

Public finance and the optimal speed of transition.¹

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Abstract

We develop a general equilibrium model that jointly considers the influence of capital accumulation constraints and of labour market frictions on the process of transition. We endogenize the economic and budgetary costs of different government policies and show that, early in transition, governments ought to subsidize state firms. Provided that intertemporal commitment is feasible, this policy limits the initial output fall, which relaxes capital accumulation constraints, accelerates transition, and increases welfare. Moreover, by resorting to indirect –instead of direct– taxes, governments can bring the path of transition closer to the first best. Yet, political pressures may induce a policy of suboptimal subsidization.

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1 Introduction

Since the beginning of transition in Central and Eastern European countries, it was clear that productive equipment had to be restructured or replaced, and that a large fraction of the labour force had to change occupation. Clearly, this transmutation was a formidable challenge for economic policy: the social and financial costs were bound to be large, and policy mistakes could make them prohibitive.

The “Optimal Speed of Transition” (OST) literature (see Boeri 2000, chp 1, and Roland 2000, chp 5, for a survey) deals with this question by analyzing how costs can be maintained within bounds, and which policies maintain transition on track. Yet, the analysis has been rather restrictive. The focus is on *i*) a single policy instrument, *ii*) a single bottleneck in the economy, and *iii*) direct taxes. The first restriction implies that the single policy instrument controlled by the government (usually the direct tax rate or the speed of closure in the state sector) is supposed to directly determine all economic variables, such as firms creation, the unemployment rate, and wages. The second assumption entails that, depending on the model, either labour market frictions *or* physical or human capital constraints determine the transition path. Finally, by focusing on direct taxes, the literature left public finance questions out of the analysis. The aim of this paper is to address these limitations. We provide an extended model, in which the interactions between labour and capital constraints are investigated, and we consider different policy levers and tax instruments that governments can use.

In the OST literature, the process of transition is modeled as the expansion of a new –“private” and high productivity– sector and the phasing out of the old –“state” and low productivity– sector. Hence, transition requires both massive investments and a major reallocation of the labour force. To capture the interactions between these two movements, we introduce labour market frictions as studied by Aghion and Blanchard (1994, AB henceforth) into the dynamic general equilibrium model of Castanheira and Roland (2000, CR henceforth), and make explicit the costs of manipulating the speed at which workers leave the state sector. Finally, we let the government use direct, as well as indirect or lump-sum taxes to leverage

finance.

Our results show that, when possible, the use of direct taxes should be avoided, and that unemployment should be decreasing over transition. This contrasts with the assumption in AB (1994) that only direct taxes can be used, and with their result that unemployment should be constant over time. In contrast with CR's (2000) results, we also show that in the presence of labour market rigidities, governments should subsidize state firms early in the transition, in order to maintain higher output levels. This in turn accelerates transition and increases welfare, because higher output levels ease capital accumulation. Yet, the government must also be able to commit to decrease subsidies later in transition, so as to maintain restructuring incentives intact. In other words, the budget constraint of state firms ought to be tightened, but only progressively.¹ This provides a rationale for the accumulation of tax arrears that was observed early in transition: provided that the government commits to decreasing the flow of tax arrears over time, temporarily exempting loss-making firms from paying their taxes does not generate soft budget constraints. Instead, it maintains higher levels of employment early in transition, limits the output fall, and accelerates transition.

These results extend the literature. The seminal paper by Aghion and Blanchard (1994) presents a partial equilibrium model in which the trade-off between the speed of closure and the resulting tax rate is analyzed. They show that transition is suboptimally slow when unemployment rates are too high (because tax rates become prohibitive) or too low (because wage rates become too high). Burda (1993) and Chadha and Coricelli (1997) also focus on the effect of labour market frictions on the speed of transition, but allow for different tax rates in the state and in the private sector, and Boeri (2000) analyzes the effects of different welfare systems in much greater detail. However, these studies do not consider the income effects of unemployment, nor the subsidy costs associated with larger employment in the state sector, and they do not compare the relative merits of different tax schemes. Our results thus shed additional light on how government policy should be designed given the extent of institutional reforms and of the initial conditions

¹By contrast, most papers in the OST literature *assume* that the government cannot manipulate the budget constraints of firms. This, again, reduces the number of instruments considered in the theoretical analysis.

faced by the country, and help explain why recovery was faster in Central Europe (where subsidies decreased more progressively and commitment was easier to achieve) than in Russia or Ukraine (where subsidies evolved more erratically and political objectives were less clear).

Although the focus is a bit different, these results also relate to the policy trade-offs faced by any country that has to undertake some economic adjustment. As Caballero and Hammour (1996) show, in the presence of labour market imperfections, positive productivity shocks in one sector may generate excessive job destruction in other sectors. We show that this job destruction generates excessive output contraction, and therefore has a negative impact on job creation in the expanding sector. Hence, insofar as it limits the amplitude of this recession, temporary job protection in the old sector may actually end up *accelerating* adjustment. In the context of the European Union for instance, these results may partially explain why some countries can be in favour of maintaining larger aids to declining sectors or industries. Labour market distortions aggravate adjustment costs and make adjustment protracted.

In a different vein, Bertocchi and Spagat (1997), Dewatripont and Roland (1992, 1995), Rodrik (1995), and Roland (1994), among others, study the (dynamic) political economy constraints faced by governments during transition. They show that wrongly designed policies can generate reform reversals. We introduce political constraints in our model by deriving the policy that is desired by the median voter and show that, in some cases, the median voter may prefer excessive state intervention (too large subsidies), even if this slows down transition and decreases aggregate welfare. On the other side, entrepreneurs in the private sector always favour a policy of *laissez-faire*, because it lowers wages across the whole path of transition.

Our stylized model of transition is introduced in Section 2. In Section ??, we derive the optimal path of transition, as well as the one that results from a *laissez-faire* policy. Section ?? derives the optimal policy of the government for a simple case of labour market distortions, and shows why this policy should be financed by indirect taxes when feasible. Section ?? shows how this policy is affected when more general labour market conditions are considered and why political constraints may induce the government to select suboptimal policies. Section ?? concludes.

2 Model

We consider an economy where agents are price takers and produce a single good with three factors of production: labour, and two types of capital inputs, with different productivity levels. Capital in the state sector is already present at the beginning of transition, since it was accumulated prior to market liberalization. In contrast, capital in the private sector is initially non-existent, and its accumulation is determined by the households' savings decision.

Consumers. The representative agent in the economy maximizes an infinite horizon intertemporal utility function:

$$V(C(t)) = \int_0^{\infty} u(C(t)) e^{-\rho t} dt, \quad (1)$$

where ρ is the subjective discount rate, $C(t)$ is consumption at time t and $u(C(t))$ is a Constant Relative Risk Aversion (CRRA) function:

$$\begin{aligned} u(C(t)) &= \frac{C(t)^{1-\sigma}}{1-\sigma}, \quad \sigma \geq 0, \text{ for } \sigma \neq 1 \\ &= \log C(t), \text{ for } \sigma = 1, \end{aligned}$$

in which $1/\sigma$ is the intertemporal elasticity of substitution.

Firms and national income. There are \bar{L} economic agents in the economy, who can be unemployed (in which case, they do not produce) or working in a firm. The economy is composed of two types of firms: “state firms,” where a worker has productivity $A(g)$, and “private firms,” where productivity is \bar{A} . Productivity is assumed higher in a private firm than in a state firm, that is: $\bar{A} > A(g)$, $\forall g$, and we set $dA(g)/dg \leq 0$ to capture the large heterogeneity of productivity in the state sector. That is, we index jobs in state firms from most to least productive. Denoting total employment in sector i by L_i , total output is then:

$$\begin{aligned} Y(t) &= Y_G(L_G(t)) + Y_P(t), \\ &\text{with } Y_G(L_G(t)) = \int_0^{L_G(t)} A(g) dg, \end{aligned} \quad (2)$$

where Y_G and $Y_P(= \bar{A}L_P)$ represent value added in the state and private sectors respectively. They depend on employment demand in each sector, which we derive below. Given the productivity $A(g)$ of state firms, the

marginal productivity of employment in the state sector:

$$\begin{aligned} Y'_G(L_G(t)) &= A(L_G(t)) \quad (\geq 0), \text{ with} \\ Y''_G(L_G(t)) &= A'(L_G(t)) \quad (< 0). \end{aligned} \tag{3}$$

Transition thus requires that (a fraction of) the labour force be reallocated from the state to the private sector, and the optimal and equilibrium dynamics of employment will be spelled out later.

Before moving ahead, it is worth noting that the parametrization of $A(g)$ and \bar{A} can be used to proxy initial conditions, as well as the quality of institutional reforms achieved by the country. Favourable initial conditions (production structure) imply that the productivity of state firms, $A(g)$, is already high before transition starts,² and thus that the country benefits from higher output levels from the outset of transition. Similarly, well-managed institutional reforms (*e.g.* well-functioning product markets and good protection of private property) or better access to international markets increase the realized productivity of restructured firms, \bar{A} .

Labour market. Overt and covert rigidities in the labour market are typically a major hindrance to economic adjustment (Caballero and Hammour, 1996), and to transition in particular (Aghion and Blanchard, 1994). Empirical regularities tend to confirm that such rigidities are present in transition countries, as witnessed by the sharp fall in production and employment in the first year(s) of transition. Alongside this fall, real wages generally dropped at the outset of transition (one exception being Hungary), rapidly followed by a progressive catching-up towards their pre-transition levels (Basu *et al.*, 2000; Jurajda and Terrell, 2002). Moreover, the wage gap between the private and the state sector tended to be positive at the outset of transition. However, this gap rapidly became insignificant (see *e.g.* Basu *et al.*, 2000), showing a strong tendency of labour markets to equalize wage payments across sectors.

Accordingly, we assume that wages are identical in the two sectors³ and are determined by three arguments: the level of unemployment $u(t)$, the

²The privatization method and the behaviour of state firms' managers prior to privatization also influence the realized productivity of these firms (see *e.g.* Aghion *et al.*, 1994; Aghion and Blanchard, 1997; or Roland, 2000). Our model however leaves aside such microeconomic determinants to state firms productivity, and takes the latter as given.

³More generally, wages in the state sector might be a convex combination of the private

interest rate $r(t)$, and $\dot{L}_P(t)$, the number of jobs created at time t . Thus: $w(t) = W(u(t), r(t), \dot{L}_P(t))$.

This specification of $W(\cdot)$ is quite flexible and can be accommodated for a wide range of labor market specifications. However, we essentially focus on two cases. Labour market imperfections and rigidities are introduced by assuming an aggregate matching function *à la* Pissarides (1990), Blanchard and Diamond (1992) or AB (1994), in which case wages follow:

$$w(t) = \beta + \gamma \times \left(r(t) + \frac{\dot{L}_P(t)}{u(t)} \right), \quad (4)$$

where β and γ are two non-negative parameters.

The second case we consider is that of perfect labour markets, as studied by CR (2000). In that set-up, wages balance labour supply and demand, and drop to zero if there is excess supply. Clearly, such an assumption lacks realism. In the next section, however, it will allow us to isolate the effects of labour market rigidities on transition and government policy.

Assuming that labour supply is fully inelastic and given by:

$$L^S(t) = \bar{L},$$

perfect labour markets thus amounts to setting:

$$\begin{aligned} w(t) &= A(L_G(t)), & \text{if } A(L_G(t)) \geq 0 \text{ and } u(t) = 0 \\ &= 0, & \text{if } u(t) > 0, \end{aligned} \quad (5)$$

with $u(t) = \bar{L} - L_G(t) - L_P(t)$.

Finally, we introduce the possibility of labour hoarding by assuming that employing all the population in the state sector is counter-productive. That is, some jobs in state firms have negative productivity (for those, operating costs are larger than the value of their output):

$$A(\bar{L}) < 0. \quad (6)$$

sector wage and of unemployment benefits. Such a generalization would however not affect the substance of our results, which only depend on the fact that private sector wages influence the profitability of state firms (see below).

Transition and capital accumulation. Since the workers' productivity is higher in private firms, they should move from the state to the private sector. However, private firms do not exist at the start of transition. They are created by the injection of fresh capital. A simple way to characterize both the size of the private sector and its demand for labor is to assume that private firms have a Leontiev technology, and that a worker can only be productive in the private sector if matched with one unit of capital. In this way, the demand for workers in the private sector is given by the stock of capital in the sector, K :⁴

$$L_P(t) = K(t).$$

Assuming that the economy cannot borrow abroad, and that there is no capital depreciation, capital accumulation is equal to the amount of national savings:

$$\dot{K}(t) = \dot{K}(t) = Y(t) - C(t). \quad (7)$$

Thus, what drive transition in this model is a process of creative destruction: from the labour supply constraint $u(t) \geq 0$, jobs must be destroyed in old (state) firms, to induce them to move to the new (private) sector. On the other hand, labour requirement in the new sector is determined by capital accumulation. Like in Aghion and Howitt (1994), productivity growth is thus driven by the joint process of job destruction in old firms and capital accumulation accompanied by job creation in new firms.

3 Command optimum and laissez-faire

3.1 The command optimum

In the next sections, we analyze the optimal policy of the government during transition. However, it is important to derive first the optimal path of transition (the *command optimum*). To this end, assume that a social planner controls both the level of consumption (and hence of capital accumulation) and the closure speed of state firms.

The central planner's problem is thus to maximize intertemporal utility (??), subject to the capital accumulation constraint (??) and the labor

⁴CR (2000) show that more general production functions can be considered, without affecting the essence of the results.

supply constraint $u(t) \geq 0$. The present value Hamiltonian of the central planner is given by:

$$\mathcal{H}(t) = \left(\frac{C(t)^{1-\sigma}}{1-\sigma} + \lambda(t) [Y(t) - C(t)] + \mu(t) [\bar{L} - L_G(t) - L_P(t)] \right) \cdot e^{-\rho t}, \quad (8)$$

where $L_P(t)$ ($= K(t)$) is the state variable, and $\lambda(t)$ and $\mu(t)$ are the co-state variables associated with the two constraints.

Taking first order conditions (since the programme is globally convex, first order conditions are necessary and sufficient), we find:

$$\frac{\partial \mathcal{H}(t)}{\partial C(t)} \equiv C(t)^{-\sigma} - \lambda(t) = 0 \quad (9)$$

$$\frac{\partial \mathcal{H}(t)}{\partial L_G(t)} \equiv \lambda(t) A(L_G(t)) - \mu(t) = 0, \quad (10)$$

$$\frac{\partial \mathcal{H}(t)}{\partial L_P(t)} \equiv \lambda(t) \bar{A} - \mu(t) = -\dot{\lambda}(t) + \rho \lambda(t) \quad (11)$$

and the transversality condition is simply:

$$\lim_{t \rightarrow \infty} \lambda(t) \cdot L_P(t) \cdot e^{-\rho t} = 0. \quad (12)$$

Using these conditions, and denoting with a superscript ‘*’ the optimal level of the variable, we find:

Lemma 1 (CR (2000), Proposition 1) *Welfare is maximized when non-productive jobs in the state sector (i.e. with $A(g) < 0$) are discontinued from the outset of transition ($A(L_G^*(0)) = 0$), whereas productive jobs are only discontinued when the private sector faces a short supply of labor ($L_G^*(t) = \min[\bar{L} - L_P^*(t), A^{-1}(0)]$, $\forall t$). Moreover, the optimal path of consumption is determined by:*

$$\frac{\dot{C}^*(t)}{C^*(t)} = \frac{\bar{A} - A(L_G^*(t)) - \rho}{\sigma}.$$

Immediate from (??)-(??).

This Lemma provides a useful benchmark with which we can compare the outcomes that may arise under different market conditions and government policies. This benchmark is identical to the optimal path of transition in CR (2000), which can be implemented with a simple policy of laissez-faire in their framework. A limitation of CR (2000), however, is that they only

consider the case of perfect labour markets (??), which, as we show below, lies at the heart of their result. For more general market conditions instead, the best policy the government can implement will turn out to be quite different.

Now, let us describe how the economy behaves when the government adopts a laissez-faire stance.

3.2 Transition under laissez-faire

In contrast to the command optimum, laissez-faire implies that market forces alone determine consumption, as well as the pace of job destruction in the state sector. For the sake of tractability, we assume that economic agents are price-takers. Given the level of wages, the profit of a state firm g (including capital return) is given by:

$$\pi(g, t) = A(g) - w(t).$$

Clearly, laissez-faire implies that state firm g makes negative profits as soon as the wage level exceeds its productivity. Therefore, the firm stops producing if $w(t) > A(g)$, in which case it pays zero wages, and makes zero profits. The equilibrium level of employment in the state sector at time t (a superscript ‘ LF ’ denotes the equilibrium value of the variable under laissez-faire) is thus:

$$L_G^{LF}(t) = A^{-1}(w(t)), \tag{13}$$

and the equilibrium level of output becomes:

$$Y^{LF}(t) = Y_G(L_G^{LF}(t)) + \bar{A} L_P(t). \tag{14}$$

The effect of labour market rigidities on employment (??) and output (??) is thus similar to that in Caballero and Hammour (1996): wage rigidities (or appropriability problems in their model) generates excessive job destruction at the outset of transition, which de-synchronizes job destruction in the old (state) sector from job creation in the new (private) sector. An important difference between the two approaches, however, is that they assume *perfect* international mobility of capital. Accordingly, their model assumes that job creation and investment are totally independent of output. Excessive job destruction thus cannot slow down transition. Only labour market

rigidities, by creating a wedge between the private and the social returns to investment, may induce slower-than-optimal transition. By contrast, our model considers imperfect international mobility of capital. We assume that capital finance must originate from national savings. Since the latter also depends on national income, excessive job destruction may adversely affect the speed of transition.

To separate the two effects, it proves useful to decompose national income by factor remunerations:

$$Y^{LF}(t) = \underbrace{w(t) (L_P(t) + L_G(t))}_{\text{Labour income}} + \underbrace{r(t) K(t) + \int_0^{L_G^{LF}(t)} (A(g) - w(t)) dg}_{\text{Capital income (private \& state sector)}}. \quad (15)$$

Under *laissez-faire*, labour market rigidities thus have a direct effect, identical to the one considered by AB (1994) and Caballero and Hammour (1996). Namely, wage rigidities decrease the private return to capital, which generates an adverse *substitution* effect on capital accumulation. A second, indirect, effect is that job destruction in the state sector decreases labour and capital income. This gives rise to an *income* effect that depresses national savings. To evaluate the impact of the substitution and income effects on the speed of transition, consider the optimization problem faced by the representative agent in the economy. Letting λ_P denote the multiplier of the capital accumulation constraint, and \mathcal{H}_P the “private sector Hamiltonian”, it yields:

$$\max_{C(t)} \mathcal{H}_P(t) = \left(\frac{C(t)^{1-\sigma}}{1-\sigma} + \lambda_P(t) \cdot [Y^{LF}(t) - C(t)] \right) \cdot e^{-\rho t}. \quad (16)$$

The only difference between the objective of the social planner (??) and that of a private agent (??) is thus the way in which the return to investment is captured, which will influence the value of λ_P (see Section ??). While a social planner internalizes the job creation effects of additional capital in the private sector, a private investor quite naturally uses the interest rate as a measure of the return to capital. Taking first order conditions and simplifying, it is immediate to see that the equilibrium path of consumption under *laissez-faire* is different from the optimal one:

$$\frac{\dot{C}^{LF}(t)}{C^{LF}(t)} = \frac{r(t) - \rho}{\sigma}. \quad (17)$$

Using (??) and Lemma ??, it only remains to derive $r(t)$ to compare the laissez-faire and the “optimal path of transition” outcomes. Since the productivity of a private firm is equal to \bar{A} , the interest rate is simply:

$$r(t) = \bar{A} - w(t), \quad (18)$$

which means that laissez-faire is only optimal if wages are perfectly flexible:

Lemma 2 *Unless wages are perfectly flexible and follow (??), laissez-faire initially generates excessive job destruction, an excessive output fall, and suboptimally slows down transition (depressed job creation).*

By (??), for any wage level $w(0) > 0$, we have $L_G^{LF}(0) < L_G^*(0)$ and $Y^{LF}(0) < Y^*(0)$. Next, a necessary condition for transition to be faster under laissez-faire would be that consumption grows faster in that case than under the command optimum ($C^{LF}(0)$ must be smaller than $C^*(0)$ for accumulation to be faster, and there must exist some point in time, T , at which $C^{LF}(T) = C^*(T)$). However, this contradicts the motion equations $\dot{C}^*(t)/C^*(t)$ in Lemma ?? and $\dot{C}^{LF}(t)/C^{LF}(t)$ with $w(t) > w^*(t)$ in (??) and (??).

Following the above discussion on the effects of labour market rigidities on output, the results of this lemma are not entirely surprising. They show that, unless wages are perfectly flexible (*i.e.*, unless factors of production are remunerated at their marginal productivity), laissez-faire induces a double inefficiency on the equilibrium path of transition.⁵ First, it causes suboptimally high job destruction early in transition, which reduces output,⁶ and thus savings and the speed of transition. Second, higher wages reduce the incentives to accumulate capital, for any given level of output.

Like in Caballero and Hammour (1996), Lemma ?? shows that labour market inefficiencies generate sluggish job creation in the private sector.

⁵Boeri (2000) and Friebel and Guriev (2000) underline other efficiency costs entailed by excessive wage flexibility. Namely, enterprises that do not pay any wages have weaker incentives to restructure or shed unproductive labour. Similarly, workers without any wealth or social protection cannot quit their job: they become “attached” to their firm. These inefficiency costs are not captured by our representative agent set-up.

⁶Note that the reshuffling of economic partnerships induced by transition has *additional* negative consequences on output (Blanchard and Kremer (1997), Roland and Verdier (1999)). The output fall captured by Lemma ?? comes on top of these effects.

The rationale behind the two sets of results is however quite different. In their setup, national income does not influence capital accumulation in the private sector, which implies that slower job destruction can only hinder wage compression, and thus further slow down transition. By contrast, our results show that *excessive* job destruction has contractionary effects, and hence does have a negative consequence on job creation. Slowing down job destruction can thus positively influence job creation and accelerate transition. This shows that state intervention will have to correct two inefficiencies: maintain higher income levels, and restore investment incentives.

4 Optimal state intervention in transition

We are now in a position to analyse how the government should design its policy to bring the path of transition closer to the command optimum. The problem of the government is that, in contrast with the social planner, the government does not directly control savings. Only private agents do. To solve the problem of the government, we thus work by recursion: first, we derive the equilibrium path of consumption given total employment and wages, using (??) above. Then, like in a Stackelberg game, we derive the optimal policy of the government, taking into account the subsequent influence of its actions on capital accumulation.

The tools and constraints faced by the government are as follows. First, to delay or prevent job destruction in the state sector, the government must subsidize some state firms. Second, it must levy taxes to finance spending, and we constrain the budget to be balanced at each point in time.

The effect of a subsidy is to loosen the budget constraint of state firms: without subsidization, any firm with a productivity lower than w will fire its worker(s). To prevent these dismissals, the government must pay the firm a subsidy equal to the difference between the wage level and the productivity of the worker: $s(g, w) = w - A(g)$. Note that subsidies need not make budget constraints “soft”: since the government makes its decision before the market, consumers and firms take the actions of the government as given (We discuss the differences between this “pre-committed” path of subsidies and soft-budget constraints below).

Dropping time indices for clarity, total employment in the state sector

thus depends on the wage level and on the maximum amount of subsidies the government is willing to transfer to a firm, \bar{s} :

$$L_G(w, \bar{s}) = A^{-1}(w - \bar{s}). \quad (19)$$

The total amount of subsidies spent, $S_G(w, \bar{s})$, is thus:

$$S_G(w, \bar{s}) = \int_{A^{-1}(w)}^{A^{-1}(w-\bar{s})} s(g, w) dg.$$

Finally, the total budget of the government is the sum of subsidies and unemployment benefits. To isolate the effects of the subsidy on the income effect highlighted above, let us assume for the time being that the government can levy a non-distortionary lump-sum tax T —other tax instruments are studied below—, such that its budget constraint becomes:

$$T = S_G(\cdot) + b(\bar{L} - L_G(\cdot) - L_P), \quad (20)$$

where $b(> 0)$ represents unemployment benefits and $L_G(\cdot)$ follows from (??).

Now, we turn to the optimal policy of the government. To maximize welfare, the government must:

$$\max_{L_G} \mathcal{H}_G = \left(\frac{C^{1-\sigma}}{1-\sigma} + \lambda [Y - C] + \mu [\bar{L} - L_G - L_P] \right) \cdot e^{-\rho t},$$

subject to (??), (??), and the consumption decision of the representative agent. From (??), we know that $\partial Y / \partial L_G = A(L_G)$ and, by the complementary slackness condition, that $\mu = 0$ if $\bar{L} - L_G - L_P > 0$. Taking the first order condition of this problem with respect to L_G yields:

$$\frac{\partial \mathcal{H}_G}{\partial L_G} \equiv \lambda A(L_G) + [C^{-\sigma} - \lambda] \frac{dC}{dL_G} - \mu = 0, \quad (21)$$

where consumption is determined by the representative agent who solves (??), which implies that $C^{-\sigma} = \lambda_P$. Subject to this constraint, the government thus maximizes welfare by setting employment to (a superscript ‘**’ denotes the constrained-optimal level of a variable):

$$A(L_G^{**}) = \left[1 - \frac{\lambda_P}{\lambda} \right] \frac{dC}{dL_G} + \frac{\mu}{\lambda}. \quad (22)$$

Of particular interest in (??) is the term λ_P / λ , which is the ratio between the private and the social co-state variables associated to the capital

accumulation constraint. Principles of dynamic optimization teach us that such co-state variables represent the marginal valuation (the shadow value) of the associated constraint (see e.g. Chiang (1992, chp.8) or Kamien and Schwartz (2000, p.136)). Namely:

- i) λ_P represents the shadow value of capital perceived by a *private* investor,
- ii) λ represents the *social* shadow value of capital.

Thus, λ_P/λ is only equal to 1 if wages are perfectly flexible, in which case the interest rate is equal to the social return to investment. By (??), the government should then implement efficient closure from the start of transition (the first term in (??) is equal to 0, and state sector employment is only determined by μ and λ , the social shadow values of labour and of capital). As Lemma ?? above shows, this simply requires a policy of laissez-faire. If instead wages are not fully flexible, the interest rate falls below the social return to capital, which entails $\lambda_P/\lambda < 1$. In turn, this induces a policy response of either faster or slower closure than under the first best. To understand this result, we can decompose the ratio dC/dL_G into an income (the first term in (??) below) and a substitution effect (the second term):

$$\frac{dC}{dL_G} = \frac{\partial C}{\partial Y} A(L_G) + \frac{\partial C}{\partial w} \frac{\partial w}{\partial L_G}. \quad (23)$$

As (??) shows, if $\partial w/\partial L_G$ is positive everywhere (which only happens in the presence of labour market imperfections), then dC/dL_G is strictly positive in $A(L_G^{**}) = 0$. From (??), this implies that the government ought to let more jobs be destroyed than under the first best path of transition, to maintain lower wages and stimulate investment. Yet, the income effects of job destruction highlighted above have a countervailing effect on the constrained-optimal path of job destruction: the more extensive is job destruction, the larger is the output fall, and this “output fall effect” calls for additional subsidies. To repeat, for $A(L_G)$ sufficiently positive, employment in the state sector stimulates capital accumulation in the private sector, in contrast with the results of Caballero and Hammour (1996). For this reason, slow job destruction may well prove efficient. To illustrate this latter intuition, consider first the case of sticky wages.

4.1 Sticky wages and lump-sum taxes

Wages are said to be “sticky” when they display downward rigidity and upward flexibility. Sticky wages are worth considering both for their analytical tractability and their empirical relevance. For instance, Grosfeld and Nivet (1999) show that they are empirically relevant in Poland, where wages increase when productivity rises but remain unaffected by productivity decreases. In our framework, sticky wages are also analytically tractable because they imply that wages reach their bottom level as soon as there is positive unemployment. We introduce sticky wages by setting $\beta (> b)$ larger than zero, and γ arbitrarily close to zero in (??). Then, (??) becomes:

$$A(L_G^{**}) = \left[1 - \frac{\lambda_P}{\lambda}\right] c(r) A(L_G^{**}), \forall u > 0, \quad (24)$$

where $c(r) \equiv \partial C / \partial Y$ is the marginal propensity to consume –which, from the properties of CRRA utility functions, is independent of the income level. This leads us to formulate our first proposition:

Proposition 1 *If wages are sticky (i.e. if $\gamma \rightarrow 0$ and $\beta > 0$ in (??)), and if the government finances its policy with lump-sum taxes, the (second-best) policy of the government can be divided into three subsequent phases:*

- i) *For $L_P(t) < L - A^{-1}(0)$, $\bar{s}^{**} = \beta$, so that all state firms with non-negative productivity keep producing. Unemployment is positive and decreasing;*
- ii) *For $L_P(t) \in [L - A^{-1}(0), L - A^{-1}(\beta)]$, $\bar{s}^{**} = \beta - A(L - L_P(t)) - \varepsilon$, with $\varepsilon \geq 0$, and there is only frictional unemployment;*
- iii) *For $L_P(t) \geq L - A^{-1}(\beta)$, $\bar{s}^{**} = 0$ (no intervention), and there is only frictional unemployment.*

Under this policy, both job destruction in the state sector and the speed of transition are strictly faster (and welfare strictly larger) than under laissez-faire, but slower than under the optimal path of transition.

By backward induction, during the *third* phase, the least productive state worker has a productivity larger than $\bar{w} = \beta$. Downward wage rigidity is thus not binding ($\lambda_P / \lambda = 1$) and, by Lemma ??, a laissez-faire approach ($\bar{s}^{**} = 0$) is thus optimal.

During the *second* phase, the least productive state worker has strictly positive productivity ($A(L_G(t)) > 0$), but setting $\bar{s}(t) = 0$ would generate

unemployment, since

$$L_P(t) \leq L - A^{-1}(\beta).$$

Yet, (??) only admits $A(L_G^{**}) = 0$ as a solution when $\lambda_P/\lambda < 1$ and $u(t) > 0$. By contradiction, positive unemployment is thus suboptimal, which implies that subsidies must bring unemployment arbitrarily close to zero. However, the interest rate $r(t) = 1 - w(t)$ is still below the social return to capital, $1 - A(L_G(t))$. Therefore, subsidies must maintain wages at their minimal level, to maximize the savings rate.

During the *first* phase, the private sector is too small to absorb all unproductive workers. Thus, government policy is determined by (??), which again only admits $A(L_G^{**}) = 0$ as a solution.

Since the private return to capital remains below its social return under this policy, Lemma ?? implies that transition is slower than optimal. Yet, under the policy \bar{s}^{**} , output is higher than under laissez-faire, whereas the private return to capital remains identical. Thus, transition is faster (and welfare larger) than under laissez-faire.

In the presence of sticky wages and when lump-sum taxes are used, the primary objective of the government should thus be to maximize output at each point in time and, as a secondary objective, maintain wages as close as possible to their socially optimal level. As Proposition ?? shows, this requires subsidies to be highest at the beginning of transition.⁷ Later, as the number of restructured firms increases, subsidies should decrease progressively, and only frictional unemployment is needed. Finally, no intervention is required towards the end of transition. This implies that net job destruction should only be positive at the beginning of transition. Once unproductive jobs have been discontinued, additional closures should only be observed in parallel with job creation in the private sector.

An implication of Proposition ?? is thus that countries in which reforms in the goods market have been unsuccessful (that is, if productivity remains low in the private sector) are also required to maintain subsidies for a longer period of time, since accumulation will also be slower: there are complementarities between market liberalization policies and the rapid phasing out of subsidies. Governments cannot substitute one (lowering subsidies) for the

⁷Moreover, since Ricardian equivalence must hold when lump-sum taxes are used, results are identical if the government uses debt instead of taxes.

other (pursuing market-oriented reforms).

Importantly, efficient intervention by the government also requires *intertemporal commitment*. We indeed assumed that, in a game-theoretic interpretation, the government moves “before” enterprises and investors. This implies that, from the onset of transition, firms know they will cease to be subsidized at some pre-determined point in time, which maintains their incentives to restructure.⁸ Put differently, subsidies do not create soft-budget constraints (Kornai 1980) when the government commits to a given path of declining subsidization. By contrast, in the absence of commitment, the government may be induced to constantly refinance loss-making firms (Dewatripont and Maskin 1995), which would inefficiently increase wages and weaken the incentives to restructure (see also Schaffer (1998) and Roland (2000, chp.9)).⁹ To increase total welfare, a combination of *controlled* intervention (one must avoid excessive subsidization in the first phase, when unemployment is required) and *intertemporal commitment* to decreasing subsidies is thus required.

Given the complementarities between market-oriented reforms and subsidization highlighted above, uncertainty on the outcome of reforms is thus likely to hamper the commitment ability of the government. If the government is perceived to await the reaction of the market before pursuing reforms and lowering subsidies, private agents will adopt a wait-and-see stance, and under-invest. In turn, low investments maintain the need for higher subsidies, which lowers investment. In this way, the lack of initial reform momentum generates a vicious circle of slow transition, too high subsidies, low investment, and possibly the abandonment of further liberalization reforms.

The contrasted evolutions of successful (most Central and Eastern European countries and the Baltic states) and less successful reformers (most countries of the CIS, Bulgaria and Romania) is quite consistent with this distinction between committed and limited-intervention policies on the one hand, and the absence of either commitment or controlled subsidization one

⁸CR (2000) also find that the credible announcement of future closures accelerates transition.

⁹Moreover, if subsidies are expected to increase at some future point in time, some state firms will expect to recover positive profitability in the future, and thus delay closure. There is a positive option value of waiting (Dixit and Pindyck, 1994), which generates excessive employment in the state sector.

on the other hand. Given the proximity of the European Union market, Central European countries exogenously benefitted from higher productivity in the private sector, which eased the implementation of liberalization reforms and allowed governments to commit to a *progressive* phasing out of subsidies in the state sector. Instead, the uncertainty due to a larger “distance from Brussels” may have hampered commitment in countries like Bulgaria or Ukraine.

For instance, Coricelli (2001) highlights that most central European countries only gradually reduced the public supply of credit, taking account of the initial absence of private financial institutions. Only later, when private credit developed in the wake of financial liberalization, did the state reduce public subsidies. This often took the shape of a relatively large accumulation of tax arrears (implicit tax exemptions) in the first years of transition, followed by their subsequent tightening. Interestingly, successful reformer managed to concentrate this flow of arrears on largely loss-making enterprises, as the model suggests,¹⁰ and evidence also supports the idea that these arrears did not generate ‘soft’ budget constraints (the interpretation of Schaffer however differs on this point): first, the flow of tax arrears was drying up rapidly. Second, firms’ employment rapidly became increasingly responsive to output in these countries, unlike in Russia (Basu *et al.* 2000, Boeri 2000). Third, countries implementing this policy of gradual subsidies reduction managed to maintain inter-enterprise and bank arrears at low levels (Schaffer 1998). By contrast, in less successful countries like Romania and Russia, the flow of tax arrears picked up again as the economic situation worsened, indicating either a lack of commitment by the state or a lack of controlled policy. Besides, inter-enterprise and wage arrears increased substantially. Explicit and implicit subsidies are displayed in Table 1:

Table 1: Budgetary subsidies and tax arrears in percentage of GDP.[†]

¹⁰The 10-15% of most unprofitable firms account for 62% and 74% of all arrears in Hungary and Poland respectively (Schaffer, 1998).

Country	1989	1991	1992	1993	1994	1995	1996
Czech Republic							
Budgetary subsidies	25 [‡]	7.7	5.0	..	3.1	2.7	2.2
Tax arrears (flow)				1-2	..	..	..
Hungary							
Budgetary subsidies	12	7.4	5.5	4.3	4.5	3.8	3.9
Tax arrears (flow)				1.2	0.7	..	..
Poland							
Budgetary subsidies	10.6	5.1	3.3	3.9	3.3	2.9	2.5
Tax arrears (flow)				1-2	0-1	..	..
Romania							
Budgetary subsidies	5.7	8.1	12.9	5.5	3.8	4.1	4.3
Tax arrears (flow)				1.5	3.1	..	..
Russia							
Budgetary subsidies			14.2	7.3	..	..	6.2
Tax arrears (flow)				..	2.1	1.4	7.3

[†]Data from Schaffer (1998), Gao and Schaffer (1998), Guriev and Ickes (2001)

[‡]Former Czechoslovakia

Coricelli (2001) further shows that financial liberalization was pursued quite differently in most CIS countries, where the state immediately liberalized financial markets but the lack of comprehensive reforms and of fiscal discipline by the government implied an rapid dry-up of financial resources for existing enterprises, thereby slowing down accumulation. Furthermore, tax arrears were much less targeted towards the most unprofitable firms – they only account for 44% of tax arrears in Russia (Schaffer 1998). As a consequence, barter trade and inter-enterprise arrears increased significantly, and firms became very little responsive to market incentives, since neither market prices nor wages could influence their decisions anymore (Basu *et al.* 2000, Gaddy and Ickes 2002). This indicates that, in the absence of comprehensive reforms, the excessive tightening of subsidies early in transition eventually made the budget constraints of state firms much softer in these countries.¹¹

¹¹Other implicit subsidies were used in CIS countries: first, the implementation of efficient bankruptcy laws was delayed. Even though this effectively maintains higher employment levels in the old sector, it also generates perverted incentives, and thus hinders restructuring. Second, oil prices are maintained below cost (i.e. below export prices) in Russia. However, this does not target subsidies towards largely loss-making firms, generates distorted signals as to which enterprises should restructure, and undermines

Summing up, we interpret the presence of subsidies and tax arrears differently from Schaffer (1998). In his view, tax arrears systematically soften the budget constraint of loss-making firms, and thus reduces their incentives to restructure. Instead, Proposition ?? makes clear that subsidies are quite purposeful, provided that the government commits to reducing them subsequently. Moreover, the evidence provided by Coricelli (2001) highlights that this policy of (explicit or implicit) subsidization of loss-making firms was going in parallel with a progressive and controlled liberalization of financial markets. Tax arrears, in this case, might have mainly been a substitute for the missing supply of private capital; a temporary aid to delay the closure of loss-making firms, which in light of Proposition ?? is necessary to limit the amplitude of the output fall.

4.2 Tax instruments

Proposition ?? assumes that the government uses lump-sum taxes. However, such taxes are generally unavailable in practice. In this section, we analyze two alternate –and more realistic– means of financing this policy, and show that lump-sum taxes are actually not even socially desirable: first, we analyze the classical case of direct taxes, which are shown to slow transition even more than lump-sum taxes. Then, we show that the government would be able implement the first-best path of transition if it could finance its policy with the help of indirect taxes. We still assume sticky wages in this section, and relax this assumption in the next section.

Direct taxes. Typically, the tax base of the government is the sum of all revenues perceived by the different agents of the economy. In our representative-agent setting, these revenues are the sum of output and transfers. Thus, if the government imposes a flat tax rate τ on all sources of

the credibility of the government, since it is politically difficult to subsequently increase energy prices. By contrast, exempting only a *small* fraction of state firms from paying their taxes generates political commitment: a majority of the population would vote in favour of also requesting the minority to pay more taxes.

revenues, its total tax receipt T is:¹²

$$T = \tau \times [Y + b (\bar{L} - L_G(\cdot) - L_P) + S_G(\cdot)]$$

where: $Y = L_P + Y_G(L_G(\cdot))$ and $L_G(\cdot) = A^{-1}(w - \bar{s})$.

Then, the balanced-budget constraint imposes that:

$$\tau = \frac{S_G(\cdot) + b (\bar{L} - L_G(\cdot) - L_P)}{Y + S_G(\cdot) + b (\bar{L} - L_G(\cdot) - L_P)},$$

and a side-effect of also taxing capital income is that consumers only take *after-tax* returns to capital, r_n , into account. It is immediate to check that the consumption path then becomes:

$$\frac{\dot{C}}{C} = \frac{r_n - \rho}{\sigma}, \text{ where } r_n = (1 - \tau)r.$$

Finally, in the presence of these taxes, (??) becomes:

$$A(L_G^{**}) = \left[1 - \frac{\lambda_P}{\lambda}\right] (c(r_n) A(L_G^{**}) - c'(r_n) \frac{\partial \tau}{\partial L_G} r), \forall u > 0.$$

It follows that:

Proposition 2 *If wages are sticky (i.e. if $\gamma \rightarrow 0$ and $\beta > 0$ in (??)), and if the government finances its policy with direct taxes, the (third-best) policy of the government induces yet slower transition, and higher unemployment in the first phase of transition, than if lump-sum taxes are used.*

Since the after-tax return to investment is lower under a direct tax scheme than under the lump-sum tax scheme, the savings rate and the speed of transition are also lower, by Lemma ???. Next, $\partial \tau / \partial L_G > 0$ for $\bar{s} = \beta$, $\forall \beta > b > 0$. Thus, $A(L_G^{**}) > 0$ in the first phase of transition, which implies that unemployment must remain suboptimally large in this phase.

Proposition ??? restates the known result that direct taxes slow growth, which, in the framework of our model, translates into slower transition. Note however that this result only holds in comparison to a lump-sum tax scheme. This third-best path of transition may still be faster than a pure

¹²Results remain unaffected if transfers are not taxed. By contrast, the results in proposition 2 do depend on the assumption that the government maintains a balanced budget (see also Chadha and Coricelli, 1997).

laissez-faire policy, since subsidies to unstructured state firms still have a positive income effect. Actually, a corollary of Proposition ?? is that positive subsidies are also needed to maximize the speed of transition, even if the government could maintain unemployment benefits arbitrarily close to zero. However, subsidies would be lower in this case than under the results of Proposition ??, since the speed of transition is maximized when taxes are maintained closer to their minimum level.¹³ This result is in turn reminiscent of AB (1994).

Indirect taxes. The results so far show that, with the above tax instruments, subsidies to state firms are unable to restore the first-best. Additional subsidies to investment would be needed to restore investment incentives. However, this would further weigh on the government budget, and increase taxes. Here, we show that taxing consumption might compensate for the costs of this additional investment subsidy, at least in this representative agent setup. Clearly, in the presence of income inequalities, or when consumers can evade such a tax by purchasing goods abroad, high indirect taxes might not be suitable. Yet, analyzing the relative merit of such a tax sheds additional light on how the government can restore investment incentives at smaller budgetary costs.

If the government implements a consumption tax, the tax base is by definition equal to total consumption. Imposing a (flat) indirect tax ι on consumption, the government budget is balanced when:

$$\iota = \frac{S_G(\cdot) + b(\bar{L} - L_G(\cdot) - L_P) + B}{C}, \quad (25)$$

where B represents some lump-sum social benefit distributed to the population. Taking account of this indirect tax in the representative agent's

¹³Jurajda and Terrell (2002) provide extremely interesting evidence on job reallocation in the Czech republic and in Estonia. Among other results, they show that the reallocation process in the Czech republic has been one of synchronized job creation and destruction. In this way, unemployment remained extremely low. In contrast, Estonia experienced a process of unsynchronized job creation and destruction (see Figure 6 in their paper), at the cost of higher unemployment. However, by implementing radical reforms and avoiding excessively high unemployment, Estonia also managed to maintain lower taxes and higher job creation rates than in the Czech republic.

decision problem, it is easy to verify that the consumption path follows:

$$\frac{\dot{C}}{C} = \frac{r - \rho - \frac{d\iota/dt}{\iota} \frac{\iota}{1 + \iota}}{\sigma},$$

and thus that a falling rate of taxation ($d\iota/dt < 0$) induces faster-growing consumption (*i.e.* higher savings rates). Hence:

Proposition 3 *In the representative agent set-up, there exists a policy $\{S_G, B, \iota\}$ that allows the government to reproduce the command optimum (first best).*

The government can set subsidies to state firms S_G to restore the optimal speed of closure, $L_G^*(t)$, and separately set $B(t)$ so as to obtain $r - (d\iota/dt)/(1 + \iota) = \bar{A} - A(L_G^*)$, in which case the path of consumption $C(t)$ must be identical to $C^*(t)$. Since the paths of output, consumption, and savings are the same as under the command optimum, the whole path of transition is also optimal.

Thus, in this representative agent framework and when wages are sticky, indirect taxes should be preferred to lump-sum taxes, which are themselves more efficient than direct taxes. The rationale for this result draws from the combination of the adverse income and substitution effects emphasized above. That is, subsidies to state firms correct the income effect, and a falling rate of indirect taxation generates a substitution effect identical to the one created by an investment subsidy.

In practice, implementing an indirect tax rate that is initially high¹⁴ and continuously falling over time may be somewhat unrealistic. Yet, what this result suggests is that governments may benefit from accompanying investment incentives with *initially* high indirect taxes (*e.g.* on luxury goods), precisely to limit the size of its budget. To the best of our knowledge, these complementarities between indirect taxes and investment incentives have never been analyzed in that context.

¹⁴With a consumption level that accounts for 45 to 60% of GDP, and a government budget between 20 and 40% of GDP, the tax rate implied by (??) may well take values higher than 50% at the beginning of transition.

5 General wage formation scheme and political constraints

The above results only hold for sticky wages, that is when wages remain equal to β for any positive unemployment level. If instead wages are sensitive to unemployment *-i.e.* if γ is sufficiently large in (??)-, any reduction in unemployment generates some increase in wages, and thus some decrease in savings. This increased sensitivity of consumption and savings implies that the optimal level of unemployment must be higher than in the case of sticky wages. When this happens, unemployment is necessary throughout the whole path of transition, for the same reasons as in AB (1994). Using (??) and reverting to lump-sum taxes for the sake of tractability, we indeed find:

$$\begin{aligned} A(L_G^{**}) &= \left[1 - \frac{\lambda_P}{\lambda}\right] \left[c(r) A(L_G^{**}) + c'(r) \frac{\partial w}{\partial u} \right], \forall u > 0 \quad (26) \\ &= \frac{\left[1 - \frac{\lambda_P}{\lambda}\right] c'(r) \frac{\partial w}{\partial u}}{1 - \left[1 - \frac{\lambda_P}{\lambda}\right] c(r)} (> 0). \end{aligned}$$

How are our previous results affected when general wage formation scheme are considered? In the first phase of transition, the constrained-optimal level of unemployment can already be quite large with sticky wages (see Propositions ??-??). Intuitively, the sensitivity of wages with respect to unemployment is then likely to remain small, and the constrained-optimal policy that results from (??) should then be close to the one derived in Proposition ??. Data confirm this intuition: in the first years of transition, *i)* the vacancy-to-unemployment ratio was quite small (0.01 in Poland and Romania, 0.04 in Slovakia, 0.06 in Hungary and 0.11 in Slovenia),¹⁵ *ii)* real wages remained basically constant or were falling (Basu *et al.* 2000, Boeri 2000), and *iii)* wages were very inelastic with respect to unemployment (Grosfeld and Nivet 1998, Basu *et al.* 2000). Later in transition, however, the sensitivity of wages with respect to unemployment is likely to increase, which then implies a more rapid reduction of subsidies than advocated in Proposition ??. Thus, the general result which states that subsidies must be highest in the first years, and only decrease progressively remains valid.

¹⁵Data from OECD (1995).

Importantly, additional measures can also be designed to limit upward wage flexibility: Poland for instance introduced the *Popiwek* in 1990, which imposed an increasing rate of taxation when wages were growing faster than the national norm. As de Crombrugge and de Walque (1997) argue, beyond its macroeconomic objectives, such a policy also aimed at avoiding decapitalisation, *i.e.* maintain the capital of state firms in operation for a longer period, which goes along the results of Proposition ???. However, in addition to this effect, the *Popiwek* also reduces wage sensitivity and limits the financial costs of subsidization, which in our framework makes it easier to bring the path of transition closer to the command optimum.

Also of interest are the political economy constraints implied by (??). This first order condition holds in case the representative agent (*i.e.* the *average* consumer in the economy) is considered. However, transition is known to have generated an increasing level of inequality in these countries, which has even become a major social and economic problem (see *e.g.* Klugman *et al.* 2002). When income inequality increases, the wedge between the average and median levels of income typically increases. In our model, we can directly introduce income inequalities by letting the equilibrium level of consumption differ across agents. From (??), we know that the optimizing behaviour of economic agents implies that $C^{-\sigma} = \lambda_P$ in the representative agent case. By extension, any agent j will set his or her consumption level such that:

$$C_j^{-\sigma} = \lambda_j,$$

and the lower is j 's income, the lower will be his or her consumption level C_j and the higher will be his or her marginal utility λ_j . Then, to derive the policy that maximizes the welfare of this agent, it is enough to substitute for this constraint into (??), which yields:

$$A(L_G^{**}(j)) = \frac{\left[1 - \frac{\lambda_j}{\lambda}\right] c'(r) \frac{\partial w}{\partial u}}{1 - \left[1 - \frac{\lambda_j}{\lambda}\right] c(r)}, \quad \forall u > 0. \quad (27)$$

In turn, this implies that:

Proposition 4 *For $\gamma > 0$, the discrepancy between the level of subsidies desired by the median and the average agent in the economy is increasing in inequality and decreasing in the unemployment rate.*

Let j represent the median-income agent. Using (??) and (??), we have:

$$A(L_G^{**}) - A(L_G^{**}(j)) = \frac{\lambda(\lambda_j - \lambda_P)}{(\lambda + c(r)(\lambda_j - \lambda))(\lambda + c(r)(\lambda_P - \lambda))} c'(r) \frac{\partial w}{\partial u}.$$

Thus, $A(L_G^{**}) - A(L_G^{**}(j))$ increases in $\lambda_j - \lambda_P = C_j^{-\sigma} - C^{-\sigma}$ and in $|\partial w / \partial u|$. In turn, $\lambda_j - \lambda_P$ is increasing in inequality since, by the properties of CRRA utility functions, a lower income for j compared to the national average implies a reduction in C_j/C . Finally, by (??), low unemployment levels increase $|\partial w / \partial u|$.

This proposition implies that popular pressure for excessive subsidization will mount as inequality increases. That is, absent an efficient social safety net, voters demand protection by means of a larger state sector. According to our results, however, this only has substantial policy implications if unemployment is also low. As discussed above, in most central European countries, unemployment was sufficiently large at the beginning of transition to lessen the elasticity of wages with respect to unemployment. In this case, the policy preferred both by the median and the average agent is to set $\bar{s} \simeq \beta$. If instead wage sensitivity and inequality are large ($\lambda_j > \lambda$), the efficient policy would still be to set $\bar{s} < \beta$ (*i.e.* $A(L_G^{**}) > 0$), but the median-income agent may prefer to increase \bar{s} beyond β (*i.e.* $A(L_G^{**}) < 0$). The benefit to the median income agent is that employment and wages increase early in transition, which increases his/her income. However, this policy comes at the expense of yet a smaller rate of accumulation, and thus slower transition.

As a rule, voters are not the only ones who influence policy. In particular, newly set-up industrialists would be quite willing to lobby in favour of a laissez-faire policy, since the latter decreases wages and thus increases their profits. Moreover, since laissez-faire depresses investment, it also decreases future competition for labour. In this way, lobbying for under-subsidization of state firms may buy off larger profit margins for long periods of time, as well as lower taxes. Extending the model in that direction would be quite interesting, but is beyond the scope of this paper. In a partially related context, however, Grossman and Helpman (1999) or Acemoglu *et al.* (2002) demonstrate that such political economy traps are actually likely to arise.

The relative welfare costs of laissez-faire and excessive subsidization of course depend on the parameters of the model. Yet, our results highlight

that, when political pressures or weak institutions prevent the government from implementing adequate reforms and/or committing to a policy of moderate and decreasing subsidization, two types of suboptimal policies can arise. On the one hand, the government may be induced to pursue with transition. In this case, it might be easiest to commit not to subsidize at all (*laissez-faire*), which reinforces the initial output fall and slows transition because of the negative income effect. This policy pattern seems to have been “chosen” by some CIS countries, and to a lesser extent by some Baltic states.

On the other hand, subsidies might be turned into a soft budget constraint, and the government then be tempted to revert to the paternalistic policy underlined by Kornai. As the cases of Belarus and Uzbekistan suggest, this policy can actually limit the output fall, both by maintaining higher income levels early in transition and by preventing the “disorganization” effects underlined by Blanchard and Kremer (1997) and Roland and Verdier (1999). However, even though such a policy may please the median-income agent in the economy, it also prevents economic “reorganization,” *i.e.* the restructuring of existing firms or the creation of new ones. This result thus provides a theoretic rationale for Fischer and Sahay’s (2000) pessimistic assessment of the future growth prospects of Belarus and Uzbekistan.

6 Conclusions

This paper developed a stylized general equilibrium model of transition that captures the joint influence of labour markets imperfections and capital accumulation constraints. It showed that, because of labour market imperfections, *laissez-faire* policies generate excessive output falls and suboptimally slow transition. In contrast, committing to a policy of moderate and decreasing subsidization helps correct the adverse consequences of labour market imperfections, in particular if the government can resort to a consumption tax (and not to direct taxes).

Since commitment is required to achieve such an outcome, an extra insight provided by the model is that the thrust of early market-oriented reforms, as well as the development of “strong institutions” weighs heavily on the amplitude and/or the duration of the output fall. Our results indicate

that, when the government is not able to commit, two types of suboptimal policies may be chosen. First, the government may adopt a laissez-faire stance (no subsidies), at the cost of a larger output fall early in transition, and a slower recovery in later stages. Moreover, if laissez-faire generates soft budget constraints because of inter-enterprise arrears, recovery will be even slower. The case of Russia roughly fits this pattern: the lack of both public subsidies and private finance forced firms to accumulate large inter-enterprise and wage arrears, which in turn made them less responsive to market incentives. The second type of inefficient policy that may emerge is one of excessive subsidies. Because of political pressures, the government can indeed be constrained to over-subsidize state firms, in order to increase employment and wages. The short-run benefit of such a policy is to limit the amplitude of the initial output fall. However, it also generates long-run costs, which take the form of suboptimally low returns to investment, and thus protracted restructuring and transition.¹⁶

An intuitive interpretation of this result is that, in countries where institutions appear to be strong only when the state is authoritarian, there is a temptation to abandon reforms and revert to a strong control of the economy by the state. Uzbekistan and Belarus seem to fit this pattern, and generate a risk of contagion: the *apparent* success of these policies (smaller output falls were observed in these countries) makes this policy option look increasingly attractive to a number of citizens and academics in slowly growing transition countries. Our results however highlight that this success is only illusory: the efficient policy that we derive in this paper imposes a commitment to decrease subsidies during transition, and thus contradicts the “paternalistic” approach apparently adopted by Belarus and Uzbekistan and already criticized by Kornai.

In between these extreme cases, many transition countries already managed to pass major reforms and reallocate a substantial fraction of their labour force. In this process, most experienced a dramatic surge in unemployment and income inequalities. It follows that, holding labour market

¹⁶Though the problems of adjustment and sectorial reallocation faced by European Union countries are quite different, some of its symptoms also bear similarities with this type of outcome. In the presence of labour market imperfections and political pressures, some governments may indeed prefer to delay required adjustments, even more so when subsidies are financed out of a common pool.

institutions fixed, wages are already very inelastic to further increases in unemployment. In that case, our results show that accelerating job destruction in the state sector would be counterproductive. To the contrary, subsidies to low productive firms should be maintained for some time in order to accelerate growth. More urgent is the need to improve productivity in the private sector, subsidize capital accumulation by new firms, and correct imperfections in the labour and capital markets. If the pace of closure were accelerated, and the above-mentioned market improvements not implemented, there is a risk that unemployment remains high for decades. This employment sclerosis is already present in several developed countries, where the combination of productivity shocks in the 1970s and 80s and of market rigidities still impedes job creation in expanding sectors (see *i.e.* Blanchard and Wolfers 2000; Ljungqvist and Sargent 1998; or Nickell *et al.* 2002).

Finally, note that related issues, such as how reforms should be designed to strengthen institutions, how welfare systems affect political incentives, or which are the effects of capital market imperfections, are not addressed in this model. However, our results show that state intervention is required *even if* financial and goods markets are perfect and if workers do not experience any mobility cost. Thus, when additional market imperfections are present, committed state intervention is even more likely to be productive. In other words, even though these market imperfections would certainly alter the details of the optimal policy derived in this paper, they should not affect the positive lessons of our results.

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