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Distance to the Efficiency Frontier and Foreign Direct Investment and Spillovers*

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1 Introduction

Are firms in the former communist economies converging to the world standard? This is the key question in the most challenging economic transformation at the start of this century. While expert opinions differ on what constitutes a successful and complete transition, it is generally acknowledged that transition economies need to raise their productivity substantially in order to catch up with the advanced countries. In this chapter, we show how much progress has been made in reducing the distance between the efficiency of domestic firms and the world technology frontier in two transition economies – the Czech Republic and Russia – and we assess whether the presence of foreign firms in these countries contributes to the reduction of the productivity gap (either through knowledge spillovers or competition).

Russia and the Czech Republic are desirable model economies because they share useful similarities in their initial conditions, yet they represent polar cases of the strategy and implementation of the transition. Unlike, for instance, Hungary and Poland, Russia and the Czech Republic maintained a relatively unreformed centrally planned system until the very end of the communist period, thus providing us with ‘authentic’ initial conditions. During the transition, both countries privatized most of the state assets in a way that was both rapid and controversial. Otherwise these economies pursued different paths, becoming prototypes of two distinct patterns of the transition process. The Czech Republic exemplifies the Central European model. It opened up to trade and capital flows, developed a relatively functioning market economy and gradually established institutions, rules and regulations.

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that made it eligible, together with other Central European countries, for accession to the European Union. Like the other Commonwealth of Independent State (CIS) countries, Russia has remained more closed to the world. It has changed its laws, regulations and institutions more slowly and without attempting to harmonize them with those of the European Union. Hence, to the extent that private corporate governance and competition are effective in strengthening performance, we should expect firms in the Czech Republic to be closing the productivity gap and converging to the frontier more rapidly than firms in Russia.

2 Evolution of the productivity gap and distance to the frontier

We start by estimating and comparing changes in the levels of productive efficiency of domestic and foreign-owned firms in each of these two countries over the 1992–2000 period.\(^2\) Specifically, we estimate the following augmented translog production function with panel data on medium-sized and large firms in the industrial sector (manufacturing, mining, and utilities) in the Czech Republic and in Russia for three consecutive periods: 1992–4 (early transition), 1995–7 (middle transition) and 1998–2000 (mature transition):\(^3\)

\[
\ln y_{it} = X_{it} \beta + Z_{it} \rho + \nu_i + \varepsilon_{it}
\]

(4.1)

where \(y_{it}\) represents the output (revenue) of firm \(i\) in year \(t\), \(X_{it}\) is a vector of inputs (in translog specification) and dummy variables for (two-digit level ISIC) industries and years, \(Z_{it}\) is a dummy for domestic ownership (with foreign ownership serving as the base), \(\nu_i\) are unobserved time-invariant firm-specific effects, and \(\varepsilon_{it}\) is an independently distributed error term, with

\[
E(\nu_i) = E(\varepsilon_{it}) = E(\nu_i \varepsilon_{it}) = E(\varepsilon_{it} \varepsilon_{is}) = 0 \quad \text{for} \; \forall \; t > s.
\]

We treat domestic firms with private, mixed and state ownership as one category since we find in a companion paper that their efficiency is similar (Sabirianova, Svejnar and Terrell, 2004, henceforth SST, 2004).

Next, for each firm \(i\) we calculate firm-specific productive efficiency in log points as \(\varphi_i = \rho + \nu_i\), with \(E(\varphi_i) = \rho\) and \(E(\nu_i) = 0\), and we measure how far the productive efficiency of domestic firms is from that of the frontier firms.\(^4\) An important methodological question is how to define the world technology frontier. Since in SST (2004) we find that the efficiency of foreign firms is above the efficiency of domestic firms at all respective points of the two efficiency distributions, in this chapter we use the average level of the estimated efficiency of the top third of foreign firms in a given two-digit industry as the benchmark for the frontier.\(^5\) We believe this is superior to the alternative of using firms operating in advanced market economies as the benchmark since the latter approach is plagued by comparison problems associated with wide exchange-rate fluctuations and different shocks and institutions across countries.