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Modeling Institutions, Start-ups and Productivity during Transition

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ABSTRACT / RESUMÉ

Modeling institutions, start-ups and productivity during transition

The transition paths from plan to market have varied markedly across countries. Central and Eastern European and the Baltic countries, which opted for a fast and profound transformation of their institutions, rapidly narrowed the productivity gap with advanced economies. In contrast, in countries of the Commonwealth of Independent States, which embarked on reforms later and contented with less depth, the productivity gap remains substantial. While the literature has focused mainly on empirical studies, this paper develops a dynamic search model of the firm start-ups that is consistent with the above trends. The model shows that an enabling institutional set up stimulates start-ups of highly productive firms at an earlier stage of transition, underscoring the importance of reforms. The role of the state sector as an employer during transition rises in countries where reforming institutions is particularly costly.

JEL Codes: O43; O14; O57; C61

Keywords: Start-ups; dynamic search model; business climate; productivity; transition

Institutions, start-ups et productivité au cours de la période de transition

On a pu constater des passages bien différents d'un système planifié vers un système de marché dans l'ex-bloc soviétique. Les pays de l'Europe centrale et orientale et les pays Baltes ont opté pour une rapide et profonde transformation de leurs institutions et ont réussi à diminuer leur retard en termes de productivité par rapport aux pays industrialisés. En revanche, les réformes étaient mises en place plus lentement et étaient moins complètes dans les pays de la Communauté des États indépendants où les écart de productivité restent importants. La littérature existante étudie ce phénomène empiriquement. Cette étude présente un modèle de recherche dynamique qui est à même de répliquer la dynamique décrit ci-dessus. Le modèle démontre l'importance des institutions favorables à la création de nouvelles entreprises de productivité élevée au début de la transition, ce qui confirme l'importance des réformes. Le rôle du secteur public en tant qu'employeur devient plus important en période de transition dans les pays où la mise en place des réformes institutionnelles est particulièrement coûteuse.

Codes JEL : O43 ; O14 ; O57 ; C61

Mots-clés : Start-ups ; modèle de recherche dynamique ; climat commercial ; productivité ; transition

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MODELING INSTITUTIONS, START-UPS AND PRODUCTIVITY DURING TRANSITION

By Zuzana Brixiova and Balázs Égert¹

1 Introduction

The transition from plan to market has been extensively dealt with empirically at the firm level, including the impact of institutions, especially the business climate, and new firms on economy-wide productivity, output, and employment growth (Fagio and Koning, 2003; Berkowitz and DeJong, 2005, Klapper, Lavean and Rajan, 2006; De Loecker and Konings, 2006). On the aggregate level, the labor relocation from the less productive state to the more productive private sector was studied in the theoretical literature (Aghion and Blanchard, 1994, Atkinson and Kehoe, 1996, Brixiova and Kiyotaki, 1997, and others). The past two decades have shown that a successful transition hinges on the dynamic private sector, and especially new firms, to drive the productivity and employment growth. At the same time, the global economic crisis demonstrated usefulness of well-targeted government interventions, including job creation.

This paper develops a theoretical framework that examines the role of institutions, with a focus on the business climate, firm start-ups and exits as well as the observed productivity and employment paths during transition. It also discusses the role of the state sector as an employer when reforming institutions is particularly costly. Specifically, the paper presents a dynamic search model that shows how an enabling institutional set up stimulates start-ups of highly productive private firms, leading to a fast recovery of productivity and increased share of good (highly productive and well-paid) jobs during the transition. The model explains some of the diverging economic outcomes between the Central and Eastern European and Baltic (CEEB) and the Commonwealth of Independent States (CIS) economies. The CEEB countries embarked swiftly on economic reforms including the transformation of the institutional infrastructure in general and the business climate in particular. In contrast, the CIS countries were slower in implementing reforms and still have a long way to go to achieve business climate quality that has been already established in the CEEB economies (Mitra, Muravyev and Schaffer, 2009).

Labor relocation during transition was accompanied by a debate on the role of the state sector in the economy, including as an employer (Roland, 2000; Tichit, 2006). The issue was viewed as important because the social costs of transition, in particular high and persistent unemployment, could have slowed it

1. Brixiova: African Development Bank, Development Research Department, email: z.brixiova@afdb.org, Égert: OECD Economics Department, email: balazs.egert@oecd.org. This research was started when Brixiova was with the OECD. We thank Jan Babecky, Geoff Barnard, Jens Hoj, Egbert Jongen, Wenli Li, and Dale Mortensen for helpful comments. Earlier versions of the paper were presented at the 65th Congress of the International Institute of Public Finance (Cape Town), the UNU-WIDER Conference on Reflections on Twenty Years since the Fall of the Berlin Wall (Helsinki), the 2010 ACES/ASSA meetings (Atlanta), and the 1st International Symposium on Computational Economics and Finance (Sousse). The views expressed are those of the authors and do not necessarily reflect those of the African Development Bank or the OECD.

and possibly bring it to a halt. And it is the concern about the social cost of adjustment that prevents some countries, such as Belarus, to adopt more decisive market reforms. With declining unemployment and emerging labor shortages in the CEEB countries during the boom of 2000-07, the debate seemed over. The private sector was seen as the best way to achieve growth with employment and social stability, and the self-correcting ability of markets was emphasized. However, as the global financial and economic crisis has turned into the global employment crisis, the social consequences have started to top the policy agenda. With that turn, the debate on the role of the state in the economy, in providing regulatory framework as well as supporting job creation, has been revived. This paper contributes to this debate with insights from transition experiences. It illustrates that in countries where reforms of institutions and the business climate have been particularly costly and prospects for private job creation poor, the role of the state sector as an employer rises.

The theoretical model presented in this paper extends the framework of Brixiova and Kiyotaki (1997), who in turn build on the literature on industry evolution and job creation and destruction of Jovanovich (1983), Hopenhayn and Rogerson (1993), and more recently Fonseca, Lopez-Garcia and Pissarides (2001). Unlike these papers which study a steady-state economy with an unlimited supply of potential entrepreneurs, this model considers a transition economy with a limited population of potential entrepreneurs. Moreover, by focusing on the prevailing business environment, the model complements Fonseca et al. (2001), who emphasize start-up costs.²

The paper is organized as follows. Section 2 provides the stylized facts on the economic restructuring and sets out the different reform paths that the CEEB and CIS countries have experienced. Section develops the model of transition with start ups responding to the business climate. Section 4 presents numerical experiments and illustrates the model's implications for productivity, structure of the private sector, and employment during transition. Section 5 shows that the role of the state as an employer rises during the transition if reforms to the institutional set up are sluggish. Section 6 concludes.

2 Stylized facts

This section summarizes the main macroeconomic trends that our theoretical model aims to capture, namely private sector growth, employment, output, and productivity. It also briefly discusses policies and institutions, which contributed to these trends. The CEEB economies are compared with non-oil exporting countries of the CIS.³

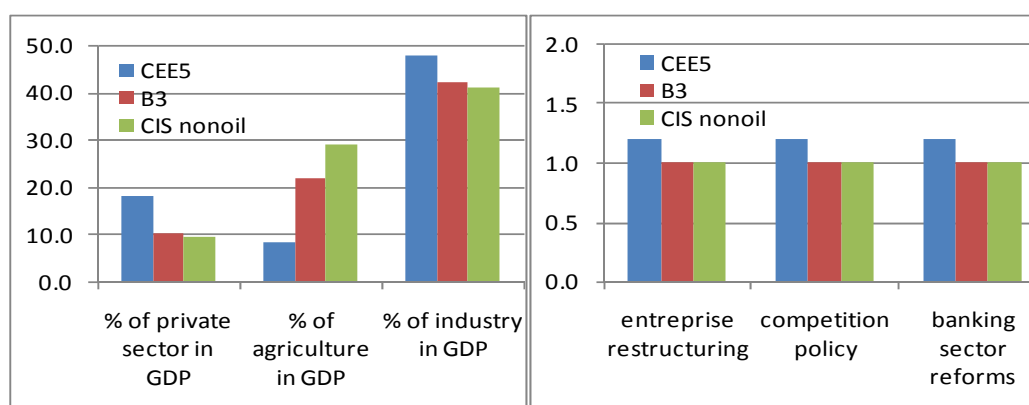
2.1 *Similar starting conditions, divergent paths*

At the outset of the transition, the CEEB and non-oil CIS countries exhibited similar structural conditions as they all started from central planning and were dominated by corporate and financial structures shaped by the socialist system. In 1990, these countries had a low share of the private sector in GDP, lacked competition policy and a well functioning two-tiers banking system. The business climate was characterized by rigidities and excessive regulations. The composition of production was skewed towards industry and agriculture, whilst services occupied a limited role in GDP compared to other countries at a similar level of development (Figure 1).

-
2. While job matching frictions also played a role, the low vacancy-unemployment ratios prevailing in most countries point to the scarcity of entrepreneurs as the primary constraint to job creation.
 3. CEE-5: Czech Republic, Hungary, Poland, Slovakia and Slovenia, the Baltic-3: Estonia, Latvia and Lithuania; non-oil CIS: Armenia, Belarus, Georgia, Kyrgyz Republic, Moldova, Tajikistan and Ukraine. Discussion of the cases of Belarus and Estonia is in Annex I.

From a macroeconomic point of view, the CEEB and non-oil CIS countries started transition with enforced full employment, limited foreign trade and artificially low inflation rates. The liberalization of prices and foreign trade (“type-1” reforms) in the early 1990s resulted in high inflation rates and unsustainable current account deficits. Therefore, policy makers initially focused on establishing macroeconomic stability. The CEEB countries managed to bring inflation rates to low 2-digit territories by the mid-1990s, while the stabilization took longer in non-oil CIS countries (EBRD, 2005).

Figure 1. Initial structural conditions in 1990



Source: Authors' calculations based on data drawn from the World Bank's World Development Indicators and EBRD transition indicators. Note: The EBRD indicators increase from 1 (little or no change from a rigid centrally planned economy) to 4 or more (standards of an industrialized market economy).

The CEEB and the non-oil CIS countries differed in the speed and scope with which “type-2 structural reforms” were put in place. “Type 2” reforms consisted mainly of measures key for establishing conditions for private sector development and growth: corporate restructuring, a well functioning competition authority, administrative reforms, development of a commercial banking sector and effective tax system, infrastructure, labor market regulations, and establishment and enforcement of a market-oriented legal system and accompanying institutions.⁴ CEEB countries adopted these structural measures faster and also paid a much greater attention to the quality of the framework (Figure 2).⁵ As a result, the business climate has become more competitive in the CEEB than in the CIS countries, as also evidenced by mark-up indexes.

More generally, the CEE-5 and in particular the Baltic countries were placed well above the non-oil CIS countries in various rankings of competitiveness and the quality of the business climates. These include the EBRD's transition index, the World Bank's Doing Business 2008 and Governance, the Institute for Management Development 2007 competitiveness report, among others.⁶

As Aidis (2003) states, “...productive entrepreneurship cannot be taken for granted in transition countries, and is influenced both by the current institutional weakness, as well as by historical legacies.” EBRD (2008) showed a link between product market competition and growth, with higher competition

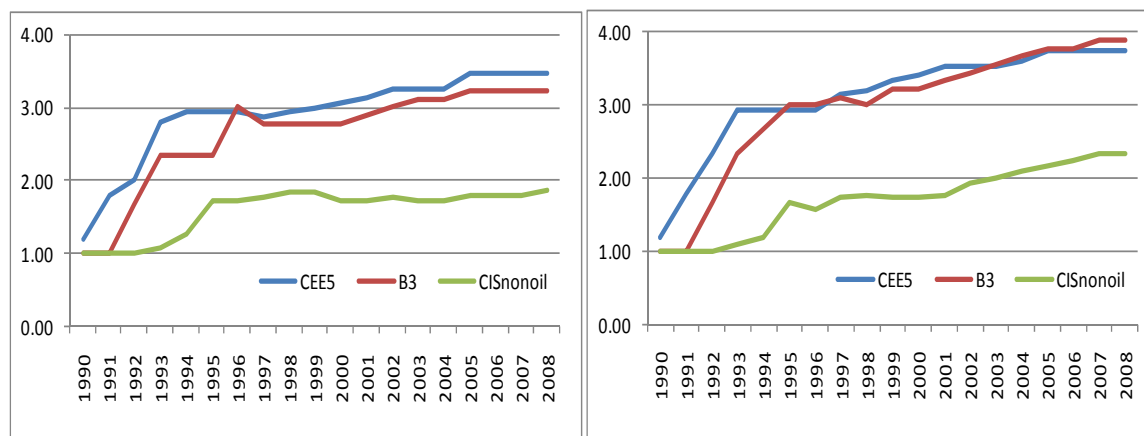
4. According to Aidis, Estrin and Mickiewicz (2007), these institutions, together with access to credit, are crucial for an environment conducive to entrepreneurship.

5. Roland (2004) underscores the need for research on how values and norms shape ideas and institutions.

6. Conceptual issues related to the World Bank's Doing Business and similar indexes were raised (Arrunada, 2007 and others). Alternative measures also point to the same overall results for these two country groups.

(lower mark-ups) is associated with higher firm entry and productivity. Bastos and Nasir (2004) found that the competitive pressure is the most critical factor of the investment climate for firm-level productivity.

Figure 2. The timing and scope of structural reforms, 1990-2007



Source: Authors' calculations based on data from the EBRD. Averages are arithmetic averages.

2.2 Private sector growth

Successful transition from plan to market has depended critically on the emergence of a dynamic private sector. In the first stage, privatization and restructuring of public enterprises led mostly to job destruction and slow growth in productivity and output. Over time, privatized firms have contributed to job creation and growth by using resources more efficiently. With substantial lowering of entry barriers, the *de novo* private small and medium enterprises drove the recovery of output and productivity⁷.

Aslund and Johnson (2004) emphasized that small differences in policies to small and medium-sized enterprises (SMEs) can have a strong impact on private sector growth in transition economies.⁸ In that context, the early 1990s reforms of the economic and legal environments and the straightforward and transparent rules for firm creation in Central and Eastern Europe contributed to acceleration in the number of SMEs. Figure 3 indicates that a higher number of SMEs per capita is associated with higher private sector output.

2.3 Structural transformations

As many new private firms were created in the service sector and to a lesser degree in manufacturing, rapid private sector growth was accompanied by a sectoral shift. A sectoral shift occurred as a correction of imbalances inherited from central planning, where the service sector in all countries was underdeveloped in comparison to countries with similar income levels. Specifically, in 1990, industry took a disproportionately large share of output and employment in all countries, and agriculture played an important role in the Baltic and CIS countries. Transition everywhere has been characterized by labor

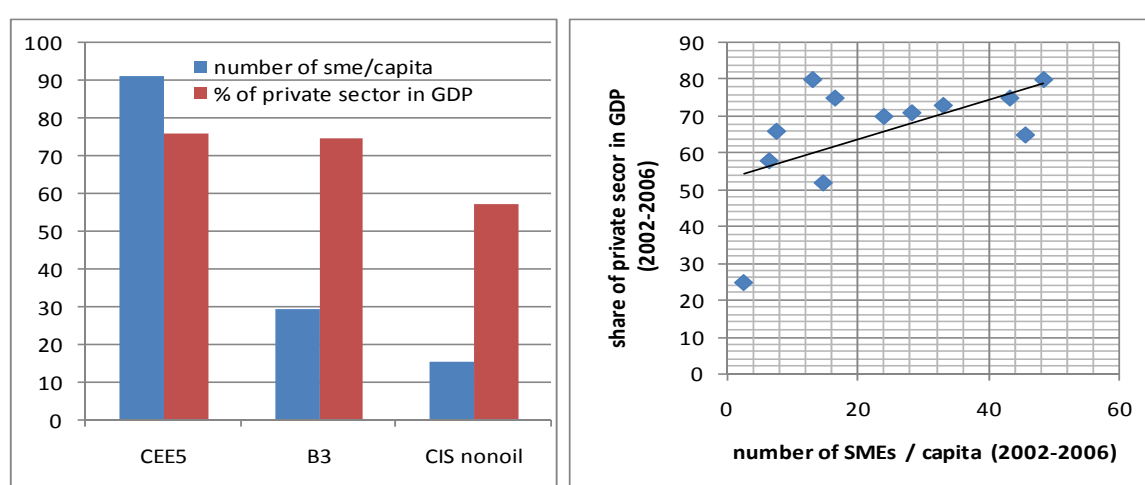
7. Studies linking firm creation with output and employment growth in transition are Bilsen and Konings (1998), McMillan and Woodruff (2002), Faggio and Konings (2003), and Berkowitz and DeJong (2005).

8. Using a database of European firms, Klapper, Laeven and Rajan (2006) also find that costly entry regulations hamper the creation of new firms, especially in industries that should naturally have high entry.

reallocation from industry and agriculture to services, especially in the early 1990s.⁹ The shift towards services was more marked in the CEEB as compared to the CIS countries.

The decrease in the share of industry and manufacturing in GDP is very similar across the three country groups (Central and Eastern Europe, the Baltics, and non-oil CIS). In 2006, industry accounted for about 30% and manufacturing for 20% of GDP in all three groups. Yet, the composition of manufacturing changed markedly in Central and Eastern Europe, while it remained mostly unchanged in the CIS. It shifted towards higher-technology products in Central and Eastern Europe and to a lesser degree in the Baltics, but the average high-technology content of CIS exports declined between 1996 and 2006 (Figure 4). Also within the group of SMEs, the share of “high productivity” enterprises has been increasing more rapidly in CEEB countries than in the non-oil CIS countries.

Figure 3. Private sector output and SMEs



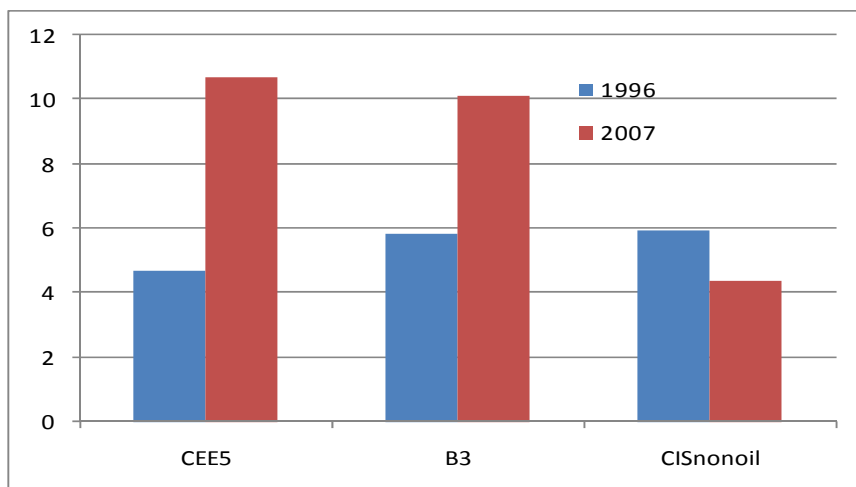
Source: Authors' calculations based on data from the World Bank's World Development Indicators and EBRD transition indicators. Note: The private sector share in GDP is an arithmetic average over 2002-06. The number of SMEs per capita refers to the year for which this indicator is available during 2002-06.

2.4. Productivity paths

The transition outcomes reflect broadly the diverging reform paths. The transitional recession of the early 1990s was shorter in the CEEB, with their real GDP picking up much earlier than in the non-oil CIS group (Figure 5). For instance, real economic activities reached their 1990 levels already in 1997 in the CEE-5, while the non-oil CIS countries still remained below their 1990 levels even in 2007. A similar pattern has emerged for economy-wide productivity developments.

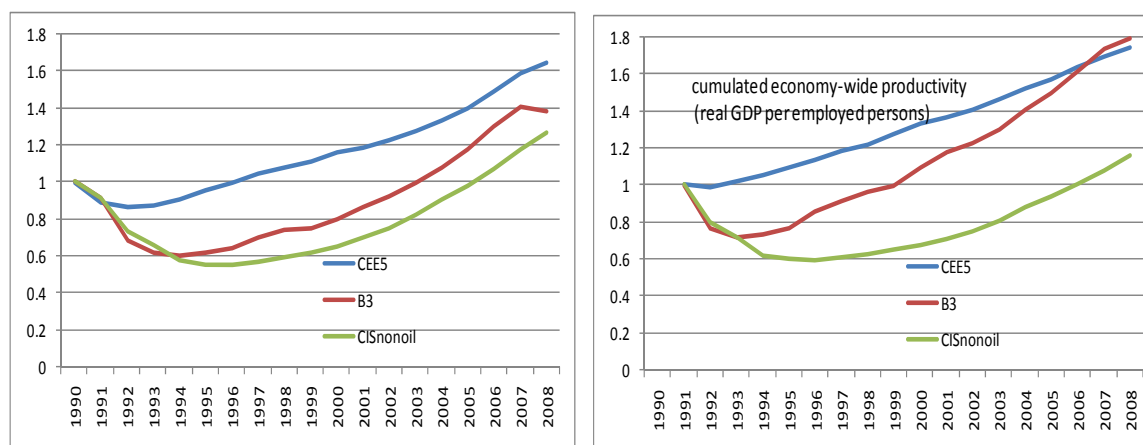
9. In the late 1990s, when the structures of the Baltic economies approached those of the EU-15 countries, job reallocation occurred mostly within sectors (Fabbio and Konings, 2003, Jurajda and Terrell, 2008).

Figure 4. The high-technology content of exports, in 1996 and 2006



Source: Authors' calculations based on data drawn from the World Bank's World Development Indicators World Development Indicators. Averages are arithmetic averages.

Figure 5. Real GDP (1990 = 100) and economy-wide productivity (1991 = 100), 1990-2007



Source: Authors' calculations based on data drawn from the World Bank's World Development Indicators. Group averages are arithmetic averages.

3. The Model

3.1 Environment

The model below shows how the quality of institutions, including the business climate, affects the entrepreneurs' choice of the type of firm (technology) they operate and consequently the output, employment, and productivity.¹⁰

Consider a continuous time economy, where economic transition consists of labor relocation from the state sector to the private sector. The population is normalized to one and consists of two types –

10. This paper does not try to explain differences in transition paths between the Central Europe and countries and the Baltics caused by availability of credit, which played role especially around mid-2000s.

entrepreneurs and workers, with population sizes μ and $1 - \mu$, respectively.¹¹ All agents live forever, are endowed with one unit of time at every t , and have the same risk neutral preferences, $U_0 = E_0 \int_{t=0}^{\infty} e^{-rt} c_t dt$, where c_t is consumption of a single good at t , and E_0 denotes expectations at $t=0$. While the individual entrepreneurs face uncertainty, there is no uncertainty at the aggregate level.

All agents are initially in the state sector, that is $s_0 = 1$. The state sector jobs decline over time at an exogenous rate λ , that is $\dot{s}_t = -\lambda s_t$. At date t , s_t proportion of entrepreneurs and workers are working in the state sector, and $1 - s_t$ are in the private sector. More specifically, workers are either employed in a private firm or unemployed, while entrepreneurs are either searching for a business opportunity or running a firm.

When entrepreneurs spend cost $d(x) = x^2 / 2\gamma$, $\gamma > 0$ units of consumption good on search, they find a business opportunity according to a Poisson process with the arrival rate of x . The opportunities are heterogeneous: some are highly productive while others are of low productivity. A business opportunity has either high productivity $z_i = z_h$ with probability ϕ or $z_i = z_l$ with probability $1 - \phi$, where $0 < z_l < z_h$.¹² z_i can be also called “business capital” as in Schmitz (1993). Rigidities in the business environment at t are treated as a “tax” θ on the business capital. The firm’s effective business capital becomes $\bar{z}_i = (1 - \theta)z_i$.¹³ With opportunity of productivity i , the entrepreneur produces output y_i using n_i workers according to $y_i = \bar{z}_i n_i$, where $0 < n_l < n_h$.

During the time when the entrepreneur runs the firm, the business capital can completely depreciate according to a Poisson process with the arrival rate δ . When that happens, the entrepreneur starts searching for a new business opportunity. Denoting $(1 - s_t)\mu$ as the number of entrepreneurs at t outside the state sector, entrepreneurs searching for opportunities, m_{ut} , and operating business, m_t , satisfy:

$$(1 - s_t)\mu = m_{ut} + m_t = m_{ut} + m_{ht} + m_{lt} \quad (1)$$

where m_{it} are entrepreneurs with firms of productivity i , $i = h, l$, and $m_t = m_{ht} + m_{lt}$. The number of entrepreneurs running high and low productive firms evolves according to:

-
11. At the start of the transition, all agents are in the state sector. As the state sector declines, some workers are working while others are unemployed. Similarly, some entrepreneurs are running a firm while others are searching. Searching entrepreneurs are unemployed, but they do not receive unemployment benefits. Since entrepreneurs tend to be individuals with specific backgrounds, such shares are not easily influenced, at least in the short term (Baumol, 1990).
 12. During transition, the consumption good is also produced in the state sector, with output per worker z_s , where $0 < z_s < z_l < z_h$.
 13. Since this paper focuses on drivers of productivity growth during transition, it does not try to explain why some countries adopted better business environment or institutional set ups faster than others.

$$\dot{m}_{ht} = x\phi m_{ut} - \delta m_{ht} \quad (2)$$

$$\dot{m}_{lt} \leq x(1-\phi)m_{ut} - \delta m_{lt} \quad (3)$$

with the initial conditions $m_{h0} = m_{l0} = 0$, that is no entrepreneurs run firms at $t = 0$. Eq. (3) holds with strict inequality when (at least some) entrepreneurs do not accept the low productivity business opportunity and continue to search for the high productivity one.

Worker who are outside of the state sector, $(1-s_t)(1-\mu)$, are either employed in highly productive businesses, N_{ht} , low productive businesses, N_{lt} or unemployed, N_{ut} and collecting unemployment benefits amounting to b :

$$(1-s_t)(1-\mu) = N_{ut} + N_{ht} + N_{lt} = N_{ut} + m_{ht}n_h + m_{lt}n_l. \quad (4)$$

The *equilibrium* of this economy is the allocation of workers and entrepreneurs and wage rate such that (i) entrepreneurs choose the effort they put into search for business opportunities and whether to accept the low productivity ones or not; (ii) workers choose allocation of labor, taking wage as given; and (iii) labor and product markets clear.

Suppressing the time subscripts, J^u , J^h , and J^l denote the values of the entrepreneur running a highly productive private firm, a low productive firm, and searching for a business opportunity, respectively. The corresponding Bellman equations are given by:

$$rJ^u = \max_x \left(-\frac{x^2}{2\gamma} + x[\phi(J^h - J^u) + (1-\phi)(J^l - J^u)] \right) + \dot{J}^u \quad (5)$$

$$rJ^h = \pi_h + \delta(J^u - J^h) + \dot{J}^h \quad (6)$$

$$rJ^l = \max_{p \in [0,1]} \{ p[\pi_l + \delta(J^u - J^l) + \dot{J}^l] + (1-p)J^u \} \quad (7)$$

Where \dot{J}^i is the rate of change of the value J^i over time, $\pi_i = \bar{z}_i n_i - w n_i$ is the profit of a firm with productivity i , $i = h, l$, and p is the probability that the entrepreneur runs a low productivity firm. Since creation of firms takes time, wages in the private sector, w are equal to the unemployment benefit, b .¹⁴ According to (5), the return from searching for a business opportunity equals the net expected return from running a business plus the change of the value of searching. According to (6) and (7), the return from operating a firm consists of profits plus the change of the value of J^i .¹⁵

14. As there is no friction in the labor market, workers are indifferent between working in the private sector and being unemployed at the margin.

15. In order for the workers not to move from the state sector into unemployment, it must be the case that $J^s < J^u$, where J^s is the value of being employed in the state sector. Results would not change under the on-the-job search. See Brixiova and Yousef (2000) for the case with the on-the-job search.

3.2 Solution

The entrepreneur chooses the search intensity, x , and accepts the low productivity business opportunity with probability p so that the marginal cost of search equals to the expected marginal payoff:

$$\frac{x}{\gamma} = L \equiv \phi(J^h - J^u) + (1 - \phi)(J^l - J^u) \quad (8)$$

where $L = \phi(J^h - J^u) + (1 - \phi)(J^l - J^u)$ is the “value” of a random business opportunity to an entrepreneur. For each searching entrepreneur, the “profit” from searching, π_u , becomes $\pi_u = \gamma L^2 / 2$. From (5) – (7), L evolves according to:

$$\dot{L} = (r + \delta)L - \phi(\pi_h - \pi_u) - (1 - \phi)p(\pi_l - \pi_u) \quad (9)$$

where $p = 1$ if $\pi_l > \pi_u$, $p \in (0,1)$ if $\pi_l = \pi_u$, and $p = 0$ if $\pi_l < \pi_u$. The entrepreneur will thus run a low productive firm if profit from doing so exceeds “profit” from searching.

Since at the beginning of transition private firms are absent, private sector development takes time. The growth of the private sector depends on the intensity of entrepreneurs’ search and on whether the entrepreneurs accept low productivity business opportunities. From (9), L is affected by the quality of the business environment, θ . The equilibrium transition path for total number of entrepreneurs becomes:

$$\dot{m} = \gamma L[\phi + p(1 - \phi)][\mu(1 - s) - m] - \delta m \quad (10)$$

where $m_0 = 0$, and $m_h = \phi m$ and $m_l = (1 - \phi)m$ when $p = 1$, while $m_h = m$ when $p = 0$.

The dynamic competitive equilibrium is characterized by the path of (L, p, m) satisfying (9) and (10). Together, (9) and (10) show that for given state sector employment and the private firms, the private sector grows more rapidly in an enabling business environment.

Characterizing transition with the phase diagram

Before turning to simulation results, the phase diagram below illustrates in further detail the impact of business environment on the speed of the private sector development for the special case of the immediate state sector closure. The impact of business environment on transition and steady state can be seen directly from (9), where the comparative statics is as: $L = L(\underset{+}{\gamma}, \underset{-}{\theta}, \underset{+}{z_i}, \underset{+}{\phi}, \underset{-}{\delta})$. With improvement of the business environment, i.e. with lower θ , the size of the private sector in the steady state and the rate of its creation increase.

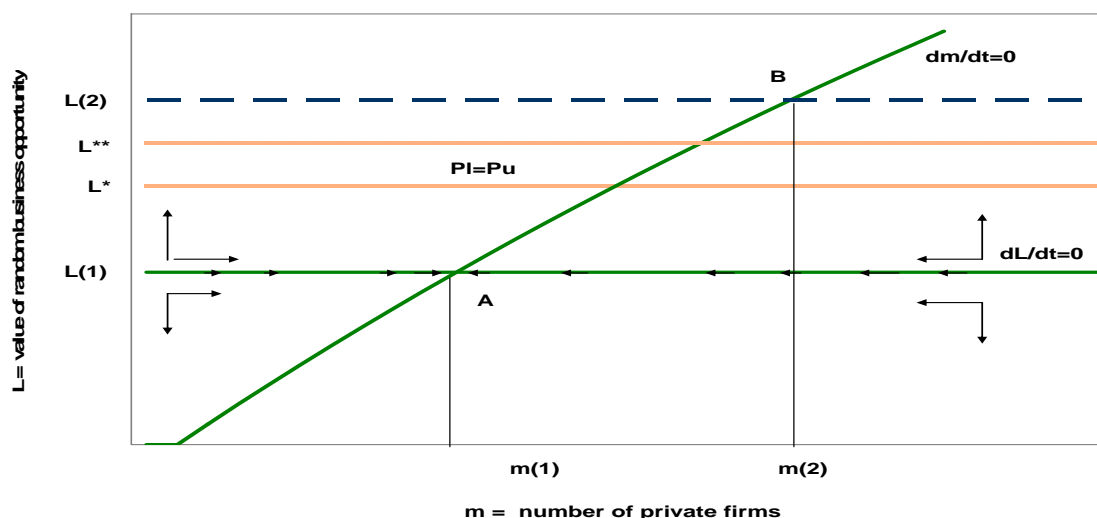
Transition paths of m and L for this case are depicted in Figure 6. First, $\dot{L} = 0$ locus and $\dot{m} = 0$ locus are determined.¹⁶ The saddle path is the locus along which L is constant at its steady-state value. While the control variable L jumps immediately to its steady state value, the state variable, m , gradually converges to it according to (10).¹⁷ As L rises with better business environment, so does the search of entrepreneurs and the rate of firm creation, as well as its steady state value.

Figure 6 shows a phase diagram of the transition economy for the case in which the entrepreneurs take all the business opportunities they find during the entire transition, as long as the business climate is characterized by θ_1 (and hence leads to the equilibrium search effort $x_1 = \gamma L_1$). The condition for $p=1$ ($\pi_l > \pi_u$) holds in the region below the $\pi_l = \pi_u$ area (ranging from L^* to L^{**}). In contrast, if the business environment is described by $\theta_2 < \theta_1$, the associated steady state is located above $\pi_l = \pi_u$ area. The entrepreneurs will accept only the high productivity opportunity, if θ_2 holds throughout the transition. If business climate improves gradually during the transition from θ_1 to θ_2 , then entrepreneurs will initially accept both types of opportunities (as L is below $\pi_l = \pi_u$ area), accept some of the low productive ones while in the $\pi_l = \pi_u$ area, and accept only high productive ones at the end of the transition, when L is above the $\pi_l = \pi_u$ area.

More specifically, with the improvement in the business climate, the equilibrium moves from point A (characterized by lower search and number of private firms, L_1 and m_1 , respectively) to a preferable point B (characterized by higher search and number of private firms, L_2 and m_2 , respectively).

16. First, $L = \frac{\phi(\pi^h - \pi^u) + (1-\phi)p(\pi^l - \pi^u)}{r + \delta} = \frac{-(r + \delta) + \sqrt{(r + \delta)^2 + 2\gamma[\phi\pi_h + (1-\phi)p\pi_l]}}{\gamma[\phi + (1-\phi)p]}$, that is L is constant (independent of m) where $\dot{L} = 0$. Second, $m = \frac{\gamma\mathcal{L}[\phi + p(1-\phi)]\mu}{\gamma\mathcal{L}[\phi + p(1-\phi)] + \delta}$ along the $\dot{m} = 0$ locus.

17. In the steady state, if the after-tax productivity gap between high and low productive businesses is relatively large, the entrepreneurs run only highly productive businesses, i.e. $p=0$. If the gap is small, they run both types of businesses, i.e. $p=1$. Under the immediate state sector closure the number of searching entrepreneurs, m_u , shrinks as quickly as the number of entrepreneurs running firms, m , expands.

Figure 6. Phase diagram for the state variable (m) and the control variable (L)

4 Numerical solutions

The simulations below, which illustrate the impact of business environment on start-ups, unemployment and labor productivity, present results that are broadly consistent with developments in transition economies over the past 20 years. The time period is one year. Baseline parameters are chosen to reflect some aspects of the annual observations from the transition countries', EBRD and OECD statistical databases, as specified in Table 1:

Table 1. Parameters of the model

Variable	Value	Source
share of entrepreneurs in population μ	0.2	OECD LF Statistics
annual real interest rate r	0.04	Standard
rate of destruction of private jobs δ	0.15	Statistics Estonia
rate of the state sector closure, λ	0.3	EBRD
average output in low productive firm z_l	1	Normalized
wage in the private sector w	0.5	Set to amount to 1/2 of output (within standard range)
average output in highly prod. firm z_h	4	Set so that steady state productivity gap is 50%
efficiency of entrepreneur's search γ	0.11	Set so that steady state unemployment with high prod. firms only is 9%
share of high productive firms ϕ	0.65	Set so that the average size of SME is 4, as in the Czech Rep. (European Commission 2008)
employment in high productive firm n_h	6	Set so that the highly prod. firm employs twice as many more employees than low prod. firm
employment in less productive firm n_l	3	Average size of small/micro enterprise (European Commission, 2008)

4.1. Steady state

Table 2 shows the steady state values under two types of the institutional set up/business climate: (1) an enabling one, with the "tax" rate $\theta = 0$ and (2) a weak one, with the "tax" rate $\theta = 0.8$. The more

enabling business environment encourages potential entrepreneurs to increase their search effort, and open only high productive businesses.¹⁸

Table 2. State results – comparison of outcomes under different business environments

	Rigid bus. climate	Enabling bus. climate
Total share of private firms	13.9	11.8
Share of high-productivity firms	9.0	11.8
Share of low-productivity firms	4.9	0.0
Share of searching entrepreneurs	6.1	8.2
Share of unemployed workers	16.2	8.9
Index of the average labor productivity	2.44	3.12

Sensitivity analysis with respect to the following key parameters was carried out: (i) the share of high productive business opportunities, and (ii) productivity level in the high productive firm. Table 3 shows that the main results are robust to different assumptions:

Table 3. Sensitivity analysis under a rigid business climate

	Productivity level in high productive firms		Share of highly productive firms	
	3.5	4.5	0.6	0.7
% of LF				
Unemployment	20.5	12.9	20.0	12.5
Share of high prod. firms	8.4	9.5	8.2	9.9

4.2 Transition

Simulations below show the impact of the business climate on the labor market outcomes in transition, taking the rate of the state sector closure as given. The case where the poor environment persists, i.e. the “tax” on the high-productivity firms remains high) is compared with the case where the environment improves, reflecting market reforms (the “tax” rate starts at $\theta(0) = 0$ and follows $\dot{\theta} = -\xi\theta$, where ξ is the rate at which the environment improves. For both cases, the impacts on the size and the structure of the private sector, level of unemployment and its duration as well as on labor productivity are examined.

Figure 7 shows that with improvement of institutions and establishing more conducive business climate, during the transition the entrepreneurs shift from opening both high and low productive firms to opening only high productivity ones – this scenario approximates the case of the CEEB countries. The case of the non-oil CIS countries (Figure 8) shows that when a poor business environment prevails, it induces firms to open both high and low productive firms during the entire transition. Thus substantial share of private firms are smaller and operating in low productive activities. Consequently, the aggregate unemployment can be also higher than under more enabling business environment scenario. Depicting different paths of labor productivity, Figure 9 shows that when the business climate is more enabling, the average labor productivity grows faster and its steady state value is higher than when the environment is rigid.

18. Under the above parameters, as the highly productive firms employ more workers, both employment and labor productivity are higher when the business environment is conducive to firm start-ups.

Figure 7. Labor market paths where at the end of transition entrepreneurs run only the highly productive businesses, but at the early stages they run also the low productive ones

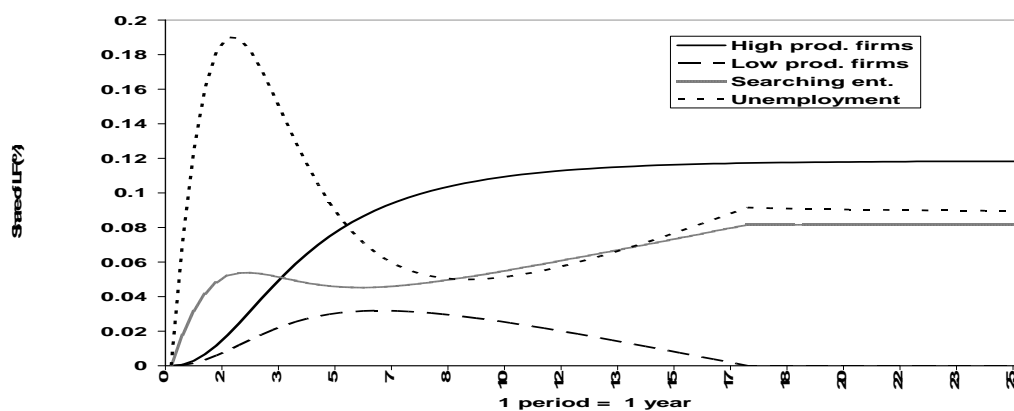


Figure 8. Labor market transition paths where entrepreneurs operate both high and low productivity businesses throughout the transition

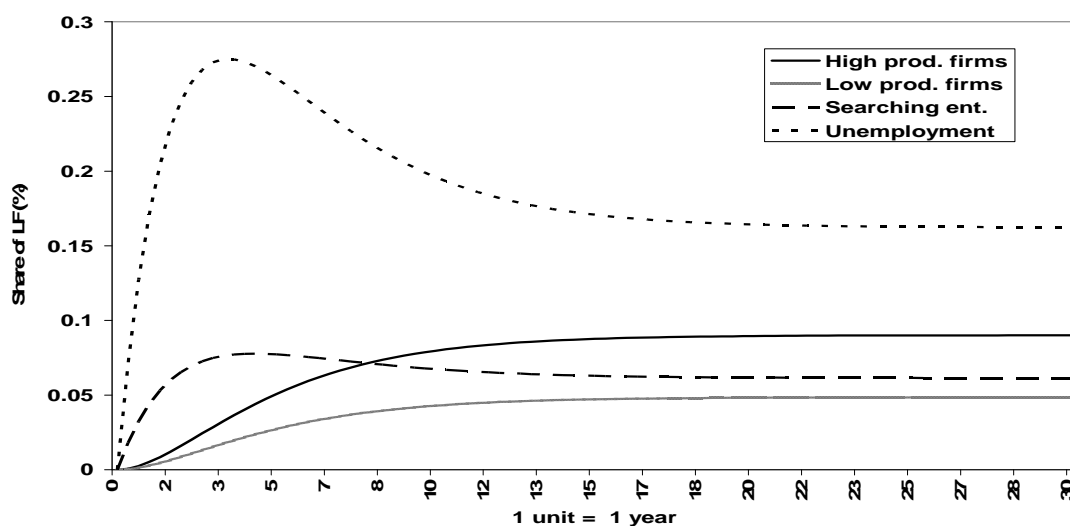
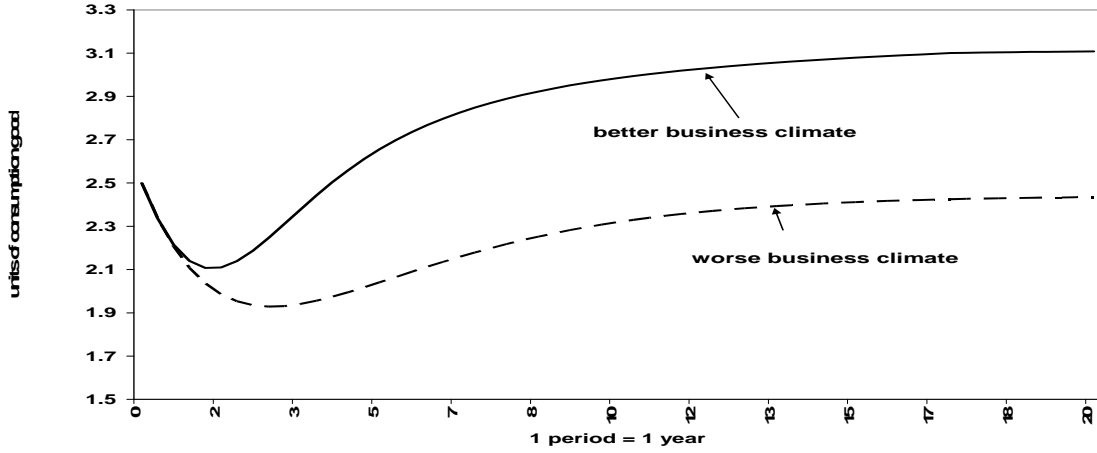


Figure 9. Transition paths of labor productivity under different quality of business climate

An alternative way to stimulate start ups is through reducing entrepreneurs' search costs/increasing their search efficiency. Such policies include training of entrepreneurs, assisting them with writing business proposals, and more broadly reducing entry barriers by streamlining registration and licensing. Since relative sectoral profits remain unchanged with lower search cost, these policies do not influence sectoral allocation of firms, but result in increased number of firms and reduced unemployment.¹⁹

5 Policy analysis

The above framework can address a related policy issue: the optimal size of the state sector employment during sectoral reallocation and under distortions in the business environment. An efficient allocation of state sector employment, private sector entrepreneurs and search effort $\{s, m, x\}$ maximizes the discounted expected utility of the representative agent. Given the standard assumption in the search literature that agents have risk-neutral preferences in consumption, this is equivalent to maximizing the discounted value of the aggregate output, $z_s s + (1 - \theta) z_p mn$, net of the total cost of searching for business opportunities, $m_u \frac{x^2}{2\gamma}$, and net of the social cost of not working or running a business, $\frac{A}{2}[1 - s - mn - m]^2$. The net output is maximized subject to the law of motion for entrepreneurs (13) and the boundary conditions.

The social planner's problem therefore can be described as:

$$\max_{m,s} \int_0^{\infty} e^{-rt} \left(z_s s + (1 - \theta) z_p mn - [(1 - s)\mu - m] \frac{x^2}{2\gamma} - \frac{A}{2} [1 - s - mn - m]^2 \right) dt \quad (11)$$

$$\text{s.t. } \dot{m} = x[(1 - s)\mu - m] - \delta m \quad (12)$$

19. These policies would influence sectoral allocation if the government selected specific sectors where entrepreneurs' search would be eased. However, such approach would create problems of its own.

and $m(0) = m_0$, $\lim_{t \rightarrow \infty} e^{-rt} \pi(t) = 0$, where π is the shadow value of the extra entrepreneur running a private firm.²⁰ The solution is given by:

$$z_s + A(1 - s - mn - m) = \mu\gamma \frac{\pi^2}{2} \quad (13)$$

$$\dot{\pi} = -(1 - \theta)z_p n + z_s(1 + n) + \pi(\delta + r) + \frac{\gamma}{2} \pi^2 (1 - \mu - n\mu) \quad (14)$$

$$\dot{m} = \gamma\pi[(1 - s)\mu - m] - \delta m \quad (15)$$

where $m(0) = m_0$.

Equation (14) states that the shadow value of the additional entrepreneur running a private firm is the discounted value of the difference in productivity between the state and the private sectors, net of the social costs of search. From (15) this value also determines the optimal value of the unemployment. Hence, the optimal size of the state sector employment is such that the unemployment level is also constant along the transition path. Finally, the optimal search effort and unemployment, together with m_0 , then determine the unique optimal path of the number of entrepreneurs running private firms, as described by equation (15).

Together, (13) – (15) show that for a given level of state sector employment and number of entrepreneurs, the optimal rate of growth of the private sector is slower in a weaker business environment. Conversely, the optimal level of the state sector employment is higher the closer the productivity gap between the state and private sectors, the higher the social cost that the policymakers attach to unemployment, and with less enabling business environment.

Simulations of the optimal transition paths for different business environments show that the optimal rate of the state sector closure is slower under more distorted business environment than under a more enabling one (Figures 10 and 11). With the limited private job creation, workers' opportunity costs of remaining employed in the state sector are low.

20. Similarly to Burda (1993), the increasing marginal social costs of unemployment prevent the immediate state sector closure to be optimal, as the associated costs would be enormous. This section also assumes that the marginal product of workers in the informal sector is zero, without loss of results' generality.

Figure 10. Optimal paths of the state sector employment under different business climates

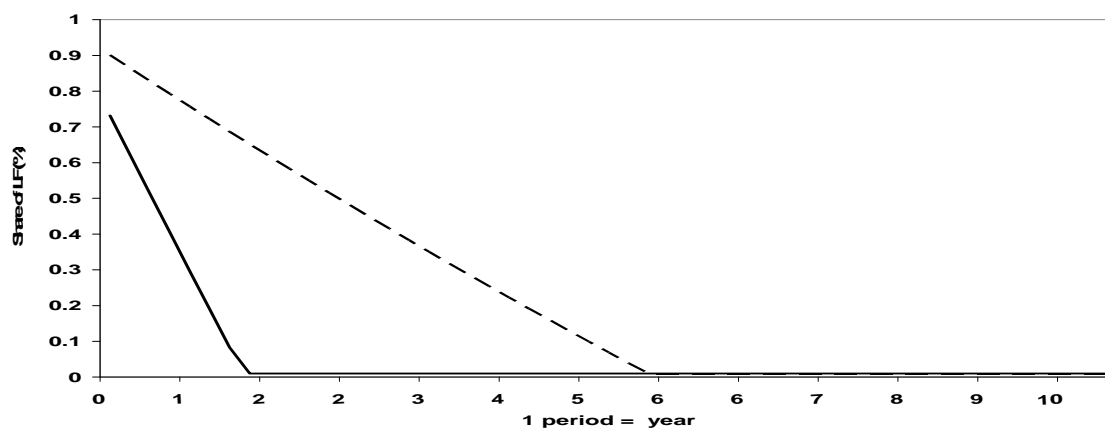
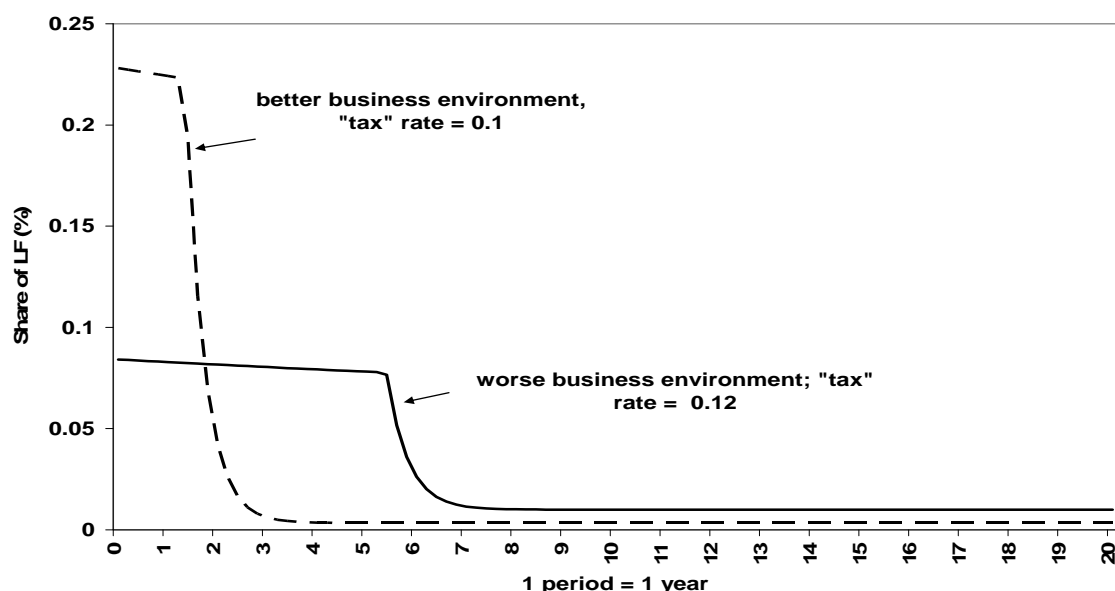


Figure 11. Optimal paths of unemployment under different quality of business climate



6 Conclusions

This paper examined differences in private sector, productivity and employment growth in the Central and Eastern European countries and the Baltic (CEEB) versus the non-oil CIS countries, using a model of labor reallocation and firm creation with transaction costs. The CEEB's faster implementation of market reforms and a more enabling institutional set up and business climate stimulated an earlier structural shift towards more productive private firms. This also led to more rapid employment and labor productivity growth, and, consequently, to faster convergence to the income levels of more advanced economies.

All transition countries would benefit from reducing further the remaining obstacles to private sector activities, such as credit constraints, high payroll taxes, and in the new EU members also the persistent skill shortages. The global financial crisis and tightened credit conditions have underscored the

importance of improving the efficiency of financial markets, and especially access of small and medium enterprises to credit.

Rational policy makers will and have paced the reduction of public sector employment in line with improvements of the business climate and realistic possibilities of creating private sector jobs, as shown in our analysis. Where such improvements are slow and costly (as, for example, in Belarus due to the political constraints), it is rational to keep workers in public jobs for longer, rather than pursuing radical closure of public enterprises. This said, the resulting slower paths of labor productivity and output growth are inferior to outcomes in an environment with early and vigorous improvements of the business climate. This confirms the importance of undertaking structural reforms and strengthening the business climate early on. These lessons of transition can be applied to other regions and countries where the business climate is still weak and the public sector accounts for a substantial share of employment.

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