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BUSINESS ENVIRONMENT, START-UPS, AND PRODUCTIVITY DURING TRANSITION

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The transition paths from plan to market have varied markedly across countries. Central and Eastern European and Baltic countries, which opted for fast and deep reforms including transformation of their business environments, rapidly narrowed the productivity gap with advanced economies. In contrast, in countries of the Commonwealth of Independent States, which embarked on reforms later and with less depth, the productivity gap remains large. Whereas the literature has focused mainly on empirical studies, this paper develops a dynamic search model of firm start-ups that reflects these trends. The model shows that an enabling business climate contributes to start-ups of highly productive firms at an earlier stage of transition, underscoring the importance of early reforms. The role of the state sector as an employer during transition rises in countries where reforming the business environment is particularly costly.

Keywords: Dynamic Search Model, Business Environment, Private Sector Growth, Productivity

1. INTRODUCTION

The transition economies of Central and Eastern Europe and the Baltics (CEEB) and the Commonwealth of Independent States (CIS) applied different approaches

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to market-oriented reforms. The CEEB countries embarked swiftly on economic reforms, including the transformation of their business climates. In contrast, the CIS countries were slower in implementing reforms and still have a long way to go to achieve the business climate quality of the CEEB economies [Mitra et al. (2009); World Bank (2010)]. These countries also experienced divergent economic outcomes, with the CEEB experiencing faster private sector growth and productivity rebound, but also higher official unemployment than the CIS group.

Transition from plan to market has been characterized by labor reallocation from the less productive state to the more productive private sector. This structural shift was studied in the theoretical literature on transition by Aghion and Blanchard (1994), Atkenson and Kehoe (1996), and others. The past two decades have confirmed what this earlier transition literature suggested: a successful transition hinges on the dynamic private sector, and especially new firms to drive growth and job creation, as posited in Brixiova and Kiyotaki (1997). Also, with new data, the impact of the business environment on entrepreneurship and labor market outcomes became well documented [Lopez-Garcia (2006); Aidis et al. (2009); World Bank (2010)].[1]

Although an abundant empirical literature exists on the impact of business climate and new firms on productivity and employment during transition [Bilsen and Konings (1998), De Loecker and Konings (2006), and others], theoretical studies have been rare. This paper contributes to closing this gap by extending the dynamic search model of Brixiova and Kiyotaki (1997) for the role of the business climate. The model helps explain some of the diverging economic outcomes observed between the CEEB and CIS economies by showing how an enabling business climate can stimulate an earlier shift to highly productive private activities and thus faster growth of the private sector, productivity, and employment, consistent with stylized facts.

In addition to discussing the business environment, the framework examines a key policy issue: the optimal path of state sector employment during transition. Besides transition, the role of the state in the economy has received increased attention as the global financial and economic crisis has turned into a global employment crisis and social concerns have started to top the policy agenda. This paper contributes to this debate with insights from transition experiences. It points out that in countries where reforms of 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 paper is organized as follows. Following this Introduction, Section 2 develops the model where the business environment impacts firm creation and thus growth and structure of the private sector, unemployment, and productivity during transition. Section 3 presents analytical results and numerical solutions. Section 4 shows that the role of the state as an employer during the transition increases if reforms to the business climate are sluggish. Section 5 concludes.

2. THE MODEL

The model that follows shows how the quality of the business climate affects entrepreneurs' search for business opportunities and their choice of whether to run low-productivity firms or not, as well as unemployment, the share of the private sector in the aggregate output, and aggregate productivity during the transition.[2] It aims to reflect some of the observed stylized facts during transition, namely faster private sector growth, larger share of high value-added/productivity activities, and more rapid productivity rebound, but also higher official unemployment in the CEEB than in the CIS.

2.1. Economic Environment

Agents. 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 infinitely lived entrepreneurs and workers, with population sizes μ and $1-\mu$, respectively. All agents 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 $t=0$.

All agents are initially in the state sector; that is, $s_0 = 1$. The state sector jobs are destroyed through idiosyncratic productivity shocks arriving at the exogenously given rate λ; that is, $\dot{s}_t = -\lambda s_t$.[3] At date t, a proportion s_t of entrepreneurs and workers are working in the state sector and $1-s_t$ are in the private sector. Workers outside of the state sector, that is, the $1-s_t$ share of the population, are either employed in private firms or unemployed/in the informal sector. Entrepreneurs are either searching for business opportunities or running private firms.[4]

Entrepreneurs. Firms are created through entrepreneurs' search at a flow cost of $d(x) = x^2/2\gamma$ units of consumption good, where $\gamma > 0$ denotes the efficiency of search. The entrepreneurs find a business opportunity according to a Poisson process with an arrival rate of x (with first arrival of the event). The opportunities are heterogeneous: some are of high productivity, others of low productivity. A business opportunity has high productivity $z_i = z_h$ with probability ϕ and low productivity $z_i = z_l$ with probability $1-\phi$, where $0 < z_l < z_h$; z_i can be also called "business capital." With productivity of type i, the entrepreneur can produce output in the formal sector y_i employing n_i workers according to a constant–returns to scale production function $y_i = \varepsilon z_i n_i$, where $0 < n_l \leqslant n_h$[5] and ε, $0 < \varepsilon < 1$, is an efficiency component, which reflects the quality of the business environment in which entrepreneurs operate.[6] Both high- and low-productivity firms and jobs are destroyed at an exogenously given rate δ, again with the first arrival of the event according to a Poisson process.

The firm's effective productivity per worker is thus $\bar{z}_i = \varepsilon z_i$, $i = h, l$.[7] With the low-productivity opportunity, z_l, the entrepreneur chooses whether to accept it ($p=1$) or continue searching for high-productivity opportunities ($p=0$). A firm of type i thus earns profit $\pi_i = \varepsilon z_i n_i - w n_i$, where w denotes the wage. Wages in

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the private sector, w, are equal to workers' default option, that is, the alternative source of income—unemployment benefit, b, and income from the subsistence informal sector, Z_u.[8] Specifically, in addition to collecting unemployment benefits, the unemployed workers are involved in subsistence informal work, that is, either household production or underground production, and its aggregate production function is $Y_{ut} = Z_u N_{ut}$, where Y_{ut} is the aggregate output and Z_u is the aggregate business capital in the informal sector, which is assumed to be constant and such that $0 < Z_u < z_l < z_h$.[9]

To characterize the optimization problems of entrepreneurs, a value function approach is utilized. Suppressing the time subscripts and denoting as J^u, J^h, and J^l the present discounted values of the income streams of entrepreneurs running a high-productivity private firm, running a low-productivity firm, and searching for a business opportunity, respectively, the corresponding Bellman equations are

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

$$rJ^h = \pi_h + \delta(J^u - J^h) + \dot{J}^h \quad (2)$$

$$rJ^l = \pi_l + \delta(J^u - J^l) + \dot{J}^l, \quad (3)$$

where r is the exogenously given discount rate and $\dot{J}^i$ is the rate of change of the value J^i over time. According to (1), the return from searching for a business opportunity equals the net expected return from running a business plus the change in the value of searching for opportunities. According to (2) and (3), the return from operating a firm consists of profits minus the expected loss due to the exogenous destruction plus the change in the value of J^i.[10]

The entrepreneur chooses the search intensity, x, so that the marginal cost of search equals the expected marginal payoff:

$$\frac{x}{\gamma} = \phi(J^h - J^u) + (1-\phi)\max[J^l; J^u] = L. \quad (4)$$

The search intensity, x, rises with the difference between the values of running a firm and searching, and thus with the level of productivity and the quality of business environment; i.e., it rises with lower θ. It also increases with the efficiency of search, γ. L denotes the value of a random business opportunity to an entrepreneur.

Labor market clearing conditions. Firms and jobs are destroyed through firm-specific, idiosyncratic productivity shocks arriving at an exogenously given rate δ. When that happens, the entrepreneur starts searching for a new business opportunity. Denoting the number of entrepreneurs outside the state sector at t as $(1-s_t)\mu$, entrepreneurs searching for business opportunities as m_{ut}, and entrepreneurs operating businesses as m_t, the labor market clearing conditions for entrepreneurs become

$$(1-s_t)\mu = m_{ut} + m_t = m_{ut} + m_{ht} + m_{lt}, \quad (5)$$

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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-productivity firms evolves according to

$$\dot{m}_{ht} = x\phi m_{ut} - \delta m_{ht} \tag{6}$$

$$\dot{m}_{lt} = xp(1-\phi)m_{ut} - \delta m_{lt}, \tag{7}$$

where p is the probability that the entrepreneur accepts the opportunity to operate a low-productivity business in the informal sector. The initial conditions are $m_{h0} = m_{l0} = 0$; i.e., there are no private firms at the beginning of the transition.

Workers who are outside of the state sector, $(1 - s_t)(1 - \mu)$, are employed either in high-productivity firms in the formal sector, N_{ht}, or in low-productivity businesses in the informal sector, N_{lt}, or they are unemployed, N_{ut}, and collecting unemployment benefits amounting to b:

$$(1 - s_t)(1 - \mu) = N_{ut} + N_{ht} + N_{lt} = N_{ut} + m_{ht}n_h + m_{lt}n_l. \tag{8}$$

2.2. Equilibrium

The *equilibrium* of this economy is then the allocation of workers and entrepreneurs and the probability that entrepreneurs accept low-productivity opportunities when (i) entrepreneurs choose the effort they put into the 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.

Denoting π_u, $\pi_u = \gamma L^2/2$, as "profit" from search for searching entrepreneurs and utilizing (1)–(3), L evolves according to

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

where$p = 1$ if $\pi_l > \pi_u$ and $p = 0$ if $\pi_l \leqslant \pi_u$. The entrepreneur will accept a low-productivity business opportunity if the profit of the low-productivity firm exceeds the "profit" from searching.

Because entrepreneurs' search is costly, private sector development takes time. The growth and the structure of the private sector depend on the intensity of entrepreneurs' search and on whether the entrepreneurs accept low-productivity business opportunities or not. From (9), L is affected by the quality of the business environment, ε. The equilibrium transition path for total number of entrepreneurs thus becomes

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

where $m_0 = 0$ and p is defined as before. The dynamic competitive equilibrium is described by the path of (L, p, m) satisfying (9) and (10). For given state sector employment and number of private firms, the private sector grows more rapidly in an enabling business environment.

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3. RESULTS

3.1. Steady State

Before turning to dynamics, it is helpful to examine the steady state equilibrium. From (9) and (10), it follows that for a given quality of the business environment $\bar{\varepsilon}$ there is a unique steady state equilibrium such that

$$L(\bar{\varepsilon}) = \frac{\phi(\pi_h(\bar{\varepsilon}) - \pi_u(\bar{\varepsilon})) + (1-\phi)p(\pi_l - \pi_u(\bar{\varepsilon}))}{r+\delta}, \tag{11}$$

$$m(\bar{\varepsilon}) = \frac{\gamma L(\bar{\varepsilon})[\phi + p(1-\phi)]\mu}{\gamma L(\bar{\varepsilon})[\phi + (1-\phi)p] + \delta}, \tag{12}$$

where

$$p = 1 \text{ if} \frac{\gamma L^2(\bar{\varepsilon})}{2} = \pi_u(\bar{\varepsilon}) < \pi_l(\varepsilon) \text{ and } p = 0 \text{ if } \frac{\gamma L^2(\bar{\varepsilon})}{2} = \pi_u(\bar{\varepsilon}) \geqslant \pi_l(\bar{\varepsilon}).^{11} \tag{13}$$

Equations (11)–(13') show that if the profit gap between high- and low-productivity firms is small, entrepreneurs run both types of businesses; i.e., $p = 1$. If the gap is large, they run only highly productive businesses; i.e., $p = 0$. Because the profit gap rises with improved business environment (i.e., higher ε), entrepreneurs will opt only for the high-productivity opportunities when the business climate sufficiently improves. Moreover, with a better business environment, i.e., with higher ε, the value of the random business opportunity L rises and so do incentives for entrepreneurs to search—both in the steady state and during the transition.[12]

3.2. Transition

For a given quality of the business environment, the control variable L (and hence the entrepreneur's search $x = \gamma L$) is constant and immediately reaches its steady state value, defined in (11). In turn, given the initial number of private firms and L, the equilibrium transition path of m follows (10), taking the transition path of the state sector employment $\dot{s} = -\lambda s$; $s_0 = 1$ as given. Moreover, the transition path of the low-productivity firms follows

$$m_{l0} = \gamma L p(1-\phi)[(1-s)\mu - m] - \delta m_l, \tag{14}$$

where $m_{l0} = 0$. As long as entrepreneurs accept all low-productivity opportunities they find, their share in the total number of firms is $(1 - \phi)$. Once they start accepting only the high-productivity opportunities, the number of low-productivity firms declines at a rate δ.

The phase diagram in Figure 1 illustrates the impact of the quality of the business climate on the entrepreneurs' search and the size of the private sector for

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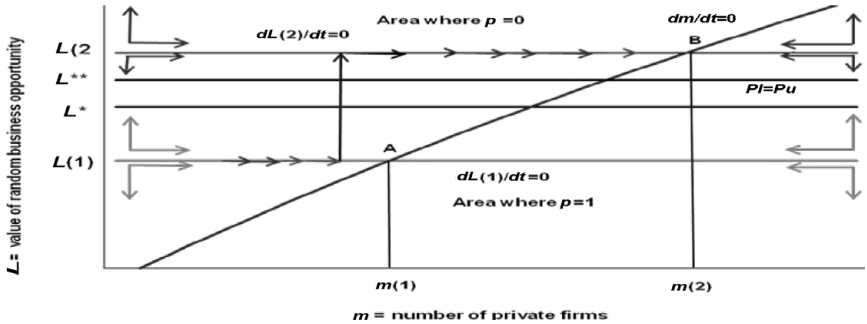

FIGURE 1. Phase diagram for the case where $p = 1$ in the first stage of the transition and $p = 0$ in the second stage of the transition. $L_1 = \phi L_2$; that is, the $\dot{m} = 0$ locus is not affected by increased entrepreneur effort.

the special case of the immediate state sector closure. Transition paths of m and L for this special case are depicted in Figure 1. First, the $\dot{L} = 0$ locus and the $\dot{m} = 0$ locus are determined. The saddle path is the locus along which L is constant at its steady state value. Whereas the control variable L jumps immediately to its steady state value, the state variable, m, gradually converges to it according to (10).

Figure 1 shows two possible transition paths: (i) one where entrepreneurs accept all the business opportunities they find during the entire transition and (ii) one where entrepreneurs accept only high-productivity opportunities. In the first case, the business climate is characterized by ε_1, which leads to the search effort $x_1 = \gamma L_1(\varepsilon_1)$, where $\pi_l(\varepsilon_1) > \frac{\gamma L_1^2(\varepsilon_1)}{2}$ (the region below$L^*(\varepsilon_1)) = \sqrt{2\pi_l/\gamma}$). In contrast, in the second case, where the business environment is described by $\varepsilon_2 > \varepsilon_1$, $\pi_l(\varepsilon_2) < \frac{\gamma L_2^2(\varepsilon_2)}{2}$ and $p = 0$. In this case, the entrepreneurs accept only high-productivity business opportunities throughout the transition. If the business climate improves during the transition from ε_1 to ε_2, the entrepreneurs initially exert search effort $x_1 = \gamma L_1(\varepsilon_1)$ and accept both types of opportunities (as long as the quality of the business climate is ε_1), but raise search effort to $x_2 = \gamma L_2(\varepsilon_2)$ and accept only high-productivity ones at the second stage of the transition (with increase to ε_2) .

3.3. Numerical Solution

The simulations that follow, which illustrate the impact of the business environment on start-ups, private sector growth, 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.

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TABLE 1. Baseline parameters of the model

Parameter	μ	r	δ	z_s	z_h	z_l	Z_u	w	ϕ	γ	$n_h = n_l$
Value	0.24	0.1	0.16	1	2.9	1.6	0.1	0.4	0.55	0.16	3.8

Notes: The share of entrepreneurs in the population, μ, is from OECD labor force statistics; the annual interest rate is set to $r = 0.1$ (above the standard value of 0.04 in advanced economies); rate of destruction of private jobs, δ, is taken from national statistics (e.g., Estonia); average employment in SME is set as in the Czech republic (ECE data); the average output in the state sector, z_s, is normalized to 1; wage in the private sector was set to amount to $\frac{1}{3} - \frac{1}{2}$ of output per worker, depending on the quality of the business climate (within standard range).

Steady state. Table 2 shows the steady state values under two types of business climate: (1) an enabling one, with $\varepsilon = 0.8$, and (2) a weaker one, with $\varepsilon = 0.45$. The more enabling business environment encourages potential entrepreneurs to search effort and opening only highly productive businesses.

Transition. Simulations that follow show the impact of the business climate on the labor market outcomes in transition in the CEEB and the CIS countries. To relate the simulations to the actual outcomes, the different rates of state sector employment decline that these countries exhibited are also reflected. The case of the CEEB countries (Figure 2), which undertook market reforms (including strengthening the business environment) in the early stages of the transition, is compared to the case of the CIS countries, where the reforms were delayed and the poor environment persisted for a number of years (Figure 3). In the simulations, the reforms are illustrated as "one-off" improvement in the business climate, as in the phase diagram in Figure 1. For both cases, the impacts of the reform of the business environment on the size and the structure of the private sector output, unemployment, and labor productivity are examined.

Figure 2a shows that with early introduction of a more conducive business climate, as in the CEEB countries, entrepreneurs shift from opening both high- and low-productivity firms to opening only high-productivity ones early on. In fact the numerical example in Figure 2 shows that with reasonable parameters outlined previously, our model matches the actual outcomes in the CEEB countries during

TABLE 2. Steady state results: comparison of outcomes in different business environments

	Rigid bus. climate $\varepsilon = 0.45$	Enabling bus. climate $\varepsilon = 0.8$
Total share of private firms (% of LF)	19.2	19.4
Share of high-productivity firms (% of LF)	10.6	19.4
Share of low-productivity firms (% of LF)	8.7	0
Share of unemployed workers (% of LF)	7.7	6.9
Index of average labor productivity	1.02	1.72

Notes: Sensitivity analysis was carried out with respect to (i) the share of high-productivity business opportunities, and (ii) productivity level in the high-productivity firm. The main results are robust to different assumptions.

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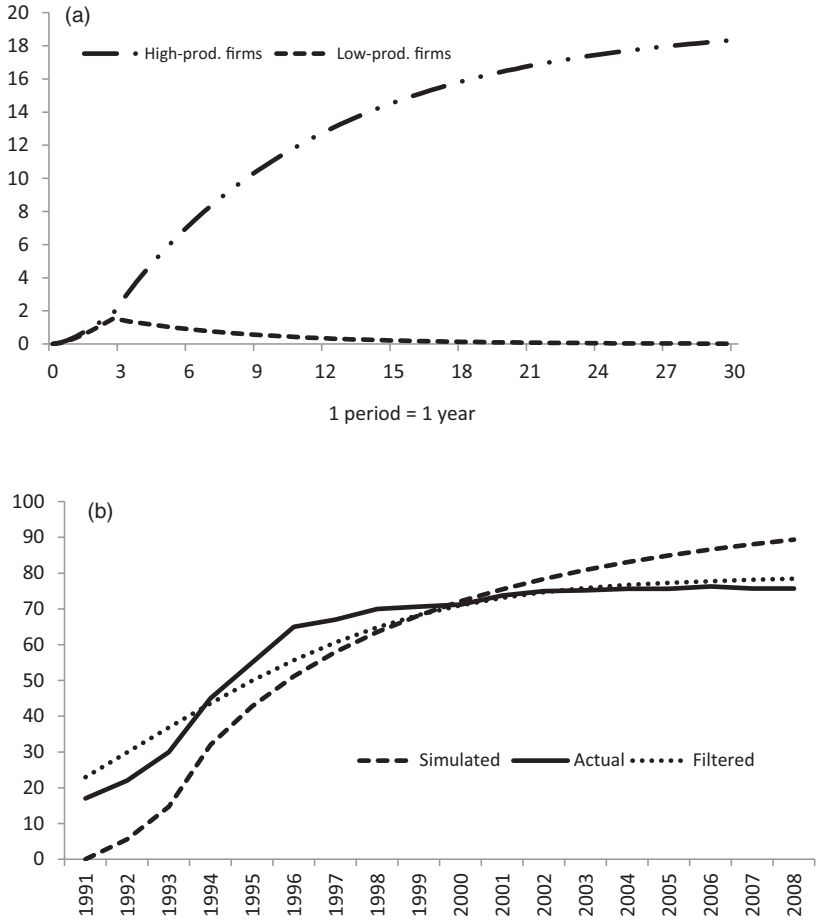

FIGURE 2. Transition paths of the private sector output, unemployment, and productivity in CEEB, 1991–2008. (a) The number of firms (% of LF); simulated. (b) The share of the private output (%). (c) Labor productivity (indices, 1991 = 100). (d) Unemployment (% of LF). *Notes:* Calculations based on the model and the EBRD data. The actual annual data are filtered with the HP filter. The state sector employment and the business environment evolve as follows: $\lambda = 0.12$ and $\varepsilon = 0.42$ for the first three years, and $\lambda = 0.1$ and $\varepsilon = 0.8$, where increase in ε reflects reforms of the business climate. LF stands for labor force.

transition relatively well. Specifically, the simulated paths of the share of the private sector in output, unemployment, and the aggregate labor productivity are reasonably close to the observed ones.

The case of the nonoil CIS countries (Figure 3) shows that when a poor business environment prevails for a longer period of the transition, it induces firms to open both high- and low-productivity firms for a longer part of the transition. Thus

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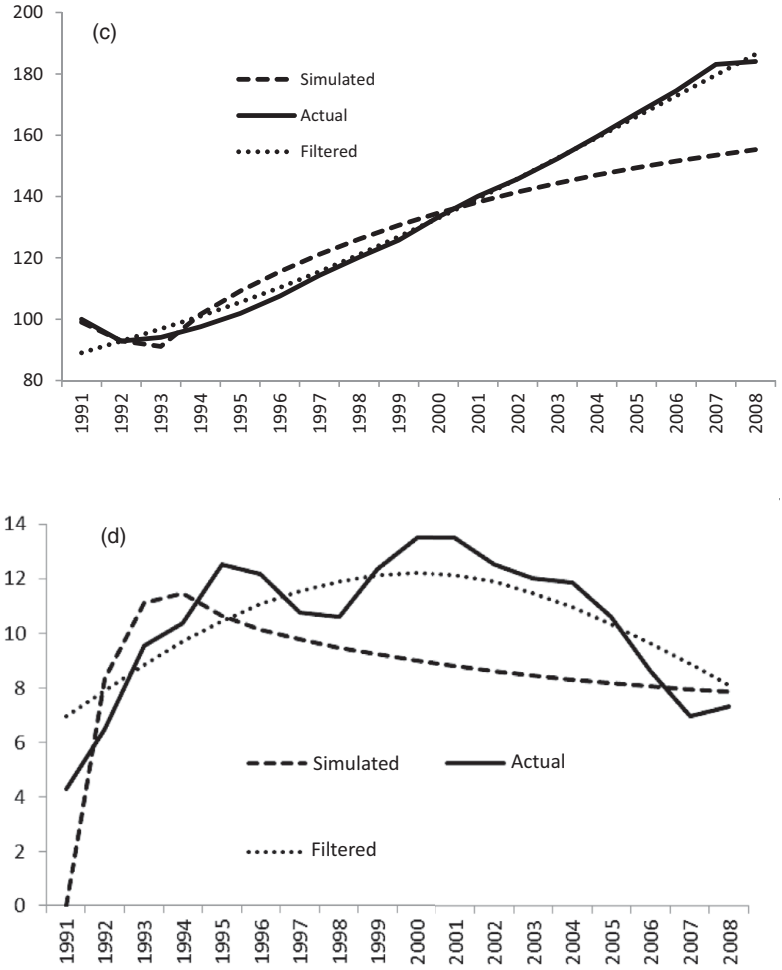

FIGURE 2. Continued.

private firms are smaller and operate in low-productivity activities for a longer time than in the CEEB countries. However, in this case, matching our simulations with the actual data on both official unemployment and the labor productivity is more problematic then for the CEEB countries.

The model can either approximate the massive decline in productivity (as in scenario *), which is accompanied by much higher unemployment than the official statistics indicate, or depict the low official unemployment (scenario **)—but then the decline in productivity (and output) is less severe than in the official data. Between these two scenarios, the first one, i.e., substantial decline in productivity and much higher unemployment than in the official statistics, is closer to the

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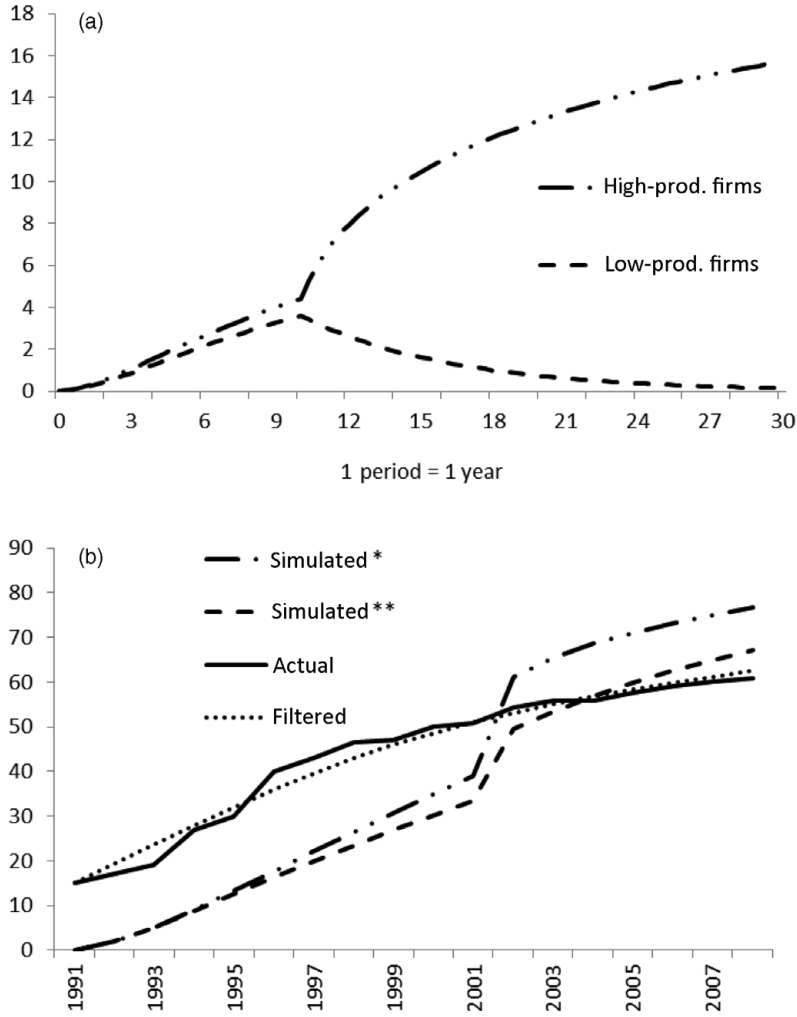

FIGURE 3. Transition paths of private sector output, unemployment, and productivity in the CIS. (a) The number of firms, simulated (% of LF). (b) The share of the private output (%). (c) Labor productivity (indices, 1991 = 100). (d) Unemployment (% of labor force). *Notes:* Calculations based on the model and the EBRD data. The actual annual data are filtered with the HP filter. The state sector employment and the business environment evolve as $\lambda = 0.05$ and $\varepsilon = 0.3$ for the first 10 years of the transition and increase to $\varepsilon = 0.75$ with reforms afterward. In the scenario labeled $*z_l$ is set to 0.8, whereas $\lambda = 0.08$ for the first ten years.

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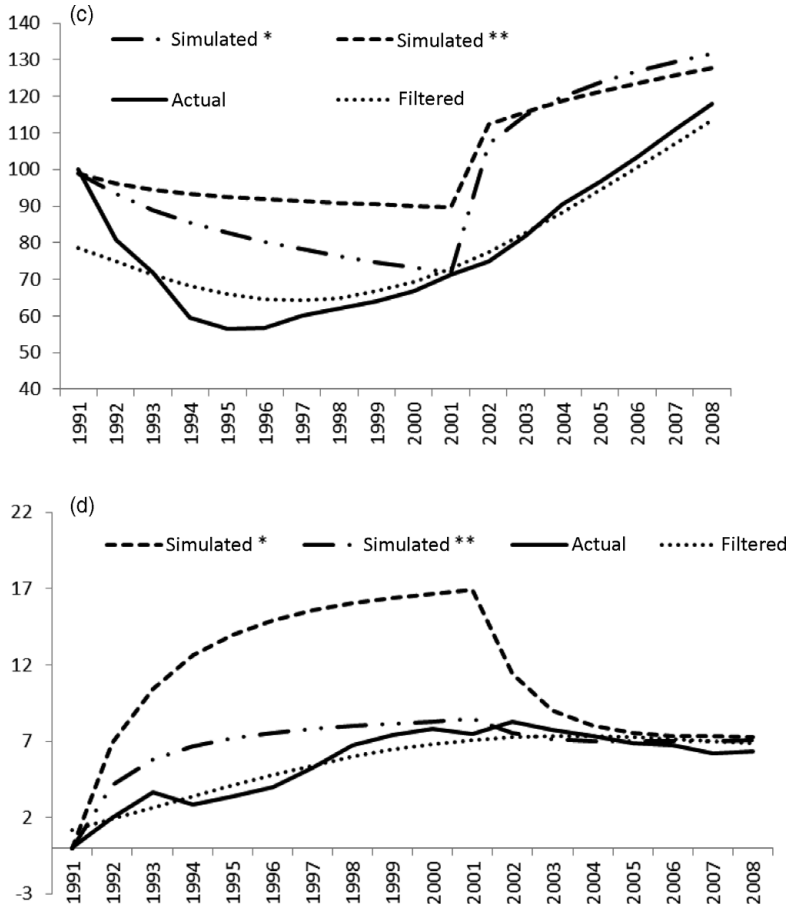

FIGURE 3. Continued

outcomes in the CIS. This is because underemployment in the CIS countries has been recognized to be much higher than in the CEEB group.[13] If the underemployed were counted as unemployed, our simulations (scenario *) would again be fairly close to the actual outcomes.

However, it needs to be underscored that in addition to the weak business climate, other factors, including adoption of different technologies (approximated by much lower z_l) in our simulations, are likely to contribute to explaining the decline in productivity of the magnitude that the CIS countries experienced.[14] Hence the weaker business environment is an important, but only one, factor behind the diverging outcomes that these countries experienced during transition.

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4. POLICY ANALYSIS: THE OPTIMAL PATH OF STATE SECTOR EMPLOYMENT

Improvements in economic efficiency through sectoral reallocation of labor are one of the main features of transition. In addition to illustrating the positive impact of improved business environment, the preceding framework can be used to examine another key policy issue: the optimal path of state sector employment.[15] In contrast to Section 3, the size of the state sector is now determined by policy makers—either directly, through layoffs from the public sector, or indirectly, through, for example, tax or wage policies. The criterion for the optimal closure of the state sector is maximization of the net present value of output.[16] An efficient allocation of state sector employment, private sector firms, and search effort $\{s, m, x\}$ maximizes output in the state sector and the formal private sector, $z_s s + \varepsilon z_p mn$, net of the cost of searching for business opportunities, $[\mu(1-s)-m]\frac{x^2}{2\gamma}$, 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 firms (16) and the boundary conditions. The social planner's problem therefore can be described as

$$\max_{m,s} \int_0^\infty e^{-rt}\left(z_s s + \varepsilon z_p mn - [(1-s)\mu - m]\frac{x^2}{2\gamma} - \frac{A}{2}[1-s-mn-m]^2\right)dt \tag{15}$$

$$\text{s.t.} \quad \dot{m} = x[(1-s)\mu - m] - \delta m \tag{16}$$

and $m(0) = m_0$, $\lim_{t\to\infty} e^{-rt}\pi(t) = 0$, where π is the shadow value of the private firm, z_s is productivity in the state sector, and z_p is productivity in the private sector. The solution is given by

$$z_s + A\,(1-s-mn-m) = \mu\gamma\frac{\pi^2}{2} \tag{17}$$

$$\dot{\pi} = -(1-\theta)z_p n + z_s(1+n) + \pi(\delta + r) + \frac{\gamma}{2}\pi^2(1-\mu-n\mu) \tag{18}$$

$$\dot{m} = \gamma\pi[(1-s)\mu - m] - \delta m, \tag{19}$$

where $m(0) = m_0$. The first-order condition (17) optimally selects state sector employment, s, at every t so that the marginal benefit of an extra state sector worker, consisting of marginal output (z_s) and foregone social cost of not working $A(1-s-mn-m)$, equals the foregone pool for private firm creation, $\mu\pi^2\gamma/2$. Equation (18) states that π, the shadow value of an extra entrepreneur running a private firm, is the discounted difference between productivity in the state and the private sectors, net of the social costs of search, $\pi^2\gamma(1-\mu-n\mu)/2$. Equation (18) also shows that π immediately reaches its steady state value. Hence, from (17), the optimal path of the state sector employment is such that $1-s-mn-m$ is also constant along the transition path.

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According to (19), the optimal search effort $x = \gamma\pi$ and state sector employment s, together with m, determine the change in the number of entrepreneurs running private firms. Substituting the condition for optimal state sector employment from (17) into (19) yields

$$\dot{m} = \gamma\pi\left(\frac{\gamma\mu\pi^2}{2A} - \frac{z_s}{A} + m + mn\right)\mu - \gamma\pi m - \delta m, \qquad \textbf{(20)}$$

where $m_0 = 0$. Hence (19) and (20) identify the optimal transition path. They show that for a given number of private firms, the optimal growth of the private sector is slower under a weaker business environment, as π, the shadow value of private firms, is lower. In sum, the optimal level of state sector employment is higher with a smaller productivity gap between the state and the private sectors, with a higher social cost that the policymakers attach to people not working or running a business, and with a weaker business environment.

Simulations of optimal transition paths in different business climates (Figure 4) illustrate that the optimal rate of state sector downsizing is lower in a weaker business environment than in a stronger one. Similarly, the optimal level of state employment in the steady state is higher with a weaker business climate. This is because, as the less enabling business environment reduces the optimal rate of private firm creation (as in Figure 4a), the society's opportunity costs of workers remaining in the state sector are reduced. In contrast, in a better business climate, the productivity in the private sector is higher and so are the opportunity costs of state sector employment. In fact, the opportunity cost of state sector employment may be so high that in spite of the social cost attached to it, high unemployment may be optimal in the early stages of transition when the private sector grows. When the state sector is closed and the steady state number of private firms is reached, the optimal unemployment level declines to its steady state value (Figure 4b).

5. CONCLUSIONS

This paper examined differences in private sector growth, productivity, and unemployment patterns between the Central and Eastern European countries and the Baltics (CEEB) and the nonoil CIS countries, using a model of labor reallocation and firm creation with transaction costs. The CEEB's faster implementation of market reforms and more enabling business climate helped stimulate an earlier structural shift to more productive private firms. The model illustrates that this also contributed to faster labor productivity growth, and, consequently, to a more rapid convergence to the income levels of advanced economies.

Although the business environment is very important for private sector development, it needs to be underscored that is only one factor behind the diverging outcomes that the CEEB and the nonoil CIS countries experienced during

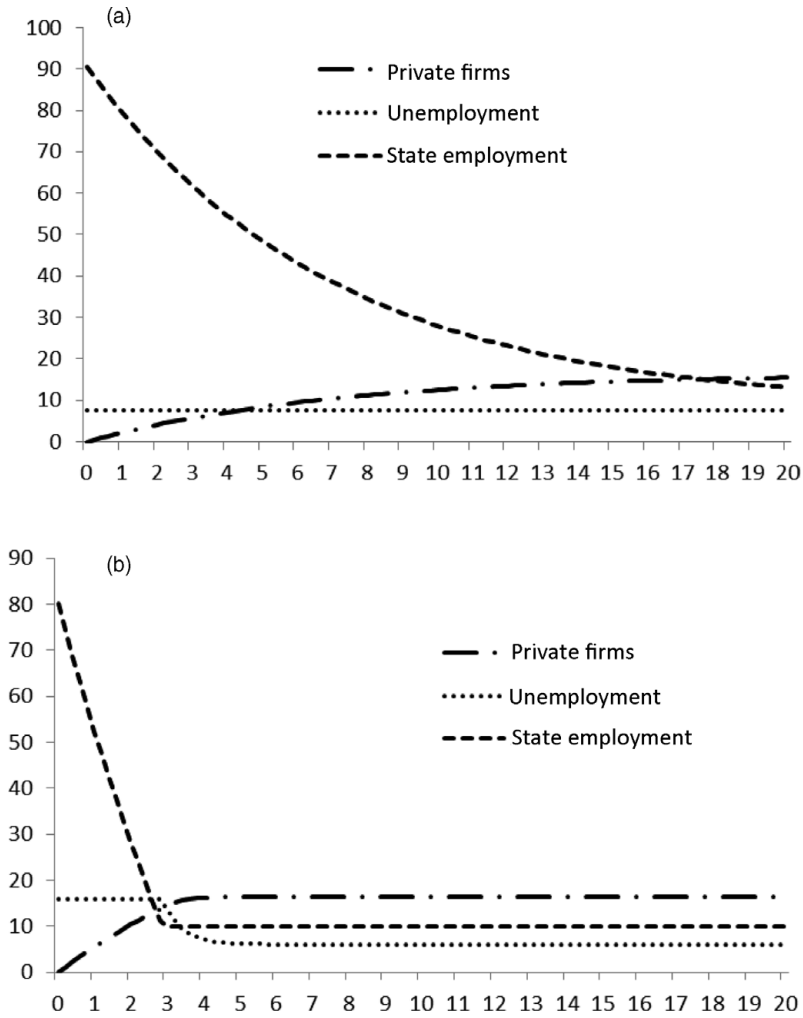

FIGURE 4. Optimal paths of state sector employment, unemployment, and the number of private firms under different business climates. (a) Weaker business climate ($\varepsilon = 0.77$). (b) Stronger business climate ($\varepsilon = 0.85$). *Notes:* Calculations based on the model and the EBRD data. Parameters are set as follows: $z = 4$, $n = 2.8$, $A = 10$, and $\mu = 0.2$.

transition. Other factors, including noneconomic ones such as the higher prevalence of conflicts in the CIS region, also played a role. Moreover, all transition countries would benefit from reducing the remaining obstacles to private sector activities, such as credit constraints, high payroll taxes, and in the new EU members, also persistent skill shortages. The global financial crisis and tightened credit conditions have once again underscored the importance of improving the

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efficiency of financial markets, and especially easing the 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 particularly slow and costly (as, for example, in Belarus, because of political constraints) and prospects for emergence of productive private firms limited, it is rational to keep workers in public jobs for longer, rather than pursuing radical downsizing of the public sector.[17] This said, the resulting slower paths of labor productivity and output growth are inferior to outcomes in an environment with early and vigorous improvement 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.

NOTES

1. These authors show that access to credit, market regulation (credit and labor regulation), start-up costs, and the tax burden have significant effects on employment and entrepreneurial entry.

2. This paper does not explain differences in transition paths between Central Europe and the Baltics caused by differences in credit expansion, which was important especially around the mid-2000s.

3. An alternative modeling strategy is in Castanheira and Roland (2000), who view transition as reallocation of capital, with labor moving freely across sectors. Another option is in Garibaldi and Brixiova (1998), who endogenize job destruction in the state sector and look at the impact of labor market policies on sectoral reallocation of labor. However, the main focus of this paper is endogenizing firm creation and private sector creation and destruction.

4. Both unemployed workers and searching entrepreneurs receive unemployment benefits $'b$. Because entrepreneurs tend to be individuals with specific backgrounds, their shares in population are not easily influenced by policies, at least not in the short and medium term.

5. Moreover, Gollin (2008) shows that differences in firm size across countries can be explained largely by differences in productivity, consistent with our assumptions that $n_l \leqslant n_h$ and $z_l < z_h$.

6. As in Parente and Prescott (2006), the efficiency component ε differs across countries because of different economic policies and institutions (in this case business environment). The preceding sections assume that a poor business environment affects both types of firms equally, but it could also be affecting more severely the high-productivity firms, which have more frequent interactions with the existing institutions. In practical terms, the efficiency component is a number in the interval (0,1]. If it is less than one, a country operates inside the production possibilitys frontier. This number reflects the EBRD transition index or the World Bank "Doing Business" Index.

7. Because this paper focuses on drivers of productivity growth during transition, it does not try to explain why some countries adopted better business environments or institutional setups faster than others.

8. During most of the transition, shortages of firms rather predominated, whereas workers were in abundant supply, and firms thus captured the profit generated by firm creation. As there is no friction in the labor market, workers are indifferent between working in the private sector and being unemployed/in the informal sector at the margin.

9. European Bank for Reconstruction and Development (2000) shows that with structural unemployment in many transition countries the unemployed coped with the job loss in the "survival" section of the informal labor market, mostly performing low-paid and low-skill jobs.

10. For the workers not to leave the state sector for unemployment, $J^s < J^u$ must hold, where J^s is the value of employment in the state sector. The on-the-job search would not change the results [Brixiova and Yousef (2000)].

11. The proof of uniqueness of the steady state equilibrium is as follows: Setting $\dot{m} = \dot{L} = 0$ and utilizing (10) and (9), let

$$H = (r+\delta)\frac{\delta m}{\gamma[\phi + (1-\phi)p](\mu - m)} + \frac{\gamma}{2}[\phi + (1-\phi)\bar{p}]\left(\frac{\delta m}{\gamma[\phi + (1-\phi)\bar{p}](\mu - m)}\right)^2 - A,$$

where $A = \phi\pi_h + (1-\phi)\bar{p}\pi_l$. Letting $m = 0$, $H = -A < 0$. Then letting $m = \mu$, $H \to \infty$. Because for given $\bar{p}$, H is continuous and monotonically increasing, $\exists$ a unique $\bar{m} \in (0, \mu)$ s.t. $H(\bar{m}) = 0$.

12. Alternatively,

$$L(\bar{\varepsilon}) = \frac{-(r+\delta) + \sqrt{(r+\delta)^2 + 2\gamma[\phi\pi_h(\bar{\varepsilon}) + (1-\phi)\bar{p}\pi_l(\bar{\varepsilon})]}}{\gamma[\phi + (1-\phi)\bar{p}]}.$$

Hence L is monotonically increasing in ε. L also rises when entrepreneurs switch from taking both types of business opportunities to taking only high-productivity ones, as long as the profit gap between the two types of firms is high enough.

13. For instance, according to the ILO KILM database, in 2001 underemployment amounted to 9% of the labor force in Armenia. In contrast, it was estimated to be less than 0.5% of the labor force in all CEE countries except Poland, where it was 1.5% of the labor force.

14. The lower z_l reflects the expansion of agricultural production that took place in the CIS. An alternative plausible explanation would be that low-productivity firms are affected by the poor business environment (for example, corruption) much more severely than the high-productivity firms.

15. Besides transition, the issue is relevant for any sectoral reallocation from low- to high-productivity activities. For example, in the aftermath of the global economic crisis, some emerging countries (e.g., Estonia) need to reallocate activities from the housing and construction sectors to either manufacturing or higher–value added services.

16. The Appendix shows that under the standard assumption in the search literature that agents have risk-neutral preferences in consumption, maximizing utility is equivalent to maximizing the net discounted value of the aggregate output. The solution to the social planner's problem is also detailed in the Appendix.

17. Similar trends can be observed in developing countries, where public sector jobs often provide insurance against risks faced by the economy. Rodrik (1997) shows that countries that are greatly exposed to external risk have higher levels of government employment.

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APPENDIX: THE UNIQUENESS OF THE OPTIMAL PATH

To derive the optimal size of state sector employment during transition, the social planner maximizes discounted net expected utility of the representative agent under resource constraints and taking into account the social cost of not being involved in the formal sector. Allowing for production only in the formal sector, the social planner solves

$$\text{Max } E_0 \left\{ \int_0^{\infty} e^{-rt} \left(c - \frac{A}{2}[1 - s - mn - m]^2 \right) dt \right\} \tag{A.1}$$

$$\text{s.t.} \quad c \leqslant z_s s + \varepsilon z_p mn - \frac{x^2}{2\gamma}[(1 - s)\mu - m] \quad \text{and} \tag{A.2}$$

$$\dot{m} = x[(1 - s)\mu - m] - \delta m \tag{A.3}$$

and $m(0) = m_0$, $\lim_{t\to\infty} e^{-rt}\pi(t) = 0$, where π is the shadow value of the private firm. Substituting from (A.2) into (A.1), the social planner maximizes output net of search cost

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and net of social cost of not being involved in the formal sector:

$$\max_{m,s} E_0 \int_0^{\infty} e^{-rt} \left(z_s s + \varepsilon z_p mn - [(1-s)\mu - m]\frac{x^2}{2\gamma} - \frac{A}{2}[1-s-mn-m]^2 \right) dt \quad \textbf{(A.4)}$$

$$\text{s.t.} \quad \dot{m} = x[(1-s)\mu - m] - \delta m \quad \textbf{(A.5)}$$

and $m(0) = m_0$, $\lim_{t\to\infty} e^{-rt}\pi(t) = 0$, where π is the shadow value of the private firm. Note that the objective function in (A.4), $f(m,s) = z_s s + \varepsilon z_p mn - \frac{x^2}{2\gamma}[(1-s)\mu - m] - \frac{A}{2}[1-s-mn-n]^2$, is strictly concave in s and m. The Hamiltonian of the problem can be defined as

$$H = \left\{ z_s s + \varepsilon z_p mn - \frac{x^2}{2\gamma}[(1-s)\mu - m] - \frac{A}{2}[1-s-mn-m]^2 \right\} + \pi\{x(1-s)\mu - m] - \delta m\},$$

where the optimality conditions are

$$z_s + A\,(1-s-mn-m) = \mu\gamma\frac{\pi^2}{2} \quad \textbf{(A.6)}$$

$$\dot{\pi} = -(1-\theta)z_p n + z_s(1+n) + \pi(\delta + r) + \frac{\gamma}{2}\pi^2(1-\mu-n\mu) \quad \textbf{(A.7)}$$

$$\dot{m} = \gamma\pi[(1-s)\mu - m] - \delta m, \quad \textbf{(A.8)}$$

where $m(0) = m_0$ and $\lim_{t\to\infty} e^{-rt}\pi(t) = 0$. Because the objective function in (A.4) is strictly concave in $s$and m and the constraint (A.5) is linear, the optimization problem defined by (A.4) and (A.5) has a unique internal solution identified by (A.6)–(A.8).

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