2004

WORKING PAPER SERIES /7/

CNB CZECH NATIONAL BANK

WORKING PAPER SERIES

Anatomy of the Czech Labour Market: From Over-Employment to Under-Employment in Ten Years?

Edited by:
Vladislav Flek

7/2004

THE WORKING PAPER SERIES OF THE CZECH NATIONAL BANK

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Abstract

In this volume we investigate the macroeconomic aspects of labour market behaviour and its microfoundations. In the first part we deal with aggregate labour market trends and issues relevant to macroeconomic policy. The second part analyses in more detail labour flexibility, namely labour market flows, long-term unemployment and labour force deprivation. The third part addresses wage flexibility and relative wages, with special attention paid to regional unemployment elasticity of wages and returns to education. Worsening labour market performance can be seen especially in a rising NAIRU, declining labour mobility, labour deprivation due to long-term unemployment, skill mismatch and emerging signs of inflexibility in wage structures. Our conclusions are of use for both macroeconomic and labour market policies, signalling, among other messages, limitations on potential output growth stemming from deteriorated labour market performance and a need for institutional and structural changes rather than counter-cyclical policies to solve the unemployment problem in the Czech Republic.

JEL Codes: E24, J21, J30, J31, J44, J61, J62, J63, J64, J65.
Keywords: Employment, labour flows, labour force marginalisation, NAIRU, returns to education, unemployment, wage curve, wage differentials, wage inflation.

* This work was supported by Czech National Bank Research Project No. D7/2003. The views expressed are those of the authors and do not necessarily reflect the official views of the Czech National Bank or of the other institutions with which the authors are affiliated. The authors wish to thank Ales Bulíř, Jan Frait and Pavel Mertlík for carefully reviewing this working paper. Thanks are also due to Bas Bakker, Randall Filer, Michaela Erbenová, Ketil Hviding, Nadeem Ilahi, Kornelia Krajnyak, Anca Pruteanu, Ondřej Schneider, Alun Thomas and Eva Zamrazilová for their valuable comments on particular chapters of this volume, Anna Vlášková for her assistance in data collecting, and Eva Grénarová for technical support. The authors alone, however, are responsible for all remaining errors and omissions.

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The Czech Labour Market: From "Success Story" to Painful Reality

Vladislav Flek

Over time, there has been a gradual shift in how Czech labour market performance is generally assessed. From heralding it as a "success story" among the transition economies,[1] commentators now tend to emphasise a more painful reality of serious institutional, structural and policy shortcomings.[2]

This story has both macroeconomic and microeconomic dimensions. There is, however, still a lack of studies that combine a macroeconomic view on how the Czech labour market functions with in-depth microeconomic analysis, and which cover the whole past decade in such a way.[3] This volume represents an effort to fill that gap, at least partly, assessing at the same time the relevance of labour market research to monetary policy. Six chapters are included in this volume.

Flek and *Večerník* interpret in Chapter 1 data on (un)employment trends, wage developments, labour market policies, institutions and even workers' opinions as expressed in various surveys. This chapter argues that macroeconomic trends, government policies and human attitudes are all interlinked, thus creating a socio-economic context within which the labour market operates. This enables the authors not only to tell the history of the Czech labour market over the past decade, but also to examine the reasons behind deteriorating labour market performance and to propose an adequate policy agenda.

Hurník and *Navrátil* deal in Chapter 2 with equilibrium unemployment in the Czech Republic and document its increase over time. There is more of interest than just a look at changing aggregate labour market performance. Current monetary policy practice of the Czech National Bank uses the deviation of actual output from its equilibrium level as the basis for decision-making processes. It should be noted that behind any equilibrium output level there is a corresponding equilibrium rate of unemployment. This can be approximated by the non-accelerating inflation rate of unemployment (NAIRU). Similarly, for fiscal policy, the notion of the NAIRU is essential in assessing the structural and cyclical component of the budget deficit. Thus the importance of identifying the time variations of the NAIRU follows from its direct impact on monetary and fiscal policies.

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[1] A typical statement of this sort was made, for example, by OECD (1995, pp. 9, 11): "The Czech Republic is often heralded as a success story among the transition economies […] All this has happened with little unemployment and no visible signs of widespread poverty or economic hardship […] The Czech exception can be fully appreciated when reference is made to the labour market."

[2] That is why, for example, Takizawa, Tzanninis and Elkan (2002, p. 3) admit that "the Czech Republic has experienced a rapid deterioration of labor market conditions since the mid 1990s".

[3] Among others, Barr (1994); OECD (1995); Večerník (1996); Boeri (1997); Flek and Večerník (1998); Svejnar (1999); Nešporová, (1999); Funck and Pizzati (2002); and Sirovátka and Mareš (2003) also attempt to analyse the Czech labour market in a complex manner, but the time span is shorter and/or the focus relatively narrower than in the present volume. To achieve such an ambitious goal, however, we partly fall back on broader international comparisons.

Gottvald presents in Chapter 3 a slightly different frequency of labour flows, as compared with recent calculations by other authors, thus altering the microeconomic view held up to now on Czech labour market dynamics. It also provides the most recent data available on declining labour mobility, a finding that supports the hypothesis of increasing equilibrium unemployment and labour market rigidity in general.

Mareš and *Sirovatka* show in Chapter 4 that without controlling for a degree of labour marginalisation and deprivation, the assumptions about the aggregate labour market's supply-side behaviour could be biased. Namely, an increasing number of Czech workers are in fact being excluded from labour market competition due to increasing long-term unemployment, with a measurable degree of social and material deprivation. At the same time, this is probably the first study providing some evidence on involuntary unemployment in the Czech Republic. Both these findings lead to analogous conclusions regarding the deterioration in labour market performance as in the previous chapters.

Galuščák and *Münich* analyse in Chapter 5 the regional unemployment elasticity of wages. This approach, called the wage curve, is widely used as an indicator of (regional) wage flexibility. The authors argue that the previous studies on this topic might be biased due to methodological shortcomings or inappropriate data structure. Some indication of a weakening of this elasticity since the end of the 1990s appears to be associated with a sharp rise in long-term unemployment. As this trend is expected to continue, it could further attenuate the unemployment elasticity of wages and complicate labour market adjustment processes, especially if adverse macroeconomic shocks appear in the future.

Jurajda estimates in Chapter 6 wage returns to various education levels and the resulting impact on the wage structure. Contrary to the existing studies, most recent data reflecting the late-transition period are also included. The results indicate relatively high returns to education in international comparison. However, skill obsolescence (and skill mismatch in general) may simultaneously be occurring for the highly skilled, as returns to university education appear to be higher for the younger cohorts. In addition, it is the short supply of university education (and not necessarily high productivity gains associated with highly skilled labour) that appears to be pushing the level of education-based wage differentials up. Finally, the returns to education started stagnating most recently, a finding consistent with the overall picture indicating insufficient wage flexibility.

We have collected the most recent and original research outcomes regarding the impact of labour market functioning on the overall performance and stability of the Czech economy. Both the macroeconomic aspects of labour market behaviour and its microeconomic foundations are characterised and comparisons made whether different levels of analysis deliver mutually compatible messages. Mostly, this indeed appears to be the case.

The conclusions regarding diminishing labour market efficiency/flexibility are of direct use for both macroeconomic and labour market policies. We indicate, among other messages, the limitations on potential output growth stemming from the deteriorated labour market performance and the need to adopt structural and institutional changes rather than counter-cyclical economic policies to deal with the relatively high unemployment in the Czech Republic.

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1. The Labour Market in the Czech Republic: Trends, Policies and Attitudes

Vladislav Flek and Jiří Večerník[4]

The opening of markets which started in 1990 produced new opportunities and incentives for labour adjustment and mobility. In parallel, it necessitated the establishment of standard labour market institutions which framed mobility and flexibility. The labour market became an arena of constant flux in terms of institutional settings and policies, as well as in terms of peoples' adaptation and shifts between different labour market states or jobs. During the process, the labour force differentiated according to education, ownership sector and, in particular, to personal abilities and willingness to move.

The market reforms and stabilisation policies that followed the foreign trade and price liberalisation were expected to produce high unemployment in transition countries. Because of the apparent inevitability of rising unemployment, Boeri (1997, p. 367) argues that in such circumstances the policy issue is not "…to prevent the rise in unemployment, but to cushion its social costs and to avoid the spread of long-term unemployment". In the Czech Republic, however, there initially appeared to be more emphasis on keeping unemployment (artificially) low, instead of moderating the consequences of relatively high transitional unemployment, a phenomenon known as the "Czech unemployment miracle".

Now, the country is facing a 10% unemployment rate, and many aspects of labour market functioning and its impact on economic growth and stability remain unclear. This concerns fundamental questions such as the actual degree of labour market flexibility, the appropriate design of labour market institutions and the adequacy of the labour market policies adopted. Moreover, there is no statistical evidence on the informal economy, which allows people to combine various forms of labour market involvement with welfare provisions and to accumulate unregistered income in such a way.

In this chapter we put together various statistical and sociological data on employment and unemployment trends (section 1.1); wage developments (section 1.2); and even workers' opinions and their potential labour market strategies, as reflected in various surveys (section 1.3). Behind this attempt, there is a belief that labour market institutions, applied policies and people's attitudes are all interlinked, eventually affecting aggregate labour market performance. Both the path dependency from the communist society and the new challenges brought by open markets are in play here.

[4] Jiří Večerník's involvement was additionally supported by the Targeted Grant Scheme of the Grant Agency of the Czech Academy of Sciences No. S7028351: "Structural tensions at the interface between labour market and social policy from the point of view of human resources and social inclusion".

1.1 Changes in Employment, Unemployment and Labour Mobility

In the 1990s, the quantitative shifts in demographic behaviour, including reproductive activity and life expectancy, were so substantial that they allow us to speak of a qualitative change. Two trends characterise the development of family behaviour since 1989: the number of marriages is declining and fewer children are being born. Three conditions help to explain the internal sources of this development: (i) the inheritance of a deformed population structure from the former regime; (ii) an increase in opportunities for self-fulfilment of young people; and (iii) a weak housing market. Similarly, ageing of the population accompanies this demographic transition.[5]

Regarding unemployment trends, there was no radical increase in unemployment in the Czech Republic as had been expected immediately after 1990. There are both microeconomic (institutional) and macroeconomic arguments explaining the Czech "unemployment miracle":

Due to the specific character of the Czech privatisation process and the semi-state-owned banks providing generous credit to large enterprises, labour was further hoarded. This is not to say that employment reductions did not take place. But, because of the above-mentioned specificity of financing of (formerly) state-owned enterprises, these pressures were clearly much lower than they would otherwise have been.[6] Moreover, most of those who eventually left the large industrial giants did not enter the pool of unemployed people anyway. Instead, they moved directly to another job or exited the labour market altogether (see the text below). The country thus enjoyed a remarkably low unemployment rate until the mid-1990s.

In the near absence of unemployment, direct job-to-job shifts were the main source of structural changes in employment, to respond to labour demand in the newly expanding sectors. Indeed, active workers profited from the open markets, and huge mobility (job-to-job) flows between the "old" (primary and secondary) and "new" (tertiary and quaternary) sectors occurred (see also Table 5). The biggest absorption capacity was expected among new entrepreneurs. According to the Labour Force Surveys (LFS), in the spring of 1992 the self-employed represented 6% of the total labour force, and entrepreneurs with employees 2.5%.[7]

As a result of both lax financial markets and a relatively high labour turnover, the higher unemployment remained strictly localised in regions of heavy manufacturing and iron and steel

[5] See Možný and Rabušic (1999) for details.

[6] Bank-owned investment privatisation funds established in the course of voucher privatisation became the key owners of Czech privatised enterprises. As a result, (state-owned) commercial banks often tended to treat their "clients" in a specific manner, meaning in many cases artificial enterprise survival for an extended period. Apart from the inter-linked ownership structure, commercial banks were afraid to terminate credit lines to (formerly) state-owned enterprises simply because of the large amount of already accumulated "non-performing" or "bad" loans, some of them inherited from the previous regime. Thus, a more prudent approach by commercial banks would have led not only to immediate bankruptcies of many industrial enterprises, but also to the destruction of any prospects of repaying less recent loans. This strategy of commercial banks, based on wishful thinking, further damaged their balance sheets, a situation that was resolved only by the full privatisation of banks starting in the second half of the 1990s. See Čapek (1995); or Mervart (1998) for more discussion.

[7] Note, however, that even though the launch of *de novo* firms was vigorous (almost no self-employment existed before 1989 in the Czech Republic), it could hardly be called an explosion. In 1998 the corresponding figures were 10% and 4%, and by the end of 2000 only the percentage of self-employed had increased, to 12%, remaining the same in 2002. Self-employment is used much more, however, as a secondary job.

production, which lost their Eastern markets. Also several micro-regions depending on one factory instead of industrial diversity – a typical product of socialist industrialisation – faced employment problems. (More recently, however, regional unemployment, especially in Northern Bohemia and Moravia, has become one of the most striking features of the Czech labour market, with some local unemployment rates exceeding 20%.)

In macroeconomic terms, the initial downward real wage flexibility in the early 1990s additionally reduced the pressures for mass redundancies: real wages declined more than labour productivity, so that labour became, relative to output per employee, even cheaper than before the beginning of the transition period (Table 1).[8]

Table 1: Employment, Wages, Productivity and Participation
(annual changes in per cent)

	90	**91**	**92**	**93**	**94**	**95**	**96**	**97**	**98**	**99**	**00**	**01**	**02**	**03***
Employment[1)]	-0.9	-5.5	-2.6	-1.6	0.8	2.6	0.7	-1.9	-1.3	-2.5	-0.2	0.3	-0.4	-0.5
GDP per employee	-0.2	-9.2	-0.7	1.9	1.0	4.2	3.2	0.0	0.9	3.3	4.0	2.6	1.2	3.2
Real wage	-5.5	-26.0	10.0	3.7	7.7	8.6	8.8	1.8	-1.2	6.1	2.6	3.8	5.2	6.9
Participation rate	66.9	.	62.6	61.0	62	61.5	61.2	61.0	61.0	61.0	60.0	60.0	60.0	59.0

Source: Statistical Yearbooks of the Czech Republic.
* Preliminary 1st – 3rd quarters 2003.
***Notes*:** 1) Average number of workers in the civil sector of the national economy.

Low real wages, high mobility flows and relatively low pressure for restructuring, however, cannot explain the story in full: given the extent of the transition recession, employment reductions were frequently inevitable – aggregate employment dropped by more than 500,000 persons during 1990–1993, a net change of some -10%. Fortunately, the contraction in aggregate employment took place simultaneously with declining labour force participation. Flows from employment to unemployment were much lower than they would otherwise have been because of sharply declining labour market participation by women and people of post-active age: During 1990–1993, the number of working pensioners declined by 250,000, about 100,000 more individuals opted for early retirement schemes, and the participation of women dropped by 270,000. As a result, there was only one unemployed person for every five jobs lost.[9]

In 1994 the first rise in aggregate employment was recorded and end-year unemployment declined by comparison with the end of 1993 (see also Table 2). In 1995, the developments of both employment and unemployment were even more favourable. The same situation essentially prevailed on the labour market in 1996 as well. This can be attributed to a demand-driven economic recovery resulting in a macroeconomic overheating. But one equally has to note the prevailing low pressure for restructuring in (privatised) enterprises as a transition-specific, short-term factor keeping the unemployment figures artificially low. The low pressure to restructure manifested itself in an absence of large waves of redundancies and in automatically continuing credit lines to the pre-privatisation clients of commercial banks, as well as increasing inter-enterprise arrears and almost absent bankruptcies of over-leveraged firms.

[8] See, for example, Flek (1996) for more discussion.

[9] See, among others, OECD (1995) or Rutkowski (1995) for additional discussion of the Czech "miracle".

The combination of increasing employment, low unemployment and real wages growing sharply in excess of labour productivity during 1994–1996 was clearly unsustainable over the long term, not least because of impending wage-push inflation and adverse effects on the country's international (price) competitiveness. This lay at least partly behind the strong policy response to the macroeconomic developments in mid-1997 (involving changes in the exchange rate regime, budgetary cuts and a more restrictive monetary policy). Consequently, a decline in aggregate employment was recorded in 1997 for the first time since 1993.

Table 2: Unemployment in the Czech Republic[1)]
(registered unemployment)

	90	**91**	**92**	**93**	**94**	**95**	**96**	**97**	**98**	**99**	**00**	**01**	**02**	**03**
Unemployment														
- rate[2)]	0.73	4.13	2.6	3.5	3.2	2.93	3.52	5.23	7.48	9.37	8.78	8.90	9.81	10.3
- rate[2) 3)]	.	2.80	3.04	2.98	3.28	2.98	3.08	4.36	6.13	8.62	8.99	8.54	9.20	9.92
- stock[4)]	39	222	135	185	166	153	186	269	387	488	457	462	514	542
- stock[3) 4)]	.	149	160	157	171	155	162	223	317	447	469	444	480	523
Unemployment by education Of which:[5)]														
Primary	.	33	38	38	39	39	37.8	32	30	29	31	31	31	30.8
university	.	4.1	2.7	2.2	2.1	2.1	2.2	2.7	2.7	3.0	2.9	3.1	3.1	3.2
(school-leavers)	8.9	21.0	20	18.1	17.7	18	20.1	23	25	24.0	22	22	22	21.5
Duration of unemployment[5)]														
less than 3 months	.	40.0	47	46	40.5	39.0	41.6	37.0	35	27	26	26	24.0	22.7
3–6 months	.	31	21	23.0	22	22	23.0	25	26	21	18	19.0	20	18.6
6–9 months	.	16	8.4	9.5	9.9	9.4	9.7	11.3	11	13	10	10	11	10.3
9–12 months	.	9.4	6.5	6.4	6.6	6.4	5.6	6.7	6.9	9.6	7.5	7.6	8.1	8.1
more than 12 months	.	3.9	17	15	21	24	20.1	20	22	30	38	37	37	40.3
Unemployed per vacancy	.	4.6	1.7	3.4	2.2	1.7	2.2	4.3	10	14	8.8	8.9	13	13.5
Of which:														
- primary	.	6.0	3.2	7.9	4.5	3.2	3.5	6.2	12.0	16	11	10	14	13.6
- university	.	1.8	0.7	1.0	0.7	0.7	1.2	3.0	5.2	7.3	4.6	4.4	5.7	6.2
Unemployment by age groups[5)]														
Of which:														
up to 19	.	19.0	17	16	14	13	12.9	12	8.4	4.8	3.5	7.8	7.4	6.9
20–24	.	14	15	15	15	27.3[6)]	26.8[6)]	29.5[6)]	25	25	23	18.0	18.0	17.0

Notes: [1)] Unless stated otherwise, the figures refer to end-year data. [2)] Per cent of the labour force. [3)] Annual average. [4)] Number of job applicants in thousands. [5)] Per cent of the stock of unemployed. [6)] For age group 20–29.

***Source**:* Statistical Yearbooks of the Czech Republic; Czech Ministry of Labour and Social Affairs.

Since then, gradually increasing restructuring pressure can be observed in privatised firms (including large waves of redundancies leading to productivity improvements), as well as progress in bankruptcy enforcement and enterprise financial discipline. All this has made the aggregate

unemployment figures grow more or less steadily (and employment decline at the same time)[10], almost regardless of business cycle fluctuations and/or government policies.

At the end of 2000, unemployment had dropped to 8.8%, in comparison with 9.4% at the end of 1999. This short-term reversal in the rising unemployment trend was for the most part a result of an increase in the numbers of individuals opting for early retirement. The inter-annual growth of employment in 2001 was caused by one-off factors, in particular the introduction of a new Labour Code, which reduced the possibilities for overtime work. The unemployment rate, however, has risen continuously since 2001.

This includes highly undesirable trends such as rising long-term unemployment, job destruction prevailing over job creation, structural unemployment as a consequence of educational and regional labour mismatch,[11] high unemployment among school-leavers, etc. (Table 2). Growing wage pressure on the part of trade unions has made the situation on the labour market even more complicated.

Apart from the regional dimension of unemployment, the rise in long-term unemployment is particularly striking, even by comparison with other Central European countries (Table 3) or the EU average.[12] In addition, there is a high measurable extent of social and material deprivation among the long-term unemployed (see Chapter 4 for more details). This produces labour market marginalisation and excludes a substantial part of the Czech population from competing on the labour market. We also suspect that this phenomenon is behind the wage hikes the country has to face, despite high aggregate unemployment figures. These findings are consistent with the signals that "equilibrium unemployment" (NAIRU) is increasing (see Chapter 2 for more discussion).

Another consequence that appears to be linked with long-term unemployment is a recent weakening of the unemployment elasticity of wages (see Chapter 5 for details). All this has happened regardless of the government's recent efforts to foster an "active" labour market and its industrial policies, including radically increasing budgetary resources for such policy measures.

[10] Sociological surveys show the largest decrease in the number of employed in the pre-retirement cohort (age 45–60 for men and 45–55 for women). Also, prolonged periods of study among the youngest cohort contributed to the overall decrease in employment – see Matějů (1999).

[11] Chapter 6 documents the consequences of educational mismatch on the Czech relative wage structure. As regards regional mismatch, Fialová (2003) computed a regional "mismatch index" for the Czech Republic using the Jackman and Roper (1987) methodology and showed that the value of the index more than doubled between 1991 and 2002. One also has to note that in 1991, at the peak of "transition recession", the minimum and maximum district unemployment rates were 0.9% and 9.1% respectively. By contrast, in 2002, the corresponding values were 2.8% and 21.7%.

[12] According to the OECD (2002), the share of long-term unemployment in total unemployment in the Czech Republic exceeded the EU average in both 2000 and 2001. Among EU countries, only Italy (with 63%) recorded higher long-term unemployment than the Czech Republic in 2001.

Table 3: Long-Term Unemployment (more than 12 months) in Selected Countries
(per cent in total unemployment)

	92	93	94	95	96	97	98	99	00	01	02
Czech Rep.	n.a.	18.5	22.3	31.2	31.3	30.5	31.2	37.1	48.8	52.7	50.7
Hungary	20.4	33.5	41.3	50.6	54.4	51.3	49.8	49.5	48.9	46.7	44.8
Poland	34.7	39.1	40.4	40.0	39.0	38.0	37.4	34.8	37.9	43.1	48.4
Slovakia	n.a.	n.a.	42.6	54.1	52.6	51.6	51.3	47.7	54.6	48.2	59.8

Source: OECD (2002); OECD (2003b). The different figures for the Czech Republic in Tables 2 and 3 are cau - sed by the use of registered unemployment in Table 2,as opposed to Labour Force Surveys in Table 3.

Substantial shifts have occurred in the structure of employment (Table 4). The key changes in the structural composition of employment took place during 1990–1996, when the rate of unemployment was very low.

Table 4: Employment Structure (in per cent)

	90	91	92	93	94	95	96	97	98	99	00	01	02	03*
Industry	37.9	38.5	36.5	35.3	33.1	32.5	31.9	32.5	32.4	32.2	31.7	31.9	31.5	30.5
Construction	7.5	8.0	8.3	9.4	9.1	9.0	9.0	8.8	8.8	8.5	8.3	7.8	7.5	6.5
Agriculture	11.8	10.1	8.6	6.8	6.9	6.2	6.0	5.8	5.1	4.9	4.4	4.2	4.1	3.9
Transport, Com- Munications	7.0	7.3	7.4	7.9	7.2	7.1	7.2	7.1	7.1	7.4	7.2	7.3	7.3	7.2
Trade and Catering	11.5	11.3	13.1	14.9	17.2	17.7	18.5	17.9	19.0	18.0	18.8	19.0	19.3	19.6
Health and Welfare	5.2	5.3	5.5	5.4	5.3	5.2	5.3	5.4	5.4	5.6	5.6	5.6	5.8	5.7
Education	5.9	6.4	6.6	6.7	6.6	6.5	6.4	6.2	6.3	6.3	6.3	6.2	6.3	6.3
Banking and Insurance	0.5	0.7	1.0	1.3	1.6	1.7	1.8	1.8	2.0	1.8	1.8	1.7	1.7	1.7
Administration, Defence	1.8	2.0	2.5	2.7	3.0	3.2	3.3	3.6	3.7	3.8	3.9	4.1	4.1	6.2
Other services	10.9	10.4	10.5	9.6	10.0	10.9	10.6	10.9	10.2	11.5	12.0	12.2	12.4	12.4
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Source*:* Statistical Yearbooks of the Czech Republic.
Notes: * Preliminary 1st – 3rd quarters 2003.

The employment share of industry declined from approximately 38% to 32% during that period, while the employment share of agriculture declined from 12% to 6%. Expanding sectors such as trade and banking increased their employment shares mainly in the first half of the 1990s.

The main sources of the changes in employment structure were massive labour force withdrawals in agriculture and industry (exits of working pensioners from the labour market, mass retirements, both regular and early, and also a decrease in women's participation), coupled with job-to-job movements. Flows to employment from unemployment were rather complementary, with no substantial impact on the structure of employment (cf. Chapter 3).

Within public services, state administration and defence have increased their employment shares, while education and health services have stagnated. Despite all the changes, the Czech labour force is still relatively overburdened in industry and short-staffed in services, in particular advisory, information, personnel and other modern services for firms. Nonetheless, the above

listed shifts in employment structure were considered, by, for example, OECD (1995), to be a satisfactory indicator of structural changes. Since 1995–1996, however, the process of further change in the structure of employment has nearly stopped. Even the constant rise in unemployment has had no visible consequences in terms of further structural changes in employment.

More detailed evidence on labour mobility is provided by the Labour Force Surveys (LFS), which started in 1993. They document massive job-to-job movements, representing one half of all mobility flows at the beginning of the 1990s. By contrast, in the late 1990s the role of this mobility flow declined heavily. The LFS data also show that the Czech labour market reached a turning point between 1995 and 1997, when the employment stock peaked and the unemployment stock shrank. Yet in 1995, job-to-job movements amounted to almost half a million workers, while in 1996 the labour market was more rigid, meaning a relatively sharp decline in total flows.

In 1997, the flows started to rise again, but – in contrast to the previous period – this rise was fed by mounting numbers of employees becoming unemployed (Table 5). A look at the changing nature of labour flows provides analogous information to the study of structural changes in employment, thus documenting increasing stagnation and rigidity on the Czech labour market (see Chapter 3 for more details on labour flows).

Table 5: Yearly Flows Between Labour Market States (thousand persons)

Kind of flow	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**
Unemployment-employment	119.5	113.5	101.4	104.6	104.7	100.7
Inactivity-employment	248.3	217.1	176.5	147.8	188.9	166.6
Employment-unemployment	82.7	65.5	61.0	74.6	88.1	147.0
Employment-inactivity	257.3	209.9	281.4	197.4	185.6	183.4
Unemployment-inactivity	25.5	35.0	35.4	20.2	23.9	24.9
Inactivity-unemployment	52.7	31.5	29.6	29.0	53.2	72.1
Job-job	723.1	572.2	446.7	353.5	315.0	247.2
Total flows	1509.1	1244.7	1132.0	927.1	959.4	941.9

Source: LFS, computations by Ivo Makalouš, Czech Statistical Office.

The LFS statistics also allow us to observe changes systematically in work contracts and other details. Regarding types of work contract, open-ended full-time job contracts strongly prevail in the Czech economy. Only 9% of employed workers had a non-standard contract at the end of 2002 and this percentage did not show any upward tendency. Nor are fixed-term contracts increasing: their proportion has remained stable since 1994 at about 7% of all employee work contracts. This type of work contract is popular among small entrepreneurs, who stick to this form to avoid severance pay and the other rather strict conditions of lay-off. Typically, professionals in public services, such as teachers, physicians, researchers and even journalists, are forced to accept fixed-term contracts.

Part-time jobs decreased from 6% of total employment in 1994 to 5% at the end of 2002 (in contrast to the EU average of 16%). Women work under part-time contracts more frequently than men. Most of the reasons for not working full time are on the side of employees – men frequently

declare health reasons and continuing education as grounds for not working full time, while women usually stress child care.

While men declare a constant rate of under-employment,[13] slightly exceeding one-tenth of those engaged in part-time work, women report increasing levels of under-employment, which reached 28% of those doing part-time work in 1998, but decreased to 15% in 2002. In short, part-time jobs do not appear to be a tool that substantially enhances labour market mobility in the Czech Republic.

With closing channels of labour mobility, a decreasing percentage of employed people are also searching for second or additional jobs. According to the LFS, their numbers are sharply decreasing (from 250,000 in 1993 to 115,000 in 2002), amounting to a negligible 2.5% of total employment at the end of 2002. Such numbers appear to be under-reported: while the LFS tells us that the number of self-employed had reached only 774,000 by the end of 2002, 2.2 million business licenses had been issued and there were 1.848 million registered entrepreneurs (excluding foreigners) by the end of 2002.

1.2 Wage Developments and Disparities

To understand the post-1989 wage developments, one has to address wage issues at both an aggregate and more structured level. The aggregate view will show us wages developing within the context of macroeconomic indicators and government policies. By contrast, a closer look at industrial and even individual wages will deliver us necessary insights into the newly emerged relative wage structures.

Aggregate real wage developments at the very beginning of the transition process were characterised by sharp absolute declines, meaning consumer prices increasing more rapidly than nominal wages. One has to discuss at least three factors that appear to explain the causes of these developments, as well as their social acceptance: a) the overall macroeconomic context; b) the role of mandatory incomes policies; and, finally, c) the pre-privatisation motivation of both managers and employees.

a) Neither excessive aggregate demand, nor unrealistic wage claims occurred in the early 1990s: price liberalisation followed by sound monetary and fiscal policies had dissolved any monetary overhang and caused aggregate demand to decline sharply. A dramatic fall in GDP had diminished the total real income available. Because of this, the previous real wage levels were unsustainable. The threat of a wage push potentially existed, but was effectively removed by a specific "implicit social contract" between the government and the main social actors;
b) The mandatory incomes policy agreed between the government, the trade union confederation and employers' associations was introduced in 1991 to prevent a wage push. The 1991 decline in consumer real wages, however, was more than two and a half times higher than that stated by the agreed targets, thus making wage controls rather

[13] The rate of under-employment represents the reported share of those who work part-time involuntarily, as opposed to the share of total part-time jobs in total employment.

superfluous.[14] Thus the only argument, if any, that might have justified the introduction of wage controls is that the government could not have perceived the actual development of wages.

c) The transitional recession had produced an overall fear of mass layoffs, a threat that outweighed the trade unions' concerns about wages. With personal benefits connected with the ongoing privatisation at stake, enterprise managers were keen to avoid industrial conflicts stemming from layoffs, since those appeared to be a more probable source of labour unrest than declining real wages. This, and not the wage controls agreed at the central tripartite level, appears to have been the true essence of the "implicit social contract".[15]

Table 6: Wage Developments in the Czech Republic (annual growth in per cent)

	91	**92**	**93**	**94**	**95**	**96**	**97**	**98**	**99**	**00**	**01**	**02**	**03***
Average nom. Wage[1)]	15.4	22.5	25.3	18.5	18.5	18.4	10.5	9.4	8.3	6.6	8.7	7.1	6.8
Average real wage[2)]	-26.3	10.3	3.7	7.7	8.6	8.8	1.8	-1.2	6.1	2.6	3.8	5.2	6.9
Unit labour costs[3)]	27.1	23.4	23.0	13.1	15.5	10.4	7.6	7.4	3.7	1.1	3.8	3.0	3.5
CPI	56.6	11.1	20.8	10.0	9.1	8.8	8.5	10.7	2.1	3.9	4.7	1.8	-0.1

***Source**:* Statistical Yearbooks of the Czech Republic.

***Notes**:* [1)] Average nominal wage per employee in the civil sector of the national economy.

[2)] Average nominal wage growth deflated by the CPI.

[3)] Ratio of the index of nominal compensation of employees and mixed income of households per worker to the index of total labour productivity at constant prices.

* Preliminary 1st – 3rd quarters 2003.

Conventional measures of wage inflation, such as nominal unit labour costs, would indicate the prevailing presence of inflation pressures stemming from wage developments over the investigated period (Table 6). Alternatively, in terms of real wages, the "wage cushion" (caused by a steeper decline in real wages than in labour productivity) was removed by the mid-1990s. Nonetheless, real wages generally continued to grow faster than labour productivity even after 1995 and the labour share (i.e. wages plus social insurance payments) in GDP increased from 42% in 1995 to 67% in 2002. The dominant effect of wage inflation is therefore to be seen in massive income redistribution in favour of wage earners, rather than in price inflation itself.

[14] In 1991 the government introduced a legally binding incomes policy with the aim of securing a 10% annual decline in consumer real wages. Enterprises as well as public sector institutions first had to wait until the past (quarterly) developments of the CPI were known and then adjust individuals' wages in line with the real wage target. Such a backward-looking mechanism thus permitted proportionally lower increases in individuals' wages compared with those in the CPI. A "tax-based" punitive penalty was introduced for exceeding the regulatory limits. Only small private firms with less than 25 employees were free from these wage controls. The incomes policy continued to be legally binding between 1992 and the first half of 1995 (with a break in the first half of 1993). The government declared zero growth in consumer real wages as a target for 1992 and 5% growth for 1993–1995. In order to compensate for the 1991 real wage deterioration and to preserve social accord, the policy norms became increasingly selective and decreasingly transparent over time and allowed an increasing number of exemptions. That is why real wage growth rates under the 1992–1995 incomes policy exceeded the norm (with the exception of 1993) and were not balanced by appropriate labour productivity improvements, either at the macro-level or at the industry level.

[15] See Flek (1996) for a more detailed explanation of the socio-economic context that had made the real wage declines acceptable for the short term.

The role of the central tripartite body has totally eroded over time, with the enterprise level being the true arena for the wage settlement process. The bargaining outcome usually meant that producers accepted declining real profit margins when allowing real wages to grow steadily in excess of labour productivity. Accepting such a wage strategy in fact impeded the privatised firms' chances of financing restructuring from their internal resources for an extended period. Industrial financial indicators, such as return on equity, remained below the returns on risk-free assets until the end of the 1990s, and the dependency of firms on external financing continued, with an evident adverse effect on employment.[16] Therefore, the microeconomic pattern of wage determination appears to express not only efficiency considerations on the part of employers in a Shapiro and Stiglitz (1984) fashion, but also continuing insiders' power.

Table 7: Relative Distribution of Wages by Deciles

(per cent and coefficients)

Decile	1989	1993	1997	1999	2001	2002
1	4.7	4.4	4.6	4.4	4.3	4.3
2	6.5	5.6	5.9	5.8	5.7	5.6
3	7.3	6.6	6.9	6.7	6.7	6.6
4	8.2	7.4	7.7	7.5	7.5	7.4
5	9.1	8.4	8.5	8.3	8.2	8.2
6	10.1	9.4	9.3	9.1	8.9	9.0
7	11.0	10.7	10.2	10.1	9.9	10.0
8	12.2	12.2	11.0	11.4	11.4	11.4
9	13.7	14.6	13.1	13.8	13.7	13.7
10	17.2	20.7	22.8	22.9	23.7	23.8
Total	100.0	100.0	100.0	100.0	100.0	100.0
Ratio 10:1	3.7	4.7	5.0	5.2	5.5	5.5
Robin Hood Index	14.1	18.2	17.1	18.2	18.8	18.9

***Notes**:* Robin Hood Index measures the share of total incomes (in per cent) that needs to be redistributed in order to obtain an equal distribution. Algebraically, it is half the mean deviation divided by the mean. (The Gini coefficient was not calculated here due to the small number of incomes bounds in published tables of wage surveys.)

***Source**:* Own calculations based on the Wage Surveys of the Czech Statistical Office.

The pre-1989 Czechoslovakia was characterised by extreme wage equalisation and, within the remaining disparities, by a predominance of individuals' demographic features (gender and age) over their personnel characteristics (skills and occupation). Alongside this, some industries (mining, iron and steel, heavy machinery) were favoured, and selected categories of workers (top state and party bureaucracy, army and police officers) privileged. Behind the facade of an almost stable range of wage inequality and small overall disparities, demographic factors actually strengthened and so-called productive industries were promoted, while the highly educated and the younger generations were disadvantaged.[17] After 1989, the transformation process broke many of those tendencies and started to change the established earnings structure.

[16] See Flek (2000) for more details.

[17] See Večerník (1991).

The range of wage inequality has increased remarkably (Table 7), but the main changes appear to have occurred in the first half of the 1990s. Since then, the continuing rapid overall wage increases co-exist with an increasingly stagnant wage distribution. This corresponds to the analogous stagnation of labour flows and employment structure observed in previous sections of this chapter. A similar tendency towards a gradual stagnation in wage structures for the second half of the 1990s can also be observed in Table 8.

According to the data in Table 8, the relative wage position of agriculture, industry and construction has attenuated while the position of trade, public administration and, in particular, banking and insurance has improved. Against expectations, however, earnings in modern services for human capital – health care and education – stagnated. In general, however, the wage growth rates of particular industries gradually tended to equalise during the second half of the 1990s, in spite of overall real wage increases.[18] From the beginning of the 2000s onwards, only a slight acceleration in inter-industry wage differentiation can again be observed.

Table 8: The Relative Wage Structure in the Czech Republic (in per cent, average=100)

	90	**91**	**92**	**93**	**94**	**95**	**96**	**97**	**98**	**99**	**00**	**01**	**02**	**03***
Industry	103.8	104.7	103.5	101.3	99.9	99.7	99.1	100.3	101.5	100.0	100.7	99.1	97.7	96.6
Construction	109.9	106.6	108.2	112.2	110.6	108.1	105.1	105.1	103.7	100.9	100.2	100.0	99.9	98.3
Agriculture	109.6	97.7	91.8	87.7	85.1	84.2	80.7	79.6	78.9	75.7	76.2	76.7	74.1	71.6
Transp.,com-munications	104.6	103.2	99.1	97.5	98.7	100.8	101.8	105.8	107.9	107.7	109.9	109	110	110.0
Trade and Catering	85.8	85.9	89.7	88.2	91.6	88.1	87.8	98.1	101.7	101.4	105.0	104.7	104	102
Health and Welfare	92.6	96.6	94.5	95.0	93.9	92.1	93.7	90.0	85.1	89.3	87.0	91.0	95.8	96.9
Education	88.1	90.3	90.6	90.2	91.7	90.9	93.0	88.1	84.2	87.5	83.6	84.9	86.6	88.4
Banking and Insurance	102.0	136.9	169.6	177.7	175.2	171.5	169.6	174.6	181.1	183.0	189.9	199	201	201
Govern. and Defence	100.4	105.3	114.6	118.9	120.7	117.6	118.4	110.1	103.0	107.7	103.2	105	108	114
Coeff. of var.	0.089	0.141	0.234	0.264	0.257	0.252	0.250	0.261	0.288	0.290	0.314	0.331	0.335	0.337

***Source**:* Statistical Yearbooks of the Czech Republic.
Notes: * Preliminary 1st – 3rd quarters 2003.

At the beginning of the transition period, wage structures were characterised by a wage advantage of new private firms as compared with state-owned enterprises. According to Flanagan (1995), a worker's wage in the new private sector exceeded by more than one-and-a-half times that which a worker of the same education and age range earned in the state-owned enterprise. This finding is, somewhat unusually, linked with the presence of a negative union wage differential because of the almost exclusive presence of trade unions in state-owned firms. Večerník (1996) notes, however, that the ownership-based wage differential tends to diminish over time.

According to Večerník (2001), the relative importance of age or sex for explaining wage variation among individuals has declined remarkably since 1988. By contrast, an increasing part of the total

[18] Flek and Večerník (1998) find an analogous trend in wage distribution within the manufacturing industry.

variance in wages can be explained by differences between non-manual and manual labour or by regions. The relative importance of education for explaining wage inequality has also increased. On the other hand, despite all the changes, sex still remains the most robust explanatory variable. It is also worth noting that the industry affiliation of a worker explains a greater part of the total wage variance than regions or manual/non-manual labour. This corresponds to the fact that sales-per-worker-based wage differentials between industrial enterprises were also found, as well as those based on profit per worker and enterprise market share, or, in other words, on rent-sharing patterns of wage determination among industrial enterprises (industries).[19]

The strengthening wage disparities caused by education can be considered the most important factor of wage determination (see also Chapter 6 for the most recent findings and a broader literature overview).[20] At the end of the communist era, one year of schooling increased men's earnings by 4% and women's earnings by 5%, according to Večerník (2001). In 1992, this figure increased to 6.1% for men and 8% for women; by 1996, the return amounted to 8.3% for men and 9.4% for women. Simultaneously, the effect of experience (years on the job) on earnings stagnated. Whereas in 1988, the effect of experience among men was nearly as strong as that of education, education clearly dominated over experience in 1996 and also more recently. In 2002, the return amounted to 9.1% for men and 10.2% for women. Despite some increase, the recent evolution of returns to education signals a certain stabilisation in the distribution of earnings, as Chapter 6 also witnesses.

Returns to education, however, tell us little about the actual degree of labour market efficiency. Chapter 6 documents in more detail that the exceptionally high "returns to education" in the Czech Republic appear to be just a result of a short supply of higher education. One can see that although returns to education have risen considerably, labour productivity has improved predominantly due to reductions in the labour force. In any case, employment reductions appear to be much more important for productivity developments than rising earnings disparities themselves.

1.3 Work Incentives and Workers' Attitudes

Various evidence and documents witness that there is a significant lack of flexibility and variability in employment patterns in the Czech Republic.[21] Emphasis should therefore be placed upon negotiating and implementing agreements to modernise the organisation of work, including flexible working arrangements, achieving the required balance between flexibility and security,

[19] In imperfectly competitive markets, supernormal rents (sales) are the result of monopoly power, while the participation of workers in sharing these rents depends on their bargaining power. This usually leads to a wage advantage for monopolised industries with high capital/labour ratios: favourable wages are relatively easily affordable because of exceptional profitability and the still low share of wages in value added. As far as empirical research is concerned, Basu, Estrin and Svejnar (1997, p. 285) note the presence of a sales-per-worker-based wage differential in Czech industry, which "is found to be positive and increasing over time". See also Buchtíková and Flek (1995), Flek and Večerník (1998), Flek (1996) or Gottvald *et al.* (2002) for additional evidence on wage differentials based on sales-per-worker, labour productivity and profitability.

[20] Gottvald *et al.* (2002) note that it is not education itself, but rather the type of occupation that is the major wage determinant. The two characteristics are, however, strongly correlated.

[21] See, for example, *Joint Assessment of Employment Policy Priorities* (2000).

and increasing the quality of jobs. At the same time, there are strong disincentives shaped by the relatively generous welfare scheme. Table 9 documents some of the most striking features of the Czech welfare system. First of all, there is a generously set minimum subsistence level for families with two (or more) children, ranging from 148% of the gross average wage in 1991 to a still relatively high ratio of 76% in 2002.[22]

This explains the benefit dependency and poverty trap that have both emerged in the Czech Republic (see Chapter 4 for more details and a broader outline of necessary changes in the current policy agenda). The point is that the bulk of the long-term unemployed suffer from low qualifications and employability. Because of the generous social protection scheme, however, their reservation wage remains close to the economy average wage, a fact that further diminishes the employment prospects of the unemployed and increases their benefit dependency. No wonder that, in such circumstances, the rapidly increasing budgetary resources allocated to support active labour market policies (ALMPs) appear to have been wasted.

Table 9: Average Wage and Subsistence Levels (CZK monthly, % of gross average wage)

Indicator	91	92	93	94	95	96	97	98	99	00	01	02
Gross average wage	3,792	4,644	5,817	6,894	8,172	9,676	10,696	11,688	12,658	13,494	14,668	15,709
Gross minimum wage	2,000	2,200	2,200	2,200	2,200	2,500	2,500	2,650	3,250 3,600*	4,000 4,500*	5,000	5,700
Average unemployment benefit	…	1,404	1,654	1,839	2,056	2,306	2,567	2,335	2,529	…	2,961	3,164
Living minimum - of single adult	1,700	1,700	1,960	2,160	2,440	2,660	2,890 3,040*	3,430	3,430	3,770	4,100	4,100
- of couple with two children aged 10–15	5,600	5,600	6,400	7,060	7,840	9,110	9,570	10,470	10,470	11,160	11,980	11,980
In % of average gross wage:												
Gross minimum wage	52	47	38	32	27	26	23	23	26 29	30 33	36	36
Average unemployment benefit	…	30	28	27	25	24	24	20	20	…	22	20
Living minimum - of single adult	45	37	34	31	30	30	28	29	27	…	28	26
- of couples with two children aged 10–15	148	121	110	102	96	94	89	90	83	…	82	76

***Source**:* Statistical Yearbooks of the Czech Republic, Ministry of Labour and Social Affairs.
***Notes**:* * changes made twice a year. For 2003, the minimum wage was set at CZK 6,200.

Not only work incentives and disincentives, labour market policies and the institutional framework, but also the deep-rooted values and attitudes of workers matter in explaining unemployment rates and the economy's performance. One has to note that those are not easy to inspect and attitudes declared in surveys do not necessarily correspond to reality. Some caution is therefore necessary in judging the surveys' results. Nevertheless, findings of this sort can help us to explain the exaggerated evaluations which characterise people's opinions and expectations in the Czech Republic *vis-à-vis* the rapidly deteriorating functioning of the labour market.

[22] These figures speak for themselves even without involving the net average wage or figures based on dollar wages.

We face a paradox here. On the one hand, the Czech Republic is still considered by many foreign investors to be a "cheap workshop of Europe", well suited for manufacturing goods designed elsewhere, with minimum value added. On the other hand, the Czech labour force has become increasingly demanding, if not somewhat choosy. Heavy work in construction and routine jobs in light manufacturing are left to new "Gastarbeiters" from countries of the former USSR. Even in many localities and regions with high unemployment, job vacancies would remain unfilled if they were not taken by foreign workers. About 100,000 foreigners currently work in the country legally, but a much higher number are estimated to work here illegally.

The explanation lies, at least partly, in changing values related to work and jobs. Večerník (2004) compares work values in advanced Western countries with the transition countries of Central and Eastern Europe and finds that there is much more job commitment in the West. By contrast, less willingness to invest in one's own human capital was found for the East. These findings are based on results received from answers to questions regarding readiness to adjust to harder work conditions or requirements, posed in an international survey "Households, Work and Flexibility" (HWF). The respondents were asked two questions, the first of which evokes the situation of joblessness and asks about the respondent's willingness to accept a new job under certain conditions, while the second evokes the situation of an attractive job offer with twice the salary in comparison with current earnings.

Table 10: Job Investment Strategies in International Comparison

Activity (you would be willing to…)	***A. You had no job and could get a new one***				***B. You were offered a new job with twice the salary***			
	Czech Republic	Hungary	Nether-lands	United Kingdom	Czech Republic	Hungary	Nether-lands	United Kingdom
1. Work more	39.5		27.4	53.6	63.9		31.6	63.8
2. Migrate	15.9	19.1	25.4	38.6	26.4	26.8	28.9	50.3
3. Worse job	16.6	25.0	20.3	27.2	31.8	29.1	19.1	39.8
4. Retrain	57.5	58.0	50.2	64.3	67.6	60.9	46.4	70.2
5. Language	39.7	44.6	63.2	57.4	49.1	47.5	60.5	63.8
Cumulative response (number of activities enumerated) in %:								
0	48.9		28.7	46.9	42.2		34.7	46.2
1–2	32.5		40.8	22.4	25.3		33.2	14.2
3–5	18.6		30.5	30.7	32.5		32.1	39.6
Total	100.0		100.0	100.0	100.0		100.0	100.0

Sourc*e: HWF Survey, 2001.*

Notes:

1. Work more than 40 hours per week
2. Move (migrate) to another place
3. Accept less attractive work conditions
4. Retrain for another profession
5. Learn a new foreign language

Only "yes" answers were taken into account. The other two answers were "maybe" and "no".

As Table 10 shows, the Czech working age population appears to be relatively less ready to migrate in order to be employed, to accept a worse job instead of unemployment, or even to learn foreign languages. Czechs score quite well in retraining and also in work intensity (although this is still much lower than in the EU countries), but are laggards in the other hypothetically offered ways of resolving unemployment problems. In general, the incentive (pull) effect of a double salary is much stronger than the enforcement (push) effect of mere unemployment. It is in the Czech Republic, however, where the gap between both "potentials" is the largest. In any case,

there still remain 42% of Czechs not interested in any strategy leading to a double salary, and about 50% not interested in any strategy leading to employment.

Taking all the available evidence together, we can say that in the majority of the labour force, a long-term commitment to one job and place is preferred over any change, commuting is preferred over migration, and welfare dependency or early retirement is preferred over retraining and seeking a new job. There is still only a weak minority of the working population that is really active and ready to invest in its human capital and be mobile and flexible. Labour market rigidities endure in the minds and behaviour of people in the Czech Republic.

1.4 Conclusion

The Czech Republic has definitely lost its exceptional position, often labelled as an "unemployment miracle". What are the reasons for this?

Let us stress that the labour market alone is not fully responsible for its seemingly poor performance. There are the following main obstacles to better macroeconomic performance and job creation which are linked with a still relatively weak supply-side flexibility of the Czech economy as a whole: (i) a long-term stagnation in total factor productivity (i.e. an enormously low rate of growth thereof); (ii) output growth dependency on real imports; and (iii) a low efficiency of investment in spite of a high investment rate. Massive FDI inflows or solid export performance are not yet able to reverse the tendency of diminishing aggregate employment and increasing unemployment.[23]

This is why employment and unemployment display, respectively, a strong downward and upward long-term trend, developments that complicate linking labour market performance with business cycle fluctuations alone. (Although there are some signs of pro-cyclical behaviour of employment and unemployment, such as during the transition recession in 1991 or in 1997–1999, when the economy experienced a currency crisis and a recession resulting from macroeconomic overheating.) Instead of stressing the cyclical factors, it is more evident that the increasing unemployment trend can to a large extent be attributed to the fact that the process of reducing excess employment in privatised Czech enterprises accelerated in the second half of the 1990s.

The apparent deterioration in labour market performance over time leads us to the conclusion that there are serious "internal" problems inherent to the Czech labour market. Among other factors, it is the changing pattern of labour flows that helps us to understand why the current unemployment rate is approaching two-digit figures. Increasing redundancies cannot be proportionally offset by declining labour force participation. Such a method of reducing labour supply has gradually been exhausted during the 1990s. Since 2001, moreover, early exits have become subject to punitive practices.

As a result, the working-age population is becoming increasingly affected by involuntary redundancies and, after being dismissed, remains dependent on a labour market exhibiting growing signs of rigidity and insufficient job creation (see Chapter 3 for more details). Most

[23] See Flek *et al.* (2001) for more details.

striking is the growth in long-term unemployment, affecting low-qualified labour above all. High regional unemployment appears to be linked with the former, thus creating "pockets of unemployment". As will be shown in Chapter 4 in more detail, the long-term unemployed suffer considerably from mental, social and material deprivation. From this one could derive an argument for deteriorated conditions for proper labour force reproduction and even a considerable amount of involuntary unemployment.

Nonetheless, the reservation wage (as well as other requirements concerning the quality of a job to be accepted), as perceived by the unemployed, appears to be above the subsistence minimum guarantee, a wage that is, however, often difficult to achieve, especially because of the existence of competition for less qualified jobs from the countries of the former Soviet Union. Another reason is that the still ongoing company restructuring often requires further layoffs, which makes it extremely difficult for firms to pay more for non-qualified labour, not to mention the declining demand for it in general. That is why it is hard to deal with the unemployment problem without altering the social benefit scheme.

The high unemployment in the Czech Republic thus resembles a vicious circle, resulting in the emergence of the "unemployment trap" and benefit dependency, accompanied by a measurable extent of labour force deprivation. Active labour market policy measures appear to be insufficient to deal with this problem. The government, faced by pressures to cope with rising long-term unemployment, has repeatedly increased the minimum wage since 1998 with the intention of strengthening work incentives for the unemployed with low incomes. However, this strategy addresses labour supply only, while the incentives to hire domestic non-qualified labour remain largely low, if not further diminished by such measures.

As far as aggregate wage developments are concerned, the previous rapid real wage increases appear less feasible in the future. At the same time, the Czech Republic increasingly displays the patterns of wage differentials that are typical for market economies. The stagnation in both employment and wage structures which started in the mid-1990s, however, signals the growing rigidity of the Czech labour market, in spite of high aggregate unemployment.

The labour market policies are still developing and adjusting closer to EU standards and goals. Aware of inconsistencies between employment and social policies, the Ministry of Labour and Social Affairs has eventually started preparing measures aimed at interrelating them more closely. The new policies should include an emphasis on the enhancement of work flexibility through broad skills and multitask occupations, flexible contracts and hours, and also adaptability to the workplace and related commuting or migration. Simultaneously, some activation measures are envisaged, such as non-entitlement of school-leavers to unemployment benefits, increased pressure on the unemployed living on social benefits to take a job, etc.

This process, however, should also involve substantial changes in labour taxation, labour legislation (where, for example, a reduction in employment protection is important), welfare institutions (where, for example, the elimination of a strict demarcation between the work life and benefits is needed) and, in particular, peoples' attitudes (greater assertion of work values in general).

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2. Labour Market Performance and Macroeconomic Policy: The Time Varying NAIRU in the Czech Republic

Jaromír Hurník and David Navrátil

During the second half of the 1990s the Czech economy experienced a sharp increase in the unemployment rate. Were these movements caused by structural changes, worsening labour market performance, or just by the changing business cycle position? Answering this question has direct implications for both monetary and fiscal policies.

Czech National Bank currently uses the deviation of actual output from its potential level as a basis for decisions on interest rates. Analogously, the Ministry of Finance uses potential output for determining the structural and cyclical component of the budget deficit. The potential output level depends, among other influences, on labour market functioning. This is reflected by the "equilibrium" rate of unemployment, which can be approximated by the "non-accelerating inflation rate of unemployment" (NAIRU), i.e. the rate of unemployment at which inflation remains constant. However, the approaches of the above-mentioned institutions to potential output determination either do not deal with the notion of the NAIRU explicitly, or deal with it in a form that remains open to further discussion.[24]

A crucial question that has to be addressed is whether the NAIRU remains stable over time. According to Gordon (1997), the decrease in the NAIRU in the USA during the 1990s was associated with relatively weak trade unions, a relatively low minimum wage and a slight decline in labour's income share. By contrast, Krugman (1994) or Blanchard (1999) find rather the opposite tendencies in Western Europe – caused, among other influences, by an inappropriate institutional design of labour market institutions *vis-à-vis* supply shocks – which contributed to the constant unemployment growth since 1960.[25]

Although at this stage of the research we are not sure about the precise role played by these particular aspects of labour market functioning in the Czech Republic, we can infer that, in this

[24] At present, the NAIRU is involved in the CNB's modeling process rather implicitly, i.e. it could be argued that it is behind each value of the potential output growth rate, which is subject to explicit modeling using the Kalman filter. This, however, makes it more difficult to assess the direct impact of labour market dynamics on economic performance. The approach of the Ministry of Finance is based on modeling potential output using a two-factor Cobb-Douglas production function with total factor productivity, where employment is adjusted for the NAIRU (see http://www.mfcr.cz/). As we argue later in the text, the methodology applied there for NAIRU approximations is still subject to methodological disputes.

[25] See, among others, also Elmeskov (1993); Richardson *et al*. (2000); and Turner *et al*. (2001).

case too, increases in the NAIRU would signal diminishing labour market efficiency and, subsequently, a slowdown in potential output growth.[26]

This chapter is organized as follows. In section 2.1 we introduce the NAIRU model and its properties implied by the theory. Section 2.2 describes the data. In section 2.3 we present model specifications in a testable form. The estimation results are presented in section 2.4, and the last section summarises our conclusions.

2.1 The Model

Unfortunately, the NAIRU is not directly observable. Some combination of economic and statistical reasoning must therefore be used to estimate it from observable data. Several estimates of the NAIRU have already been made for the Czech Republic. They differ, however, in the economic models used and also in estimation methodology.

Vašíček and Fukač (2000) use a backward-looking model of inflation expectations for an open economy, employing the Kalman filter. We will show later in the text that assuming pure backward-looking agents can lead to downward-biased estimates. Fukač (2003) extends the model of Vašíček and Fukač (2000) by incorporating forward-looking inflation expectations, which makes it closer to our methodology. Similarly, Benes and N´Diaye (2004) use the Kalman filter to estimate potential output and the NAIRU. However, their methodology reflects some *a priori* assumptions about the transmission mechanism of monetary policy, whereas in our approach this information is extracted from data. Besides, Benes and N´Diaye (2004) are more oriented on comparing the Kalman filter with Hodrick-Prescott filter results rather than on precise estimations of the NAIRU.

Another analysis aimed at estimating the Czech NAIRU is provided by Hájek and Bezděk (2001). It explores a Hodrick–Prescott statistical filter, without any economic restrictions. Finally, Bezděk, Dybczak and Krejdl (2003)[27] follow the Elmeskov (1993) methodology, which differs quite substantially from ours. It must be said that the Elmeskov methodology is disputable from a theoretical viewpoint – in the first step it assumes the existence of a constant NAIRU and only subsequently is the time-varying NAIRU estimated.

Our focus on possible time movements of the NAIRU instead of on its fixed value implies the use of the time-varying NAIRU methodology, following, for example, Gordon (1997) or Greenslade *et al*. (2003). This methodology uses Gaussian maximum likelihood methods, as described, for example, by Hamilton (1994),[28] and is frequently used for estimating

[26] See Hurník and Navrátil (2004) for a sensitivity analysis of the potential output growth (based on a production function approach) to NAIRU movements in the Czech Republic.

[27] This study reflects the framework used by the Czech Ministry of Finance for determining the structural and cyclical component of the budget deficit.

[28] See also Blake (2002); Basdevant (2003); or Harvey (1989). This method for estimating the NAIRU represents a reduced-form approach combining structural and purely statistical methods.

unobservable variables. Its advantage is that it allows us to estimate simultaneously the NAIRU and the relationship between inflation and the unemployment gap (i.e. the deviation of actual unemployment from the NAIRU).

The Phillips curve (Phillips, 1958) has become a generic term for any relationship between the rate of change in nominal prices (or wages) and the behaviour of real indicators of demand intensity, such as the unemployment rate or output. Gordon (1997) uses the following backward-looking form of the model:

$$p_t = \alpha_B(L) \cdot p_{t-1} + \beta(L) \cdot d_t + \eta(L) \cdot h_t + e_t \tag{1}$$

Where p_t denotes the first differences of the logarithms of the price level (quarterly inflation), d_t stands for the logarithm of the excess demand index (on product or the labour market) normalised at zero, h_t is the vector of supply-shock variables, L is the polynomial in the lag operator and e_t is a serially uncorrelated error term. As we are interested in estimating the time-varying NAIRU, equation, (1) can be rewritten as follows:

$$p_t = \alpha_B(L) \cdot p_{t-1} + \beta(L) \cdot (u_t - u_t^*) + \eta(L) \cdot h_t + e_t \tag{2}$$

The term $(u_t - u_t^*)$ represents the unemployment gap, i.e. the difference between the actual unemployment rate and the time-varying NAIRU. We introduce several changes in this approach in order to capture more properly the character of the Czech economy as a small open economy with the central bank operating in a forward-looking inflation targeting regime. Namely, we extend the analysis for forward-looking element and for exchange rate pass-through.

In general, there are two strategies for catching supply shocks and filtering out their influence on the NAIRU and inflation. The first is to use an explicit set of variables describing such shocks. The alternative strategy is based on removing the influence of supply shocks on inflation using core inflation (p_t^{core}) as a key inflation variable. It represents headline inflation (p_t^{cpi}) excluding regulated and energy price movements. We prefer to follow the second approach as the regulated and energy prices were the source of the main inflationary shocks in the Czech Republic.

In line with Driver *et al.* (2003), we extend the analysis by incorporating the forward-looking element of inflation expectations into equation (2). This form of the Phillips curve is in accordance with the New Keynesian paradigm and is derived from the following microfoundations:[29] Firms set prices to maximise profit, but – due to adjustment costs such as menu costs and long-term contracts – they are not able to adjust prices every period. Therefore,

[29] For the derivation of the New Keynesian Phillips curve see, for example, Fuhrer and Moore (1995); Christiano, Eichenbaum and Evans (2001); Galí and Gertler (1999); or Calvo (1983).

they set prices to be optimal not only for the current period but also for the forthcoming periods when they cannot change prices. It follows that firms do not set prices solely according to the current economic conditions but also according to those expected to prevail in the future.

Therefore, we add a new variable $E_t p_{t+1}$ into equation (3) which denotes a forward-looking expectation formed at time t about price level developments in the next period, $t + 1$. In this specification of the Phillips curve, inflation is determined by lagged and expected inflation and by the unemployment gap. The lagged values of inflation combine the backward-looking part of inflation expectations and the inherent sluggishness in inflation. If a forward-looking element is significant, then – in the case of inflation decreasing over time – the estimated NAIRU path without incorporating the forward-looking component would be downward-biased, as economic agents base their inflation expectations not only on previous (higher) inflation.

Inflation expectations are not directly measurable.[30] The first possible way of obtaining inflation expectations is to extract them from the yield curve. This strategy comes from the Fisher equation and assumes that the real interest rate is stable and movements in nominal interest rates are given by changes in inflation expectations. But, as for example Kotlán (2002) shows, there are also other factors influencing the yield curve and real interest rate movements. Therefore, it is hard to extract inflation expectations solely from the yield curve without having any knowledge of the whole economic model.

A second way is to use inflation expectation surveys. In the Czech Republic, however, inflation expectation surveys (of households, firms or the money market) are available only from May 1999, which constrains the data sample substantially.[31]

The third method assumes that forward-looking expectations can be represented by perfect foresight, i.e. $E_t p_{t+1} = p_{t+1}$. This implies that the forward-looking agents are not only able to foresee perfectly future inflation, but also the shocks that will hit the economy. Perfect foresight can be expected to result in an upward bias in the estimated impact of expected inflation. Having in mind all pros and cons, including data availability and the resulting problems with using monthly data for analysis, we follow this methodology in order to avoid the bias that would be certainly present in the results of pure backward-looking alternative. At the same time, we are aware of the fact that an optimum method of formulating forward-looking expectations still represents a future research challenge.

[30] As Figure 2 documents, the recent disinflation period was not smooth and gradual; there were also periods with increasing inflation. Therefore, a simple linear decreasing trend cannot properly approximate the inflation expectations.

[31] Despite this constraint, the results based on inflation expectations survey data are briefly discussed in the empirical part of this chapter.

In an open economy, real economic activity is also affected by external developments.[32] Thus the unemployment gap may not catch all the inflation pressures resulting from excess economic activity. In order to reflect these external influences on prices (through an "indirect" channel *via* real economic activity), we add into equation (3) the real exchange rate gap (z_t), i.e. the deviations of the real exchange rate from its "equilibrium" value (see later in the text for a definition). In addition to that channel, there is a "direct" price channel, as prices of imported goods directly influence the aggregate price index. To capture this effect, equation (3) is extended to include import price inflation (p_t^{imp}), or alternatively the change in the nominal exchange rate.

Thus we deal with both the real and nominal determinants of inflation. The former group is represented by the unemployment gap and the real exchange rate gap. In the latter group, there are lagged inflation, inflation expectations and import price inflation. The sum of the coefficients of the nominal inflation determinants must in practice equal unity to ensure the existence of the natural rate of unemployment consistent with the constant rate of inflation (the homogeneity condition), i.e. the existence of a vertical Phillips curve in the long run. Although there are some counter-arguments to the existence of long-run Phillips curve verticality, raised especially by Akerlof *et al.* (2000), we follow the mainstream approach and impose $1-\alpha_1-\alpha_2=0$.[33] Our final estimated equation is as follows:

$$p_t^{core} = \alpha_1 \cdot E_t p_{t+1}^{core} + \alpha_2 \cdot p_{t-1}^{core} + (1-\alpha_1-\alpha_2) \cdot p_t^{imp} + \beta \cdot (u_{t-1} - u_{t-1}^*) + \gamma \cdot z_{t-1} + e_t \qquad (3)$$

2.2 The Data

The data used for the analysis cover the period 1Q1994 - 1Q2004.[34] As we are strictly limited by the available data, we do not follow Gordon (1997), who uses a large lag structure. In particular, we are not able to adopt the polynomial lag distribution for p_t and for $(u_t - u_t^*)$. We use instead only one lag for inflation and for the unemployment gap. The data are seasonally adjusted using the X11 procedure.

In our basic model, we use the ILO definition for measuring unemployment, as published in the Czech Labour Force Surveys. This indicator appears to measure "true" unemployment more

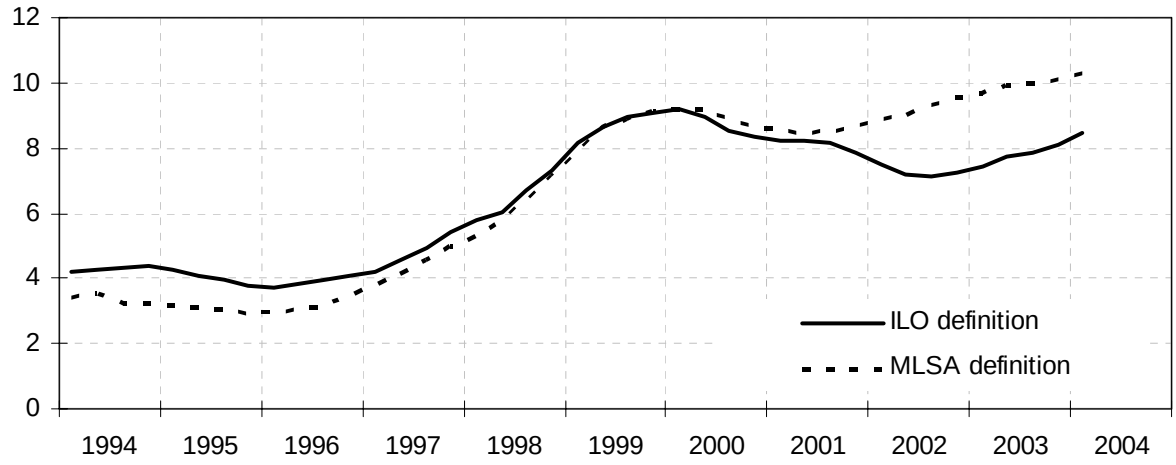
[32] See, for example, Obstfeld and Rogoff (1996); (McCallum and Nelson (2001); Barro and Tenreyro (2000); or Galí and Monacelli (2002) for more detail.

[33] See, among others, also Christiano, Eichenbaum and Evans (2001). For further criticism of the mainstream approach, see Franz (2003).

[34] We exclude the year 1993 because of the split-up of the Czech and Slovak Federation and the introduction of VAT. We suspect that both factors would have substantially affected the variables in question.

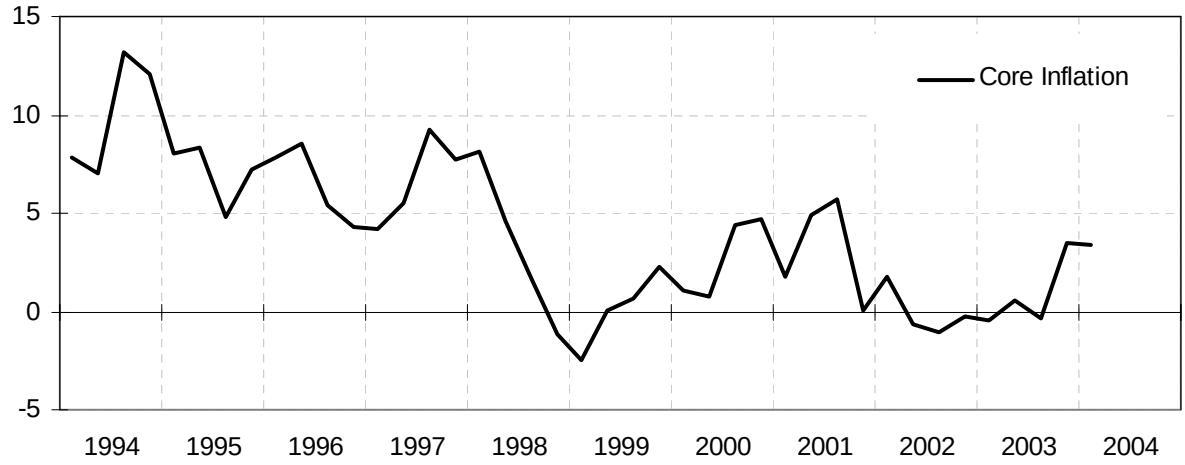
adequately than the Ministry of Labour and Social Affairs (MLSA) method.[35] It is released quarterly and this determines the use of quarterly data in the present analysis. Figure 1 demonstrates the differences. (Unemployment according to the MLSA definition is used as a robustness check of our estimates in an alternative unemployment model.)

Figure 1: The Unemployment Rate *(in %, seasonally adjusted)*



Sources*:* Czech Statistical Office, Ministry of Labour and Social Affairs.

Figure 2: Core Inflation (in %, annualised, seasonally adjusted)



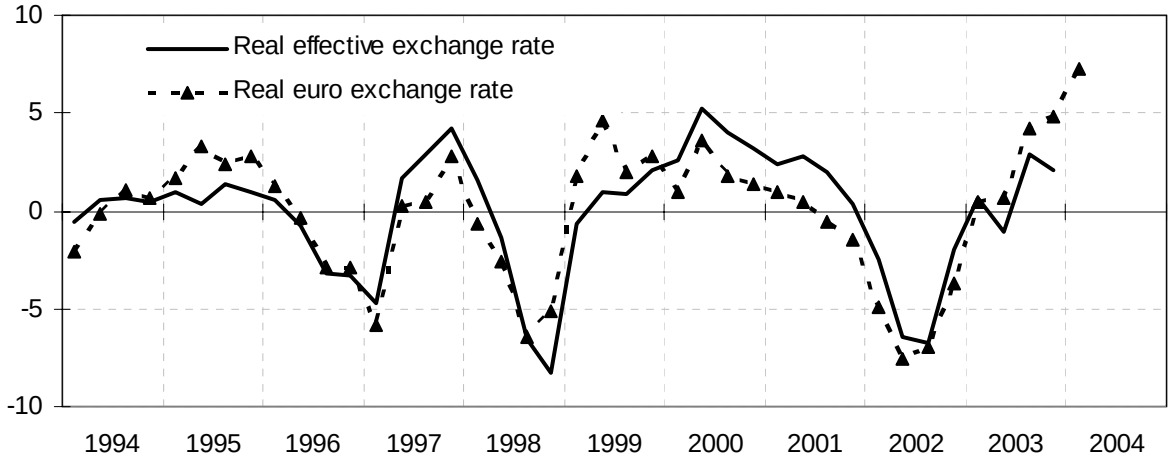
Source*:* Czech Statistical Office, Czech National Bank.

[35] According to the ILO definition, the unemployment measure involves all persons aged 15+ who satisfy all of the following three conditions: (i) are without a job; (ii) are actively seeking a job; (iii) are immediately available for a job. By contrast, unemployment measured by the Ministry of Labour and Social Affairs simply counts those registered as "unemployed".

The price dynamics are approximated by core inflation (p_t^{core}), which excludes the direct influences of changes in regulated and energy prices. Figure 2 shows the quarterly annualised core inflation rates.

To approximate the real exchange rate gap in Figure 3, we use the real effective exchange rate (the nominal effective exchange rate deflated by the Czech and effective foreign inflation).[36] The real effective exchange rate trend is then obtained by using the Hodrick-Prescott filter with the coefficient $\lambda = 1600$. This approximates in our basic model the equilibrium real exchange rate.[37] Positive values in Figure 3 mean an undervalued exchange rate against the trend, and *vice versa*. To check the robustness of the estimation, we also use a detrended real exchange rate against the euro as the EU is the main trading partner of the Czech Republic, accounting for approximately 60 % of total Czech imports. Note also that we prefer to deflate the nominal exchange rate by the CPI instead of some labour cost measure, as in this analysis we are predominantly interested in the information incorporated into CPI inflation.

Figure 3: Real Exchange Rate Gap (in %)



Sources: Czech National Bank, Czech Statistical Office, Federal Statistical Office of Germany, International Monetary Fund.

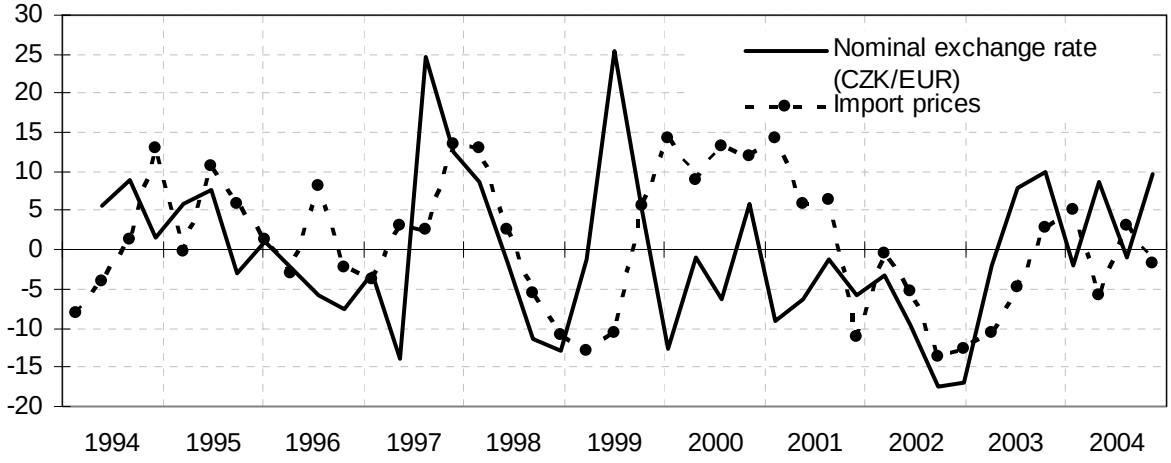
To catch the "direct" foreign channel, we can use the change in the nominal exchange rate (CZK/EUR). Indeed, we do so in our alternative import inflation model. However, this relies on a precondition that the law of one price holds. If pricing-to-market prevails, then the change in

[36] *REER = NEER*(CPId/CPIf).* Effective foreign inflation (*CPIf*) is a weighted inflation of trade partners of the Czech Republic. The shares in total Czech foreign trade determine the respective weights.

[37] We are aware that our trend approximation is not the only approach to defining and computing the "equilibrium" real exchange rate (note, among others, the FEER or NATREX methodology). However, given that this research is primarily focused on labour market performance, at this stage we do not go deeper into examining the sensitivity of the NAIRU to alternative exchange rate equilibrium concepts.

import prices is a better indicator of the direct price pressures stemming from other countries – see, for example, Betts and Devereux (1996) for a more detailed explanation.[38] Thus we use import price inflation in our basic model. Figure 4 shows both indicators.

Figure 4: Change in the Nominal Exchange Rate and Import Price Inflation
(in %, annualised, seasonally adjusted)



Sources: Czech National Bank, Czech Statistical Office, Federal Statistical Office of Germany, International Monetary Fund.

For unit root testing we use the Kwiatkowski-Phillips-Schmidt-Shin (1992) test (KPSS). The KPSS null hypothesis is (trend) stationarity. As Amano and Norden (1992) show, the KPSS test can reduce the incorrect conclusions of the traditional ADF test, especially in the case of a small sample. As indicated in Table 1, for all the variables involved we cannot reject the null (stationarity) hypothesis.

Table 1: Unit Root Test

	KPSS
Core inflation	0.100
Real euro exchange rate gap	0.057
Real effective exchange rate gap	0.054
Nominal exchange rate gap (1st difference)	0.140
Import prices (1st difference)	0.115

Notes: Test includes constant (critical value at 10 % level is 0.347) or constant and trend in case of core inflation (critical value at 10 % level is 0.119).

[38] Our definition of import prices excludes energy price movements.

2.3 Estimating the NAIRU

The use of Gaussian maximum likelihood methods for estimating the NAIRU combines inflation equation (3) with equation (4), which describes the explicit path of the NAIRU. Equation (3) is a "signal" equation and equation (4) is a "state" equation.

$$u_t^* = u_{t-1}^* + \varepsilon_t \tag{4}$$

$$e_t \sim \mathrm{N}(0, \sigma_e^2); \varepsilon_t \sim \mathrm{N}(0, \sigma_\varepsilon^2)$$

$$\mathrm{cov}(e_j, \varepsilon_k) = 0$$

The error term ε_t in state equation (4) is expected to be white noise with standard deviation σ_ε. If $\sigma_\varepsilon = 0$, then the NAIRU is constrained to be constant and the estimation is quite simple. But if $\sigma_\varepsilon \neq 0$, then the NAIRU is changing over time and the estimation is more complicated. Specification (4) implies that the NAIRU follows a random walk and changes in the NAIRU are driven by σ_ε. The disturbance vectors e_t (from (4)) and ε_t are assumed to be uncorrelated with each other in all time periods.

If there is no constraint imposed on the standard deviation σ_ε, we shall see high volatility in the estimated NAIRU series which appear hard to interpret from an economic point of view. To obtain the results in less volatile form it is common to smooth the original estimated trajectory of the time-varying NAIRU. Gordon (1997) recommends *a priori* setting of the standard deviation σ_ε, and in such a way limiting the possible fluctuations of the NAIRU directly. This means constraining the standard deviation σ_ε within the two-equation system, i.e. setting explicitly the signal-to-noise ratio ($\sigma_\varepsilon^2 / \sigma_e^2$). The second approach is to use external smoothing techniques such as the Hodrick-Prescott filter with a well-known λ coefficient at a low level.

We rely on another smoothing technique. We compute smoothed series of the NAIRU by backward recursion, as proposed, for example, by Harvey (1989, 1993) or Hamilton (1994). In such a way we obtain the conditional forecast and its standard error, which minimises the mean squared error. First, we compute the conditional forecasts $u_{t+1|t}^*$, $u_{t|t-1}^*$ and mean squared errors $P_{t+1|t}$, $P_{t|t-1}$ for $t = 1,2,\ldots,T$; see (5) and (6). The smoothed series and mean squared errors are then computed by backward recursion:

$$u_{t|T}^* = u_{t|t}^* + (u_{t+1|T}^* - u_{t+1|t}^*) \tag{5}$$

$$P_{t|T} = P_{t|t} + (P_{t+1|T} - P_{t+1|t}) \tag{6}$$

$$\text{for } t = T-1,\ T-2,\ldots 1$$

This method enables us to avoid the problem with the *a priori* (arbitrary) choice of standard deviation in the Gordon fashion, or of the λ coefficient in the Hodrick-Prescott filter. This estimation methodology, however, rests on the assumption that the disturbances ε_t and e_t are normally distributed. If this assumption does not hold, then the maximum likelihood methodology cannot give the conditional mean of the state vector. Then the estimated values of the NAIRU could be biased.[39]

2.4 The Results

We estimate a two-equation system where the signal equation is given by (3) and the state equation by (4). Our basic model involves the ILO definition of unemployment, the real effective exchange rate gap and import inflation. We present the results of estimating this system with incorporated forward-looking expectations, as well as pure backward-looking expectations.

Table 2: Estimation Results

	Expected inflation (α_1)	Lagged inflation (α_2)	Unemploy-ment gap (β)	Exchange rate gap (γ)	S.E.
(A) Basic model	0.486***	0.460***	-0.629***	0.162	1.782
	(4.090)	(4.344)	(-4.451)	(1.140)	
(B) Pure backward-looking model	-	0.852***	-0.496***	0.045	2.252
		(17.752)	(-4.832)	(0.222)	
(C) Alternative unemployment model	0.491***	0.444***	-0.707***	0.127	1.739
	(3.898)	(3.850)	(-3.015)	(0.837)	
(D) Alternative real exchange rate gap model	0.456***	0.478***	-0.508***	0.083	1.970
	(3.835)	(4.252)	(-7.011)	(0.545)	
(E) Alternative import inflation model	0.494***	0.468***	-0.506***	0.266*	1.929
	(3.335)	(3.766)	(-7.110)	(1.962)	

***Notes*:** Model (A) uses the core inflation, inflation expectations, import prices, real effective exchange rate and ILO unemployment rate. Model (B) then uses the same variables as model (A), but the coefficient α_1 is fixed at zero. In comparison, model (C) uses also the same variables as model (A); only the used rate of unemployment follows the MLSA definition instead of the ILO definition. Finally, in model (D) the real exchange rate gap is derived from the exchange rate against the euro instead of the real effective exchange rate and in model (E) the change in the euro nominal exchange rate is used to catch the "direct" foreign price channel instead of import prices.

*, **, *** denote the significance at the 10%, 5% and 1% level, respectively; *t*-statistic in brackets.

[39] Despite this potential bias the presented estimation methodology remains the optimum estimator in the sense that it minimises the mean square error. To test the distribution of the disturbances terms (ε_t and e_t), we need to know the NAIRU. Therefore, it is impossible to test ex-ante the "true" distribution of the disturbance terms.

We also present estimates with an alternative measurement of unemployment, the real exchange rate gap and import inflation. Because of the short data sample we cannot test whether or not our estimates are time-invariant.[40] Table 2 contains the estimated coefficients and their *t*-statistics in brackets.

From our basic model (A) we can derive the proportion of backward- and forward-looking agents in the economy ($\alpha_1/(\alpha_1+\alpha_2)$). The results imply that this ratio is approximately 50:50. The above share of forward-looking agents might seem unexpectedly high, as compared to Driver *et al.* (2003), who estimate 30 % for the UK and 10 % for the USA.[41]

The estimated coefficients α_1 and α_2 imply small values of the coefficient of import inflation ($1-\alpha_1-\alpha_2=0.05$). However, this alone does not indicate that the prices of import goods really have such a small impact on inflation, since import inflation also works through inflation expectations.

Coefficient β measures the elasticity of inflation to the unemployment gap. In our basic model (A), it has an expected negative sign and a reasonable value of –0.6. The influence of the exchange rate gap (coefficient γ) on inflation is characterised by an elasticity of 0.16. It is, however, insignificant (see the value of the *t*-statistic in Table 2).

The assumption that a specification with pure backward-looking expectations can be downward-biased is partially confirmed; the differences between the NAIRU using the backward-looking and forward-looking specification are primarily negative since 2000 (see the differences between the NAIRU based on the basic model (A) in Figure 5 and the NAIRU based on the pure backward-looking model (B) in Figure 6). This means that the pure backward-looking specification would shift the NAIRU estimates downward at the end of the sample. Thus the use of our basic model with partly forward-looking inflation expectations is justified.

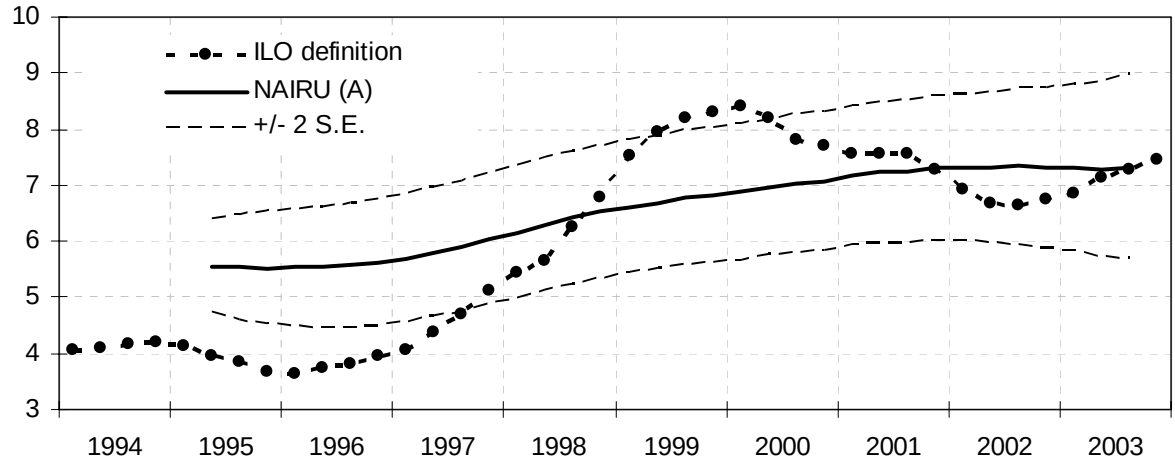
Figure 5 shows the Czech NAIRU (in the definition of our basic model (A) specification and within the band of ± double the standard error) and the actual unemployment rate. The band represents the 95% confidence interval.

After a period of stability in 1995-1996, the Czech NAIRU started increasing, from 5.5 % in 1996 to approximately 7.5 % in 2003. More precisely, the critical period in which we observe the rise in the NAIRU starts in the last quarter of 1996 and ends in the first quarter of 1999. Since then the NAIRU has remained roughly stable. Conditional on using different methodology and data sets, we can compare our results with other estimates.

[40] For example, this means a situation where a change in monetary policy regime (such as introducing inflation targeting) influences transmission from the real economy to prices, or where the share of forward-looking agents is changing over time.

[41] Therefore, we must interpret our results with caution. But Christiano *et al.* (2001) or Beneš and Vávra (2003) derive the New Keynesian Phillips curve from microfoundations using backward indexation and structural inflation persistence, and also demonstrate that the share of forward-looking agents might be close to 50 %.

Figure 5: Unemployment Rate and the NAIRU (in %)



Our results are comparable with previous research. Vašíček and Fukač (2000), as well as Fukač (2003) or Hájek and Bezděk (2001), use registered unemployment. Their results suggest increases in NAIRU from 3-4.5 % in 1996 to 8.5-9 % in 2000. Bezděk, Dybczak and Krejdl (2003), as well as Beneš and N´Diaye (2004), adopt the ILO definition of unemployment and show that a 95% confidence interval NAIRU moved from 4 % in 1994 to 7.5 % in 2002 and from 4 % in 1994 to 6.5 % in 2000, respectively. All the estimates at our disposal show the NAIRU growing since 1996.

In general, the reasons for the increasing NAIRU arise from the situation on the labour market. We should mention labour market regulations, the activity of trade unions, a rising minimum wage, the level of social benefits and the share of labour in GDP. All this supports the idea about worsening labour market performance for institutional reasons, which is expressed by the rising NAIRU.

The increase in the NAIRU implies a proportional slowdown in potential output growth. From a business-cycle point of view, we can identify two periods. First, from 1995 to 1998 actual unemployment was below its equilibrium level, thus there were inflation pressures arising from the labour market. High domestic demand and an undervalued exchange rate had not yet forced firms to restructure and reduce over-employment. Wages grew faster than labour productivity and this was reflected – through private consumption – in pressures on consumer prices.[42]

By contrast, the period 1999-2000 was characterised by a positive unemployment gap, i.e. with actual unemployment above the NAIRU. The economy was in recession after an exchange rate shock in 1997, followed by tightening fiscal and monetary stances.

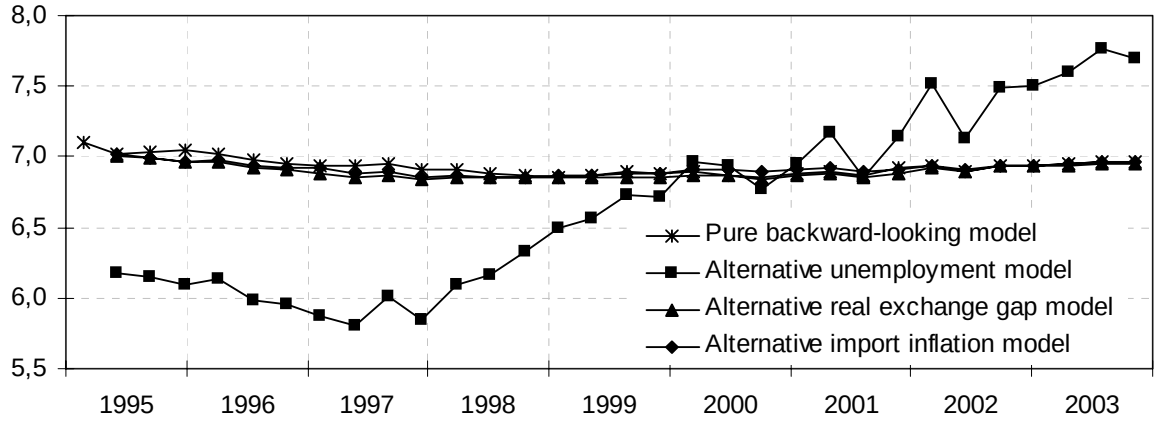
[42] As Hurník and Navrátil (2002) note, however, this imbalance was reflected also in growing external disequilibrium.

Toward the end of the sample, the level of unemployment is close to the NAIRU. This implies relatively stable conditions on the labour market, meaning that the economy has adjusted to a relatively high level of "equilibrium" unemployment. So there is probably no excessive room for counter-cyclical policies, but rather for structural policies aimed at reducing the NAIRU.

During the period of a rising NAIRU (1996-1999), the Czech economy experienced both pro- and anti-inflationary shocks. Nominal exchange rate appreciation in the second half of 1996 was followed by a speculative attack on the currency in May 1997. The currency crisis resulted in an exchange rate depreciation and also by the liberalisation of regulated prices. As a result, inflation rose dramatically in the second half of 1997. Then, during 1998 the economy was hit by an opposite shock, namely an external disinflationary shock caused mainly by oil and food prices. Although we have tried to eliminate the possible impact of such shocks, our results could still be biased, as the estimates depend critically on the relationship between the unemployment rate and inflation. The high degree of uncertainty surrounding the NAIRU estimates is explicitly demonstrated by a rather wide confidence band, the observed increase in the NAIRU is statistically insignificant at the conventional 5% level. Alternative models also express a relatively high uncertainty with regard to the level of the NAIRU.

Our alternative estimate using the MLSA definition of unemployment (model (C)) gives a very similar result in comparison to the basic model (A). Indeed, as seen in Figure 6, the implied changes in the NAIRU are very close to our basic model. By contrast, the implied NAIRU in the alternative definitions of the real exchange rate gap and import inflation (models (D) and (E)) is more stable, fluctuating in a narrow band around 7 %. One must admit, however, that the statistical significance of these two alternative models is worse than of the basic model (see the standard error statistics in Table 2).

Figure 6: Alternative Estimates of the NAIRU



In order to check the robustness of inflation expectations used in our model, we also estimate an alternative model with financial market expectations based on the CNB inflation expectations survey data.[43] This NAIRU estimate is higher and approaches a 10% level whereas the rate of forward-lookingness is lower (20%). However, these results face several problems.

First, the time series of survey expectations are available with monthly frequency starting in May 1999. Consequently, there is a need to use the monthly unemployment according to the MLSA data instead of ILO unemployment that is released only quarterly. The rate of unemployment in the MLSA definition is higher than the ILO unemployment over the whole sample, shifting the results upwards.

Second, as a high frequency of monthly data requires the use of a richer lag structure, we face the multicolinearity problem.

Third, the survey expectations cover year-to-year inflation *one year* ahead, while in our baseline model we use quarter-to-quarter inflation *one quarter* ahead. Even so, bearing in mind all the above-mentioned problems, the alternative estimation still lies within the confidence interval of our baseline estimation.

2.5 Conclusion

The NAIRU estimates are based on the relationship between price movements and the position of the economy in the business cycle. Assuming that such a relationship exists in the short run and using a methodology for estimating unobservable variables, we obtain estimates of the NAIRU that indicate that – after stabilizing at around 6 % during 1995-1996 – the NAIRU increased between 1996-1999 by approximately 1.5 percentage points and stabilised thereafter.

The estimated movements of the NAIRU raise the question as to what factors caused these movements. Generally, the reasons for a rising NAIRU appear to reflect the situation on the labour market. In particular we argue that the structure of the labour market had changed substantially in the second half of the 1990s, as the new system of social benefits and the new Labour Act were introduced. Moreover, regular minimum wage increases were adopted also in that period. All these institutional changes could have resulted in a rising NAIRU.

In such a case we could conclude with an indication of worsening aggregate labour market performance and decreasing efficiency. However, the story does not end here, as the critical period of the rise in the NAIRU is connected with several offsetting shocks that hit the economy. As a result, there still is a fair amount of uncertainty surrounding the NAIRU estimates. This opens room for future research.

[43] See CNB (2004) for data. We do not report these alternative estimation results here in full, but they are available from the authors upon request.

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3. Czech Labour Market Flows 1993–2003

Jaromír Gottvald

Any labour market displacement requires mobility of workers so as to enable their absorption either into the same industry or into a different one. This is a crucial condition for efficient reallocation of resources. This chapter looks at labour force mobility and the impact of structural changes and adjustments on the Czech labour market. More specifically, the main objective of this chapter is to look at how flexible the Czech labour market is, through a comparison of the strength of labour market flows internationally and during the different stages of economic transition.

In the following section 3.1, I define the methodology of Markov's chains and the relative employment growth index, which are used for empirical analysis. In the same section, I also define the data sources. The next section 3.2 analyses labour flows between various labour force statuses, while section 3.3 deals with job-to-job flows. Labour mobility between industries is analysed in section 3.4, especially absolute flows between declining and growing industries. The final section gives a summary.

3.1 Data and Methodology

The source of the data used here for the flow analysis is "The Labour Force Survey" (LFS) carried out quarterly since 1993 by the Czech Statistical Office (CZSO). In the LFS, each quarter was originally shifted one month backwards. This means that, for example, the first quarter of 1996 consists, in fact, of December 1995, January 1996 and February 1996. These shifts were changed by the CZSO to ordinary regular quarterly ranks (i.e. January, February and March as the first quarter, etc.) in 1998. All LFS data used here are re-calculated using the new methodology.[44] To date, only a few studies have used LFS data to examine Czech labour market flows.

Terrell and Šorm (1996) analyse two sets of cohorts of the working age population using the quarterly LFS data for 1994 and 1995 and compare the flows-in and flows-out among the three different labour market states (employment, unemployment and out-of-labour force). They also calculate gross probabilities and estimated exits out of unemployment in the same years by multinomial logit analysis. A more detailed, yet methodologically similar, comparative analysis of the determinants and extent of labour mobility in the Czech Republic has been provided more recently by Šorm and Terrell (2000), using the quarterly micro LFS data for the period 1994–1998. Also Huitfeldt (1996) examines Czech labour market flows, using individual data from the LFS (1994–1995). In addition, Gottvald (1999) investigates Czech labour market flows by means of gross flow analysis (industries, occupations and gender), using LFS data for the period 1993–

[44] Note, however, that the structure of the LFS is still subject to changes and therefore certain calculations in this chapter can only be done for specific periods.

1998. Finally, Kux (1996, 1997) also gives an exposition of how to measure labour market flows by means of the LFS in the Czech Republic.

All these studies use similar panel data for individuals, but are based on different time spans (their concrete results will be commented on later in the text – see especially paragraph 3.2). The key methodological assumption is that a Markov process governs movements between various labour market states. Markov's chain model is a probabilistic analysis showing how each state in an evolutionary process produces the next state in a finite chain.[45] It can be applied to a labour market where the probability of transition between labour market states depends on the state formerly occupied. There are three major states: employment (*E*), unemployment (*U*) and out-of-labour force – inactive (*O*). There are nine potential transitions, which can be represented by a P_i matrix:

(1)

$$P_i = \begin{array}{|ccc|} \hline EE & EU & EO \\ UE & UU & UO \\ OE & OU & OO \\ \hline \end{array}$$

where, for example, *UE* represents the probability that an individual is observed as employed at time *t+1*, conditional upon being unemployed at time t. The gross transition probability that an individual is unemployed at time *t* and is employed at time *t+1* is given by:

$$P_{ue} = UE_{t+1}/U_t \ , \tag{2}$$

and generally given by: $[i, j = E, U, O]$, (3)

where F_{ij} is the number of individuals in state *i* at time *t* that have moved to state *j* at time *t+1*. S_i is the initial stock of individuals in this state at time *t*.

In addition, the "Relative Employment Growth Index" (REGI) is used in this chapter to measure the relative employment growth in different industries. More specifically, the REGI is a measure where the employment growth of an industry is weighted by the total employment growth of an economy. This form of measurement is advantageous when, for example, a decrease in employment occurs in a particular industry whilst overall employment in the given period is increasing. Consequently, the resulting decrease is relatively larger and thereby better demonstrates the level of change. The same type of index is used, for example, by Eamets *et al.* (1997).

3.2 Mobility across Labour Market States

During the period 1990–1993, which was not monitored by the LFS, there were major changes in total employment and also in employment structure. In the course of the privatisation process, large monopolistic enterprises were administratively split into many small and medium-sized firms. This process resulted, among other things, in a change of industry (a statistically recorded

[45] See, for example, Rutherford (1992) for more details.

change of employment) for many employees, but without any real change in the type or place of work. This kind of "labour mobility" could therefore hardly be regarded as a consequence of restructuring and modernisation followed by efficiency gains.

This period was also characterised by a natural outflow of a part of the labour force from the labour market (employed pensioners, women). At the same time, the first wave of involuntary redundancies resulted also in the emergence of unemployment, combined partly with outflows abroad and into the black economy. On the other hand, underdeveloped industries like services and the public sector absorbed most of the dismissed workers (see Chapter 1 for more discussion of this initial period of transition). In general, it is very difficult to specify the range of all these moves and their impact on the industrial structure of employment before 1993. The years following are listed in the present analysis (Table 1).

Table 1: Czech Labour Market Transition Probabilities

	For labour market status 4 quarters later								
Period	P_{ee}	P_{eu}	P_{eo}	P_{ue}	P_{uu}	P_{uo}	P_{oe}	P_{ou}	P_{oo}
1993q1–1993q4	93.5	1.7	4.8	54.6	32.3	13.1	4.6	1.1	94.3
1994q1–1994q4	94.9	1.2	3.9	52.2	32.6	15.2	3.9	0.7	95.3
1995q1–1995q4	93.8	1.2	4.9	48.9	36.2	15.6	3.3	0.6	96.0
1996q1–1996q4	95.1	1.4	3.4	47.5	43.4	9.0	2.9	0.8	96.4
1997q1–1997q2	94.3	1.8	3.8	39.3	50.1	10.6	3.7	1.1	95.2
1998q1–1998q4	93.9	3.1	3.8	35.7	56.4	7.9	2.8	1.3	95.9
1999q1–1999q4	94.2	2.4	3.4	36.4	56.4	6.9	2.6	1.0	96.8
2000q1–2000q4	95.0	1.7	3.3	33.7	60.2	6.1	1.9	0.8	97.3

***Source*:** LFS/1993:I–2001:IV (data not available for 1997:III and 1997:IV); own calculations from quarterly data.

The probability that a person remains employed one year later, given that he/she was employed in the initial state, is relatively high and stable. More specifically, the probability P_{ee} for 4 quarters later fluctuates between 93.5% (93:I–93:IV) and 95.1% (96:I–96:IV). The values of this probability differ markedly from other Central and Eastern European (CEE) economies, thus suggesting a more rigid employment structure in the Czech Republic.

Gora and Lehman (1995) find the following values for Poland: P_{ee} = 88.4% (93:5) and P_{ee} = 89.7% (94:4), whilst Bellman *et al.* (1995) calculate P_{ee} = 83.6% (91:11) for East Germany. Gora and Lehman (1995) find a similar probability for the Czech labour market as the present analysis (P_{ee} = 93.0%). Finally, Šorm and Terrell (2000) also present similar results, where P_{ee} lies within an interval from 95.7% to 96.6% for the status 3 quarters later.

The probabilities characterising the outflows from the employment status are P_{eu} and P_{eo}. In words, someone who is employed in a given quarter has a certain probability of exiting employment in the next four quarters *via*: (i) unemployment (P_{eu}), or (ii) by finding himself/herself out of the labour force ($P_{eo.}$). Throughout the period, the probability that an employed person exits the labour force is higher (nearly 2–3 times) than the probability he/she becomes unemployed (with the exception of 1998 and 1999). The probability P_{eu} moves between 1.2% (94:I–95:IV) and 3.1% (98:I–98:IV), whilst P_{eo} ranges between 3.3% (00:I–00:IV) and 4.9% (95:I–95:IV).

These numbers are significantly lower than the comparable results for Poland, where the probability of exiting employment during the next four quarters was 10.3% (5/93–5/94) – see Gora and Lehman for details (1995).

The highest fluctuations in labour market status can be seen within the pool of Czech unemployed. The probability P_{ue}, which, together with P_{oe}, characterises the flexibility of job creation, is very high at the beginning of our sample (P_{ue} = 54.6% (93:I–93:IV)), but decreases continuously to 33.7% (00:I–00:IV). This is a striking result, documenting that the Czech labour market has witnessed a sharp decline in job creation flexibility relative to the stock of unemployed.

At the same time, P_{oe} moved from 4.6% at the beginning of the LFS survey (93:I–93:I) to 1.9% by the end of our monitoring period (00:I–00:IV). In absolute terms, this is less than one half of the number of those re-employed from the stock of economically inactive persons as compared to the beginning of 1993.

A remarkable evolution also occurred in respect of being and remaining unemployed. Namely, P_{uu} started at a very low level of 32.3% (93:I–93:IV), but increased gradually to 60.2% (00:I–00:IV). Probabilities below 40% are suggestive of a short average duration of unemployment in the Czech Republic between 1993 and 1996, while the subsequent increases in P_{uu} are consistent with rising long-term unemployment, another sign of adverse labour market developments.

A relatively stagnant and low probability level is found for $P_{ou.}$ This kind of flow (i.e. entering the labour market and becoming immediately unemployed without any work experience) is typical for some school-leavers. This probability reached its maximum in 1998 (1.3%) and its minimum in 1995 (0.6%). By contrast, P_{ou} in Poland (93:5–94:5) was, according to Gora and Lehman (1995), 4.3%.

Three transition probabilities have changed significantly during the investigated period. Namely, the probability that people will remain unemployed one year later, P_{uu}, has doubled during the last seven years. Not surprisingly, the probability of leaving unemployment to employment (P_{ue}) has decreased by some 20 percentage points. Probability P_{uo}, meaning that people leave from unemployment to out-of-labour-market, has also decreased significantly.[46] Such an evolution of labour flows enables us to document the changing nature of labour market flexibility during the three different stages of economic transition:

[46] The LFS data also reveal the different labour market experience of men and women, generally displaying a higher propensity of women to leave their employment status as well as exit the labour force. During the period 93:I–99:IV, the probability P_{ee} (i.e. of maintaining one's employment status) is about 4 percentage points higher for men than for women. For men, P_{ee} ranged between 94.5% (95:II –96:II) and 97.2% (96:I–97:I). For women, P_{ee} was noticeably lower, ranging from 90.1% (93:I–94:I) to 93.5% (96:III–97:III). Another significant difference is the probability of leaving employment and exiting the labour force, $P_{eo.}$ This is higher for women (4.6–7.6%) than for men (1.8–4.6%). More detailed results are available from the author upon request.

a) *Delayed restructuring* (up to 1997), accompanied by enterprise soft budget constraints and continuing credit lines from state-owned commercial banks, created relatively little unemployment pressure and weak incentives to shed labour. Given the parallel expansion of private entrepreneurship, especially in the underdeveloped service sector, it is no wonder that the probability of remaining unemployed ($P_{uu,}$) was relatively low and the probability of receiving a new job after a short unemployment span (P_{ue}) relatively high. One must also admit that the unemployment pressure was additionally weakened by a high probability of leaving the labour force instead of remaining within the pool of unemployed (P_{uo}), caused especially by mass labour force withdrawals of jobless women, dismissed working pensioners as well as widespread use of early retirement schemes by those who would otherwise have remained among the unemployed.
b) *Recession resulting from a macroeconomic overheating* (1997–1999) meant a dramatic change in the nature of labour flows, characterised by diminishing employability of those who lost their jobs (P_{ue}) and, consequently, increasing prospects of remaining unemployed ($P_{uu,}$). At the same time, the opportunity for reducing unemployment artificially by labour force withdrawals of post-working-age individuals (P_{uo}) had been exhausted. On the other hand, the "worsening" labour market flexibility may be associated, at least in part, not only with tightening monetary and fiscal stances, but also with increasing pressures to restructure on formerly state-owned enterprises (improving bankruptcy enforcement, the termination of automatically renewed credit lines, better financial discipline in the enterprise sector, etc.).
c) *The post-recession period* (2000 to date) further worsened labour market flexibility. This can be seen especially in the rise in long-term unemployment, manifesting itself in a gradually growing P_{uu}. Continuing, or even accelerating, enterprise restructuring is not, however, the only factor behind such a labour market evolution. One must equally point to weak job creation, labour market legislation preserving labour market rigidities, the failure of government active labour market policies, etc. (see Chapter 1 for more discussion).

A complementary international comparison concerning job flows can be obtained by calculating the rate of mobility, again using the LFS. In Table 2, the percentage of total status changes (i.e. *EU, EO, UE, UO, OE, OU*) is divided by the total number of the working age population[47] (total employment) in order to calculate the mobility rate.

For 1993, the result for the Czech Republic is 12.4%, with a tendency to decrease gradually in subsequent periods; for instance to 8.2% in 1996. Even for Poland the similar indicator is higher, ranging from 15.5% for 92:5–93:5 to 14.3% for 93:5–94:5.[48] Analogously, for Estonia, Eamets *et al*. (1997) report 19.7% in 1994.[49] As a result, Czech job flows are the lowest of all the countries listed in Table 2.

[47] Total population minus children under 15 and pensioners (working pensioners are included).

[48] Own calculations based on Gora and Lehman (1995). Children under 15 are excluded, but there is no upper age limit.

[49] The percentage of total status changes plus "round tripping" (but without EE status, i.e. job-to-job flows), divided by the total sample size, which represents the working age population (15–69) – see the next footnote for the definition of "round-tripping" and job-to-job flows.

Table 2 Mobility Rates in International Comparison (per cent; 1994/1995)

Type of employees	Type of mobility rate	Sweden[1]	Norway	Finland	Poland	Estonia[4]	Czech Republic
All employees	Wide	24.0	20.1	23.3	15.5[2] 14.3[3]	19.7	12.4[5] 8.2[6]
All employees	Narrow	16.2	12.4	11.5	n.a.	n.a.	n.a.

***Source*:** STEP Report R-06/1998, p. 44, www.sol.no/step. 1) 1995/96 2) 1992/93 3) 1993/94 4) 1994 5) 1993 6) 1996.

***Notes*:** Wide: including persons leaving the active work force. Narrow: Excluding those leaving the active work force. Job-to-job flows are not included.

3.3 Job-to-Job Flows

In the flow analysis presented above, we are only able to record one movement of an individual over the period of four quarters and determine whether the initial state *j* is different from the final state *i*. When an individual, however, moves from state *j* to state *i* and then returns back to the original state *j* within a four-quarter period, we are unable to record such movements. That is why the probabilities analysed above do not explain in full the nature of labour flows. There are three probabilities (P_{ee}, P_{uu}, P_{oo}), explaining the rigidity of each labour market status. We can, therefore, assume that the higher the probabilities P_{ee}, P_{uu} and P_{oo}, the smaller the moves registered among the remaining states. Then we could observe that the transition matrices are increasingly diagonal-heavy over the analysed period. This holds, however, only if there is no "round tripping" within the states (including job-to-job flows as a particular case).[50]

In this analysis, I concentrate on job-to-job flows. The point is that the magnitude of job-to-job flows provides important information on the extent of job destruction and job creation (structural change) and the convertibility of skills. Only individuals with marketable skills can shift from job to job. It is thus important to see whether these inner flows cause substantial upwardly biased probabilities of "staying" in a state *E*. For the Czech labour market, job-to-job flows are expected to play a potentially major role in labour reallocation. If so, the reported high probability of P_{ee} includes a high proportion of job-to-job shifts. This would mean (at least for some periods) a relatively higher level of labour market mobility than appeared in Table 1, especially if controlled for the effects of the splitting-up and privatisation of Czech enterprises.

I calculate the probability of a job change within the employment status ($E \rightarrow E$) during the period 1993–1997 to resolve the above-formulated dilemma. In accordance with Terrell and Šorm (1996, 2000) or Huitfeldt (1997) I make use of the LFS questionnaire, where respondents are asked: "How long has your job continued without interruption?" This backward-looking question is structured in nine possible answers, up to "more than 20 years".

[50] The term "round tripping" applies to those who flow through another state within the investigated period and return back the original one (e.g. an employed person with a short unemployment spell). The term "job-to-job flow" applies to those who flow from employment directly to another employment.

The answers relevant to our analysis are categorised as follows: (i) "up to one month", (ii) "more than one month and less than 3 months", and (iii) "more than 3 months". In all cases, the initial state of the respondents is "employment". From this data I furthermore calculate the probabilities of a job change within each quarter of the year. The results for the individual quarters are summarised in order to achieve annual figures on job-to-job flows.

Table 3: Job-to-Job Flows (probability in per cent of all employed)

Employment	**Duration of employment**		
Period	Up to 1 month	1–3 months	∑ 0–3 months
1993q1–1993q4	0.9	1.8	2.7
1994q1–1994q4	2.3	3.9	6.2
1995q1–1995q4	3.0	6.4	9.4
1996q1–1996q4	2.6	5.3	7.9
1997q1–1997q4	2.1	4.6	6.7
1998q1–1998q4	1.4	3.2	4.6

***Source*:** LFS, Czech Statistical Office; own calculations (total job-to-job flows calculated as the sum of quarterly data flows (∑ 0–3 months) multiplied by the stock of employment from the LFS).

The results in Table 3 demonstrate that the probability of an employed individual taking part in job-to-job flows ranges from 2.7% in 1993 to 9.4% in 1995. Thus the extent of these flows appears to be higher than that reported by Terrell and Šorm (1996, 2000) or Huitfeldt (1997). Terrell and Šorm (1996) indicate that in the case of the Czech Republic surprisingly few people appear to have changed jobs without passing through unemployment or leaving the labour force (referred to by authors as "churners"): the probability of a job-to-job change was only 2.5% in 1994 and 6% in 1995. In a further study, Terrell and Šorm (2000) report figures rising from 2.5% in 1994 to 5.8% in 1996, but falling to 3.5% in 1998. In addition, Huitfeldt (1997) calculates transition probabilities for job-to-job mobility of 2.4% for the first two quarters of 1995 in the Czech Republic.

Moreover, one must admit the results presented by Terrell and Šorm (1996, 2000) and Huitfeldt (1997) are too low to explain the structural changes in employment which occurred in the Czech Republic, given that aggregate unemployment rates remained quite low during the periods under investigation. Inter-industry variation in labour-force exits then appears to be the only factor explaining the structural changes in employment.

By contrast, Flek (1999) mentions substantially different results based on the SIALS database, with job-to-job moves being one of the dominant explanations of movements of employees on the Czech labour market. Between 1992 and 1997, nearly 40% of the labour force had moved voluntarily to another employer and 12.8% to self-employment or private business activities. Večerník (2001) presents absolute figures on job-to-job flows, with similar conclusions (see also the discussion in Chapter 1).

Note that aggregate unemployment was very low, especially during 1994–1996, while economic growth accelerated and created a number of new jobs as a consequence. Thus, also in line with the argumentation in Chapter 1, I conclude that the probability of changing a job without an episode

of unemployment was relatively high and represented, in fact, the decisive labour flow during that period (cf. Table 5 in Chapter 1).[51] Even this kind of flow, however, tends to diminish over time, as does job turnover in general.[52]

Only a small number of international studies exist for transition economies with comparable data structure and methods used. For Poland, Gora and Lehman (1995) show that only 3.8% of both the employed and inactive were engaged in "round tripping" in 1992, as compared to 28% of the unemployed. Dorenbos (1999, p. 197) compares Hungary and Poland at the beginning of the transition process (1988–1993). Although his results are not directly comparable with ours, he concludes that "job-to-job transitions (though broadly defined) are, on average, four times more frequent than transitions from employment to unemployment. This implies that a very substantial part of the mobility on the labour market has been neglected in most research efforts so far. In Hungary, job-to-job transitions occurred more frequently than in Poland."

3.4 Industrial Structure of Employment

Transitional probabilities between different labour market states do not distinguish whether a status change concerns a transition to another job in the same firm, within the same industrial branch or in a different industry. I therefore use the LFS data in order to establish labour transitions between 17 industrial branches by the NACE classification. (Job-to-job movements and intra-industry flows cannot be detected in such a way, however.) First, I use the 1998 REGI (Table 4) indices to compare industries according to employment developments. Then, the REGI is also used to look at employment flows between industries in more detail.[53]

According to REGI 2003:1993, the most remarkable change took place in health and social work. An initial period of falling employment due to privatisation was replaced by a period of employment growth, which eventually resulted in exceeding the number of employees in comparison with 1993.[54] A similar break in the employment trend also occurred in "other communal services". In mining and quarrying, as well as agriculture and hunting, the fall in employment continued even after 1998, albeit with lower dynamics. In contrast, the fall further accelerated in fishing, forestry, and electricity, gas and water supply. The fall in employment came to a halt in manufacturing, with the fall in employment almost coming to a stop in trade, car services and financial services, but after a previous period of rapid growth. Growth in

[51] The results in Table 3 still point to a surprisingly low extent of job-to-job flows in 1993. By contrast, Večerník (2001) reports the highest absolute extent of job-to-job flows specifically for 1993. Explaining in retrospect the differences in results with regard to 1993 is difficult. In my understanding, the low quality of the reported LFS data in the first year of its existence could explain them at least partially. In addition, I cannot exclude possible differences in calculation methods.

[52] When we deduct new labour market entries to employment, which compose nearly 30% of the total changes, only 8–9% of the employed per year actually changed their job during 1989–1995. The same indicator for 1995–1999 reveals a slowdown in job turnover; only about 5–6% of the employed per year changed jobs. Almost one-third of all employees still have the same job as before 1992. The data clearly show that the average job duration grows and job turnover decelerates. More detailed results are available from the author upon request.

[53] REGI 2003 cannot be used because not all flows are available. Thus the year 2003 is additionally calculated according to REGI 1998 methodology.

[54] The most robust relative growth in employment, however, has been in "private households with employed persons". Absolute figures on the number of employees indicate, however, that it still remains a fully insignificant industry.

employment continued in hotels, restaurants and real estate, renting and business activities industries. Employment in construction and public administration decreased slightly after 1998.

Table 4: Relative Employment Growth Index

Industry (NACE)	REGI index (1) 1998:1993	REGI index (2) 2003:1993	Change [(2)–(1)] for period 2003:1998
Mining and quarrying	-0.3398	-0.5650	-0.2252
Agricultural, hunting	-0.3136	-0.4357	-0.1221
Health and social work	-0.1042	+0.1234	+0.2276
Electricity, gas and water supply	-0.0767	-0.2018	-0.1251
Manufacturing	-0.0737	-0.0797	-0.0060
Education	-0.0538	-0.0151	+0.0387
Transport, storage and communication	-0.0357	-0.0500	-0.0143
Other communal services	-0.0198	+0.1532	+0.1730
Fishing, forestry	-0.0099	-0.2685	-0.2586
Private households with employed persons	+0.0011	+4.7500	+4.7489
Hotels and restaurants	+0.0734	+0.1860	+0.1126
Construction	+0.1418	+0.0567	-0.0851
Real estate, renting and business activities	+0.1420	+0.2760	+0.1340
Public administration	+0.2509	+0.0646	-0.1860
Trade, car services	+0.2608	+0.2609	+0.0001
Financial services	+0.4758	+0.5109	+0.0351
Extra-territorial organisations	+2.0033	-	-
Total index of employment growth	0.998	0.983	+0.015

***Source*:** Czech Statistical Office, LFS, own calculations, 2003 = 2003:I.

Tables 5–8 show employment flows between industries, divided into three groups (increase, stagnation or decrease in industry employment measured by the REGI). The highest absolute flows-in and flows-out are in manufacturing, representing more than 30% of the total employment.

Nonetheless, the share of manufacturing in the total flows is only 22% and these moves constitute only 5% of the total employment in manufacturing. The industries with the greatest flows-in and flows-out (according to their shares in the total inter-industry employment turnover) are the same as the industries with the highest REGI.

Table 5: Flows between Industries and Labour Market Statuses from 93:I to 94:I (thousands)

Industries[1)] where employment is	Flows-out	Stayed	Flows-in	Net change of employment	Net contribution to unemployment	Net contribution to inactivity
Declining[2)]	-169.1	2478.1	+116.6	-52.5	+13.3	+7.3
Stable[3)]	-41.8	528.2	+34.8	-7.0	-9.8	-6.6
Growing[4)]	-127.3	1368.5	+186.9	+59.6	-9.4	-24.0
∑	-338.2	4374.8	+338.3			

***Source*:** Own calculations from LFS.

***Notes*:** 1) NACE classification. Industries were divided into categories according to the REGI index, declining below 5% of the total change during 1993–1997; stable from -5% to +5% of total change and growing for more than 5% of the total change. 2) Agriculture, mining and quarrying, manufacturing, electricity, gas and water supply, education, health and social work; 3) Fishing, forestry, transport, storage and communication, other communal social service activities, private households with employed persons) 4) Construction, trade, cars and household repairs, hotels and restaurants, financial services, real estate, renting and business activities, public administration, extra-territorial organisations.

Table 6: Flows between Industries and Labour Market Statuses from 95:I to 96:IV (thousands)

Industries where employment is	Flows-out	Stayed	Flows-in	Net change of employment	Net contribution to unemployment	Net contribution to inactivity
Declining	-133.2	2302.9	+108.6	-24.6	-15.1	+45.8
Stable	-41.2	547.1	+40.7	-0.5	-6.0	+9.1
Growing	-139.6	1608.4	+164.4	+24.8	-30.0	+26.2
∑	-314.0	4458.4	+313.7			

Table 7: Flows between Industries and Statuses from 97:I to 98:I (thousands)

Industries where employment is	Flows-out	Stayed	Flows-in	Net change of employment	Net contribution to unemployment	Net contribution to inactivity
Declining	-90.6	2157.8	+80.0	-10.6	+2.4	+92.0
Stable	-26.2	543.5	+29.8	+3.6	+2.3	+16.2
Growing	-119.7	1691.6	+127.0	+7.3	-22.9	+15.0
∑	-236.5	4392.9	+236.8			

Table 8: Flows between Industries and Statuses from 01:IV to 02:IV (thousands)

Industries where employment is	Flows-out	Stayed	Flows-in	Net change of employment	Net change of unemployment	Net change of inactivity
Declining	-59.2	1989.5	+57.5	-1.5	n.a.	n.a.
Stable	-21.4	519.3	+24.4	+3.0	n.a.	n.a.
Growing	-80.2	1655.8	+78,1	-2.1	n.a.	n.a.
∑	-160.8	4166.4	+160.0			

In general, the flows for the last ten years have decreased markedly, thus suggesting an enormous slowdown in labour market dynamics: total flows-in declined by more than 50% during 1993 and 2002, with the most remarkable fall recorded in "declining" industries, followed, however, by "growing" industries.

This suggests a sharp decrease in job creation even in those industries with statistically growing employment. Also, a parallel decline in total flows-out suggests an increasing stagnation in the structure of employment.[55]

3.5 Conclusion

This chapter provides an overview and explanation of labour flow dynamics in the Czech Republic. It attempts to examine how flexible the Czech labour market is, through a comparison of the strength of labour market flows internationally and during the different stages of economic transition. There are the following generalised conclusions:

a) The overall analysis of mobility flows throughout the analysed period (divided into three sub-periods) shows increasing structural stagnation and diminishing labour market flexibility. International comparisons reveal that the values of Czech flows are significantly lower than those in other Central and Eastern European (CEE) economies or in Nordic countries.
b) Contrary to the previously presented findings and in line with the argumentation in Chapter 1, I conclude that the probability of changing a job without an episode of unemployment was relatively high and represented (at least for the mid-1990s) the decisive labour flow. Even this flow, however, tends to diminish over time.
c) It can be stated that industries creating and destroying jobs are consistent with the conventional wisdom regarding "traditional" and "new" industries. One must admit, however, that employment flows-in and flows-out between industries have decreased markedly over the last ten years, thus suggesting once again an increasing stagnation in the structure of employment.

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[55] Flows between occupations are methodologically the same as for industries. Flows between occupations are analysed separately for white collars, blue collars and elementary occupations. There is quite small but stable growth in employment for white-collar workers and an opposite trend for blue-collar workers. Absolute flows-out and flows-in, however, are higher for blue-collar workers. The greatest relative employment flows were in elementary occupations: 9.7% in 1993, decreasing to 7.1% in 1997. The intensity of flows fell continuously for all groups over time and reflected the same tendencies as the flows between industries. More detailed results are available from the author upon request.

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4. Unemployment, Labour Marginalisation and Deprivation

Petr Mareš and Tomáš Syrovátka [56]

The purpose of this chapter is to document in detail the impact of long-term unemployment on labour market marginalisation in the Czech Republic. We intend to do so first in terms of the scope, structure and concentration of marginalised groups, and second in terms of the impact of labour market marginalisation on financial and material deprivation, psychological well-being, health and social bonds.

While frictional unemployment can be regarded as one of the mechanisms sustaining balance on the labour market, long-term unemployment implies economic and social losses, both for individuals and for society. As regards individuals and social categories, long-term unemployment represents one of the principal and most apparent forms of their marginalisation. Persons and social categories who possess little human capital find themselves particularly marginalised, due to their low level of education and poor or non-existent qualifications, as well as inadequate working habits and an inability to meet the general flexibility requirements (this also concerns certain ethnic groups).

In terms of individual costs, Giddens (2001) shows that in the United Kingdom people without qualifications face a five times higher risk of losing a job than those with higher qualification levels. Moreover, once unemployed, they are also more prone than the rest to find themselves caught in an unemployment trap. If they do find a new job, it is usually poorly paid and rather insecure. Analogously, Esping-Andersen (1999) argues that it is not as difficult to keep one's position in the labour market as it is to enter the labour market at all.[57]

In macroeconomic terms, the effects of marginalisation on labour market performance, economic growth and stability are also mostly negative: the low employability of the marginalised labour force and diminished effective labour supply push up the level of "equilibrium unemployment", adversely affecting the economy's non-inflationary growth.

[56] This work was in part supported by the Grant Agency of the Czech Republic, Grant No.: 403/03/1007 "Social Exclusion and Social Inclusion in the Czech Society".

[57] This corresponds with data obtained from a representative sample of the economically active population in the Czech Republic: in the 18–24 age group, the proportion of persons with experience of unemployment is higher than one might expect given their short work career. The data presented in this chapter was obtained from a panel of unemployed persons interviewed during the first month after they had registered with selected labour offices in the Czech Republic (in seven districts with different levels of unemployment). In all, 1,321 questionnaires were obtained in the first panel wave (2000). Half of the respondents were men and half women; one-third of them possessed primary education, one-third lower secondary education and one-third higher secondary or university education; one-quarter of them were below 25 years of age, half between 25 and 45 and one-quarter over 45. This structure corresponded well to the overall structure of the registered unemployed. The second wave was carried out after a lapse of 6–8 months and involved 817 of the initial panellists (of which 43% remained unemployed and 49% were currently employed; the rest had left the labour market for various reasons), who agreed to share their experience with unemployment and their life strategies. Our sample consists to a large extent of people marginalised on the labour market: more than 60% of the panellists have been unemployed repeatedly, one-third of them were unemployed more than one year before their current unemployment spell and half of them lost their last job within 3 months after signing the labour contract. We tried to avoid selectivity in the return of questionnaires by controlling the findings for individual educational categories (education proved to be a decisive factor in the first research wave).

Marginalisation, i.e. exclusion from labour market competition, becomes most costly if coupled with increasing labour mismatch. Such "pockets of unemployment" entrench themselves across geographical space and resist short-term active employment policy measures, because the increase in unemployment is rooted in deeper structural factors – whether on the demand side (unfavourable structure of the region's industries, insufficient infrastructure, etc.) or the supply side (a surplus of non-qualified or highly specialised labour) of local labour markets.

Growth in long-term unemployment, as well as prolongation of periods of unemployment and, correspondingly, of the average duration of unemployment is signalling the establishment of a marginalised labour force in the Czech Republic, too. An analysis is therefore needed to establish the extent of labour force marginalisation and deprivation, including the economic costs and consequences.

This chapter is organised as follows: First, we deal with the system of unemployment benefits in the Czech Republic to show the material impact of unemployment and also to discuss its link with the system of social benefits and the emergence of the "unemployment trap". Then, we look more closely at the typology of the unemployed. We go on to analyse the impact of marginalisation on the mental, social and material deprivation of unemployed individuals and families, which will also contribute to the discussion on involuntary unemployment in the Czech Republic. The final section provides a summary.

4.1 Unemployment Benefit Policy

Bison and Esping-Andersen (2000) consider the two factors that are most decisive with respect to the material impact of unemployment. One must first consider the position of the unemployed in the family and the family's other available resources. The material assistance that the welfare state guarantees to the unemployed is another important factor.

Originally, the Czech system of income protection for the unemployed was inspired mostly by the corporatist (continental) variant of the welfare state – see Esping-Andersen (1990) for more discussion. In 1990 and 1991 the replacement ratio was 65% of the net wage (and even 90% in the case of collective dismissals) and the duration of benefit provision was 12 months.

The transition recession and increasing unemployment resulted in an outlook of high budgetary expenditure on unemployment benefits. This soon led, as in other post-communist countries, to an inclination towards the Anglo-Saxon liberal model. Burda (1993) argues that, out of all the post-communist countries, this tendency was strongest in the Czech Republic. In 1992, the replacement ratio was reduced to 60% (50%) of the previous net wage and the duration of benefit provision was reduced to 6 months.[58] After 6 months of unemployment a person could only claim means-tested social benefits.

[58] Originally, the social benefit ceiling equalled 1.5 times the minimum wage. Between 1996 and 1999 it equalled 1.5 times the subsistence minimum level for a single person. This means, for example, that the effective replacement rate for a worker with an average salary was definitely less than half of his/her previous wage from the very beginning of his/her unemployment.

Growing external as well as internal economic disequilibrium led the government to adopt measures to further reduce budgetary expenditures. This mostly affected social spending and involved cuts in a number of social benefits. Among other measures, the unemployment benefit replacement ratio was cut in 1998 from 60% to 50% of the previous net wage (during the first three months of unemployment), from 50% to 40% (during the following three months), and from 70% to 60% (in the case of participation in labour market training).

The Social Democrat minority government formed after the 1998 elections proposed a number of measures to increase the level of income protection for the unemployed. In the case of unemployment benefits, it gained Parliament's support in 2000 to raise the benefit ceiling from 1.5 to 2.5 times the subsistence minimum for a single person.

At the same time, however, the entitlement criteria were tightened for those unemployed who re-entered the unemployment registers repeatedly: a minimum of 6 months of continuous employment was required between registrations. The previously set replacement ratio was, however, not subject to improvements, while the other restrictions introduced in 1997, such as cuts in child benefits and deceleration of benefit indexation, were only temporary.

Despite these efforts, the material consequences of unemployment made themselves felt within a very short period of unemployment. They strongly influence the overall subjective perception of unemployment. It is worth mentioning that it was precisely the low level of income during unemployment that led a great number of people to retire early in the second half of the 1990s when unemployment was on the increase. Between 1998 and 2000, more than 1% of the labour force chose early retirement each year.[59]

Finally, some minor changes were suggested by the government in November 2003, which should come into effect in May 2004: the unemployment benefit replacement ratio in the fourth month of unemployment and afterwards will be increased from 40% to 45% and the unemployment benefit period will be prolonged for 9 months for people aged 50–55 and for 12 months for those aged over 55.

The Czech system of unemployment benefits can generally be considered "strict". It approximates the Anglo-Saxon model, even though unemployment benefit is calculated from the applicant's previous wage. The unemployed in the Czech Republic, therefore, could be assumed to be suffering from a considerable degree of material deprivation.

It must be noted, however, that the social assistance system, which the unemployed enter after 6 months of unemployment and which is grounded in the concept of the subsistence minimum guarantee, makes it possible, for example in the case of a four-member family, to accrue an income exceeding the net average wage – see Chapter 1 for discussion.

The growth in long-term unemployment can be explained by the gradual accumulation of the pool of unemployed over time. They remain unemployed partially owing to their low level of human capital and growing demand for qualified labour (structural unemployment), and partially owing

[59] The government started penalising early labour market exits in 2001, mainly for budgetary reasons, and their numbers have since fallen.

to a relatively strong welfare state and the level of welfare benefits, which are competitive with the level of attainable wages (the "unemployment trap").[60]

No wonder that the unemployed appear to find the subsistence minimum in some respects more important than unemployment benefits. In fact, not much more than one-third of the unemployed in the Czech Republic receive unemployment benefits.[61] A number of them have never met the unemployment benefit entitlement criteria related to the applicant's employment record. In addition, the transition from unemployment benefits to social assistance (the subsistence minimum) is quite fast, taking place within a mere 6 months.

4.2 The Typology of the Marginalised Labour Force

Low-qualified labour is at a greater risk of marginalisation (Table 1). This concerns especially women, since their work career is discontinued by maternity and childcare (both can in a way be perceived as a type of hidden unemployment). Elderly people and the disabled are also among the most affected risk groups.[62]

While households with one member suffering from marginalisation (especially if he/she is a "breadwinner") face serious problems, cases are not unknown of households with both partners being marginalised. A relatively high frequency of persons who have changed numerous jobs during the past ten years, coupled with a short duration of their last employment between the two periods of unemployment, indicate that many unemployed people have become well acquainted with life without paid work. Leaving aside fresh graduates and other persons without previous work experience, as many as 61% of our respondents share at least some experience of being without paid work at some point in their work history before they enter their current unemployment status. For 32% of them it was a repeated experience (often the third one at least).

A major determinant of the incidence of unemployment in a person's work career is human capital, indicated by completed education. In particular, unskilled manual workers with elementary education have been unemployed repeatedly.[63] Only 25% of them were unemployed for the first time at the time of the research. By contrast, in the category of university-educated panellists, only 13% have faced repeated unemployment. In general, highly educated people and public sector employees are at a much lower risk of unemployment than others.[64]

Marginalisation is also associated with accumulation of unemployment in certain types of households. Double unemployment (i.e. both partners unemployed) affected almost 30% of our

[60] Nonetheless, in our sample, almost all the respondents were highly critical of the insufficient level of both unemployment benefits and the subsistence minimum.

[61] According to the Ministry of Labour and Social Affairs, 45% of the unemployed were receiving unemployment benefits in 2000. This figure dropped to 37% in 2001 and remained the same in 2002.

[62] In the EU countries, the magnitude of LTU amounted to 41–76% of total unemployment after 1989, having increased from a mere 12% in the early 1970s and about 35% in the 1980s – see Benoit-Guilbot (1994) or Gallie (1994) for more discussion.

[63] Workers with elementary education (unskilled labour) face the highest average duration of unemployment. This group is also marked by the greatest variance in unemployment duration and the greatest number of persons with outlying values of aggregate unemployment duration.

[64] Calculations based on Labour Force Survey 2002 (4Q), Czech Statistical Office.

panellists' households to whom the question was applicable (i.e. the panellists had a partner). Moreover, for half of these panellists the current unemployment experience was the third one at least. Such a proportion of unemployment accumulation is high and marks a specific category of households (in most cases, both partners have completed only elementary education, and they often suffer from health problems).

Table 1: Long-term Unemployment (LTU) in the Czech Republic

	Total long-term unemployed (>12 months)	**Incidence of LTU in the category of the unemployed (%)**	**Structure of LTU (%)**
Men	82,600	50.3	43.9
Women	105,600	50.1	56.1
Primary educ.	60,500	66.9	32.1
Lower secondary	84,900	48.9	45,1
Higher secondary	39,100	40.9	20.8
University educ.	3,700	24.5	2.0
up to 19 years	8,500	32.1	7.1
20–24 years	25,600	38.5	17.7
25–29 years	25,700	45.3	15.1
30–39 years	44,500	53.6	22.1
40–49 years	44,300	59.1	20.0
50 years and over	39,600	58.8	18.0
Disabled	26,200	72.0	13.9
Total	188,200	50.2	100

***Source*:** Czech Statistical Office; Labour Force Survey for 2Q 2002; own calculations.

The increased risk does not limit itself to "nuclear" families only. A higher incidence of unemployment can be seen also within broader families of long-term unemployed (31% of parents and 34% of brothers and sisters of the long-term unemployed under 35 have experienced unemployment as well). This exemplifies the homogeneity of the social backgrounds of the long-term unemployed respondents in our panel.

Table 2: The Typology of Affected Households (per cent of respondents with a partner)

Respondent lost a job more than once before		Respondent lost a job more than once before	
Partner doesn't have a steady job	**10%**	Partner has a steady job	**32%**
Respondent lost a job at least once before		Respondent lost a job at least once before	
Partner doesn't have a steady job	**10%**	Partner has a steady job	**16%**
Respondent lost a job for the first time		Respondent lost a job for the first time	
Partner doesn't have a steady job	**5%**	Partner has a steady job	**27%**

Source: Data on a panel of households affected by unemployment in seven districts of the Czech Republic.

The high concentration of unemployment within the broader family typically concerns those who are themselves exposed to the highest risk of unemployment. 20% of respondents with merely elementary education and no further vocational training stated that their children had experienced unemployment too. In the case of their parents and brothers/sisters the proportions were 25% and 30% respectively.

By contrast, university graduates reported zero unemployment among their children. 20% of them reported a history of unemployment among their brothers and sisters and 10% among their parents (all the percentages above were derived from the relevant baselines – for example from the

categories of respondents with economically active children, brothers and sisters or parents respectively).

4.3 The Impact of Marginalisation on Labour Force Deprivation

According to Clasen *et al*. (1998), unemployment brings about a decline in self-respect, social isolation, loss of a person's social bonds, disintegration of the time structure of everyday life and further negative effects on one's personal and family situation.

As evidenced by Oswald (1994) or Gallie, March and Vogler (1994), a number of the unemployed greatly feel the accumulation of disadvantages to which they are exposed on the labour market and which affect their lives and life prospects. The degree of social deprivation resulting from unemployment goes hand in hand with the degree of stigmatisation. The absolute level of these adverse unemployment consequences varies in different environments.

4.3.1 Social and Mental Deprivation: Evidence of Involuntary Unemployment

Our research findings for the Czech Republic suggest that the subjective feelings of social deprivation, stigmatisation and health deterioration are still less marked than in most EU countries. Only a minority (about 15%) of our respondents stated that their health and social bonds had deteriorated. At the same time, however, more than half of them reported aggravation of their mental well-being over the course of their unemployment (53%) and similarly, 60% found unemployment more or less stressing.

The proportion of respondents who feel unemployment as a traumatic experience increases markedly with age (from 30% in the 20–35 age group up to 70% among persons over 50). University-educated persons are more resistant to unemployment-related traumas (for the most part, it is their first encounter with unemployment, they have better prospects on the labour market, their self-confidence is stronger, etc).[65] The reported mental, health and social problems, and mainly the subjective perceptions of respondents' well-being during unemployment, strongly correlate with indicators of material deprivation (which was reported by 82% of the respondents). Material deprivation thus appears to be the basic source of psychological trauma, as opposed to subjective social deprivation.

Considering, however, that more than half of the unemployed seem to be traumatised by their unemployment to some extent, and assuming, in line with Oswald (1994), that people prefer psychological well-being to trauma, we suggest that our results provide some evidence of involuntary unemployment (understood as those unemployed who would prefer work if available).[66]

[65] This somewhat contradicts Oswald's (1994) results, who for the UK evidenced the highest degree of unemployment-related mental distress among young people and also among highly educated respondents and provided well-founded arguments supporting such results (e.g. in terms of the high opportunity costs of being unemployed for university graduates).

[66] Oswald (1994) bases his assumption on the empirical evidence found for the US and the UK, documenting much lower happiness of the unemployed as compared with others.

Involuntary unemployment in the above definition does not necessarily imply that all those affected are actively seeking a job. As evidenced by a number of countries, many of them are discouraged or frustrated due to a lack of vacancies, the psychological costs of job search and a low level of self-efficacy due to increasing unemployment duration and unsuccessful job search. This means that the discouraged unemployed do not actively seek a job, but they would accept it if it were on offer.[67]

One might also argue that some of the unemployed might have been psychologically deprived even before their unemployment started and, therefore, that this characteristic alone does not explain involuntary unemployment. Anyway, the most convincing argument of our study is not only that 60% of the Czech unemployed feel stressed specifically due to their unemployment status, but the psychological well-being of about one-half of them further worsened during unemployment.

4.3.2 Material Deprivation

European countries' experience from the 1980s shows that long-term unemployment increases the risk of poverty and social exclusion – see Hagenaars et al. (1994) or Atkinson (1998). For the most part, the unemployed are indeed destined to cope with the material deprivation associated with unemployment. Gallie (1999) suggests that while the correlation between unemployment and social exclusion of the unemployed has not been demonstrated clearly enough, the effect on their economic deprivation is not negligible and deserves greater attention than it has received so far. The situation in the Czech Republic deserves even more attention, since households of the unemployed are affected more severely by poverty than in other EU countries (Table 3).

Income poverty in the general population and among the unemployed can be compared internationally using data from the European Household Panel (third wave, from 1996) and the Czech "Mikrocensus" (1996).

To measure income poverty among households of the employed and unemployed, we use the index of poverty risk. The value of the index in Table 3 generally tells us how much higher the incidence of poor people is in a particular category of the population as compared with the average in the population as a whole. Thus the figure 9.33 in the Czech case means that there are nine times more poor people among those living in households where the head of the household is unemployed compared to the total population. For households consisting of employed people, the corresponding figure is just 0.53.

While the general level of income poverty in households of the employed is fairly close to the EU level, the risk of income poverty in households consisting of the unemployed seems to be much higher in the Czech Republic. Actually, about two-thirds of unemployed households in the Czech Republic are poor,[68] which is the highest figure by comparison with other EU countries (only

[67] According to Červenka (2003), about 80% of respondents considered a lack of jobs as the prevailing reason for unemployment during 2000–2002. By contrast, only around 20% reported a lack of willingness of the unemployed to work.

[68] The share of the poor in a category of the unemployed in a country equals the incidence of poverty in total population multiplied by the risk index of poverty for the unemployed (in the Czech case it is 7% x 9.33 = 65.5%).

Belgium, France, Ireland and the UK recorded rates between 50% and 60%). By contrast, the general poverty rate is the lowest in the Czech Republic.

Table 3: Income Poverty in the EU and the Czech Republic
(in per cent of total population; index risk)

Incidence of poverty	**CR**	**EU 14**	**Belgium**	**Denmark**	**France**	**Ireland**	**Italy**	**Germany**	**Portugal**	**Austria**	**United kingdom**
Population total	7%	17%	17%	12%	16%	19%	19%	16%	22%	17%	19%
Index/risk:											
Employed	0.53	0.77	0.62	0.56	0.73	0.54	0.90	0.63	0.82	0.93	0.56
Unemployed	**9.33**	**2.92**	**3.57**	**1.71**	**3.62**	**3.21**	**2.94**	**2.91**	**1.47**	**1.72**	**2.86**
Pensioners	2.04	1.09	1.14	2.39	1.16	0.85	0.70	1.01	1.85	1.03	1.40
Other inactive	5.83	3.05	3.23	4.33	3.45	3.36	2.61	4.58	2.71	2.44	3.09

***Source*:** Zelený (2001), adapted.

Notes: "Index of the risk of poverty" – the ratio of the poor in a given category to the poor in the population as a whole; "Employed" – individuals who live in a household in which at least one member is employed; "Unemployed" – individuals who live in a household in which at least one member is unemployed and none of the members is employed. The poverty line was set at 60% of median-equivalent income. This income was computed using a modified OECD scale (the head of the household was assigned a weight of 1.0, other adults 0.5 and children below the age of 14 years 0.3).

The vast majority of the unemployed in our panel spoke about aggravation of their financial situation during the period of unemployment (82%). Indeed, as Table 4 documents, there is a strong association between indicators of material deprivation during unemployment and the respondents' overall evaluation of life.[69]

Actually, the unemployed state that their households' incomes declined on average by 25% as compared with the period when they had been employed. In order to assess the impact of this decline in income, we must realise that 25% of lost income represents, in a sample of low-income households with children (i.e. with income lower than 1.3 times the subsistence minimum), almost all of their rent and energy budget or about 80% of their food expenses (cf. CZSO 2001).

The average income reported by unemployed households was approximately 1.3 times the subsistence minimum level. Over 40% of the unemployed declare that they live on an income below the subsistence minimum. In relation to the average income of households with employed members this represents slightly less than 60%. In cases where unemployment takes away the main source of the household's previous income, however, the proportion drops to as little as 47% of the average income of employed households.[70]

[69] To be more precise, Spearman's correlation coefficient between overall evaluation of life in unemployment and the question *"How do you make ends meet?"* is 0.470 (sign = .000). In the case of the correlation between assessment of one's purchasing power and evaluation of the overall situation during unemployment it is 0.409 (sign = .000).

[70] The monthly average net financial income in employed households in 2000 was CZK 20,254 (CZSO 2001).

Table 4: Financial Situation and Material Deprivation of the Unemployed
(in per cent of total respondents/unemployed)

	Income below the minimum level of subsistence	**Household income decline by more than 25%**	**Makes ends meet with great difficulties**	**Financial situation worsened a great deal**	**Income suffices only for the cheapest things, or not even for the cheapest food**
TOTAL	42.5	52.1	26.8	41.7	42.5
SEX					
Men	42.7	**58.8**	26.8	40.9	44.7
Women	42.4	**47.0**	26.9	42.3	40.7
AGE					
Under 25 years	**23.6**	**29.0**	**17.2**	**24.4**	**30.8**
26 to 45	**50.2**	**54.0**	**27.7**	**41.9**	**43.3**
Over 45 years	**44.0**	**66.8**	**33.6**	**56.4**	**51.1**
EDUCATION					
Elementary	**50.3**	42.5	31.2	44.8	**54.9**
Lower secondary	**50.0**	61.3	27.2	41.0	**45.1**
Upper secondary	**33.0**	53.6	26.4	45.2	**33.2**
University	**11.0**	40.5	11.3	18.0	**22.6**
BREADWINNERS' ROLE					
Main income	**54.7**	**65.6**	32.3	**50.0**	47.5
Same incomes	**38.5**	**60.4**	25.0	**47.2**	37.4
Supplementary income	**36.7**	**40.2**	24.9	**40.3**	39.2
No partner, family	**31.0**	**40.0**	24.5	**30.4**	45.6
LIVING WITH PARENTS					
Lives with parents	**29.0**	**35.8**	20.2	**26.7**	**34.3**
Does not live with parents	**47.3**	**58.1**	29.6	**47.5**	**45.8**
TYPE OF HOUSEHOLD (EXCLUDING RESPONDENTS WHO LIVE WITH PARENTS)					
Individual	**46.3**	**67.4**	32.7	54.5	**34.5**
Childless couple	**34.7**	**67.5**	28.3	51.7	**42.0**
Two-parent family	**48.7**	**48.6**	29.6	47.4	**46.0**
Single-parent family	**69.0**	**56.9**	40.6	53.1	**56.3**
DURATION OF UNEMPLOYMENT					
Less than 1 month	37.5	41.7	**19.5**	37.0	37.8
1 to 3 months	38.6	45.7	**22.4**	39.7	38.7
3 to 6 months	39.9	52.6	**28.8**	39.5	40.0
More than 6 months	46.9	56.3	**30.6**	46.2	47.5
PARTNER'S UNEMPLOYMENT					
Partner unemployed	**60.9**	65.2	30.4	**53.6**	**53.6**
Partner employed	**41.2**	51.4	24.6	**40.5**	**41.7**

Source: The data were obtained from 816 unemployed respondents. The relationship between income and the subsistence minimum, as well as the figures on income decline, are based on the stated incomes of 660 unemployed respondents.

Notes: The figures in bold are cases where the specific variables (percentages) displayed in the columns correlate significantly with the qualitative variables in the first row (Spearman's correlation, SL .05 or less).

The income impact of unemployment varies in line with the role of the unemployed person in the family and the material assistance provided by the state. In addition, it depends on the quality of human and social capital. This factor influences long-term accumulation of resources, including income generated in periods of both employment and unemployment, as well as individual prospects of finding a new stable job.

During periods of unemployment in those households in which the previous salary of the currently unemployed member used to be the household's main income source, total family income declines sharply and is low in general. This applies above all to households with children, both two-parent and single-parent ones.[71] On average, these households' incomes drop to a level which only exceeds the household subsistence minimum by about 10%. In single-parent households it drops below the subsistence minimum level.

By contrast, a relatively higher income level during unemployment (compared to the subsistence minimum) was found for the unemployed living with parents (young people under 25), as well as those respondents whose income served as a supplement to the income of the household's breadwinner (typically women living in complete families). When the subsistence minimum is applied as a benchmark, this finding also applies to highly educated respondents, although their income in absolute terms declines sharply during unemployment.

Our findings show that 75% of the unemployed under 25 years of age live with their parents.[72] Parental support considerably relieves the material consequences of unemployment, in terms of both additional income and accumulating financial savings. Considering that the young unemployed living with parents benefit from shared board and accommodation, it is not surprising that they find themselves much less financially deprived than other groups.

In addition to the position of the unemployed in their households, their human and social capital, as well as their ability to economise, proves to be of key importance. While the sharpest absolute decline in income during unemployment was found among the unemployed with higher educational qualifications, it is the group of elementary-educated, followed by those who have completed lower secondary education (vocational training), that have the lowest absolute income during unemployment. The feeling of material deprivation is also strongest among those unemployed individuals with elementary education.

While this can be a demonstration of secondary poverty resulting from low social competence, equally important is the fact that non-qualified workers have the poorest entitlements in the system of income protection during unemployment due to their precarious position in the labour market. Moreover, they are also likely to have the most limited financial resources, such as savings, etc.

As the period of unemployment grows longer, the material deprivation of the unemployed deepens. The replacement ratio is reduced after 3 months of unemployment, and after another 3 months the entitlement to unemployment benefits expires altogether. Moreover, temporary resources such as savings are usually expended very quickly. It is worth mentioning, however, that, given the low replacement ratio, the material deprivation of the unemployed is relatively high from the very initial stages of unemployment and we therefore do not find a substantial influence of unemployment duration.

[71] Considering the role of the breadwinner, this typically applies to middle-aged unemployed people (26–45).
[72] The unemployed under 25 years of age represent about 25% of all unemployed individuals in the Czech Republic (MLSA 2002).

It is also symptomatic that the income situation of those who eventually found a new job has not much improved. In most cases, their income remains below the level that prevailed prior to the unemployment. Leaving other factors aside, this can be ascribed to the frequently occurring necessity to incur debts during unemployment. However, decisive in this respect is the fact that, as in the EU countries, the long-term unemployed often find new employment in companies that offer lower wages, non-standard job contracts (temporary or part-time jobs) and low job security.

4.4 Conclusion

Labour market marginalisation due to long-term or frequently repeated unemployment is strongly associated with both material and mental deprivation among the major part of the unemployed. This supports the hypothesis that involuntary unemployment is not negligible in the Czech Republic.

Welfare benefits are sometimes "voluntarily" accepted as an alternative to low and insecure earnings. This happens not only because of their relatively favourable level (this concerns just certain types of households and low-wage workers), but also because of the seeming security that they imply as compared with the risks brought about by temporary employment, mainly via the secondary labour market.73 Indeed, passive strategies tend to prevail, especially in the case of workers with low qualification levels, despite the state of permanent deprivation to which they are exposed. This is, however, more a consequence of the unemployment trap and welfare dependency than a finding contrary to the involuntary unemployment hypothesis. .

Thus the adverse impacts of marginalisation need more policy attention. First, labour force reproduction in terms of human capital and employability is adversely affected. As a result, the efficiency of job search worsens even in cases where the material deprivation of the (involuntarily) unemployed increases.

Second, due to a high and still growing share of long-term unemployment, the effective labour supply diminishes and "equilibrium unemployment" increases.[74] Wage pressures and inflation risks could therefore emerge and threaten macroeconomic stability in spite of relatively high aggregate unemployment. Restrictive economic policies are only partly sufficient to prevent such pressures, since these would in turn hamper the economic growth necessary to eliminate high aggregate unemployment. In line with the argumentation in Chapters 1 and 2, we therefore conclude that structural and institutional changes affecting labour market performance are urgently needed.

Labour taxation should be lowered, especially with regard to low-earnings categories. The benefit system should in turn create more incentives to re-enter employment (i.e. to make benefits more conditional on job-search activity, diminish the universal generosity of the welfare system and create some back-to-work financial incentives).

[73] Some of the unemployed clearly tend to supplement their social incomes by engaging in the shadow economy.

[74] These effects have been emphasised by, for example, Layard, Nickell and Jackman (1994) and are in line with the argumentation in Chapter 2 of this volume.

In addition, the scope of active labour market policies needs to be extended to the most marginalised groups. Policy targeting, content and measures have to be improved by adopting a more "activating" approach.

Finally, income support schemes (unemployment benefits and social assistance benefits) should be better harmonised. Unemployment benefits might perhaps be more earnings-related and the replacement ratio possibly higher, especially in the case of accepting longer labour market training. By contrast, social benefits should be more strictly conditional on search or training activities and reward activity.

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5. Regional Wage Adjustments and Unemployment: Estimating the Time-Varying Wage Curve

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The relationship between unemployment and wages is one of the key equilibrating channels in the economy. The strength of this relationship is determined, among other things, by the legal framework of bargaining between employees and employers, the institutional setting of the welfare system and the mobility of labour. Blanchflower and Oswald (1994) enriched the academic discussion on the relationship between unemployment and wages by empirically analysing the effect of the regional unemployment rate on the level of individual or region-average wages. They found that the local unemployment elasticity of real wages is about -0.1 for a number of developed and developing countries. This evidence, called the wage curve, is widely used as an indicator of real wage flexibility at the regional level.[76]

The wage curve evidence is less straightforward in the economies of Central Europe (Table 1). The regional elasticity of wages in the Czech Republic differs markedly from Slovakia and Hungary. Existing studies, such as Blanchflower (2001) and Huitfeldt (2001), find the elasticity in the Czech Republic to be between 0.00 and -0.04. A low elasticity estimate is also reported for Austria by Winter-Ebmer (1996). Given that estimation methods are appropriate in these studies, this evidence points to drawbacks emanating from the bargaining between employers or employees or from the welfare system. In particular, the wage formation might not reflect local labour market conditions, or it might be the welfare scheme that restrains wage adjustments. Galuščák and Münich (2003) provide evidence that the problem of low elasticity estimates is rather in the estimation procedure itself and in the heterogeneity of the wage curve relationship. Although the baseline elasticity estimate is -0.03, the estimate is greater in absolute value after controlling for the endogeneity of unemployment and in particular groups of districts. In any case, all these estimates are still below the benchmark specified in Blanchflower and Oswald (1994).

Do the previous estimates of the regional elasticity of wages mean that Czech real wages are inflexible with respect to regional unemployment? Or alternatively, are these estimates low because of inappropriate estimation techniques? In this chapter, we adopt the methodology described in Galuščák and Münich (2003) with the aim of assessing the degree of real wage flexibility at the regional level by estimating the unemployment elasticity of wages. The panel of district-level data on unemployment and average wages covers the period 1993–2001, allowing us to assess how the regional flexibility has changed in this period. We improve the estimation employed in Galuščák and Münich (2003) by using contemporaneous instruments in order to utilise the full length of the panel. Because local structural conditions are important determinants of wage flexibility at the district level, we allow for different functional forms of the wage curve across districts.

[75] We thank the Department of Analysis and Statistics at the Ministry of Labour and Social Affairs for providing us with the data on registered unemployment.

[76] See, for example, Nickell (1997).

Table 1: Previous Wage Curve Estimates

Country	Period	Coefficient log(u)*	Data level	Estimation method	Number of regions	Authors
Czech R.	1992, 1994–1997	-0.21 (4.35)	individual	OLS	8	Blanchflower (2001)
Czech R.	1992, 1994–1997	0.03 (0.41)	individual	OLS, regional dummies	8	Blanchflower (2001)
Czech R.	1992–1998	-0.013 (1.86)	district	OLS	73	Huitfeldt (2001)
Czech R.	1992–1998	-0.042 (5.25)	district	OLS, district fixed effects	73	Huitfeldt (2001)
Czech R.	1996–2001	-0.032 (2.0)	district	OLS, district fixed effects, instruments	74	Galuščák, Münich (2003)
Czech R.	1996–2001	-0.079 (2.2)	district	OLS, district fixed effects, instruments	45**	Galuščák, Münich (2003)
Slovakia	1995	-0.049 (3.85)	individual	OLS	42	Blanchflower (2001)
Slovakia	1992–1998	-0.128 (9.1)	district	OLS	29	Huitfeldt (2001)
Slovakia	1992–1998	-0.109 (7.3)	district	OLS, district fixed effects	29	Huitfeldt (2001)
Hungary	1990–1997	-0.052 (2.07)	individual	OLS	20	Blanchflower (2001)
Hungary	1990–1997	0.042 (1.23)	individual	OLS, regional dummies	20	Blanchflower (2001)
Hungary	1994–1995	-0.11	individual	OLS, regional dummies	14	Kertesi, Kollo (1997)
Poland	1991–1997	-0.153 (3.59)	individual	OLS	8	Blanchflower (2001)
Poland	1991–1997	-0.127 (2.28)	individual	OLS, regional dummies	8	Blanchflower (2001)
Austria	1983	-0.029 (2.7)	individual	OLS, regional dummies	99	Winter-Ebmer (1996)

Note: * t-statistics in parentheses.
** without the districts that experienced the largest rise in unemployment rate between 1996 and 2001.

Our prime goal is to analyse how the regional flexibility of wages changed during 1993–2001. A potential deterioration in the flexibility would have an adverse impact on the economy during periods of adverse shocks. In addition, the regional flexibility will be important as regards the prospect of losing independent monetary policy upon EMU entry.

This chapter is set out as follows. The next section summarises the theory and previous evidence on the wage curve. Section 5.2 is devoted to the estimation method, while the following two sections describe the data and results. The last section concludes the chapter.

5.1 Theoretical Background

Real wage flexibility at the regional level may be investigated using equations of the following type:

$$w_{rt} = \alpha_r + \beta u_{rt} + \delta_t, \qquad (1)$$

where w_{rt} is the logarithm of the average nominal wage in region r at time t and u_{rt} is the logarithm of the regional unemployment rate.[77] The region-specific (α_r) fixed effects represent differences in prices across regions, which are given by different industrial and demographic structures. On the other hand, the time-specific (δ_t) fixed effects capture differences in prices over time and contemporary aggregate shocks affecting all regions. The time-specific fixed effects contain, for example, potential effects of the economy-wide unemployment rate and the economy-wide previous wage level – see Bell *et al*. (2002).[78] The coefficient β is therefore the local unemployment elasticity of the real wage level. It is a measure of the regional real wage flexibility. Controlling for fixed effects, the estimation is not affected by the spurious effects observed in the case of cross-sectional estimates.

Based on the estimation of individual or regional-average wage data, the literature agrees that the estimates of β in equation (1) are negative at about -0.1. Estimates for the countries of Central and Eastern Europe have been published recently. Blanchflower (2001) estimated wage curves in 23 transition countries from Eastern and Central Europe for the period 1990–1997. For some of these countries, the estimates of β are larger in absolute terms than in developed economies, while they are lower for Hungary and the Czech Republic (Table 1). The wage curve disappears for these two countries when region-specific dummies are included.[79] Huitfeldt (2001) finds a significant wage curve using district-level panel data from the Czech Republic between 1992 and 1998. His estimates of β for district average wages are greater in absolute terms after allowing for district fixed effects, but still lower than the results obtained for Slovakia and other countries. In our earlier work (Galuščák and Münich, 2003), we found a similarly low elasticity of wages in regressions pooling all districts. The elasticity is, however, greater in absolute terms for particular groups of districts, indicating that the functional form might differ across districts.[80] These results all indicate that real wage flexibility with respect to local unemployment might be low in the Czech Republic.

What size of the regional unemployment elasticity of wages is expected in a typical transitional economy? What should be expected in terms of its changes during the transition? The wage curve should be observed in an economy where at least some sectors work on the principles of supply and demand. As the proportion of market sectors increases during the transition, we might expect to observe an emerging wage curve. In other words, regional wage flexibility might increase in the course of the economic transition.

In order to interpret changes in the elasticity, we refer to the framework of efficiency wages described in Shapiro and Stiglitz (1984). In their stylised model, an upward-sloping no-shirking condition (NSC) is derived describing the minimum wage level needed to induce effort and

[77] Blanchflower and Oswald (1994) used the log-specification based on the best empirical fit.

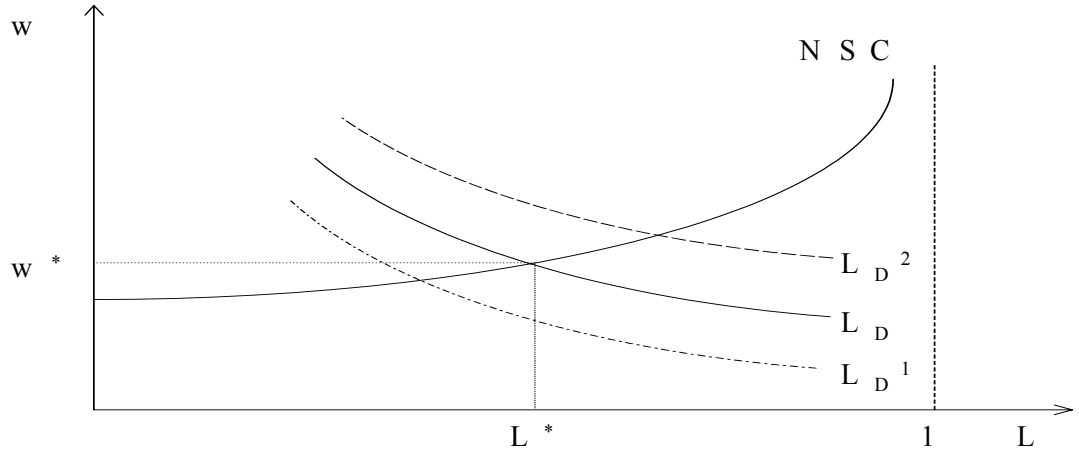
[78] While the national rate of unemployment reflects some wages set nationally, the previous economy-wide wage level provides comparability factors in the contemporaneous wage bargaining.

[79] On the other hand, Kertesi and Köllö (1997) estimated a significant wage curve in Hungary in 1992–1995.

[80] Card (1995) pointed out that the wage curve might be different for different groups of workers. He found that younger, less educated, less unionised, male workers are more likely to have a significant unemployment elasticity of wages. Examining earnings and unemployment in ten regions of the UK between 1972 and 1995, Cameron and Muellbauer (2001) estimated a significant negative unemployment elasticity of pay in the case of manual men.

prevent shirking of employees at a given rate of employment (Figure 1). Blanchflower and Oswald (1994) show that the wage curve is identical with the NSC and that the NSC is the same in all regions if institutional factors do not differ across regions. According to these authors, regions exhibit different unemployment-wage combinations due to non-pecuniary benefits. A region with a non-pecuniary benefit greater than in another region pays lower wages and suffers from higher unemployment in order to meet the zero migration condition in the long run. In each region, the equilibrium is reached at the intersection of the NSC and a negatively sloped demand function. The labour demand curve emanates from the usual relationship of the value marginal product of labour.

Figure 1: The No-shirking Condition and Aggregate Labour Demand



The convex profile of the NSC implies that the slope of the wage curve may differ across regions if regional differences in the rate of unemployment are high. Using equation (1) to model the wage curve, one implicitly assumes that the slope of the wage curve is the same for all regions. This is depicted by the aggregate labour demand curve L_D in Figure 1.

The equation for the NSC is given as

$$w \geq e + B + \frac{e}{q}\left(\frac{b}{1-L} + r\right), \qquad (2)$$

where e is the effort of employees (e=0 if shirking), B is the level of unemployment benefits, q is the probability of being fired if caught shirking, b is the exogenous risk of job termination, L is the employment rate (1-L=u is the unemployment rate), and r is the interest rate. The first two derivatives of (2) with respect to L are positive, implying that the slope of the wage curve is lower during recessionary periods resulting in a decline of the aggregate demand for labour. On the other hand, the wage curve becomes steeper during periods of high aggregate labour demand (depicted as L_D^1 and L_D^2 in Figure 1).[81]

[81] Increases in *B* or *r* shift the NSC upward, implying a lower slope in the wage curve for a particular labour demand curve. Effects of changes in other parameters of the NSC on the slope of the wage curve are ambiguous.

In order to estimate the change in the flexibility over time, we estimate the wage curve by adopting a static equation (1) and using contemporaneous instruments in the estimation. We estimate the wage curve using the full sample (1993–2001) and in the early and late transition separately (1993–1997 and 1998–2001). We focus on how the shape of the wage curve has changed during the economic transition by estimating the time-varying wage curve. We expect the elasticity to have increased during the economic transition to a market economy. On the contrary, the recession of 1997–1999 might have led to a temporary deterioration in regional wage flexibility.

Wage flexibility might be heterogeneous across regions or specific groups of workers. Hence, we allow for different functional forms of the wage curve. According to Galuščák and Münich (2003), the wage curve estimates might be biased by including districts with the highest rise in unemployment rate between 1996 and 2001 in the sample. In these districts, the unemployment rate was prevalently low until 1996, while it increased sharply during the 1997–1999 recession to the level observed in other districts. Unemployment increased to the level observed in other districts for a given wage level, indicating that these districts experienced a "delayed" transition. To account for this, we also provide estimates of the elasticity using the sample excluding these districts.[82] We expect some improvement in the overall elasticity due to the delayed transition observed in these districts. Finally, we estimate the regional elasticity of wages in districts excluding Prague, Prague-East and Prague-West.[83]

5.2 Estimation

In the empirical analysis, we extend our deterministic specification (1) by including a component ε_{rt} that represents the variation in observed wages not explained by unemployment:

$$w_{rt} = \alpha_r + \beta u_{rt} + \delta_t + \varepsilon_{rt}. \qquad (3)$$

In line with equation (1), we assume that regional fixed effects capture price differences across regions and that prices grow at the same rate in all regions.[84] Fixed effects represent district- or time-specific unobserved factors contributing to the variance in observed wages. Not controlling for fixed effects, while these effects are correlated with the explanatory variables through

[82] The selection of districts is arbitrary. In Galuščák and Münich (2003), we calculated the ratio of unemployment rates in 2001 and 1996 and sorted the districts by that ratio. Using K-means cluster analysis, we created four groups of districts. Then we merged these groups into two groups of districts: a group of districts that experienced the lowest increase in unemployment rates between 1996 and 2001 (45 districts), and another group of districts with the highest increase in unemployment (32 districts, with Prague at the top). In fact, we discard almost half the sample. The aim is to demonstrate that the wage curve might be weaker in problematic regions.

[83] As capital cities have specific local labour markets, we exclude the districts of Prague-East and Prague-West as many residents in these districts commute to Prague. While they affect the unemployment statistics in their home districts, their wages are counted in the average wage in Prague.

[84] It seems implausible to assume that regional price differences are constant over the period used in the estimation. Potential changes in regional differences transform to the measurement error of the left-hand side variable in equation (3), leading to an efficiency loss of the estimates. In addition, the Czech Statistical Office does not provide district inflation rates.

unobserved relationships, the parameter estimates based on the standard ordinary least squares procedure would be biased.[85]

The standard approach to control for the presence of fixed effects is to transform the observations into cross-sectional unit specific mean deviations, subtracting the unit specific mean values:

$$w_{rt} - \overline{w_r} = \beta(u_{rt} - \overline{u_r}) + \delta_t^{'} + \varepsilon_{rt} - \overline{\varepsilon_r}, \qquad (4)$$

where bars denote mean values across time periods.

District-specific fixed effects may also be removed by first differences. In particular, transforming equation (3) into first differences yields

$$w_{rt} - w_{r,t-1} = \beta(u_{rt} - u_{r,t-1}) + \delta_t^{"} + \varepsilon_{rt} - \varepsilon_{r,t-1}. \qquad (5)$$

In the estimation of equation (4) and equation (5) we assume that unemployment is exogenous. This may not be the case, for two reasons. First, suppose that there is an unobservable time-varying variable that is correlated with both the unemployment rate and the wage level. For example, migrants moving to regions with low unemployment and high wages might represent such a variable. Migration into a region increases the rate of unemployment and decreases the average wage at the same time. Not controlling for migration, the error term is correlated with unemployment, leading to biased estimates of elasticity. A second source of violation of the assumption that the unemployment rate is exogenous is the time aggregation. Using annually aggregated data, annual wage rates are likely to contain the accumulated effect of unemployment. To overcome the problem of endogeneity, we have to instrument for the unemployment rate.

Appropriate instruments for unemployment are the lagged values of the unemployment rates. However, using the lagged values as instruments shortens the time dimension of the sample. In order to avoid this problem, we look for instruments among contemporaneous variables. We use the average unemployment rate in neighbouring districts as instruments. In the notation of equation (5), the difference in unemployment rates u_{rt}–$u_{r,t-1}$ might be instrumented using u_{rt}^{s}–$u_{r,t-1}^{s}$. In addition, unemployment rates are at least partly determined by inflows into unemployment. Given that i_{rt} is the logarithm of the number of inflows into unemployment, we can use the differences in inflows in neighbouring districts i_{rt}^{s}–$i_{r,t-1}^{s}$ as instruments for u_{rt}–$u_{r,t-1}$. However, we do not use both differences in unemployment rates and differences in inflows, since unemployment rates are highly correlated with lagged inflows.

Both the mean-deviation and the first-order transformation also limit the scope for possible heteroscedasticity because the transformation removes all scale effects. For example, suppose that district size is a source of heteroscedasticity. Assuming that the district labour force does

[85] Not controlling for district fixed effects, we might observe a positive long-run relationship between unemployment and real wages. Such evidence would be in line with the theory of compensating differentials (Harris and Todaro, 1970). In particular, higher wages compensate for high unemployment in order to achieve the zero migration condition.

not change over time, the difference of the log-variables has the same effect as multiplying the variables by the district labour force, removing the source of heteroscedasticity. It should also be noted that the difference multiplies the impact of errors in the variables.[86]

5.3 Data

Aggregate wage data are published regularly by the Czech Statistical Office. They come from regular reports that economic units are obliged to fill in by law. In this chapter, we use monthly district averages of the annual data covering the period 1993–2001. The sample covers all employees in the public sector, but is restricted to firms with more than 25 employees in the private sector until 1996, and more than 20 employees since 1997. However, in 1995 and 1996, the sample covers firms with more than 100 employees in industry, construction and hotels and restaurants. The data refer to the location of the workplace. The first row in Table 2 shows the average monthly earnings statistics.

Table 2: Data Statistics

	1993	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**
Average monthly earnings (CZK)	5518.1 (406.6)	6455.5 (493.3)	7602.2 (561.8)	8961.5 (674.7)	9860.8 (714.3)	10684.5 (845.5)	11484.0 (909.7)	12196.6 (931.3)	13144.2 (1009.3)
Unemployment rate (%)	3.4 (1.6)	3.7 (1.8)	3.4 (1.7)	3.6 (1.8)	4.8 (2.1)	6.6 (2.5)	9.1 (3.2)	9.3 (3.8)	8.8 (3.9)
Short-term unem. rate (less than 12 months, %)	3.0 (1.3)	3.0 (1.3)	2.6 (1.2)	2.8 (1.3)	4.0 (1.5)	5.3 (1.7)	6.8 (1.8)	5.9 (1.9)	5.5 (1.7)
Long-term unem. rate (more than 12 months, %)	0.5 (0.3)	0.7 (0.5)	0.8 (0.6)	0.8 (0.6)	1.0 (0.7)	1.5 (1.0)	2.5 (1.5)	3.4 (2.0)	3.3 (2.2)
Number of districts	73	73	73	74	74	74	74	74	74

Notes: Mean values across districts for the year, standard deviations in parentheses.
Source: Czech Statistical Office, Ministry of Labour and Social Affairs.

The district-level data on registered unemployment come from the registers of 77 district labour offices in the Czech Republic (76 until 1995) and represent detailed and standardised monthly sources of information collected for the Ministry of Labour and Social Affairs. The data include end-of-month values of stock variables and period-cumulative values of gross flows of unemployment and vacancies. Table 2 shows the mean values and standard deviations of the unemployment rate and the short-term and long-term unemployment rate defined as the number of the unemployed divided by the labour force. Short-term unemployment covers persons seeking a job for less than 12 months, while long-term unemployment includes persons registered with labour offices for more than 12 months.

The registry unemployment data are likely to underestimate the actual number of unemployed. Some people do not register with a labour office when they change jobs. Under-reporting is more likely in urban areas, where other channels of job search are used. The under-reporting is consequently likely to be uneven across districts. Assuming that the differences in the under-

[86] Note that $var(\varepsilon_{rt}-\varepsilon_{r,t-1})=2var(\varepsilon_{rt})$.

reporting of unemployment across districts are time-invariant, this effect is removed by the differences used in this chapter. In contrast to this problem, the registry unemployment might be over-reported since some people register with a labour office in order to be eligible for social security benefits. Again, we assume that this effect is to a great extent removed by mean-specific and first-specific differences.

5.4 Results

In order to illustrate the effect of different estimation techniques on the results, we first estimate the wage curve by the ordinary least squares applied to the pooled sample. The results are shown in columns 1 and 5 of Table 3. The elasticity is insignificant on the pooled sample and even positive (+0.03) when the districts with the highest rise in the rate of unemployment between 1996 and 2001 are excluded from the sample. Not controlling for district fixed effects, we estimate a positive long-run relationship between unemployment and real wages.[87]

Accounting for district fixed effects yields estimates that are similar to the results published by other authors for the Czech Republic. We do so by estimating equations (4) and (5) allowing for the mean-specific and first-specific deviations. The elasticity is -0.02 for the full sample and -0.03 for the sample without the districts with the highest rise in unemployment (columns 2, 3, 6 and 7 in Table 3). The size of the elasticity is, however, still notably smaller than found in most other countries.

Table 3: Looking for the Wage Curve, 1993–2001

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
ß	-0.001	-0.016***	-0.018***	-0.086***	0.033***	-0.032***	-0.030***	-0.094***
	(0.007)	(0.004)	(0.005)	(0.022)	(0.009)	(0.006)	(0.008)	(0.027)
N	74	74	74	74	45	45	45	45
NT	663	663	589	589	402	402	357	357
R2 (overall)	0.94	0.94	0.89		0.95	0.95	0.90	
R2 (within)		1.00				1.00		
F statistics				3104***				1943***
Hausman test				17.4***				8.6***
Low unemployment rise districts					x	x	x	x
OLS	x				x			
Fixed effects		x				x		
First differences			x				x	
First differences, IV				x				x

Notes: * significant at 10%, ** at 5%, *** at 1%; robust standard errors in parentheses, time dummies not reported.
Hausman test: H0: instrumented variable (logu) is exogenous (F statistics reported).
Estimates for all districts and for the districts with the lowest rise in unemployment rate between 1996 and 2001 (columns 5–8).

[87] For example, heavy industry districts exhibit higher wages due to wage differentials compensating for less favourable work conditions. These districts also exhibit persistently higher unemployment rates due to a lower educational level of the labour force and occasionally due to lasting restructuring. Not controlling for district-specific effects, the estimate of β is biased upward. Given that the actual effect is negative, we underestimate the actual wage-curve effect. A strong bias even leads to a positive coefficient β.

Allowing for endogeneity of the unemployment rate raises the elasticity estimate dramatically to -0.09 (see columns 4 and 8 in Table 3).[88] The results of the Hausman test do not allow us to reject the hypothesis that the unemployment rate is endogenous, implying that the instrumenting is appropriate. This also implies that the findings so far reported by other studies might be biased due to inappropriate estimation techniques or data imperfections. Our results indicate that, contrary to previous studies, the elasticity of real wages might be at the level observed in other countries and reported by Blanchflower and Oswald (1994).

We explore whether excluding the districts with the highest increase in the unemployment rate between 1996 and 2001 has a significant effect on the elasticity estimate. For this purpose, we estimate the first-specific deviation equation (5) with an additional term on the right-hand side representing the unemployment rate interacted with a dummy variable. The dummy equals one for the districts with the highest rise in unemployment and zero otherwise. While column 3 in Table 4 is the same as the last column in Table 3, column 4 in Table 4 reports estimates of equation (5) with the added term. The estimate of the added term is significant and positive, indicating that the wage curve does not have an identical functional form across all districts.

Table 4: 2SLS Estimates of the Wage Curve, 1993–2001

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ß	-0.086***	-0.090***	-0.094***	-0.105***	-0.099***		
	(0.022)	(0.017)	(0.027)	(0.026)	(0.034)		
ß*d		0.017		0.033***	0.021		
		(0.041)		(0.010)	(0.052)		
ß (short-term u)						-0.068	-0.135*
						(0.061)	(0.080)
ß (long-term u)						-0.024	0.020
						(0.053)	(0.070)
N	74	74	45	74	45	74	45
NT	589	589	357	589	357	589	357
F statistics	3104***	2738***	1943***	2776***	1705***	2693***	1364***
Hausman test	17.4***	8.9***	8.6***	8.6***	4.5**	8.8***	5.1***
Low unemployment rise districts			x		x		x
d=1 if high unemployment rise districts				x			
d=1 if 1998–2001		x			x		

Notes: Columns 1 and 3 are from Table 3 for comparison.
* significant at 10%, ** at 5%, *** at 1%; robust standard errors in parentheses, time dummies not reported.
Hausman test: H0: instrumented variables are exogenous (F statistics of the joint test reported).
Estimates for all districts and for the districts with the lowest rise in unemployment rate between 1996 and 2001 (columns 3, 5, 7).

[88] We instrument the unemployment rate using average unemployment rates in neighbouring districts. Alternatively, using the inflow rate in neighbouring districts defined as the ratio of inflows and the labour force as instruments for the unemployment rate yields the estimates -0.10 and -0.11. In order to account for possible effects associated with different wage methodologies in 1995 and 1996 (see Section 5.3), we repeated the estimation with the sample excluding the years 1995 and 1996. The results are similar to those in Table 3.

Although all the results in Table 3 indicate that excluding the districts with the highest rise in the unemployment rate between 1996 and 2001 from the sample might improve the results, the main difference is between the estimation techniques. In particular, one has to treat the unemployment rate in the wage curve relationship as endogenous for yearly district-level data.

We now turn our attention to estimating whether the regional flexibility of real wages has improved, deteriorated or remained the same during 1993–2001. Using our preferred method, we estimate the first-specific deviation equation (5) with an additional term on the right-hand side (β^*d) representing the unemployment rate interacted with a period-specific dummy variable (denoting 1998–2001 for the late transition). The regression results are shown in column 2 of Table 4 for the full sample and in column 5 for the sample with only the low unemployment rise districts. The estimates of β^*d are insignificant, suggesting that the flexibility has been roughly the same throughout the period 1993–2001. The positive estimate of the coefficient β^*d, although insignificant, is an indication of a possible deterioration in the flexibility during 1993–2001.[89] This result is striking, as we could expect that ongoing restructuring should increase the flexibility.

We explore the possible sources of weakening flexibility. We estimate equation (5) with separate terms representing the short-term and long-term unemployment rates. The estimates are shown in columns 6 and 7 of Table 4. For the districts with the lowest rise in unemployment, the elasticity of the short-term unemployed is -0.14, while it is insignificant (+0.02) for the long-term unemployed. The wage curve is observed for the short-term unemployed, while the long-term unemployed do not affect wage formation.[90] Although the short-term unemployed have a high elasticity of real wages, the elasticity is lower in absolute value at the economy-wide level due to the incidence of long-term unemployment.

In order to investigate further how the shape of the wage curve has changed during the economic transition, we split the sample into early and late transition and repeat the estimation. Splitting the sample allows the district-specific fixed effects to differ between the two periods. The results are reported in Table 5. The elasticity has worsened between the early and late transition (compare columns 1–2 and 3–4) by the same size as the estimates of (β^*d) in Table 4. Hence, allowing district-specific fixed effects to be different between the early and late transition does not change the results. Estimating the effects of short-term and long-term unemployment rates indicates that while the elasticity for the short-term unemployed might have improved between the early and late transition, the elasticity for the long-term unemployed deteriorated during the same period (columns 5–6 and 7–8 in Table 5).

[89] This result seems to be robust to the choice of the break point as well as to the length of the sample.

[90] This evidence confirms our previous results (Galuščák and Münich, 2003). High incidences of long-term unemployment are observed in districts with high unemployment. These districts are, for example, mining or heavy industry districts with both high unemployment and high wages. Wages do not adjust downward in these districts because the welfare system leads to higher reservation wages.

Table 5: The Wage Curve in the Early and Late Transition

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ß	-0.090***	-0.073**	-0.099***	-0.079***				
	(0.027)	(0.030)	(0.034)	(0.039)				
ß (short-term u)					-0.042	-0.167	-0.139	-0.144**
					(0.083)	(0.154)	(0.180)	(0.070)
ß (long-term u)					-0.048	0.092	0.011	0.086
					(0.064)	(0.167)	(0.123)	(0.103)
N	74	74	45	45	74	74	45	45
NT	293	296	177	180	293	296	177	180
F statistics	4148***	1328***	2392***	1018***	3096***	673***	1544***	523***
Hausman test	14.8***	3.0*	8.3***	0.6	7.3***	2.6*	5.2***	2.5*
Low unemployment rise districts			x	x			x	x
Early transition, 1994–1997	x		x		x		x	
Late transition, 1998–2001		x		x		x		x

Notes: 2SLS estimates.
* significant at 10%, ** at 5%, *** at 1%; robust standard errors in parentheses, time dummies not reported.
Hausman test: H0: instrumented variables are exogenous (F statistics of the joint test reported).
Estimates for all districts and for the districts with the lowest rise in unemployment rate between 1996 and 2001 (columns 3–4, 7–8).

In order to disentangle the effects of the 1997–1999 recession on the wage curve, we estimate equation (5) separately by 2-year intervals. The estimates of the time-varying wage curve are shown in Table 6. The elasticity is -0.11 in 1994–1995 and -0.13 in 1995–1996. It decreased markedly to -0.02 during the recession (1997–1998), but fell back after the recession (columns 6 and 7), although probably not to the level observed before the recession. In order to estimate how the recession affected the elasticity, we repeated the estimation using the whole sample with two dummy variables denoting the recession (1997–1998) and the after-recession period (1999–2001). The results in the last column of Table 6 indicate that the elasticity was -0.11 in 1994–1996 and that the deterioration was significant during the recession. The elasticity is insignificantly higher in the period after than before the recession.

The results indicate that the regional flexibility was high between 1994 and 1996 at the level observed in most developed and developing countries.[91] The significant deterioration in the flexibility during the recession of 1997–1999 is consistent with the predictions of the efficiency wage model. After 1999, the flexibility might not have returned to the level observed before the recession, probably due to hysteresis effects in the Czech labour market. The sharp rise in long-term unemployment at the end of the 1990s (see Table 2) is, therefore, the prime suspect for why the regional real wage flexibility might not have recovered to the pre-recession level.

[91] It seems that the elasticity was at the same level in all districts. Repeating the estimation in column 8 of Table 6 for the districts which experienced the highest rise in unemployment, the results indicate that the elasticity was -0.117 prior to the recession. Consequently, these districts were more heavily affected by the recession.

Table 6: The Time-varying Wage Curve

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ß	-0.105***	-0.125**	-0.052	-0.017	-0.058	-0.114***	-0.081***	-0.112***
	(0.033)	(0.043)	(0.047)	(0.033)	(0.060)	(0.040)	(0.032)	(0.033)
ß*d_1								0.095**
								(0.047)
ß*d_2								0.029
								(0.048)
N	73	73	74	74	74	74	74	74
NT	146	146	147	148	148	148	148	589
F statistics	3085***	3443***	4551***	1741***	1149***	874***	1166***	2327***
1994–2001								x
1994–1995	x							
1995–1996		x						
1996–1997			x					
1997–1998				x				
1998–1999					x			
1999–2000						x		
2000–2001							x	

Notes: 2SLS estimates
d_1=1 if 1997–1998
d_2=1 if 1999–2001
* significant at 10%, ** at 5%, *** at 1%; robust standard errors in parentheses, time dummies not reported.

5.5 Conclusion

In this chapter we estimate the degree of regional real wage flexibility. We estimate the elasticity of wages using a static version of the relationship between district-level unemployment rates and district-level wages. We build on the methodology described in our earlier work (Galuščák and Münich, 2003). We estimate the wage curve using estimation methods accounting for endogeneities and show that previous estimates could have been low due to inappropriate estimation techniques. The elasticity is about -0.1, just at the level reported by Blanchflower and Oswald (1994) for a number of developed and developing countries. In contrast to previous studies, this result indicates that Czech real wages are flexible with respect to local unemployment rates. Furthermore, we show that the wage flexibility might not be homogenous across districts. We show that changes in the shape of the wage curve observed during the 1997–1999 recession are in line with the standard efficiency wage model.

In accordance with Galuščák and Münich (2003), the elasticity is significantly greater in absolute value after excluding the districts that experienced delayed restructuring. Prior to the recession, the wage elasticity was high in all districts. Our results show that the degree of wage flexibility has not changed significantly between the early and late transition. A significant deterioration in flexibility is observed during the recession of 1997–1999, which we explain using the efficiency wage model. The degree of regional flexibility might not have returned to its pre-recession level. We associate that observation with hysteresis effects in the Czech labour market.

We provide some evidence that the sharp rise in long-term unemployment observed at the end of the 1990s might have weakened the regional flexibility of real wages. Given that long-term unemployment will probably continue rising, the flexibility of real wages at the regional level will

deteriorate, meaning the loss of an important equilibrating channel in the economy when facing negative shocks, particularly after EMU entry. This is an important issue to be incorporated into labour market policies still relying only on information on growth of aggregate wages and unemployment. As a result, this chapter delivers additional evidence on deteriorating labour market performance in the Czech Republic, a message which is consistent with the findings of previous chapters.

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6. Czech Relative Wages and Returns to Schooling: Does the Short Supply of College Education Bite?

Štěpán Jurajda[92]

A large body of empirical literature documents the rise in returns to education occurring during early pro-market reforms in post-Soviet economies. However, there is a dearth of descriptive evidence on late-transition pre-EU-accession returns to education. This chapter fills the gap for the Czech Republic by estimating private wage returns to various education levels using a large matched employer-employee data set covering salaried employment in the enterprise sector in 2002.

One dimension of the analysis is given particular attention: namely the quantification of the Czech college/high school wage gap. The size of the gap is important for the recent local policy debate on the limited supply of (and excess demand for) college education in the Czech Republic. The country has one of the highest secondary school completion rates in the OECD, but one of the lowest shares of college graduates in the labour force (OECD, 1997). I therefore ask whether the limited supply of college education leads to unusually high returns to having graduated from college.

I provide separate estimates not only for men and women, but also for different age groups. A separate focus on young employees is motivated by the potentially low substitutability of workers with a given level of education across age groups. (Recall that older Czech workers graduated from communist schools.) Furthermore, public-college enrolment in the Czech Republic increased by approximately 50% during the first transition decade, leading to an increase in the relative supply of college graduates among the labour market inflow. Such higher relative supply may lower the relative price of college degrees on the labour market. Yet, public colleges remain highly oversubscribed.[93]

One interpretation of this fact is that the demand for education is "too" high because public colleges are tuition free. An alternative explanation is that the market reward for college degrees is very high. A quantification of the market value of a recent college degree, relative to a high school diploma, is therefore important for shedding light on the binding nature of the limited supply of college education in the Czech Republic.[94]

It is important to stress from the start that because I rely on employee data, the estimated returns to education are quite descriptive in their nature. I do not control for sample selection into work for

[92] The author would like to thank the Ministry of Labour and Social Affairs of the Czech Republic and Trexima Ltd. for data access and Vladimír Smolka of Trexima for helpful data assistance. This research has been supported in part by a grant from the Grant Agency of the Czech Republic No. 403/03/340.

[93] Every year, only about half of all applicants to Czech public colleges manage to get enrolled (UIV, 1998).

[94] See, for example, Card and Lemieux (2000) for work stressing the imperfect substitutability of workers across age groups and changing relative supply of college education across cohorts. Ideally, one would capture time and age effects together with cohort-specific effects. However, this approach is not feasible so far given the few available years of post-communist history.

women or for the selection of both men and women into enterprise-sector salaried employment as opposed to public-sector employment or self-employment (entrepreneurship).

This chapter is organised as follows. The next section provides a brief discussion of the existing empirical literature on returns to education in transition economies. It also includes some notes on the Czech educational system. In section 6.2 I describe the data set, while section 6.3 reviews the results.

6.1 Background

The wage rewards of schooling – "returns to education" – are a central concern to both labour economics and econometrics.[95] The topic continues to generate voluminous empirical literature, recently evaluated by Heckman *et al.* (2003). It is therefore not surprising that the wage rewards of education received much attention in post-Soviet economies, where they are crucially tied to growth potential.

Pay differentiation was strictly regimented under central planning, as wages were set according to industry-specific wage grids varying only with the difficulty and "social importance" of the job and with the worker's education and experience (Münich *et al.*, 1999). Since returns to education provide a direct incentive for investment in human capital, it was desirable that pro-market reforms allow for an increase in the returns. Indeed, wage regulations were quickly abolished at the start of the 1990s and wage dispersion rose rapidly. A wealth of studies summarised by Svejnar (1999) document this increase in wage differentiation and suggest that it was in part due to a swift increase in the benefits of education.[96]

The Czech Republic was no exception in this regard. Three studies which investigate changes in the returns to education between the communist and post-communist eras in the Czech Republic report significant increases in the returns. Chase (1997) finds that among men the added income for each year of education approximately doubled between 1984 and 1993 while Flanagan (1995) reports somewhat smaller increases from 3.4% for men in 1988 to 4.4% in 1993. Finally, Münich *et al.* (1999) estimate that male returns to a year of schooling increased from 2.7% in 1989 to 5.8% by the end of 1996. Skill-related wage differentials kept rising even in the mid-to-late 1990s, albeit at a slower pace (Filer *et al.*, 1999). By 1997, male employee wages increased by up to 9% for each year of additional schooling.

There is also evidence comparing returns to specific education degrees across the main sectors of the economy. Using 1998 data and focusing on a different issue, Jurajda (2003) reports a 10 percentage

[95] Many advances in applied microeconometrics have occurred within the "returns" literature. Originally, the literature addressed two major issues: measurement error and ability bias. Currently, there are two competing strategies of estimating returns to education. The first is based on quasi experiments (e.g. Card, 2001). The second estimates more structural models of individual choice, which explicitly allow for human capital heterogeneity and variation in returns across individuals (e.g. Heckman and Vytlacil, 1998). While the first approach is statistically more robust, the second may be closer to estimating policy-relevant (treatment) effects.

[96] The literature on early-transition returns to education includes Krueger and Pischke (1995) for East Germany, Rutkowski (1996) for Poland, Orazem and Vodopivec (1997) for Slovenia, and Lubyová and Sabirianova (2001) for Slovakia and Russia.

point higher college/high school wage gap in the enterprise sector than in the public sector, comprising education, health and public administration.[97]

In this chapter, I extend the existing evidence by covering the situation after the end of the first transition decade and the two years before EU entry. As argued in the introductory section, the analysis is important for the ongoing debate about the reform of tuition-free, oversubscribed and under-funded tertiary education in the Czech Republic (World Bank, 2001). Although the structure of the Czech educational system parallels those of other European countries, there is a significant difference in the educational structure of the labour force: while the secondary school completion rate is very high, only a small proportion of Czech workers have completed college.[98] This fact is not surprising given that a major group of secondary-level students attends apprenticeship programmes, which offer only dismal prospects of continuing on to higher education degrees.

Given these imbalances, the focus of the present study is on the returns to specific education degrees. While Czech elementary (compulsory) and tertiary education is quite similar to that found in other countries, Czech secondary education deserves some explanation. Overall, there are three types of secondary schools in the Czech Republic: vocational, specialised and academic ("gymnasium" in Czech). At the end of all academic secondary schools, most specialised schools and some vocational programmes, students pass school-leaving examinations ("maturita" in Czech). These exams approximately correspond to the UK General Certificate of Education (GCE) or the German "Abitur" exam. All graduates who pass these comprehensive exams may continue on to colleges, but about two-thirds of those who do so typically come from gymnasiums. Colleges are publicly funded and typically involve a single-field four to five-year track of study.[99]

The preferred categorisation of the different education degrees used in the subsequent analysis consists of four groups: (i) elementary education, (ii) apprenticeship without GCE, (iii) all types of secondary education with GCE combined, and (iv) college degrees and higher.[100] One may want to further differentiate types of GCE-awarding secondary schools; these results are available upon request.

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[97] Put differently, the relative difference between the wages of high school graduates with a comprehensive school-leaving examination and the wages of workers with only an elementary education was higher in the enterprise sector than in the public sector. The relative wages of all other education groups, in comparison to the wages of elementary education workers, were similar across the two sectors of the economy.

[98] According to OECD (1997), by 1995 about 88% of the Czech labour force aged 25 to 64 had completed at least higher secondary school. Only one OECD country had a greater rate of high school completion (the USA, at 89%), while the average across OECD countries was only 65%. On the other hand, only 12% of the population aged 25 to 64 had a university degree in 1995, compared to an OECD average of 23%. Among OECD countries, only Turkey (8%), Italy (8%) and Austria (9%) had a lower rate of university completion among the working-age population.

[99] Since 1995 a new type of tertiary school has emerged, partly in response to the excess demand for college education: these so-called higher professional schools typically provide two years of education leading to various specialised diplomas in professional fields. Although these schools are considered tertiary, they operate in the framework of secondary schooling and cannot award Bachelor degrees.

[100] This grouping roughly corresponds to the OECD classification of education levels – the ISCED groups. Category (i) essentially consists of compulsory education and spans ISCED levels 1 and 2. Category (ii) corresponds to ISCED 2 and a small group of workers with ISCED 3C. Category (iii) is identical with ISCED 3A. Finally, the highest category (iv) covers ISCED levels 5 and 6.

6.2 Data

In the Czech Republic, there are two major worker-level data sets with wage information.[101] First, self-reported wage information is available in the Mikrocensus household survey for 1988, 1992 and 1996.[102] Second, there is a quarterly national employer survey, called the Information System on Average Earnings (ISAE), in which firms report the hourly wages of their employees.[103] In this paper, I rely on the second data source from the first quarter of 2002.

The ISAE employer survey was started in the early 1990s based on informal sampling practices. Fortunately, recent data are based on two major updates (in 1998 and 2002) based on stratified random sampling conducted by the Czech Statistical Office in 1996 and 2000 within the Eurostat Structure of Earnings Survey programme. Only firms employing more than 10 workers are sampled. The data include over one-third of the entire Czech enterprise employment and cover all firm size categories and industries, except the budgetary sector of health, education, and public administration.[104]

The data include not only the industry, region of operation and ownership type for each firm, but also hourly wages, gender, education, age and a detailed occupational classification for all employees of the surveyed enterprises.[105] These wage records are drawn directly from companies' personnel databases using software developed by the data collection agency. Having available a measure of hourly wage rates is ideal for the purpose of estimating returns to education because of the potential differences in hours worked across levels of education. Furthermore, the definition of hourly wage is detailed and fully consistent across firms.[106]

Table 1: Weighted Data Means

Variable	Women	Men
Hourly wage (CZK)	74.6	102.4
Age	40.98	41.2
Firm employment	2,325	1,599
Number of workers	321,641	484,126
Number of firms	2,223	2,196

Source : Own calculations based on the Trexima ISAE data.

The uniformity of the wage definition and the use of personnel records minimises the extent of reporting errors likely to be present in household survey data. As with most other data from transition

[101] Unfortunately, the Czech Labour Force Survey does not ask about wages.

[102] This data has been used in analyses of earnings differentiation by Večerník (2001).

[103] The survey is collected by a private agency on behalf of the Czech Ministry of Labour and Social Affairs.

[104] The sample is not perfectly representative of the population of firms. Thus, to recover population statistics as closely as possible, weights reflecting the sampling procedure were calculated by dividing the population frequency of firms within strata cells by the corresponding sample frequency. The population distribution is based on an end-of-year firm register, which is compiled by the Czech Statistical Office and which is used as a sampling frame for the survey. The re-weighted data form the basis for the analysis.

[105] Wage records of top management are excluded from the data.

[106] Each quarter, employers in the Czech Republic are legally required to calculate for each worker an average hourly wage, defined as total cash compensation including bonuses and other special payments divided by total hours worked for that quarter. This average wage is then used for calculating sickness and unemployment benefits.

economies, education is reported in ISAE as the highest degree obtained rather than as years of schooling actually attended. Unfortunately, education is missing for 8% of workers and this part of the data is therefore excluded from the analysis. Table 1 contains selected summary statistics and sample-size indicators for the analysis-ready data. There are over 800,000 worker wage records available, from over 2,000 firms.

6.3 Results

6.3.1 Education Structure of Employment and Relative Wages

The structure of enrolment by school type and level has changed significantly since the breakdown of the communist regime; in particular, enrolment in tertiary education has increased by over 50% (UIV, 1998). A simple view of the extent to which this recent development has affected the educational structure of the employee workforce is presented in the top two panels of Table 2. The relative supply of education, which one would expect to be linked to the relative wage rewards of education, is presented for each gender and age group separately; this is motivated by the concern that workers with similar education but different age (experience) are not close substitutes.

Table 2: Educational Structure of Employment and Wages by Education, Gender and Age

Education \ Age in 2002	15-23	24-30	31-37	38-44	45-51	52-61	15-61
Men: % Share of Each Education Category on Age Group							
Primary	9	6	6	6	10	11	8
Apprenticeship, no GCE	60	58	56	56	59	55	57
Secondary with GCE	30	28	26	24	19	23	24
University and higher	1	9	13	14	12	11	11
Women: % Share of Each Education Category on Age Group							
Primary	11	7	9	15	28	26	18
Apprenticeship, no GCE	35	41	44	44	41	37	41
Secondary with GCE	50	43	39	35	27	33	35
University and higher	3	10	8	7	5	4	6
Men: Average Hourly Wage Relative to Secondary Education with GCE							
Primary	0.76	0.69	0.66	0.65	0.59	0.58	0.63
Apprenticeship, no GCE	0.83	0.75	0.71	0.70	0.66	0.65	0.70
Secondary with GCE	1.00	1.00	1.00	1.00	1.00	1.00	1.00
University and higher	1.09	1.51	1.94	1.91	1.81	1.77	1.85
Women: Average Hourly Wage Relative to Secondary Education with GCE							
Primary	0.76	0.66	0.67	0.65	0.63	0.61	0.66
Apprenticeship, no GCE	0.77	0.67	0.69	0.68	0.65	0.64	0.68
Secondary with GCE	1.00	1.00	1.00	1.00	1.00	1.00	1.00
University and higher	1.05	1.57	2.07	1.75	1.83	1.70	1.78
Men: Median Hourly Wage Relative to Secondary Education with GCE							
Primary	0.78	0.74	0.69	0.67	0.65	0.64	0.68
Apprenticeship, no GCE	0.87	0.80	0.77	0.74	0.72	0.71	0.76
Secondary with GCE	1.00	1.00	1.00	1.00	1.00	1.00	1.00
University and higher	1.14	1.34	1.65	1.59	1.58	1.54	1.58
Women: Median Hourly Wage Relative to Secondary Education with GCE							
Primary	0.76	0.71	0.69	0.67	0.67	0.63	0.69
Apprenticeship, no GCE	0.79	0.71	0.72	0.70	0.68	0.67	0.71
Secondary with GCE	1.00	1.00	1.00	1.00	1.00	1.00	1.00
University and higher	1.00	1.46	1.71	1.56	1.60	1.67	1.59

Source : Own calculations based on the Trexima ISAE data.

Several facts stand out in Table 2:[107] (i) Czech employees over 45 have a lower overall level of education, (ii) the educational structure of enterprise employment is stable for workers between 31 and 44 years of age, who are most likely to hold an apprenticeship degree with no GCE, (iii) there has been an overall increase in the level of education for younger female employees, (iv) while the fraction of female employees with at least a college degree has increased for the younger cohorts, young men with tertiary education are relatively less likely to become employees in firms with over 10 workers, which are covered in the ISAE sample. The last finding corroborates earlier evidence from transition economies suggesting that young, well-educated men are most likely to move into the de novo sector consisting of the self-employed and small newly started private firms (see, for example, Jurajda and Terrell, 2003).

The middle two panels of Table 2 show the relative average wages of workers across education levels, conditional only on age and gender. The displayed statistic gives wage levels relative to the average wage of employees with a secondary degree with GCE within each gender and age group. Starting with women in the lower panel, average wages appear similar for apprentices and employees with only primary education – both groups make on average only about 67% of the hourly wage level of workers with a GCE. This gap is surprisingly stable for all age groups above 24. Even for male workers, the benefits of an apprenticeship degree, relative to only primary education, appear small, at about 5 percentage points.

While not having a GCE lowers hourly wages by about 30%, obtaining a college degree leads to wage rates that are nearly two times higher than wages of workers with a secondary education with GCE. The college/high school gap is "only" about 50% for workers aged 24–30, but this is probably driven by differences in experience, as high school graduates have accumulated more productive practice than college graduates of the same age. Finally, it is interesting to note that college/high school wage gaps are remarkably similar across gender.

The bottom two panels of Table 2 present an alternative comparison of relative wages based on medians as opposed to means. This alternative summary statistic is not sensitive to outliers and represents more closely the situation for "typical" workers. As expected, the wage differences based on medians are somewhat smaller, but remain substantial. For example, a college-educated male worker aged 31–37 whose wage is at least as high as that of half of all other similar workers faces hourly wage rates that are 65% higher than those of a typical worker in the same age category with only a GCE.

How does the Czech college/high school unconditional mean wage gap compare to those found in other countries? Brunello et al. (2000) document the size of the college/high school male wage gap in ten European economies in the mid to late 1990s using data on workers who are approximately in the 45–51 age group. Their base group of high-school graduates covers upper secondary education (ISCED 3 and 4) and therefore closely corresponds to the definition of secondary education with GCE used in this paper. Furthermore, their sample of countries covers Austria and West Germany,

[107] Note that it is rare for one to attain a college degree before 23 years of age in the Czech Republic, hence the low fraction of college graduates in the youngest age group.

two neighbours of the Czech Republic with a similarly low supply of tertiary education and a strong tradition of vocational education. Brunello et al. (2000) define the college/high school gap as the log of the ratio of average hourly wages and find that this unconditional wage gap varies from a low of 0.28 in Italy to a high of 0.57 in Portugal. It equals 0.41 in West Germany and 0.37 in Austria.

Applying the same scale and focusing on the comparable group of (about 30,000 available) male employees aged 45–51, the Czech data imply a college/high school wage gap of 0.60, much higher than most EU figures and even somewhat above the high level of Portugal. In particular, the Czech gap is about 50% higher than those of both Germany and Austria. Given that the gap is even higher for Czech workers aged 31–44, I therefore conclude that the returns to college degrees on the Czech labour market are extremely high in the West European context.

6.3.2 Mincerian Returns to Education

In this section, I estimate extended Mincerian log-wage regressions. First, I condition on education together with worker potential experience and its square.[108] Second, I additionally control for an extended set of firm characteristics, including region of location, two-digit industry, ownership type and a quadratic in firm size. The purpose of this exercise is twofold: (i) to estimate the widely used and comparable return to an additional year of schooling, often referred to as the "benefits of education",[109] and (ii) to check for the sensitivity of the benefits of education to the potential education-related differences in worker employment patterns across firm types.

Table 3 reports these results, namely the coefficients on education variables in log-wage regression equations.[110] The top panel of the table reports the returns to an additional year of schooling based on years of schooling data imputed from the education degree using typical years of study.[111] The bottom panel shows the results of a separate estimation conditioning on a set of dummy variables for the highest degree obtained, with secondary education with GCE serving as the reference group.

The first two columns of Table 3 show parameter estimates from regressions where the only additional control variable is worker experience and its square. The results imply that wages of male (female) employees in the Czech Republic increase by about 11% (9%) with each additional year of schooling. Comparing these estimates to those in the last two columns of Table 3, where I additionally control for many firm characteristics, suggests that these returns to schooling are not very sensitive to conditioning on employment patterns. Put differently, workers with relatively many

[108] Potential experience equals age minus 6 minus imputed years of schooling. For women, this measure overestimates the actual years of experience depending on the number of children and length of maternity leaves.

[109] Technically, they represent only the private economic benefits to education, while private returns would also reflect the private costs of education. Social returns to education would then incorporate various education externalities.

[110] The reported standard errors are robust to unconditional heteroscedasticity as well as to interdependence of error terms across workers of the same firm. See Jurajda (2003) for details.

[111] These estimates are subject to measurement error to the extent that students switch programmes, repeat years of study or, alternatively, take unusually few years to complete a given degree. Münich *et al.* (1999) are able to compare estimates based on imputed years of schooling to those calculated off reported years in school. They find that the imputation-based Czech returns to education in 1996 are 0.8 percentage points higher than the correct estimates.

years of schooling are only somewhat more likely to work in firms, industries and regions where wages are higher for all types of workers.

Table 3: Estimated Mincerian Returns to Education in 2002

Gender	Men	Women	Men	Women
Age group	15-61	15-61	15-61	15-61
Years of schooling	0.111	0.089	0.103	0.077
	(0.003)	(0.003)	(0.002)	(0.003)
Returns relative to secondary education with GCE				
Primary education	-0.407	-0.393	-0.378	-0.351
	(0.017)	(0.014)	(0.013)	(0.012)
Apprenticeship, no GCE	-0.302	-0.357	-0.263	-0.284
	(0.010)	(0.012)	(0.007)	(0.010)
University education	0.500	0.498	0.494	0.454
	(0.016)	(0.026)	(0.015)	(0.022)
Control variables				
Experience and its square	Yes	Yes	Yes	Yes
Firm controls	No	No	Yes	Yes

Note: All OLS coefficient estimates are highly statistically significant based on standard errors (in parentheses) allowing for clustering of unobservables within firms. Firm control variables are total employment and its square, industry, ownership and r

Examining the impact of specific degrees in the bottom panel of Table 3, it is clear that educational structure is a major determinant of wages even after controlling for other explanatory characteristics. Education degrees alone explain over 30% of the variation in raw wages. (This corresponds to R^2 from a separate unreported regression conditioning only on education degrees.) Additionally controlling for all other available explanatory characteristics (worker experience, region of employment, firm size, industry and ownership type) raises the share of the explained variation from 30% to 44% for both genders. The estimated education-degrees coefficients do not move by more than 4 percentage points when firm characteristics are accounted for, with the exception of the female dummy for apprenticeship degree.[112] The benefits of specific degrees are also quite similar across gender, even after conditioning on other explanatory variables.

Next, Table 4 lists the estimated returns to education for each age group, combining male and female workers and conditioning on the extended set of regressors. The returns to years of schooling vary relatively little over age categories. The age trends in the estimated conditional returns to specific degrees (as compared to secondary education) are similar to those in the unconditional gaps in Table 2. Note that after imposing the same returns to experience for workers of all types of education, the returns to college are relatively higher for the young age group in Table 3.

[112] The estimated returns are not overly sensitive to the weighting scheme either.

Table 4: Estimated Mincerian Returns to Education by Age

Age Group	24-30	31-37	38-44	45-51	52-61
Years of Schooling	0,090	0,105	0,100	0,087	0,087
	(0,004)	(0,004)	(0,003)	(0,002)	(0,002)
Returns relative to secondary education with GCE					
Primary education	-0,316	-0,362	-0,395	-0,405	-0,407
	(0,020)	(0,022)	(0,016)	(0,012)	(0,012)
Apprenticeship, no GCE	-0,210	-0,243	-0,282	-0,315	-0,343
	(0,011)	(0,009)	(0,010)	(0,009)	(0,009)
University education	0,448	0,535	0,511	0,468	0,431
	(0,026)	(0,027)	(0,025)	(0,024)	(0,021)

Note: All firm and worker control variables are included. See Table 3 for more notes.

Finally, I compare simple specifications of the returns to education degrees across 1998, 2000 and 2002. The structure and size of the 2000 data are similar to that of the 2002 sample. The 1998 data are described in Jurajda (2003); in comparison with the most recent data, the enterprise sector sample from 1998 contains only about one-half of the 2002 firms and is less representative of the entire economy.

Table 5: Estimated Returns to Education over Time

Year	1998	2000	2002
Returns Relative to Secondary Education with GCE			
Primary education	-0.427	-0.370	-0.360
	(0.015)	(0.009)	(0.010)
Apprenticeship, no GCE	-0.271	-0.279	-0.272
	(0.013)	(0.008)	(0.006)
University education	0.409	0.481	0.482
	(0.030)	(0.020)	(0.014)

Note: The estimates are based on all workers and condition on all controls and the female dummy. For more notes see Table 3.

The results presented in Table 5 imply that the education-related wage differentials were constant over the 2000–2002 period. The 1998–2002 comparison suggests a large increase in the college/high school wage gap as well as a reduction in the penalty for not having any secondary education. However, given the low comparability of the data over time, I hesitate to draw strong conclusions.

6.4 Conclusion

In this chapter, Czech returns to years of schooling and to specific education degrees are estimated using 2002 data on hourly wages of salaried employees. Education is clearly the dominant observable wage determinant. Four simple education degrees alone explain about 30% of the total wage variation, while all other explanatory variables (worker experience and region of employment, firm size, industry and ownership type) increase the share of explained variation from 30% to 43%.

The estimated return to education is close to 10%, which is relatively high. Furthermore, the college/high school wage gap is much higher than those found in the EU economies. In particular, it is about 50% higher than comparable gaps in Austria or Germany, both of which have relatively similar educational systems and enrolment patterns. There is also some evidence that the gap increased between 1998 and 2002. These findings are consistent with the interpretation that the continuing dramatic oversubscription of Czech public colleges is due to insufficient supply (lack of funding) and not to low cost (tuition-free). The short supply of college education apparently "bites" on the Czech labour market.

Earlier estimates of returns to education (Filer *et al*., 1999) based on mid-transition data already implied that the Czech returns to education have increased to a high level relative to the level of development (Psacharopoulos, 1994). One explanation for this fact is that one year of communist schooling supplies relatively less human capital. However, the analysis presented in this paper shows that returns are similarly high even for workers who were 11 to 17 at the time of the breakdown of communism. These findings are consistent with the presence of high demand for educated workers, driven perhaps by skill-biased technological change (Katz and Author, 1999), combined with the traditionally limited supply of tertiary education.[113]

The economic costs of having relatively few college-educated workers are potentially large and diverse. Today, the country is less likely to attract high-value-added foreign direct investment that requires an abundant college-educated labour force. Tomorrow, the gains from technological innovations will be smaller. Finally, EU accession will open EU universities to Czech students on an equal-access basis. Those who are unable to get enrolled in local tertiary education are likely to do so abroad. To the extent that these future EU-based students will be unlikely to return to the Czech Republic upon graduation, the insufficient supply of college education may result in a brain drain.

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[113] One would expect that in the long run a country's technology reflects its relative endowment abundance, including the educational structure of the labour force. It would therefore be natural to expect the Czech economy to operate more vocational education-intensive blue-collar technology. Still, the emergence of IT and other "skill-based" technologies may reinforce the relative lack of a highly educated labour force on the Czech labour market.

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