Optimal speed of transition with a shrinking labour force and under uncertainty*

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Abstract

In the '90 -during the restructuring of large state enterprises- Central European economies experienced high unemployment. Social policy expenditures, particularly targeted to the non-employed, grew faster than expected due to the need to finance the *out-of-the-labour* categories. In 1992, after the Passive Labour Market Policies' reforms, the pace of transition decelerated. Unemployment dynamics, speed of transition and non-employment policies are modelled based on the assumption that the labour force is shrinking over time. Dismissed workers have the opportunity to choose an *outside-option* alternative to the labour force participation. Individual uncertainty is assumed in a first phase of transition, while aggregate uncertainty -generating opposition to restructuring- is modelled in a second phase. The model predicts a slowdown in the speed of transition.

JEL classifications: J41, H53, P26.

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1 Introduction

The reasons why different Central European Economies (CEEs) experienced different speeds of transition are still being studied. The debate on gradualism versus shock therapy has been very lively and has not led to a clear consensus view, as stated by Arrow (2000) and Roland (2002), among others scholars.

At the beginning of 1992 social policy reforms were adopted by CEEs in order to accelerate the process of reallocation of workers. The unemployment benefits replacement rate was indeed reduced. Unfortunately, this change was accompanied by: an increase of other social policy costs, a decrease in the participation rate, and a slower speed of transition.

CEEs still risk paying too much for the non productive population, i.e. for too many people out-of-the-labour force[1]. This situation creates high costs for the society, both in terms of reduced long run growth and fiscal burden. Western European countries, meanwhile, have been somehow successful in trying to avoid these costs: they have been witnessing a rising dependency ratio without marked outflow dynamics towards out-of-the-labour force. This is not the case for CEEs, where unprecedented fleeing flows appeared: the paper sheds some light on the similarities between Western and Eastern European countries, especially concerning the need for reforms in their pensions systems.

We give a new interpretation of the reason why the speed of transition was slower than expected in CEEs and why it led to high unemployment. The dismissal of jobs from the state sector should have generated a *temporary* rise in unemployment, then a decline later on. However, once the private sector started absorbing workers, a particular combination of policies seems to have hindered this absorption.

The main focus of this paper is to study the labour force, the unemployment equilibrium and the optimal speed of transition in a two-sector (state-private) reallocation model with the following characteristics: the out-of-the-labour force (OLF) dynamics are endogenous; agents choose their labour market status according to their idiosyncratic preferences; and unemployment has a social cost when aggregate uncertainty shows up. The analysis

[1] A contribution of how to endogenise the economic and budgetary costs of different government policies is offered by Castanheira (2003), where the endogenous relationship between capital accumulation and labour market friction is taken directly into account.

is applied to the Visegrád countries[2].

1.1 The Fiscal Burden of Social Policies

Liberalization, privatization and macroeconomic stabilization in CEEs were accompanied by protracted high fiscal budget deficits. As explained by Chadha and Coricelli (1994), fiscal variables and labour market dynamics interacted through the social policy expenditure schemes.

The labour market structure in Eastern Europe has been rapidly changing since the beginning of transition (1989-1990) due to privatization and restructuring of large state enterprises.

The governments of the Czech Republic, Hungary, Poland and the Slovak Republic implemented radical labour market reforms since 1992. The unemployment benefits (UB) system has been revised according to the suggestions of policy advisers, economists and social scientists. In the '90s the academic literature has unanimously prescribed that unemployment benefits must be reduced to speed up the transition process and increase private employment creation.

The cut in UB in 1992 was followed by an initial slight decline in unemployment. However, it was also accompanied by a slowdown in the closure rate of state enterprises and thus by a reduced job creation rate in the private ones.

1.2 Beyond the Optimal Speed of Transition Literature

Our paper investigates why the CEEs experienced the puzzling slowdown in transition notwithstanding reduced UB. We argue that there is a weakness in the existing literature.

The *Optimal Speed of Transition* (OST) literature -Aghion and Blanchard (1994) [3]- has extensively explored the labour market dynamics in connection with fiscal policies, while partially ignoring the fact that transition was

[2]Poland, the Czech Republic, the Slovak Republic (commonly referred to as Slovakia), and Hungary are members of the Visegrád Group, created in February 1991 in the northern Hungarian town called Visegrád.

[3]Aghion and Blanchard (1994) (A-B) is considered the seminal article of the OST literature stream.

strongly characterised by a drop in the participation rate and an increase in the dependency ratio.

Some scholars illustrate the endogenous role of the categories OLF (Boeri, 2000a) and others point out the role played by both *aggregate uncertainty* and *individual uncertainty* (Roland, 2002; Fernandez and Rodrik, 1991).

Furthermore, Boeri (1997a,b) shows that heterogeneous agents behaved in different ways when faced with uncertainty and Aghion and Blanchard (1998) explore the case when social opposition to restructuring restrained the whole process of transition.

However, a key phenomenon has remained unexplored, namely the fact that governments had to cope with a peculiar trade-off: on the one hand, they were eager to push people away from the labour force, reducing the level of unemployment and maintaining consensus around policies; on the other hand, relevant flows to inactivity created growing budget costs, open-ended entitlements (e.g. pensions) and higher *non-employment benefits-to-wages* ratio.

In our paper we investigate the interactions among unemployment, speed of transition and non-employment policies [4] in the light of the aforementioned trade-off. As a matter of fact, we start from the existing literature and, as a result, we broadly extend the conceptual framework of the OST analysis.

We examine the Visegrád countries during the 1989-1998 period. These countries were relatively advanced in terms of transition outcomes (EBRD, Transition Report 1998)and they were sufficiently homogeneous in terms of economic performance.

The paper is organized as follows: in section 2 we sketch some stylized facts about the transition process in the CEEs; in section 3 we explore a model of unemployment dynamics extending the OST literature (Aghion and Blanchard (1994)); in section 4 we outline the policy implications of our model; and in the final section we present the conclusions.

[4]Non-employment policies are targeted to the *not working* categories, i.e. unemployed and out-of-the-labour force. It is possible to distinguish between "non-employment subsidies/benefits" (including unemployment benefits, social assistance, early retirement, disability pensions and sickness benefits) and general pensions. Non-employment benefits plus pensions are the non-employment policies (see table (2)).

2 Stylized facts

The theoretical literature on transition fails to take into account the fact that the labour force -the employed plus the unemployed- is not the only actor in the labour market (see Figure 2).

The reform process in the labour market of a transition economy usually involves a huge labour force reallocation from the public to the private sector, as well as large flows of people fleeing the labour market, as explained by Boeri and Bruno (1997). The public sector is no longer able to create exogenously full employment, registering low productivity and shortage of fresh investments. At the same time, the private sector is not able to absorb new unemployed instantaneously.

Aghion and Blanchard (1994) have modelled this reallocation phenomenon using a two-sector model analytical framework[5]. They show that unemployment has two main effects: on the one hand, it lowers wages and facilitates the creation of private employment; on the other hand, it raises the payroll-taxes needed to finance unemployment benefits and ultimately payroll taxes induce higher labour costs and hinder job creation. Nevertheless, a level of unemployment in which the job creation function is maximized does exist (bell shaped curve).

A-B concentrate on a *restricted* labour market (employed and unemployed), ignoring the categories OLF, which are explicitly considered in our paper. In fact, unemployed and OLF are characterized by different dynamics and different fiscal impact on payroll taxes. Unemployment benefits are temporary costs, whereas financing OLF categories gives rise to open-ended entitlements, such as pensions for early retirement schemes or disability.

The four stylized facts we consider below are: the 1992 reforms of UB systems; the drop in participation in the labour force; the pension cost increase; and the slowdown of transition.

2.1 The 1992 Reforms in the UB systems

Following the suggestion of the academic/institutional consensus, at the beginning of 1992 UB generosity was restrained and a payroll-tax system was introduced to finance unemployment benefits. These reforms increased the

[5]They adopt a partial equilibrium approach. For a general equilibrium approach see Castanheira and Roland (2000).

opportunity cost of being unemployed. A less generous benefit level was instituted and the eligibility requirements for UB were restricted.

The immediate effect was the fall in the number of people registered as seeking work and hence unemployed. The fiscal weight of the UB diminished for most of the Visegrád countries and the pension cost increased. The replacement rates for unemployment benefits and pensions are reported in figure 3. While there was a gradual drop in the incentive to become unemployed, the pensions schemes became progressively more attractive.

2.2 Labour Force Participation Drop

In the 1989-1998 period, employment and participation rates[6] drastically fell, in particular for women, the young and the elderly [7], i.e. the two extremes of the age distribution.

In this period relevant flows of people fled the labour market, the reason being early retirement schemes, disability pensions or by other open-ended income support subsidies (e.g. social assistance). The four economies experienced high unemployment levels among youth and showed a consistent number of discouraged workers and long-term unemployment, as Boeri, Burda and Kollo (1998), Aghion, Blanchard and Carlin (1997) and Burda (1993) point out.

Feldmann (2004) reports that in CEEs the levels of unemployment rate, including both long-term unemployment and youth unemployment rate (1997-2002 average), are comparable to the levels registered in big Western European countries (Germany, France and Italy). However, they are much higher than the levels registered in the UK and the USA, where job markets are more flexible.

Figure 1 shows the steady decline in the employment and participation rates in the Visegrád countries[8]. The pool of unemployed was not transitory

[6]Unemployment was nearly absent before the transition, with the exception of Hungary. This allows the use of the employment rate instead of the participation rate for comparison of the pre-transition labour market with the actual one. In the early 90s the participation and employment rates were practically the same.

[7]This effect is further increased by the fact that the retirement age in CEEs was *statutorily* lower than the OECD, giving rise to a much lower *actual* level of retirement.

[8]Figure 1 is computed on the basis of the following ranges: men aged 15-59, women aged 15-54, except for Poland, where the range for men is 18-64 and 18-59 for women. Using the OECD standard measure of WAP (men and women 15-64) the computed decline would be even more drastic.

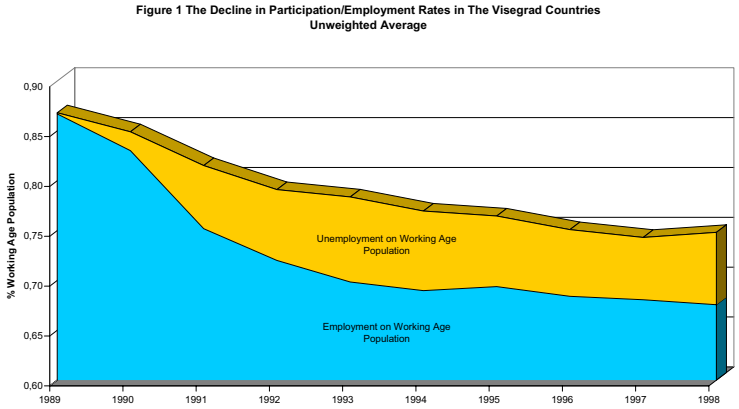

Figure 1: Sources, The Vienna Institute for International Economic Studies (WIIW), Countries in Transition 1998.

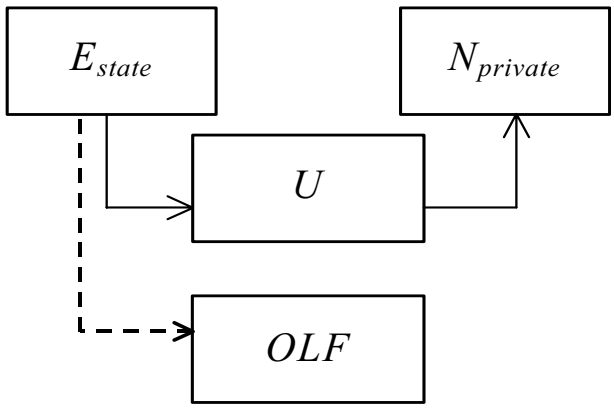

Figure 2: Extending the OST Reference Scheme

but stagnant and did not decline over time (Boeri, 1994).

The Czech Republic and Poland experienced a limited drop in the participation rate with respect to Hungary and the Slovak Republic, whilst the decline in the employment rate was common to all four economies. The participation rate numbers in 1998 seem to be close to the levels registered in Western Europe. In fact, the average employment rate and participation rate in the EU (15) were stable between 1992 and 2003, 59.5 to 62.5 and 68.4 to 70.6, respectively (Eurostat figures). In 2002, the USA participation rate was well above 75% (2002).

Boeri and Edwards (1998) show that between 1990 and 1995 social assistance, early retirement and disability pensions recipients significantly increased as a percentage of the working age population, whilst the unemployment benefits recipients diminished.

2.3 Pension cost increase

The cost of early retirement pensions, disability pensions and social assistance (SA) grew rapidly in the first years of transition. Coricelli (1998) states: 'The main pressure for the budget came from growing social expenditures. Among those, the largest weight fell to pension expenditures, leading some observers to talk of *pensioners' power* threatening the reform process'. Feldmann (2004) points out: '[...], the large scale early retirement and disability schemes are so expensive that the tax burden on the economy, and on labour in particular, had to be increased repeatedly in order to fund these schemes'.

Expenditures for SA increased within the government budget. These kinds of benefits were tailored to people already receiving UB and who were in the short-term employment category. Furthermore, these subsidies had large adverse effects on the fiscal deficit due to their long-lasting nature, as argued by Boeri and Edwards (1998), Chadha and Coricelli (1994) and Chadha and Coricelli (1995).

Table 1 shows the expenditures for non-employment benefits in the Visegrád countries. Unemployment benefits tended to be more expensive in the first years of transition (e.g. the 2.22% of GDP registered in Hungary in 1992), but their costs declined or stabilized in the following years. All the other components -SA, early retirement (ER) and disability (Dis.)- grew in the four countries, with the exception of ER in Poland.

Disability pensions were particularly expensive (e.g. in Poland they

Table 1: Non-employment Benefits Expenditures (% of GDP)

Country	Years	UB	SA	ER	Dis.	Total
Czech Republic	1990				1.16	1.16
	1991	0.23	0.06	...	1.15	1.44
	1992	0.18	0.16	...	1.43	1.77
	1993	0.16	0.19	...	1.48	1.82
	1994	0.18	0.22	...	1.51	1.90
	1995	0.15	...	...	1.68	1.83
Hungary[a]	1990					
	1991	0.76				0.76
	1992	2.22	0.02	0.05	...	2.30
	1993	1.96	0.15	0.11	...	2.22
	1994	0.99	0.31	0.15	...	1.45
	1995	...	0.31	...	...	
Poland	1990				2.47	2.47
	1991	1.38	...	...	3.39	4.77
	1992	1.71	...	0.77	3.84	6.33
	1993	1.72	...	0.15	3.82	5.69
	1994	1.77	...	0.10	4.00	5.88
	1995	...	...	...	...	...
Slovak Republic[b]	1990			0.07	1.48	1.55
	1991	0.86	...	0.20	1.62	2.68
	1992	0.52	0.46	0.22	1.82	3.01
	1993	0.50	0.59	0.25	1.82	3.17
	1994	0.39	0.87	...	1.55	2.81
	1995	0.32	0.78	...	1.75	2.95

UB: Unemployment Benefits.
SA: Social Assistance.
[a] Early Retirement (ER) for people who have been unemployed for at least six months.
[b] Disability (Dis.) includes partial disability.
Note: "..." Data not available.
Source: Boeri and Edwards (1998).

Table 2: Expenditure for Social Policies in Three Groups of Countries, 1990-1995 (% of GDP)

Countries	Social Policies[a]	Non-employment Policies:	
		Non-employment Benefits[b]	Pensions[c]
Visegrád	28.3	3.4	11.8
Balkans[d]	15.3	1.8	8.2
CIS[e]	8.9	0.5	6.3

[a] Bulgaria and Czech Republic 1991/95, Hungary 1991/94, Poland and Romania 1990/94, Slovak Republic 1990/95.
[b] Non-employment subsidies/benefits include unemployment benefits, social assistance, early retirement, disability pensions and sickness benefits.
[c] Average on 1991-95 period.
[d] Bulgaria and Romania.
[e] Commonwealth of Independent States.
Sources: Boeri and Edwards (1998), World Bank (1996); Unicef, Regional Monitoring Report, EBRD Transition Report 1998.

reached 40 times the cost of early retirement). The growing towards allowing for many *disability pensions* is even more evident by comparison with industrialized countries: in OECD countries less than 4% of the working age population receives such pensions, while in the Czech Republic the share was 7.5% (1997-2002 average) and in Hungary 10.4% (1997), as documented in Feldmann (2004).

In CEEs, disability pensions seem to have been used as a substitute for early retirement and unemployment benefits, as learned from Western European Economies. In fact, in CEEs, the disability regimes could be based on flexible selection procedures, where age is only *one* of the eligibility criteria[9].

Table 2 illustrates three models of social expenditures[10] in the 1990-1995 period, showing that different schemes were adopted in the three groups of

[9]However, in EU as well, the costs of disability pensions is a high % of GDP, 2.2% (2001). The apparent incoherence of low proportion of recipients and high cost of disability pensions as a % of GDP is due to the per-capita generosity of disability pensions scheme in the EU 15 economies, as documented by European Commission (2002).

[10]The proportion of social policies that are not non-employment policies in the Visegrád countries refer to a wide range of policy measures, including the so called active labour market policies (ALMPs).

transition countries. Boeri (2000a) enlightens the Visegrád group ability to attain deeper structural change, faster reallocation of workers, relatively stable GDP growth and higher redistribution of wealth with respect to the other groups of countries [11]. This is a sign of the higher capability of the Visegrád countries to react to the high social costs created by transition. They opted for initial higher payments in terms of social policies, thereby gaining in the medium run in terms of structural change and redistribution policies. On the theoretical side, Roland (2002) argues: 'The theory of political economy suggests the possibility of a trade-off between the speed of reforms and the net present value of compensation transfers: namely, faster reforms will involve higher compensation costs.'.

2.4 Speed of Transition Slowdown

The speed of transition slowed down in the 1995-1997 period. The rate of job creation and destruction is a proxy of the speed of transition concept. Following the methodology of Davis and Haltiwanger (1992) we look at the level of job creation/destruction in three different periods (see table (3)):

- 1989-92, the very beginning of transition;
- 1993-97, the second phase of transition;
- 1995-97, the end of the second phase.

After the initial quick progress of transition, obtained through the dismissal of workers (high NEG rates) [12], in a second phase the four economies could no longer sustain a sufficient job turnover (low GROSS) and there was a high dispersion of flows (high EXCESS). A stagnant unemployment pool and a low job turnover were clear indications of a reduced speed in the reallocation of employment.

[11] The Commonwealth of Independent States was characterized by an "L shaped" dynamics of GDP growth, while CEEs registered a "U shaped" recovery. Furthermore, in the former group there was a drastic decline in wages (nominal adjustment), whereas the latter group registered a strong decrease in employment level (quantity adjustment). See figure 1.

[12] Boeri and Terrell (2002) show how quitting, instead of being laid-off, has been the main driving force of job destruction in state firms.

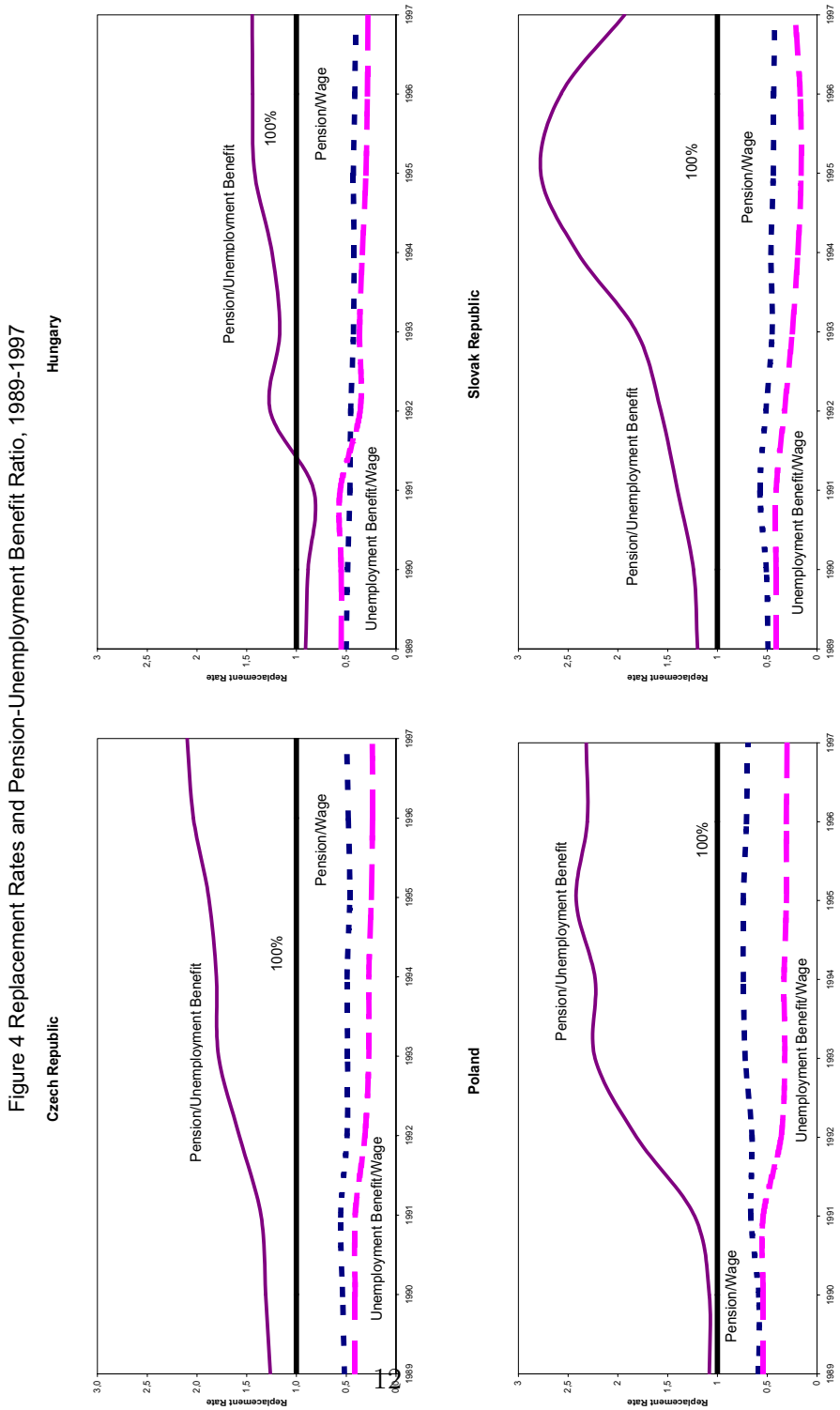

Figure 3: Sources, The Vienna Institute for International Economic Studies (WIIW), Countries in Transition 1998.

Table 3: Job Creation and Job Destruction in the Visegrád Countries

Country	**Indexes**[a]	**1989-92**[b]	**1993-97**	**1995-97**[c]
Czech Republic	POS	2,6	6,5	4,5
	NEG	11.8	5.3	6.9
	GROSS	14.4	11.8	11.4
	NET	-9.2	1.2	-2.5
	EXCESS	5.2	10.6	8.9
Hungary	POS	3.9	|1.9	2.1
	NEG	17.7	|6.7	2.9
	GROSS	21.6	|8.5	5.0
	NET	-13.7	|-4.8	-0.9
	EXCESS	7.8	|3.7	4.1
Poland	POS	1.4	7.5	5.0
	NEG	16.1	3.9	2.3
	GROSS	17.5	11.4	7.3
	NET	-14.7	3.6	2.7
	EXCESS	2.8	7.7	4.7
Slovakia	POS	2.1	6.3	4.2
	NEG	16.4	2.0	2.0
	GROSS	18.5	8.3	6.2
	NET	-14.3	4.4	2.3
	EXCESS	4.2	3.9	3.9

[a] See Appendix 6.2 for details on indexes computation.
[b] Data for the Czech Republic, Poland and the Slovak Republic from Boeri, Burda and Kollo (1998), Forum Report CEPR. Data for Hungary based on ILO Yearbook. The vertical lines denote a break in the series: for Hungary there is a break between 1989-92 and 1993-97.
[c] 1994-1997 for Poland and the Slovak Republic.
Sources: Computations based on ILO, Yearbook of Labour Statistics, 1998.

3 The model

We start building the model of an economy completely characterised by full state employment and absent private employment. Employees expelled from the state sector face the choice of being unemployed versus being out-of-the-labour force, the *outside-option* (see figure (2)). In other words, workers fired by state enterprises have two alternatives: either to remain in the labour market, receiving UB, or to exit with an adequate *premium*. However, agents differ in their perception of the value of their future utility, i.e. they have an idiosyncratic value function guiding their choice.

The policy maker is eager to avoid high unemployment and social unrest, that would restrain the reallocation process.

The policy maker is also eager to avoid excessive flows toward the OLF: budget costs and payroll taxes would suffer a massive increase.

The concern of the policy maker is both the *optimal speed* and the *optimal method* of transition. The government must decide on passive labour market policies (PLMPs)[13] with the ultimate goal of as fast as possible (OST idea) reallocation of the labour force from the public to the private sector.

3.1 The Building Blocks of the Model

The dynamic of the model is divided into 2 phases where agents are able and unable, respectively, to go for the *outside-option*. In the first phase individual uncertainty prevails, while in the second the aggregate uncertainty appears. Let analyze the characteristics of the two phases.

Phase I. Individual uncertainty, the outside-option:

- The policy-maker acts upon the relative generosity of pensions and unemployment benefit schemes and thus she affects the incentive to flee, eventually, the labour force. High pensions with respect to UB allows for flows toward the status of out-of-the-labour force, i.e. relatively generous pensions induce laid-off workers to choose early retirement or disability pensions instead of remaining unemployed;

- Agents dismissed from state sector are heterogeneous and they perceive differently the value of becoming part of the categories OLF. A frac-

[13]Passive labour market policies and active labour market policies -such as training programs or direct intervention on the re-qualification of labour force- complement each other. This second category is not modelled in our paper.

tion of workers go for OLF rather than for unemployment. Figure (2) represents the aforementioned outside option;

- At the beginning of transition participation rate starts dropping and the labour force starts shrinking. i.e. it is not fixed over time;
- There is *no social opposition* because workers are given the possibility to decrease the risk of their non-employment status. Consequently, they do not show any social opposition to dismissal, such as pressure to stop the restructuring of state firms.

Phase II. Aggregate uncertainty, the social opposition:

- Participation rate stabilises because it has reached $\overline{OLF}$, the target level (see Figure 1 in 1997 and 1998);
- There is a reverse in government policies: the eligibility criteria to obtain ER, disability pensions or SA change and this manoeuvre immediately stops the shrinking of the labour force, precluding the possibility to flee. There is a sort of saturation of the OLF;
- The heterogeneous evaluation (individual uncertainty) of the agents is no longer playing any role, because nobody has the possibility to pursue the *outside option* any more;
- Faced with no possibility to escape unemployment, workers *do* implement social opposition to restructuring. Unemployment has a social cost and it is now an obstacle to the transition. This is a 'political economy' hypothesis: *aggregate* uncertainty appears when the instruments to deal with the *individual* uncertainty are lacking.

In the model, the sequencing of policy implementation will be therefore crucial to the determination of the unemployment level and of the share of people in the two categories (the unemployed and the out-of-the-labour).

$$[0] \xrightarrow[\exists\ Outside{-}Option \Rightarrow \nexists\ Opposition]{\textbf{Phase I}\ \text{Individual Uncertainty}} [T] \xrightarrow[\nexists\ Outside{-}Option \Rightarrow \exists\ Opposition]{\textbf{Phase II}\ \text{Aggregate Uncertainty}} [T+m]$$

3.2 The Dynamics of the Model

The general framework of our model is similar to Aghion and Blanchard (1994). The idea is derived from Harris and Todaro (1970), i.e. an *efficiency wage*-led migration from rural to urban areas in developing countries. Boeri and Terrell (2002) have indeed emphasized that the urban-rural divide has been present in transition countries as well, where '[...] non-employment has become more and more concentrated in rural areas while capitals display very dynamic labour markets'.

However, the assumption of constant labour force made by the OST literature is highly unrealistic because it does not take into account the change in the relative weight of employment, unemployment and out-of-the-labour force categories.

By normalizing the total working age population at each point in time, the following equality holds:

$$E(t) + N(t) + U(t) + OLF(t) = 1 \tag{1}$$

where henceforth E stands for those employed in the state sector, N for those in the private sector, U the unemployed and OLF the out-of-the-labour force categories. Initial conditions are chosen so that $N_0 = 0$, $U_0 = 0$, $OLF_0 = j > 0$ ($j < \overline{OLF}$, the target OLF, see section 3.5).

3.2.1 State Sector Employment

Phase I In the first phase, where the reallocation of unemployment is low and the social opposition mechanism is absent, the formulation of state sector dynamics is simply:

$$\frac{dE}{dt} = -s \tag{2}$$

i.e. s is an exogenous constant rate of state firm enterprises closure;

Phase II When the target $\overline{OLF}$ is reached, the model turns individual uncertainty into aggregate uncertainty. It is possible to introduce the opposition mechanism into the model. Equation (2) is modified accordingly:

$$\frac{dE}{dt} = -\left[s - vU(t)\right] \tag{3}$$

with $v \geq 0$ and $[s - vU(t)] \geq 0$, otherwise the restructuring/privatization process would stop and eventually reverse. This new formulation of the speed of transition now depends on time *via* unemployment:

$$\bar{s} \rightarrow s - vU(t) = s(t)$$

$$[0] \xrightarrow[\nexists \quad Opposition \Rightarrow \dot{E} = -s]{\textbf{I} \text{ Exogenous Speed}} [T] \xrightarrow[\exists \quad Opposition \Rightarrow \dot{E} = -[s - vU(t)]]{\textbf{II} \text{ Endogenous Speed}} [T + m]$$

The motivation for this modification is the following: the government is worried about high unemployment because there is opposition to privatization when unemployment is too high. This hypothesis considers the power of lobbying within medium and large state firms as recognized by Dewatripont and Roland (1992a) and Dewatripont and Roland (1992b), Roland (1994), Roland (2002), and Fidrmuc (2000):

> 'Insider managers use the threat of reducing economic activity and destroying jobs to extract subsidies and favorable legislation. Politicians can respond to such subsidies under such plausible and popular rubrics as saving jobs and providing a better business climate.' and '[...] the support for reformist parties is negatively affected by unemployment and by the proportion of retirees and blue collars and agricultural workers [...].'

This mechanism has unfortunately created a vicious circle: high unemployment often leads to high subsidies, softer budget constraints[14] and thus a slower speed of transition. Put in other words, the higher the unemployment, the higher the opposition to restructuring will be.

If workers "vote" on the speed of dismissal in state enterprises, potential gainers and potential losers will participate in this decision. The number of voters advocating a slower restructuring process will increase when unemployment is high. The potential losers gain power and thus the speed of transition reacts inversely to the level of unemployment.

[14]Kornai, Maskin and Roland (2003) have widely investigated the nature of the so called "soft budget constraint", the typical legacy of the communist period in the very first years of transition. The tightening of the budget was one of the principal instruments used to induce old state enterprises to compete.

3.2.2 Private Sector Employment

The private sector dynamic equation is the same in phase I and II:

$$\dot{N} = a\,(y_N - \tau - w) = a\,(1 - \tau - w) \tag{4}$$

where a is a parameter, $y_N = 1$[15] the constant average product of labour in the private sector, τ the payroll taxes per worker (indirect cost) and w the wage per worker (direct cost).

3.2.3 The Fiscal Side

The budget constraint of the government[16] in both phase I and II is:

$$Ub + OLF\beta = (E + N)\tau = (1 - U - OLF)\tau \tag{5}$$

$$\tau = \frac{Ub + OLF\beta}{(1 - U - OLF)} \tag{6}$$

The budget constraint (5) states that pensions β and not only the UB b (as in Aghion and Blanchard (1994)) are financed through payroll taxes and not by general government funds or deficit. Actively employed, in both the state and private sectors, are the only source of pensions and UB financing[17].

3.3 The Value Functions of N, U and OLF

Aghion and Blanchard (1994) in their paper consider the present value of being unemployed versus the present value of being employed in the private sector. In our formulation people out-of-the-labour force are considered as well, hence a further arbitrage condition has to be taken into account.

The model encompasses three value functions: employment in the new private sector V_N, unemployment V_U and out-of-the-labour force V_{OLF},

[15] According to the efficiency wages mechanism the average product of the private sector is higher than the average product of the state sector, $y_N > y_E \Rightarrow 1 > y_E$.

[16] The literature concerning *intermediate preferences* (e.g. risk heterogeneity and social insurance) deals exactly with the same problem of optimal decision on unemployment benefits under government budget constraint, where the UB transfer to unemployed are financed with taxes on employed.

[17] However, equation (5) could be easily amended to take into account budget deficits.

$$rV_N = w + \frac{dV_N}{dt} \tag{7}$$

$$rV_U = b + \left(\frac{\dot{N}}{U}\right)(V_N - V_U) + \frac{dV_U}{dt} = b + pc + \frac{dV_U}{dt} \tag{8}$$

$$rV_{OLF} = \beta + \varepsilon_i + \frac{dV_{OLF}}{dt} \tag{9}$$

where: b and β are the unemployment benefit and pensions, respectively; $p = \frac{\dot{N}}{U}$ is the probability of becoming employed; and the term $\varepsilon_i \in [0,1]$[18] reflects the idiosyncratic valuation of individual i for OLF[19]. In a similar framework, Boone (2004) considers a two sector model where risk-averse agents increase their mobility according to the level of unemployment benefits. In his paper uncertainty is modelled through risk-aversion. In our paper the idiosyncratic term could incorporate many individual specific elements, like age, risk aversion, skills, education, gender, etc.

The term $(V_N - V_U) = c$ is constant. This is an incentive compatibility constraint according to which there is a constant willingness to seek a job, in order to exit from unemployment [20]. It follows that $\frac{dV_N}{dt} - \frac{dV_U}{dt} = 0$, taking the difference between (7) and (8) and solving for the wage

$$w = b + c\left(r + \frac{\dot{N}(t)}{U(t)}\right) \tag{10}$$

where the second term on the RHS denotes the *risk premium* of being unemployed.

We also state that $b < \beta < w$ [21]. This inequality is empirically testable and it is also an hypothesis adopted by the previous theoretical literature,

[18] I thank a referee for this point.

[19] In Boeri and Terrell (2002) the aspect of heterogeneity among workers is very important. At the beginning of transition the flows toward OLF were higher than the flows toward U and the majority of workers deciding to flee the labour force were low skilled.

[20] The analogous incentive compatibility constraint between the value of being OLF and of being U is: $V_{OLF} - V_U = \underline{c}$, solving for $rV_{OLF} - rV_U$ we obtain $\beta - b = r\underline{c} + pc - \varepsilon_i$. Then $V_N - V_{OLS} = c - \underline{c}$ and solving for $rV_N - rV_{OLF}$ we obtain $w - \beta = r(c - \underline{c}) - \varepsilon_i$. These conditions hold for $c > \underline{c}$.

[21] The value of β can be considered pension (ER, Dis.) or SA. In the first case the inequality holds for all the analyzed countries excluding the first two years in Hungary (see Figure 3); if β stands for SA, the inequality should be modified as follows: $\beta < b < w$. In

Chadha and Coricelli (1994). The wages are determined by the labour market dynamics, while the β to b spread is exogenously determined by the policy maker.

3.3.1 The Indifferent Agent

Solving for the value functions under the hypothesis that pc is constant[22]:

$$\begin{aligned} V_N &= \frac{w}{r} + \alpha_N e^{rt} \\ V_U &= \frac{b+pc}{r} + \alpha_U e^{rt} \\ V_{OLF} &= \frac{\beta+\varepsilon_i}{r} + \alpha_{OLF} e^{rt} \end{aligned}$$

if the integration constants are equal to zero, the equality $V_U = V_{OLF}$ gives the idiosyncratic term of the indifferent agent:

$$\overline{\varepsilon} = b - \beta + pc = pc - (\beta - b) \tag{11}$$

By assuming $\overline{\varepsilon} \in [0,1]$[23] and knowing that the probability to find a job ($p = \frac{\dot{N}}{U} \in (0,1)$) is bounded as well:

$$\overline{\varepsilon} \in [0,1] \quad \& \quad p = \frac{\dot{N}}{U} \in [0,1] \Rightarrow (\beta - b) \in [0,1]$$

we have the boundaries for the spread pensions-UB. Solving equation (11) for p and the two corner values of $\overline{\varepsilon}$ we know that the probability to find a job must be sufficiently high ($p \geq \frac{\beta-b}{c}$), otherwise there is no incentive to become unemployed, but at the same time it must be bounded from below ($p \leq \frac{1-(\beta-b)}{c}$).

---

order to have a clear-cut distinction between U and OLF the first case is more appropriate, even if the SA could be also considered a kind of *escape* from the labour force, i.e. an OLF condition.

[22]The $\dot{N}/U$ ratio is constant if the government maintains the economy at the optimal speed of transition level and there is no slowing down. The qualitative results of the model are not affected by these caveats, see Appendix (6.3).

[23]This is for convenience; any other normalization would only affect the support of the distribution of $\overline{\varepsilon}$, on which the density function is computed, see section (3.3.2).

The $\beta - b$ spread is indeed a policy instrument, while $\frac{\dot{N}}{U}$ and c are determined by labour market conditions. As far as the policy instrument is concerned, any action trying to encourage flows toward OLF will set high pensions and, conversely, a policy encouraging flows toward U will require high unemployment benefits. As far as the labour market dynamic is concerned, the higher the probability of finding a job -*p*- and the value of employment -*c*-, the higher the flows toward unemployment become.

A high $\beta - b$ spread (high premium of pensions with respect to unemployment benefits) induces a higher number of agents to choose pension schemes. This is because the wider the $\beta - b$ spread, the lower the idiosyncratic term of the indifferent agent becomes, thus the higher the number of people choosing OLF (the lower the number of people choosing unemployment) will be.

3.3.2 Unemployment and OLF Flows

In the previous paragraph we developed a qualitative analysis of relevant labour market flows but we were not able to say who is finally going to chose the outside-option. On the basis of the idiosyncratic term of the indifferent agent, it is possible to determine that two generic agents i and j will behave in the following way:

- if $\varepsilon_i < \overline{\varepsilon} \Rightarrow i \in n_1$: people passing from E to U;
- if $\overline{\varepsilon} < \varepsilon_j \Rightarrow j \in n_2$: people passing from E to OLF exploiting the outside option;
- $n_1 + n_2 = n$ the total number of people previously employed in the state sector

$$\begin{array}{ccc} E & \xrightarrow{i \in [\mathbf{n_1}] \forall \varepsilon_i < \overline{\varepsilon}} & U \\ {\scriptstyle j \in [\mathbf{n_2}] \forall \varepsilon_j > \overline{\varepsilon}} \downarrow & & \\ OLF & & \end{array}$$

The flows towards unemployment and OLF

$$x_1 = \frac{n_1}{n_1 + n_2} \qquad x_2 = \frac{n_2}{n_1 + n_2}$$

can be computed according to the distribution of ε_i among agents:

$$x_1 = F_\varepsilon(\overline{\varepsilon}) = \int_0^{\overline{\varepsilon}} f(\varepsilon, .)\, d\varepsilon \tag{12}$$

$$x_2 = F_\varepsilon(1 - \overline{\varepsilon}) = \int_{\overline{\varepsilon}}^{1} f(\varepsilon, .)\, d\varepsilon \tag{13}$$

$f(\varepsilon, .)$ being the density function in ε, based on a vector of parameters[24]. This formulation states that agents with $\varepsilon_i < \overline{\varepsilon}$ will become unemployed, while agents with $\varepsilon_j > \overline{\varepsilon}$ will choose the status of OLF.

3.4 The Dynamics of Unemployment

The equation concerning the unemployment dynamics is derived by rewriting the derivative of the normalization equation (1)

$$\begin{aligned} \dot{E} + \dot{N} + \dot{U} + O\dot{L}F &= 0 \\ \Rightarrow \dot{U} &= (s - vU) - \dot{N} - O\dot{L}F \\ &= (s - vU)x_1 - \dot{N} \\ \Rightarrow O\dot{L}F &= (s - vU)x_2 \end{aligned}$$

where x_1 is the ratio between people moving $E \rightarrow U$ and the total number of people moving out from the state sector and x_2 is the ratio between people moving $E \rightarrow OLF$ and the total number of people moving out from the state sector $(x_1 + x_2 = 1)$[25].

3.5 The Government Strategy in the Two Phases

The initial reallocation process implies an increase in the pool of both unemployed and OLF. The government provides an incentive to choose OLF,

[24] With a uniform distribution it would be $x_1 = \overline{\varepsilon}$ and $x_2 = 1 - \overline{\varepsilon}$, for example.

[25] In the formulation of A-B some workers become unemployed $s(1 - \lambda)$ and the remaining $s\lambda$ are job-to-job shifts (as explained by Boeri (1998), Boeri (2000b)), producing at the $y = 1$ average product level, as in the private sector. However, the private job creation $H = \dot{N}$ '[...] is the increase in the private sector employment *not due to* privatization/restructuring of state firms', Aghion and Blanchard (1994) page 14 (H is not a function of λ). Alternatively, in our paper all the workers of restructured firms have passed through unemployment in order to find a job in the private sector, i.e. $\lambda = 0$.

setting $\beta - b$ sufficiently high. This, however, is just temporary: the policy maker has no interest in decreasing the participation rate forever, due to the long run costs in terms of growth and fiscal burden: the larger the pool of people in the OLF, the lower the potential GDP that can be produced in the future. Attempting to speed up transition today may end up reducing GDP in the long run and driving up overall payroll taxes.

This consideration probably induced governments to stop widening the spread starting from 1995, when a halt of the upward trend in pension/UB ratio growth was registered (see table 3[26]).

This effect can be achieved assuming that the policy maker has in mind a target level for the OLF ($\overline{OLF}$) and once this target is reached, the supply of early retirement and disability pensions is exogenously set to 0: the outside-option is no more offered[27] and the inflows into OLF are 0. This seems to have occurred: in fact in the 1997 the participation rate stabilized around 70 percent (see figure (1)).

In terms of the model:

$$
\begin{aligned}
phase \quad I: \quad OLF(t) < \overline{OLF} \quad &\Rightarrow \quad \exists \quad Outside - Option \\
&\Rightarrow \quad \overline{\varepsilon} \in [0,1] \\
&\Rightarrow \quad F_\varepsilon(\overline{\varepsilon}) = x_1(t) \geq 0, F_\varepsilon(1-\overline{\varepsilon}) = x_2(t) \geq 0 \\
phase \quad II: \quad OLF = \overline{OLF} & \\
&\Rightarrow \quad \nexists \quad Outside - Option \\
&\Rightarrow \quad \overline{\varepsilon} = 1 \\
&\Rightarrow \quad F_\varepsilon(1) = x_1 = 1, F_\varepsilon(0) = x_2 = 0
\end{aligned}
$$

The flows x_1 x_2 are determined according to equation (11), the function for $\overline{\varepsilon}$, and equations (12) (13), the functions determining the flows (sections (3.3.1) and (3.3.2)).

$$
[0] \xrightarrow[\exists \quad Outside-Option]{\mathbf{I}\ OLF(t)<\overline{OLF}} [T] \xrightarrow[\nexists \quad Outside-Option]{\mathbf{II}\ OLF=\overline{OLF}} [T+m]
$$

[26]The only exception is the Slovak Republic where the pension/UB ratio (over 250%) was greatly re-adjusted between 1995-1997.

[27]This hypothesis could appear unrealistic if we consider a natural rate of retirement. However, in this reduced framework we are only interested in *net* inflows.

$$[0] \xrightarrow[F_\varepsilon(\overline{\varepsilon})=x_1(t)\geq 0, F_\varepsilon(1-\overline{\varepsilon})=x_2(t)\geq 0]{0\leq\overline{\varepsilon}\leq 1} [T] \xrightarrow[F_\varepsilon(1)=x_1=1, F_\varepsilon(0)=x_2=0]{\overline{\varepsilon}=1} [T+m]$$

Equation (11) has to be amended for the case in which the outside-option is lacking once $OLF = \overline{OLF}$:

$$\overline{\varepsilon} = \begin{cases} 1 & OLF = \overline{OLF} \\ pc - (\beta - b) & OLF < \overline{OLF} \end{cases}$$

In order to enter in phase II the government has simply to allow $\overline{\varepsilon}$ to hit its upper bound, leaving pensions and unemployment benefits unchanged but not offering the outside-option any more (e.g. drastically reducing the access to ER, Dis. and SA)[28].

3.6 Phase I System

The dynamic system for the four variables E, N, U, OLF is represented below when $OLF < \overline{OLF}$ ($t \in [0, T)$):

$$\begin{cases} \dot{E} = -s \\ \dot{N} = \frac{aU}{U+ac}\left[1 - rc - \frac{b+(b+\beta)OLF}{(1-U-OLF)}\right] \\ \dot{U} = sx_1 - \dot{N} \\ \dot{OLF} = sx_2 \end{cases}$$

under the condition $x_1 + x_2 = 1$ and the normalization equation (1).

This system can *not* be solved for an equilibrium in $\dot{U} = 0$, because of the long run effect of $OLF(t) = sx_2t + k$. In fact, the private sector dynamics becomes:

$$\dot{N} = \frac{aU}{ac+U}\left[1 - rc - \frac{b + (b+\beta)[sx_2t + k]}{1 - U - [sx_2t + k]}\right]$$

[28] A more realistic hypothesis of a change in the spread in order to affect the incentive would be mathematically more complex, but it would not change the qualitative results of the model. This simplifying assumption is crucial for different reasons. The $\beta - b$ spread is fixed, but the important choice concerns the timing of the switch between phase I and II. Furthermore, we want to rule out from the model the dynamic implications in term of choices for perfect foresighted agents knowing in advance the government policy in the future.

that still depends on time. A government not worried about the overall level of OLF, i.e. the excessive drop of the participation rate, would leave the labour market without an equilibrium in terms of unemployment[29].

The economic logic is the following. The strategic policy of pushing people OLF is a *temporary* action. If this was not the case, the participation rate could potentially drop indefinitely: through payroll taxes fewer and fewer workers would finance the larger and larger people OLF. This is not only not sustainable but it is also damaging to job creation in the private sector. The policy maker is thus forced to block the process at some point before it easily spins out of control.

3.7 Phase II System

As soon as the target $\overline{OLF}$ is reached, the policy maker shifts policies ($t \in [T, T+m)$) and the speed of transition is affected by the social opposition function[30]. In the new system the identification of the equilibria for unemployment is possible:

$$\begin{cases} \dot{E} = -(s - vU) \\ \dot{N} = \frac{aU}{U+ac}\left[1 - rc - \frac{b+(b+\beta)\overline{OLF}}{\left(1-U-\overline{OLF}\right)}\right] \\ \dot{U} = (s - vU) - \dot{N} \\ \dot{OLF} = 0 \end{cases}$$

As a result an unemployment equilibrium level can be investigated.

3.7.1 The Unemployment Equilibria

The equilibria for unemployment are derived solving for

$$\dot{U} = 0 \Leftrightarrow \dot{N} = (s - vU) \tag{14}$$

When $\dot{U} = 0$ occurs, the flow of people entering unemployment equals the flow exiting from it[31].

[29] I thank a referee for this point.

[30] In the model there is no foresight of the moment of policy reverse. However, if this was the case, a even faster phenomenon of escape from the labour force would be generated.

[31] As pointed out in Boeri (2000b) the scale effect has to be taken into account. Until

In our model the inverted U-shaped $\dot{N}$ curve is shifted downward, in other words, for every level of unemployment the private job creation rate is lower with respect to A-B. The new $\overline{OLF}\beta$ component has to be financed through payroll taxes, thus hindering the absorption of workers by private firms and reducing job creation[32].

The unemployment solutions are obtained through the intersection of the inverted bell shaped curve of $\dot{N}$ derived in the system and equation (14)[33].

$$(s - vU) = \frac{aU}{U + ac}\left[1 - rc - \frac{b + (b + \beta)\overline{OLF}}{1 - U - \overline{OLF}}\right] \tag{15}$$

In the next paragraph the graphical solution of this equation is analyzed.

3.8 The Implication on the Speed of Transition

In phase I the policy maker is progressively compelled to slow down the speed of transition (figure (4) and (5)). The new (but lower) level of optimal speed of transition has to be chosen at the maximum point of the downward shifted inverted U shaped curve in each moment in time. Notice that if the speed of transition is maintained always at s^* such that

$$U^* = \arg\max_U \frac{aU}{U + ac}\left[1 - rc - \frac{b + (b + \beta)OLF}{(1 - U - OLF)}\right]$$

there is a unique U^* *semi-stable* equilibria: for $U < U^*$ there is convergence to the equilibria, for $U > U^*$ divergence. If the speed is slower than the optimum, two equilibria are generated, U_1 is stable, while U_2 is unstable.

In the second phase, the social opposition element emerges (figure (6)) because of the increased unemployment pool. Consequently, there are multiple equilibria[34].

---

the private sector has reached a size equal to the public one, a higher growth rate is not sufficient to avoid the rise of unemployment.

[32]Blanchard and Diamond (1992) used a similar framework.

[33]The rate of private job creation will be zero for two values of unemployment: $U_1 = 0$ and $U_2 = 1 - \overline{OLF} - \frac{b+(b+\beta)\overline{OLF}}{1-rc}$.

[34]In the case of forward looking employers Aghion and Blanchard (1994) show that both equilibria can be reached and both optimistic or pessimistic employers' expectations become self fulfilling.

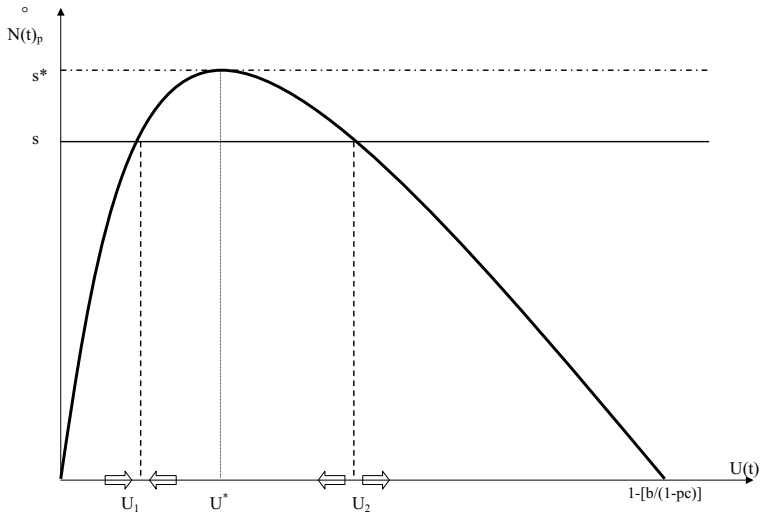

Figure 4: Aghion-Blanchard Model

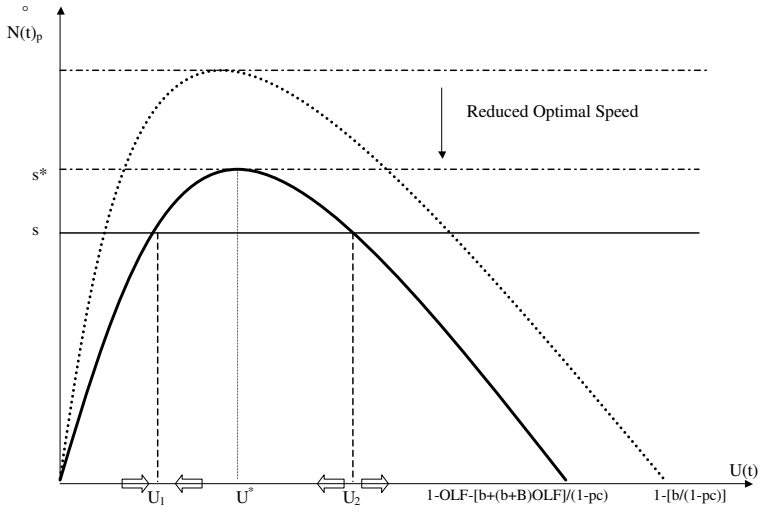

Figure 5: Phase I: The Extension of OLF Categories, $0 \rightarrow T$

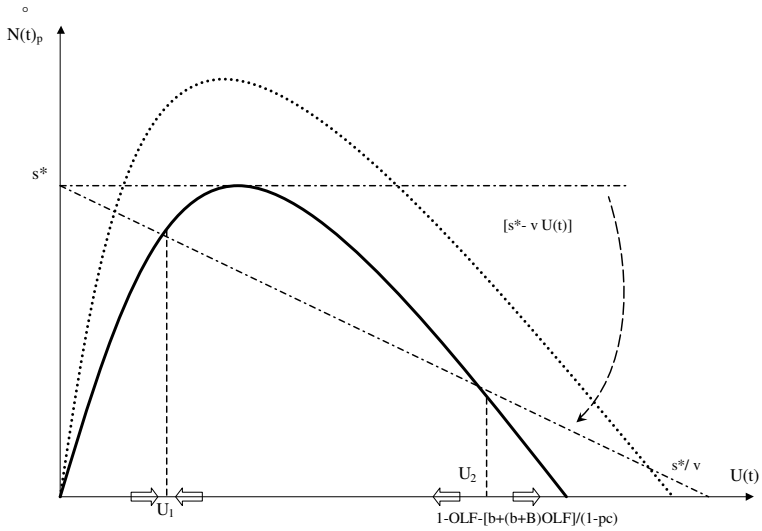

Figure 6: Phase II: The Extension of Social Opposition

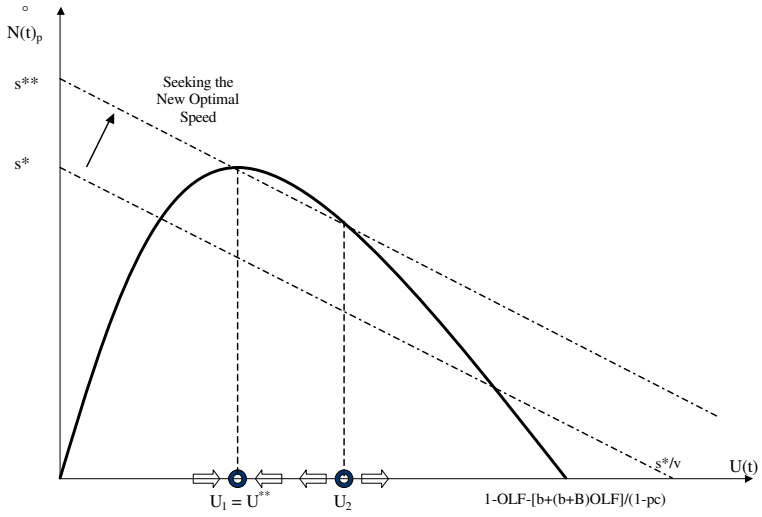

Figure 7: The New Equilibria, $0 \rightarrow T + m$

If now the policy maker seeks the new optimal speed $s^* \rightarrow s^{**}$ (figure (7)), the multiplicity of equilibria remains[35]. In other words the trap of high unemployment is still present. The new "optimal" unemployment point ($U_1 = U^{**}$) is a proper stable equilibrium (no more semi-stable as in Aghion and Blanchard (1994)).

3.9 The Long Run: Implicit Costs

[36]

The equilibrium unemployment ($\dot{U}= 0$) cannot be sustained forever. At some point in time, it is inevitable that $\dot{N}> 0$ and $\dot{E}= 0$ ($E = 0$), implying $\dot{U}< 0$, until $U(T + m) = 0$. This is the steady state of the model, where the economy reaches a natural zero rate of unemployment.

At the end of the transition process the following long run results show up:

$$\begin{aligned} U^L(T+m) &= 0 \\ OLF^L(T+m) &= \overline{OLF} \\ GDP^L(T+m) &= y_E E(T+m) + y_N N(t+m) \\ &= 1 - \overline{OLF} \\ w^L(T+m) &= 1 - \beta \left[\frac{\overline{OLF}}{1 - \overline{OLF}} \right] \end{aligned}$$

The GDP[37] in the long run is derived by computing the sum of the state and private production: the first is 0 and the second is $y_n N = 1(1 - E^L - U^L - OLF^L) \Rightarrow 1 - \overline{OLF}$. The wage is derived through equations (4) and (6) where the long values are plugged into.

It is now possible to conclude that for $\overline{OLF} < 1$ both GDP and wealth, expressed as wages, are a negative function of pension largesse and the size of the categories out-of-the-labour force.

[35] For $\frac{s^{**}}{v} \geq 1 - \overline{OLF} - \frac{b+(b+\beta)\overline{OLF}}{1-rc}$.

[36] I thank a referee for suggesting to add this section.

[37] GDP and GDP per capita coincide for the normalization hypothesis.

4 Policy Sequencing

From 1989 till the end of 1991, unemployment benefit schemes were quite generous with respect to other social instruments (i.e. $\beta - b$ was low, because of high UB). This increased unemployment and allowed the reallocation of labour from the public to the private sector. Initial low levels of unemployment benefits would have prevented the beginning of a transition, due to an inadequate *social safety net*. However, high UB led to high government budget deficits (the payroll tax system was not set yet) and little incentive to search for work, due to high replacement rates of UB systems.

The 1989-1991 is a kind of "phase 0" of the model where equation (5) was not constraining the financing of UB, if not marginally, and there was no hindering of the private job creation process. In fact, in the very first period of transition the budget was not binding and UB were paid with government money. Unemployment and budget deficits grew. In this starting period the drop in the participation rate was limited (figure (1)).

In 1992, labour market institutions' reforms reduced UB generosity and increased the (relative) generosity of pensions (early retirement, disability pensions and social assistance). Furthermore, the payroll tax system was introduced. This policy change was meant to reduce the pressure on unemployment, inducing people to exit from the labour market. Unfortunately, the costs were both on the short run and long run.

In the short run, there was a burden on the budget deficit[38] and payroll taxes generated a lower growth of the private sector, contrary to the previous 1989-1992 period. All this led to an overall forced slowdown in speed of transition (figure (5)).

In the long run another effect emerged: the larger the pool of people OLF, the lower the potential GDP produced in the future. This is probably the more dangerous but less evident risk the CEEs have been coping with so far. In fact, they seem to have started decreasing generosity of pensions and open ended entitlements (phase II of the model) around 1995-1997 to avoid long run costs (see section (3.9)).

The public sector slowed down the restructuring/privatization process also because of the appearance of social opposition in this phase when the outside-option was no longer feasible.

[38] As already pointed out, the model does not take into account budget deficit, in order to show the extreme case result of increased pension costs.

Fiscal responsibility has often been advocated as a pre-requisite of an adequate process of transition within a policy of stabilization. However, had the budget deficit been less rigidly constrained, the governments could have sustained a faster transition in terms of restructuring. A completely rigid fiscal constraint has, in some cases, perversely led to the reduction of the speed of transition, because of the fear of social opposition to restructuring.

Alternative explanations of this reduced speed were already presented in the literature. Rodrik (1995) analyzed the effect of subsidies to the state sector in slowing down the transition. Commander and Schankerman (1997) investigated the effect of high social benefits (largely firm-specific) and firms dominated by insiders: this phenomenon has generated informal sector participation and has hindered restructuring, to some degree by inducing higher set-up costs for new private firms. Aghion and Blanchard (1998) theorized a framework in which the insiders -potential losers of the process of dismissal of public jobs- imposed political constraints so that the outsiders would not have easy access to the shares' market.

We have attempted to provide a further and different explanation of the unexpected phenomenon of the slowing pace of restructuring.

5 Conclusions

This paper has developed a theoretical re-investigation of the optimal speed of transition (OST) model of Aghion and Blanchard (1994).

Out-of-the-labour force categories are endogenised within the model and workers fired from the state sector choose inter-temporally which labour market status -out-of-the-labour force or unemployment- could guarantee higher net present value. In a first phase, agents face individual uncertainty: their idiosyncratic evaluations determine whether to exploit the *outside-option*. In a second phase, there is an unexpected policy reversal as the *outside-option* was no longer available: aggregate uncertainty raises and social opposition to unemployment shows up.

The model broadly extends the results of the optimal speed of transition literature. The optimal speed is no more exogenous: in the first phase, it must be progressively reduced; in the second phase, multiple equilibria occur, with the drawback of increased risk of a non-optimal high level of unemployment.

The model predicts that policies oriented toward tight government budget constraints hinder the pace of job reallocation. However, policies meant

to keep a sufficiently high participation rate are beneficial to the speed of transition and to the reduction of long run costs.

In terms of policy implications, tight fiscal policies seem to have driven the CEEs into a slowdown of transition and a drastic drop in the participation rate, moving up the dependency ratio. Thus the necessity to finance open-ended entitlements and the shrunk labour force increased the long run costs. In other words, the attempt to speed up transition in the short-run lowered the potential GDP later on. It could be the case that the Visegrád countries' governments have only partially predicted and tackled these long term effects.

However, the experience of Central European Economies shares some similarities with Western European countries, especially concerning the reform of pensions programs. In fact, this is one of the critical points of the social policy agenda within the enlarged EU, probably due to the fear of the aforementioned potential high long run costs.

6 Appendix

6.1 Summarizing the Two Phases

$$[0] \xrightarrow{\textbf{Phase I}} [T] \xrightarrow{\textbf{Phase II}} [T+m]$$

$$[0] \xrightarrow[\exists\ Outside{-}Option \Rightarrow \nexists\ Opposition]{\text{Individual Uncertainty}} [T] \xrightarrow[\nexists\ Outside{-}Option \Rightarrow \exists\ Opposition]{\text{Aggregate Uncertainty}} [T+m]$$

$$[0] \xrightarrow[\dot{E}=-s]{\text{Exogenous Speed}} [T] \xrightarrow[\dot{E}=-[s-vU(t)]]{\text{Endogenous Speed}} [T+m]$$

$$[0] \xrightarrow[\exists\quad Outside{-}Option]{OLF(t)<\overline{OLF}} [T] \xrightarrow[\nexists\quad Outside{-}Option]{OLF=\overline{OLF}} [T+m]$$

$$[0] \xrightarrow[F_\varepsilon(\bar{\varepsilon})=x_1(t)\geq 0, F_\varepsilon(1-\bar{\varepsilon})=x_2(t)\geq 0]{0\leq\bar{\varepsilon}\leq 1} [T] \xrightarrow[F_\varepsilon(1)=x_1=1, F_\varepsilon(0)=x_2=0]{\bar{\varepsilon}=1} [T+m]$$

6.2 Job Creation and Job Destruction Indicators, Davis and Haltiwanger (1992)

In table (3), the employment creation and destruction indicators have been computed as follows:

$$POS = \frac{\sum_{exp}(E_t - E_{t-1})}{\frac{(E_t+E_{t-1})}{2}} \qquad NEG = \frac{-\sum_{con}(E_t - E_{t-1})}{\frac{(E_t+E_{t-1})}{2}}$$

'esp' stands for expanding and 'con' contracting sectors, respectively. The indicators are then constructed: $GROSS = POS + NEG$, $NET = POS - NEG$, $EXCESS = GROSS - |NET|$.

6.3 The Value Function of Unemployment, V_U

The value function of unemployment depends on $pc = \left(\frac{\dot{N}}{U}\right)(V_N - V_U)$. Even if unemployment were in equilibrium, the term p would not be constant for the entire transition period.

In phase I there is a progressive reduction of p (see figure (5)).

In phase II p is constant only when the system reaches an equilibrium (this was not the case in phase I). However in phase II $\overline{\varepsilon} = 1$ and there is no more outside option, everyone is compelled to go for unemployment and the V_U is not playing any role.

Phase I (time-dependence): it is not possible to compute the value function of unemployment

$$V_U = \frac{b + pc}{r} + \alpha_U e^{rt} \tag{16}$$

from

$$rV_U = b + pc + \frac{dV_U}{dt}$$

Notwithstanding this, the approximation used in our model (equation (16) with $\alpha_U = 0$) is an *over-evaluation* of V_U (p is decreasing in t), and it under-estimate the escaping process generated through $x_2 = F_\varepsilon(1 - \overline{\varepsilon}) = \int_{\overline{\varepsilon}}^{1} f(\varepsilon, .)\, d\varepsilon$.

The computation of the V_U standard form solution is the following:

$$\begin{aligned}
\frac{dV_U}{dt} - rV_U &= -\left(b + \frac{\dot{N(t)}}{U(t)}c\right); \\
e^{\int_0^t -rdt} V_U &= \int e^{\int_0^t -rdt}\left(-b - \frac{\dot{N(t)}}{U(t)}c\right)dt + C \\
e^{-rt} V_U &= \int e^{-rt}\left(-b - \frac{\dot{N(t)}}{U(t)}c\right)dt + C \\
V_U &= -e^{rt}b\int e^{-rt}dt - e^{rt}c\int e^{-rt}\frac{\dot{N(t)}}{U(t)}dt + C
\end{aligned}$$

Splitting the integral in two parts, phase I $[0, T)$ when $\frac{dp}{dt} < 0$ decreasing in t and phase II $[T, T + m)$ where it is constant $\overline{p^{II}} < p$ we obtain:

$$\begin{aligned} V_U &= \frac{b}{r} - e^{rt}c \int_I e^{-rt} \frac{\dot{N(t)}}{U(t)} dt - e^{rt}c \int_{II} e^{-rt} \overline{p^{II}} dt + C \\ V_U &= \frac{b}{r} - e^{rt}c \int_I e^{-rt} \frac{\dot{N(t)}}{U(t)} dt + \frac{\overline{p^{II}}c}{r}[1 - e^{rm}] + C \end{aligned}$$

$\dot{N}$ depends on $OLF(t)$ which still depends on time in phase I. There is no closed form solution for V_U.

However, the model would only be affected in the transitional dynamics of phase I, $[0, T)$: without the overvaluation of V_U, the time needed to reach the $\overline{OLF}$ would be shorter, but the main qualitative conclusions of our model would not be affected.

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