, and 1.67% in the latter group in 1992-1995. If these inflow rates hold then, at the end of a three-year period, the maximum proportion of employees with previous unemployment experience can be roughly 50% in the former case, and 80% in ther latter (provided that no multiple spells occured). The implied difference in the overall wage mean is about 4% (provided that pay cuts are persistent). The assumptions made (no multiple spells, persistent wage cut) bias the estimate upwards to a large extent. Thus, judging from the magnitudes, we may conclude that pay cuts could probably explain only a fraction of the 12%-15% relative wage decrease that we actually observe in high-unemployment regions relative to low-unemployment regions during the early stage of the transition period.

3.3. The wage curve - Range

Unemployment and wage differentials changed little following the transformational recession of 1989-92. (Table 5). The ranking of regions by unemployment was also stable over time. On the LOD-level Spearman's correlation between rankings in March 1992 and March 1995 was 0.892, a high value if we consider that the average LOD has a labour force of about 25,000 thus the market is small enough to be exposed to random fluctuations. The rank correlation for the 20 counties and the same period was over 0.95. Wages were slightly more variable (rank correlation of 0.742).

Table 5: The dispersion of LOD-level unemployment rates and net average earnings

	1989	1992	1995
Unemployment			
Coefficient of variation	..	0.370	0.342
Kurtosis	..	3.152	3.074
Decile ratio: d9/d2	..	2.744	2.520
Wages			
Coefficient of variation	0.077	0.119	0.115
Kurtosis	6.136	12.428	12.111
Decile ratio: d9/d2	1.157	1.255	1.273

Source: Wage Survey, Nobs = 170

These data suggest that the wage curve was stabilized over a wide range of regional unemployment rates. It seems that the existing differentials in terms of wages and unemployment were insufficient to mobilise capital and labour mobility and/or speed up investment and growth in 'bad' regions. In sections 4 and 5 we look at the possible causes.

4. The scope for recovery in high-unemploment regions

Hungary's regions were hit by the transition shock unequally. Empirical work by Fazekas (1996) demonstrated that worst affected were agricultural regions with poor infrastructure, poor land quality, low educational levels, no tourism, poorly developed services and trade, large Gipsy community, located far from the Austrian border and Budapest.[10] The shock to be absorbed by either employment or wage cut in these poorly developed regions was further strenghtened by their obsolete industrial structure. A composite measure of exposure to the transition shock can be the a forward-looking producer price index: the average of two-digit industrial sales price indexes in 1989-92 weighted with enterprise sales revenues in 1989. Table 6. gives this index for quintiles of regions by unemployment in 1992.

Table 6: Forward-looking producer price index 1989-92 in groups of regions by the 1992 March rate of unemployment

Quntiles	Best	2.	3.	4.	Worst
PPI	207.9	203.3	198.9	198.3	197.1

Unfortunately we can not give a precise account of the economic development of our small regions during the transition. Nevertheless, the evidence at hand is consistent in suggesting that in 1989-92 the economic performance of firms was deteriorating, and the speed of restructuring was

[10] His results clearly suggest that the widely publicised cases of some mining and steel centres and single-enterprise towns represent exceptions rather than the rule.

lower in the high-unemployment-low-wage regions than in other parts of the country. We also have pieces of evidence suggesting improvement in the financial performance of enterprises after 1992. The following points will briefly review these data.

4.1. The state of local economies - Some indicators

(i) Restructuring. The Wage Survey provides us with a useful measure of structural change in terms of firm creation. The survey selects firms randomly and we have the possibility to distinguish between continuing firms (interviewed in wave t and t-1) and newly selected firms. If the probability that a continuing firm was not selected in *t-1* but was selected in *t* is uncorrelated with the local rate of unemployment, which is likely to be the case, the relative proportion of newly selected firms can be regarded as a proxy for the relative share of genuine new firms in a region or region group. The respective statistics are shown in Table 7.

Table 7: New firms* as a percentage of all firms interviewed in the Wage Survey, in regions grouped by the 1992 March rate of unemployment (%)*

	1992		1995	
	Firms	Employment	Firms	Employment
Best	57.4	38.2	71.2	69.2
2.	50.0	38.9	64.2	62.7
3.	48.3	38.7	61.1	50.4
4.	41.8	29.6	62.9	53.9
Worst	36.2	25.2	60.3	53.7

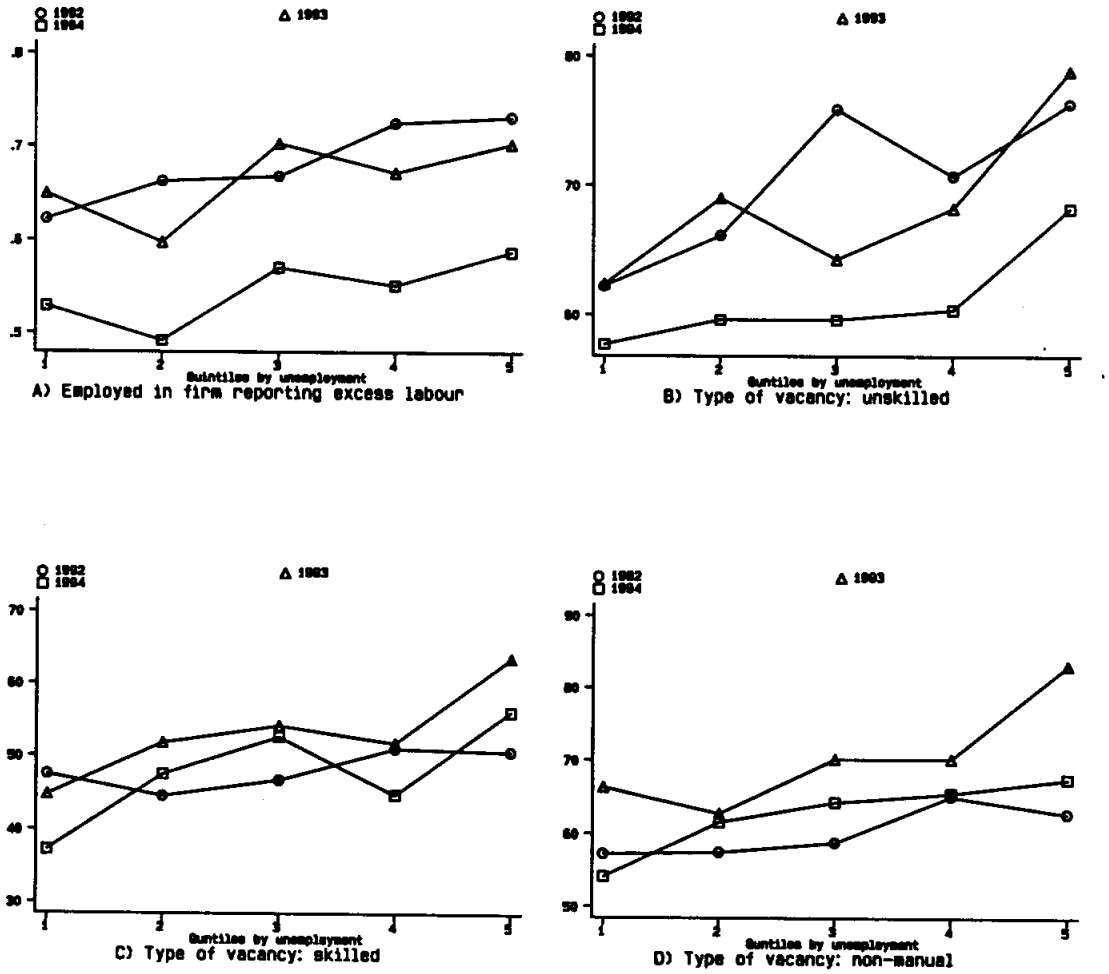
*'New' stands for firms arriving at the sample in 1992 and 1995, respectively. Nobs (1992):7197 Nobs(1995):7989

The indications of Table 7 are consistent with results from other sources. Data from the CSO-TSTAR data base (Fazekas and Köllõ, 1997) show that in the best quarter of LODs the number of business establishments with a legal personality (per 1000 inhabitants) grew by 3.5 in 1993 and 3.3 in 1994. The respective figures for the worst quarter were only 1.5 and 0.9. The number of self-employed per 1000 inhabitants grew by 8.6 in 1990-92 and 1.6 in 1992-94 in the best quartile but only by 2.4 and 0.9 in the worst quartile. The depressed consumer markets of high-unemployment regions, as well as the lack of tourism, opened limited scope for a series of easy-to-start small businesses like taxi driving, trade or catering. The figures on the growth of business density also suggest that the 'recombination of property' (Stark 1995) that could actually save many jobs in former state firms via break-ups may have been less intense in these regions.

The differences between the worst regions and groups 2-4 are smaller in 1995 than in 1992. The CSO-TSTAR data on business start-ups (sole-proprietorships) also suggest a wider gap in 1990-92 than in 1992-94.

(ii) Excess employment. Thanks to the NLC Forecast Survey we have data on how continuing firms evaluated the size of their staff. Panel A shows the proportion of firms reporting that they had excess employment. As we move from the best 1/5 of regions to the worst 1/5 the proportion of these firms appears to increase in both 1992, 1993 and 1994. Panels B, C and D show the proportion of firms reporting that they did not want to fill their vacancies opened by attrition. In all years and job categories (unskilled, skilled, non-manual) the degree of reluctance to fill vacancies increased with unemployment. These data do not hint at convergence over time.

Figure 6: Measures of excess employment in 1992-94. Firms grouped by the rate of unemployment (Forecast Survey, 1240 firms observed in panel)



(iii) Profitability. Profit figures are notoriously unreliable in Hungary so we restrict ourselves to a meaningful distinction between loss-makers and other firms. Table 8 shows the proportion of workers employed by lossmakers in the five region groups in 1992 and 1995.

Table 8: The proportion of workers employed by lossmakers as a percentage of total employment observed in the Wage Survey. Regions grouped by the 1992 March rate of unemployment (%)*

	1992	1995
Best	39.6	25.0
2.	41.3	29.8
3.	50.0	19.6
4.	50.0	12.8
Worst	52.0	23.5

Nobs (1992): 7197, Nobs (1995): 7989

In 1992 the employment share of lossmakers was considerably higher in 'bad regions'. In 1995 there was no clear trend but it seems that the improvement between 1992 and 1995 in terms of profitability was on the whole more remarkable in high-unemployment regions. To check the validity of this impression we add a simple test by estimating the probability of non-negative or increasing profit using one-digit industry dummies and the 1992 March rate of unemployment as predictors. The most simple logit 'models' do not assume causality they are only aimed at capturing the incidence of profit-making in good versus bad regions after controlling for industrial composition.

Table 9. Coefficients from logit equations: Prob(event)=Λ(Industry dummies, U92)

Event:	Sample:	Coefficient of the 1992 March rate of unemployment (Z-value)	
Non-negative profit, 1992	All firms in wave 1992	-0.012	(-2.06)
Non-negative profit, 1995	All firms in wave 1995	0.020	(-2.07)
Lossmaking in 1992, non-negative profit in 1995	Continuing firms (N=2619) yes: 942, no: 1677	0.040	(4.47)
Non-negative profit in 1992, lossmaking in 1995	Continuing firms (N=2619) yes: 281, no: 2338	-0.030	(-2.05)

The results reinforce the impression from grouped data. The probability of profit-making was decreasing with the rate of unemployment in 1992. Three years later the probability was already increasing in unemployment after controlling for industrial composition. The probability of transition from loss-making to profit-making was higher and the transition from profit-making to

loss-making was lower in regions where the rate of unemployment was high at the end of the early transition period.

The sporadic evidence reviewed here is consistent in suggesting that labour shedding and the fall of wages were insufficient to improve the business climate of 'bad' regions immediately. A part of the data hint at an improvement in relative terms later, between 1992 and 1995. How can we reconcile this story with wage development? This is the point where distinguishing between wage levels and labour's share can be useful. The following section will argue that the effect of unemployment on labour's share was not as strong as its effect on wages probably because of limits set by reservation wages.

3.2. The wage curve in terms of labour's share

We try to capture the impact of unemployment on the share of labour by keeping the firm's average product constant in wage regressions and observing how wages change with the local unemployment rate.[11] To allow for non-linearity the quadratic specification is used (Table 10):

$$\ln(w) = f(X, J, I, R, F, \ln(y), U, U^2)$$

Table 10 : The coefficients of regional unemployment rates in individual earnings regressions estimated with a productivity term

Dependent variable: ln (gross monthly earnings)

Coefficients of:	1992	1993	1994	1995
U	-.050[n]	-.663	-1.256	-1.410
U^2	-2.446	.486[n]	1.696	2.118

The coefficients are significant at the 0.001 level except n: not significant at the 0.1 level

Comparing the wage curves estimated with and without a productivity term on Figure 7 suggests that while the wage curves were nearly linear (after 1992) the labour share curves were strongly non-linear. The gain from unemployment of employers - in terms of share from the average product - were not as large as wage differentials would suggest. In 1995, for instance, the simulated wage curve hints at 25% adjusted wage difference between the extreme values of the unemployment range (U=5% and U=32%) while the difference in terms of labour share was only about 15%. This is consistent with expectations discussed in the Introduction.

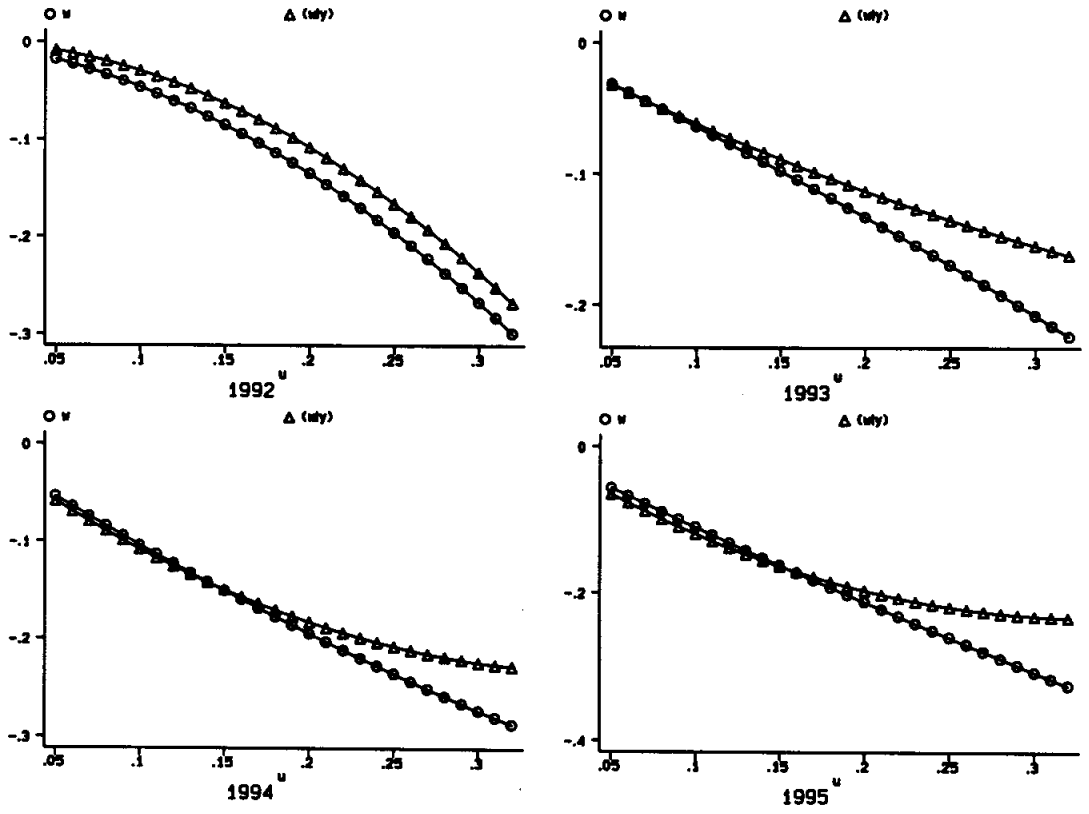
The discrepancy can at least partly explain why do we observe a coincidence of low wages and unsuccesful employers in 'bad' regions at early stages of the transition. A deeper look at the

[11] Average product is defined as sales revenues net of consumer tax and price subsidies minus material cost minus outlays for subcontracting. As the frontiers between depriciation, profit and

interactions of unemployment, productivity and wages can also help explain (partly) why some improvement was observable at later stages.

„other costs" were rather vague during the transition we only make distinction between workers, suppliers and other claimants. Note that payroll taxes are linear.

Figure 7: The wage curve in terms of wages versus labour's share



Circle: wage curve Triangle: labour share curve

When dealing with the problem of interactions between y and U and w and y we can benefit from the exceptional size of the sample.[12] We split the samples to nine groups defined by the level of the firm's productivity (1,2,3) and local unemeployment (1,2,3) and generate 8 dummy variables standing for the nine cells of a 3x3 table. Then we reestimate the earnings functions using these dummies (medium-level productivity and medium-level unemployment is treated as the reference category):

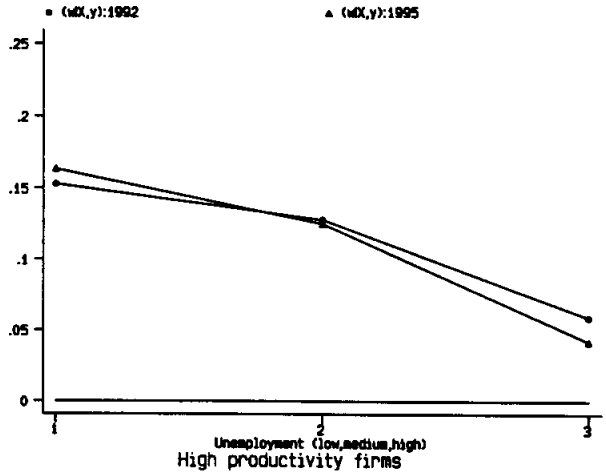
$$\ln(w) = f(X, J, I, R, F, \text{dummies for interactions of y and U})$$

The parameters of the interactive variables are displayed on Figure 8 for 1992 and 1995. The upper panel refers to high-productivity firms and the two curves show wages relative to the reference category in 1992 and 1995. We observe lower wages at high-unemployment in both 1992 and 1995 and also see the simplified 'wage curve' turning (modestly) clockwise. In the range of medium-level productivity the curves are not monotonous but also indicate that wages were lower at high unemployment in 1992 and even more so in 1995. The third panel suggests that wages in low-productivity firms fell - between 1992 and 1995 - relative to the reference category *except* for the case of low-productivity firms located in high-unemployment areas. As shown on the chart wages (adjusted for individual and industrial differences) were lower in this cell by about 22% compared to the reference category and 37% compared to workers employed in a high-productivity, low-unemployment environment, already in 1992. We beleive that the lack of a further wage decline in 1992-95 in this cell might be explained by the extremely low *level* of wages (their proximity to reservation levels). The limited scope for wage adjustment in the inefficient firms of high-uenmployment regions could presumably contribute to their poor financial performance early in the transition.

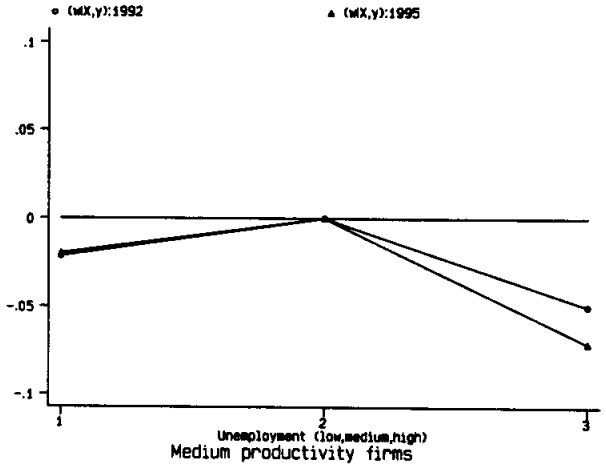
The charts also call the attention, however, that in the range of higher wage levels (associated with medium or high productivity levels) employers were able to benefit from high unemployment in terms of further wage cuts between 1992 and 1995. This can at least partly explain the improvement of profitabilty that we observed in Section 3.1.

[12] The elasticity of wage with respect to productivity increased from 0.069 to 0.179 in 1986-95.

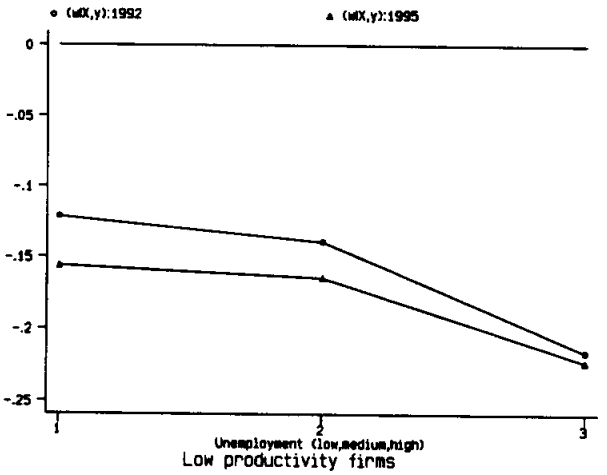
Figure 8: Relative wages in low, medium and high-unemployment regions in 1992 and 1995. Regression coefficients from individual earnings functions.



High productivity firms



Medium productivity firms



Low productivity firms

5. Labour Outflows, Capital Inflows - Their Scope in Reducing the Range of Unemployment and Wage Differentials

As was suggested by the evidence in the previous section regions may have difficulties in pulling themselves out of the crisis 'by the hair': capital and labour mobility can do this job more efficiently and perhaps in a less painful way. In this section we briefly review the scarce evidence on capital and labour mobility and draw conclusions for their capacity to reduce regional differences.

5.1. Migration

Despite the lack of a housing rental market[13] and mortgage financing migration in Hungary is not as low as many observers assume and is, in fact, closely correlated with local unemployment. Without addressing the question of causality (whether unemployment is a cause of net emigration or they are both the by-products of common factors) we simply look at the magnitudes arising from settlement-level data for the period 1990-94.[14] A univariate regression of net migration in 1990-94 (M,%) on unemployment in March 1993 (U,%) yields: M = .769 - .063U. For assessing the magnitudes suggested by these coefficients let us assume that an initial distribution of U starts a migration process lasting for five years. In this simplified case (and assuming uniform settlements with 1000 inhabitants) we get that migration would reduce the population by 4% where U=25% and increase it by 2.2% where U=5%.

If migration would mean the shift of unemployed workers from bad regions to employment or unemployment in good regions the levelling effect could be substantial. The real effect is certainly weaker. As usual, emigration is one of the best predictors of immigration so the net figure may hide intense structural change. The interrelation between emigration and immigration is well shown by Table 11 summarising a simultaneous equations model for 3044 settlements over the period 1990-94.

Though we lack data on the composition of migrants there is sufficient anecdotical evidence suggesting that migration from bad to good regions very often means shifts from employment to employment while the immigrants to bad regions - pulled by vacancies and low housing prices among others - often stay or become unemployed. The magnitudes indicated by the above-mentioned univariate regression are excessive, hint at an upper limit, and even so suggest that migration can only play a marginal role in reducing unemployment rate differentials.

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[13] Over 90 per cent of the housing stock is privately owned by the tenants in Hungary, 1997.
[14] The data come from the CSO-TSTAR data base and are analysed in detail in Kertesi (1997)

Table 11: Annual emigration and immigration rates 1990-94 (2SLS)

	Standardized coefficients	t
Immigration equation	Immigrants/year (%)	
Emigrants/year (%)	0.225	20.1
Business establishments/inhabitant	1.459	5.7
Taxable income/tax payer	0.002	5.6
:Emigration equation	Emigrants/year (%)	
Immigrants	0.709	3.8
Unemployment rate (1993)	0.108	7.5
Agricultural employment (% of total, 1990)	0.003	11.6
Gipsy population (%, 1990)	0.009	6.4
Commuting Type I*	0.052	4.3
Commuting Type II*	0.528	3.9
Immigration equation: F(3,3040)=155.6, aR2=0.5396		
Emigration equation: F(6, 3037)=237.4, aR2=0.5423		
Nobs: 3044		
Emigration and immigration rates are enodogeneous		

Type I: The settlement's unemployment rate was above 23% but the average unemployment rate of towns available from the settlement at a monthly commuting cost of Ft 6,000 was below 17.5% in 1993. See Section 5.2.

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5.2. Commuting

In a small country like Hungary commuting could effectively contribute to the levelling off of regional unemployment rates. Though we lack reliable information on travel to work (the latest data come from the Census of 1990) the available evidence suggests that long-distance commuting can be severly limited by skyrocketing transport costs. The orders of magnitude are illustrated by Figure 9.

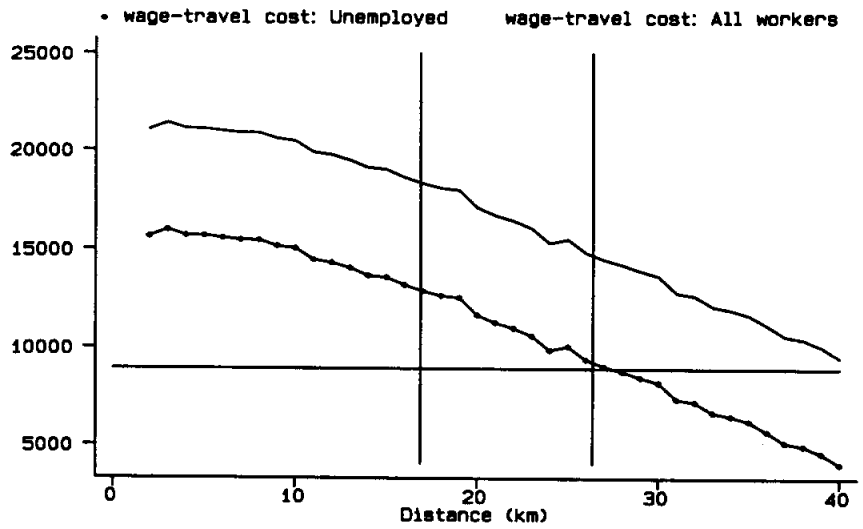
The chart is based on the estimation of monthly commuting cost for 10,309 routes between Hungary's villages and towns (Köllõ 1997).[15] Grouping the routes by rounded distance yields 40 groups each containing about 250 observations. In each group we find routes selected from the whole territory of the country so it seems justified to compare the estimated costs with country-wide average wages or benefits. Accordingly, the upper curve shows monthly after-tax earnings (Ft 22,042) net of estimated monthly commuting cost, as a function of distance. The lower curve does the same but the earnings figure considered is the average post-unemployment wage of workers

[15] For each route the monthly cost of daily commuting was calculated on the basis of the (i) availability of public transport (ii) cost of season tickets (iii) car density in the region (iv) the cost of driving with an existing versus a newly-bought car (v) various assumptions made on the number of passengers per car. The calculations were restricted to routes from villages to towns in their neighbourghood (less than 40 km on road).

leaving UI for a job (Ft 17,040). The horizontal line indicates the average UI benefit (Ft 8920). The figures relate to January 1993.

Figure 9: Earnings net of commuting cost by the distance of commuting

(Estimation for January 1993)



As shown by the upper curve, commuting to a distance of 40 km provides a net wage that is just equal to the UI benefit. In other words there is no gain from being employed in a job that is 40 km away from one's place of living. For the typical unemployed job seeker - who can expect a far lower wage than the economy-wide average - the 'point of no gain' is only at 27 km.

The implications for inter-regional commuting are possibly severe. The average distance between a settlement and its own region centre is 16.9 km in Hungary. (This is indicated by the vertical line on the left.) Commuting to a distance like that provides a gain of about 100% over the UI benefit for the median job seeker and 40% for an unemployed job seeker. The average distance to the second closest region centre is 26.7 km. Commuting to such a distance yields rougly 60% gain for the median job seeker and virtually no gain for the average UI benefit recipient.

The chart - and the calculations behind - are obviously simplified. Workers may have access to firm-financed transport, a car pool, or some other options reducing their travel cost. By ignoring these cases we tend to underestimate the gains from inter-regional commuting. The bias to the opposite direction is clearly stronger because the cost estimates used here exclude the value of travel time so they crucially underestimate the actual cost of travel to work. Travelling to a distance of 26.7 km takes at least two hours a day as time-tables suggest. If we measure the value of one hour's travelling by the net hourly wage, for instance, we get an implied monthly cost close to Ft 6000 that

would completely offset the pecuniary gain (of the average job seeker) from commuting to that distance.

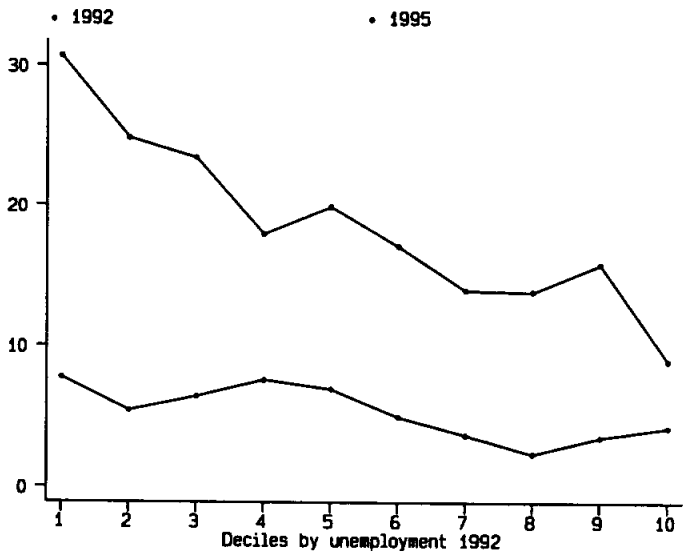
Considering these results and the possible direction of bias we may risk the conclusion that commuting across the borders of regions can play a minor role in reducing unemployment rate differentials.

5.3. Capital mobility

We shall be very brief on capital mobility for the reason that we lack information on business relocation or geographical allocational decisions in general: using the available data we cannot make distinction between jobs created by local businessmen and capital inflows. Foreign direct investment is to some extent an exception because in this case capital comes from outside 'by definition' and the investor is free to chose between various regions of the country. As shown by Figure 10 foreign investors strongly prefer the developed, low-unemployment regions of the country. This was the case in 1992 and even more so in 1995.

Figure 10: Percentage of workers employed in majority foreign-owned firms

(Wage Survey, enterprise sector. Regions ranked by unemployment in 1992: 1-10).



6. Conclusions

The first conclusion suggested by the evidence is that a wage curve with a slope similar to ones observed in mature market economies developed early in the transition in Hungary. Simultaneous shocks to employment and wages had a major role in starting this process. What we

observed seems to provide supporting evidence for both parties in the wage curve debate. We saw simultaneous shifts in unemployment and wages in 1990-92, continuing wage decline at high rates of unemployment in 1992-94, but no further decline afterwards. In harmony with the predictions of bargaining models we observed unemployment-related differences in bargaining positions but also found discrepancy between the wage curve and the 'labour share curve'. We think the main message for further research might be that a clearer distinction is required between consumer real wages, labour cost and labour's share in modelling the effect of unemployment. This can be particularly important in partial equlibrium models where both demand- and supply-side decisions are considered and the issue of firm liquidity is involved.

There are some messages for Hungary rather than for the wage curve debate: good news and bad news alike. The good news are that neither unemployment differentials nor wage differentials increased substantially after the early stage of transition. We observe net emigration from badly hurt regions and slight improvement in the profitability of their enterprises: signs of adjustment potentially reducing the differentials arising after the transition shock. The bad news are more numerous. The differences of unemployment and wages are large and so far persistent. The levelling effect of labour mobility is predictably minimal. Foreign direct investment is concentrated in the best regions of the country. We found evidence (that is open to doubt for econometric reasons) that the long-term unemployed exert weaker influence on wages than do the short-term unemployed. Had this indeed be the case a hysteresis effect, as discussed by Nickell (1995), can further contribute to the lasting crisis of badly hurt regions.

Most importantly, we observe a qualitative difference in the way regions get out from the deep 'transformation recession'. Good regions restructured their economy faster; experienced a boom of businesses and keep on attracting both labour and capital. The economy of 'bad' regions was stabilized at the expense of dramatic employment loss, severe wage cuts and their workers had to accept lower share from the pie of enterprise revenues. Whether the price they paid will help their countryside to catch-up with more affluent regions is one of the hardest questions facing our new democracy.

* * *

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The Birth of the 'Wage Curve' in Hungary 1989-95

by

Gábor Kertesi and János Köllõ

APPENDIX

Earnings functions 1989, 1992, 1993, 1994 and 1995
using data from the NLC Wage Survey

1989

Source	SS	df	MS	Number of obs =	87738
				F(52, 87685) =	1560.69
Model	8153.20246	52	156.792355	Prob > F =	0.0000
Residual	8809.16723	87685	.100463788	R-squared =	0.4807
				Adj R-squared =	0.4804
Total	16962.3697	87737	.193332	Root MSE =	.31696

lnker	Coef.	t	P>|t|	[95% Conf.	Interval]
male	.2832869	114.382	0.000	.2784327	.2881412
exp	.0308513	85.572	0.000	.0301446	.0315579
exp2	-.0004706	-60.376	0.000	-.0004859	-.0004553
vocational	.1273092	44.976	0.000	.1217613	.1328571
secondary	.1730797	50.907	0.000	.1664159	.1797435
higher	.4977677	85.019	0.000	.4862924	.509243
non-manual	.1388458	41.217	0.000	.1322433	.1454484
managerial	.7409103	64.159	0.000	.7182761	.7635445
unclass.	.0236806	2.194	0.028	.0025243	.0448368
agriculture	.0895562	18.835	0.000	.0802369	.0988754
forestry	-.0436266	-2.683	0.007	-.0755013	-.0117519
coal mining	.1798544	24.827	0.000	.1656554	.1940534
petrol min.	.1088825	7.905	0.000	.0818844	.1358806
other mining	.1680075	14.091	0.000	.1446381	.1913768
textiles	.0392087	8.667	0.000	.0303416	.0480759
paper	.1015416	7.721	0.000	.0757658	.1273174
printing	.1240026	9.926	0.000	.0995166	.1484885
petrol ref.	.2708072	12.795	0.000	.2293244	.31229
chemical	.1868269	23.237	0.000	.1710685	.2025853
nonferrous	.049237	6.536	0.000	.0344721	.064002
metallurgy	.1066205	16.236	0.000	.0937492	.1194917
furniture	-.0519184	-4.685	0.000	-.073638	-.0301988
energy	-.0885718	-10.663	0.000	-.1048525	-.0722911
water	-.0608586	-7.537	0.000	-.0766848	-.0450325
construction	.0585265	12.270	0.000	.0491779	.0678751
trade	-.0693257	-17.097	0.000	-.0772732	-.0613782
foreign trade	.2210599	20.010	0.000	.1994066	.2427131
catering	-.2155749	-29.192	0.000	-.2300489	-.201101
transport A	-.080187	-14.242	0.000	-.0912225	-.0691515
railways	-.1243881	-22.533	0.000	-.1352077	-.1135685
public transp.	-.1094373	-10.382	0.000	-.1300983	-.0887763
mail+telecom	-.1926409	-26.643	0.000	-.2068127	-.178469
Budapest	.1107924	15.993	0.000	.0972141	.1243706
Central-cap.	.0087928	0.975	0.330	-.0088907	.0264762
Central town	-.0247816	-3.212	0.001	-.039905	-.0096581
NW - capital	-.0368535	-4.717	0.000	-.0521658	-.0215411
NW - town	-.0429016	-5.433	0.000	-.0583793	-.0274238
NW - village	-.0371532	-3.593	0.000	-.0574178	-.0168886
SW - capital	-.037778	-4.518	0.000	-.0541668	-.0213892
SW - town	-.0268223	-3.013	0.003	-.0442707	-.009374
SW - village	-.076736	-6.604	0.000	-.0995096	-.0539624
NE - capital	-.0511562	-6.975	0.000	-.0655304	-.0367819
NE - town	-.0989726	-13.197	0.000	-.1136713	-.0842738
NE - village	-.0934063	-10.549	0.000	-.1107607	-.076052
SE - capital	-.0237371	-3.041	0.002	-.0390344	-.0084398
SE - town	-.0886208	-11.650	0.000	-.1035304	-.0737112
SE - village	-.1367942	-12.264	0.000	-.1586567	-.1149318
L<50	.0179791	2.054	0.040	.0008253	.0351329
301<L<1000	-.0112287	-2.631	0.009	-.0195943	-.0028632
1001<L<3000	.0020084	0.472	0.637	-.0063332	.0103499
L>3000	.0247931	5.201	0.000	.0154504	.0341357
ln(K/L)	.049368	28.878	0.000	.0460174	.0527187
_cons	8.536709	913.527	0.000	8.518393	8.555024

1993

Source	SS	df	MS	Number of obs =	91773
				F(56, 91716) =	1485.81
Model	12454.7439	56	222.406141	Prob > F =	0.0000
Residual	13728.6469	91716	.149686499	R-squared =	0.4757
				Adj R-squared =	0.4754
Total	26183.3909	91772	.285309145	Root MSE =	.38689

lnker	Coef.	t	P>|t|	[95% Conf.	Interval]
male	.2224869	74.756	0.000	.2166536	.2283202
exp	.0245666	52.755	0.000	.0236539	.0254794
exp2	-.0003632	-34.688	0.000	-.0003837	-.0003427
vocational	.1363712	39.886	0.000	.12967	.1430724
secondary	.2478304	59.082	0.000	.2396088	.256052
higher	.644178	95.038	0.000	.6308929	.6574631
non-manual	.2521309	63.251	0.000	.244318	.2599438
managerial	.6952065	52.708	0.000	.6693546	.7210585
unclass.	-.0258201	-0.815	0.415	-.0879007	.0362604
agriculture	-.0473513	-9.683	0.000	-.0569356	-.037767
forestry	-.1705237	-18.948	0.000	-.1881626	-.1528849
coal mining	.1198754	5.669	0.000	.0784306	.1613202
petrol min.	.4468885	17.105	0.000	.3956825	.4980945
other mining	.2090204	11.172	0.000	.1723488	.245692
textiles	-.0540845	-8.865	0.000	-.0660421	-.0421268
paper	.0635268	3.689	0.000	.029776	.0972776
printing	.0972122	8.372	0.000	.0744537	.1199707
petrol ref.	.3371994	22.255	0.000	.3075018	.3668969
chemical	.1128499	11.872	0.000	.0942194	.1314804
nonferrous	.0877841	7.995	0.000	.0662631	.109305
metallurgy	.0683983	5.161	0.000	.042424	.0943727
furniture	-.1039648	-9.103	0.000	-.126349	-.0815807
energy	.0869883	9.312	0.000	.0686796	.105297
water	-.0288128	-3.122	0.002	-.0469014	-.0107243
construction	.0400046	6.523	0.000	.0279839	.0520253
trade	-.0308174	-6.541	0.000	-.0400522	-.0215825
foreign trade	.2522449	19.442	0.000	.2268161	.2776737
catering	-.1104682	-15.320	0.000	-.1246014	-.0963351
transport A	-.0751731	-9.604	0.000	-.0905146	-.0598315
railways	.0127461	1.604	0.109	-.0028334	.0283255
public transp.	.3244528	22.752	0.000	.2965028	.3524028
mail+telecom	-.0198513	-1.971	0.049	-.0395931	-.0001096
Budapest	.0959627	11.860	0.000	.080104	.1118215
Central-cap.	.0256607	2.413	0.016	.0048141	.0465073
Central town	.0277295	3.343	0.000	.0114718	.0439872
NW - capital	-.0249255	-2.931	0.003	-.0415953	-.0082558
NW - town	-.0345315	-4.153	0.000	-.0508267	-.0182363
NW - village	-.1129919	-12.425	0.000	-.1308165	-.0951673
SW - capital	-.0006787	-0.073	0.941	-.0187991	.0174416
SW - town	-.0369531	-3.918	0.000	-.055437	-.0184691
SW - village	-.0711279	-7.139	0.000	-.0906545	-.0516012
NE - capital	-.022139	-2.745	0.006	-.0379471	-.006331
NE - town	-.0362242	-4.263	0.000	-.0528781	-.0195703
NE - village	-.1237398	-13.364	0.000	-.1418882	-.1055915
SE - capital	.026114	3.068	0.002	.0094329	.0427951
SE - town	-.0337295	-4.110	0.000	-.0498142	-.0176449
SE - village	-.0830757	-8.870	0.000	-.1014324	-.064719
L<50	-.0258375	-5.237	0.000	-.0355083	-.0161668
301<L<1000	.0713121	19.598	0.000	.0641801	.0784441
1001<L<3000	.1196812	26.975	0.000	.1109851	.1283772
L>3000	.1634329	28.343	0.000	.152131	.1747347
ln(K/L)	.0397216	32.669	0.000	.0373385	.0421048
private	-.0112392	-3.457	0.000	-.0176114	-.0048669
foreign	.1552077	34.306	0.000	.1463404	.164075
mixed	.0959496	11.010	0.000	.078868	.1130311
ln(u)	-.0904166	-13.699	0.000	-.1040388	-.0779943
_cons	9.090924	539.511	0.000	9.057898	9.12395

1995

Source	SS	df	MS	Number of obs =	94371
				F(56, 94314) =	1558.01
Model	14056.72	56	251.012858	Prob > F =	0.0000
Residual	15195.0237	94314	.161111009	R-squared =	0.4805
				Adj R-squared =	0.4802
Total	29251.7437	94370	.309968673	Root MSE =	.40139

lnker	Coef.	t	P>|t|	[95% Conf.	Interval]
male	-.2299961	-75.543	0.000	-.2359634	-.2240288
exp	.0212346	44.369	0.000	.0202966	.0221726
exp2	-.000293	-26.885	0.000	-.0003144	-.0002716
vocational	.1067445	29.035	0.000	.0995388	.1139502
secondary	.1975151	45.382	0.000	.1889846	.2060456
higher	.5639973	88.045	0.000	.551442	.5765525
non-manual	.2171758	55.126	0.000	.2094542	.2248974
managerial	.7402642	81.382	0.000	.7224358	.7580926
unclass.	-.0205314	-0.767	0.443	-.0729693	.0319065
agriculture	-.023571	-4.611	0.000	-.03359	-.0135521
forestry	-.0751017	-7.821	0.000	-.0939225	-.0562809
coal mining	.2843081	16.048	0.000	.2495837	.3190325
petrol min.	.3913358	15.767	0.000	.3426897	.4399819
other mining	.1691403	8.159	0.000	.128507	.2097735
textiles	-.0205111	-3.302	0.001	-.0326857	-.0083366
paper	.1202202	6.590	0.000	.0844652	.1559751
printing	.0976815	8.209	0.000	.0743582	.1210049
petrol ref.	.1384989	7.916	0.000	.1042058	.1727919
chemical	.1460846	14.324	0.000	.1260953	.1660739
nonferrous	.0974744	8.710	0.000	.075539	.1194099
metallurgy	.1430944	10.346	0.000	.1159865	.1702024
furniture	-.0388036	-3.212	0.001	-.0624784	-.0151289
energy	.0227247	2.523	0.012	.0050714	.040378
water	.0285868	2.463	0.014	.0058378	.0513358
construction	.0056339	0.988	0.323	-.0055465	.0168144
trade	-.0859342	-17.982	0.000	-.0953009	-.0765676
foreign trade	.1511244	12.132	0.000	.1267095	.1755394
catering	-.216405	-30.498	0.000	-.2303127	-.2024974
transport A	-.0211413	-2.919	0.004	-.0353389	-.0069436
railways	-.0414952	-4.316	0.000	-.0603373	-.0226531
public transp.	.1162833	8.911	0.000	.0907071	.1418596
mail+telecom	-.0020604	-0.233	0.816	-.0194195	.0152987
Budapest	.0888741	11.388	0.000	.0735782	.10417
Central-cap.	.0637385	5.929	0.000	.0426671	.0848099
Central town	.0566837	6.688	0.000	.0400728	.0732946
NW - capital	.0185802	2.175	0.030	.0018344	.035326
NW - town	.0142739	1.693	0.091	-.0022558	.0308036
NW - village	-.0271253	-2.933	0.003	-.0452529	-.0089977
SW - capital	-.0331256	-3.456	0.000	-.0519131	-.014338
SW - town	.0342016	3.411	0.000	.0145516	.0538517
SW - village	-.0377352	-3.657	0.000	-.0579577	-.0175128
NE - capital	.0222869	2.623	0.009	.0056326	.0389413
NE - town	.0079731	0.866	0.386	-.0100701	.0260164
NE - village	-.0523116	-5.381	0.000	-.0713658	-.0332574
SE - capital	.0395135	4.539	0.000	.0224522	.0565749
SE - town	.00903	1.047	0.295	-.0078721	.0259322
SE - village	-.0628487	-6.381	0.000	-.0821522	-.0435452
L<50	-.0437694	-9.951	0.000	-.0523905	-.0351483
301<L<1000	.1251477	33.563	0.000	.1178394	.1324559
1001<L<3000	.1143944	23.615	0.000	.1048997	.1238891
L>3000	.1702669	27.042	0.000	.157926	.1826077
ln(K/L)	.0468704	39.206	0.000	.0445273	.0492136
private	-.0109373	-2.888	0.004	-.0183598	-.0035148
foreign	.1841862	43.107	0.000	.1758115	.1925608
mixed	.2021795	1.124	0.261	-.1503378	.5546968
ln(u)	-.1093521	-15.676	0.000	-.1207749	-.0939294
_cons	9.818013	489.122	0.000	9.778671	9.857355