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Working Paper

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CESifo Working Paper, No. 3934

Provided in Cooperation with:
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Suggested Citation: Carlin, Wendy; Schaffer, Mark (2012) : The business environment in the transition, CESifo Working Paper, No. 3934, Center for Economic Studies and ifo Institute (CESifo), Munich

This Version is available at:
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CESIFO WORKING PAPER NO. 3934
CATEGORY 11: INDUSTRIAL ORGANISATION
SEPTEMBER 2012

CESifo *Working Paper No. 3934*

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Abstract

Following the collapse of planning, new small and medium-sized firms rapidly emerged in all transition economies. Using firm level data, we investigate the interaction between the widespread opportunities for new business activities such firms faced and their business environment. The business environment includes physical infrastructure, the availability of an educated labour force, provision of administrative and judicial services, the control of corruption and crime, and the stability of the macroeconomic environment. By comparing how different elements of the business environment affected firms in formerly planned economies with those in economies outside transition, we document not only the challenges faced by transition firms but also the effects of the planning legacy.

JEL-Code: D290, H490, M290, P210.

Keywords: infrastructure, human capital, institutions, planned economy, transition, business environment.

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September 2012
We are very grateful to Paul Seabright for discussions on our related work, which have influenced this paper. Some of the analysis in this paper builds on work in Carlin and Schaffer (2009), which was prepared as a background paper for Mitra *et al*. (2010). An earlier version of this paper was given as the keynote lecture at AISSEC, Macerata, Italy, 2011. This paper is appearing in Paul Hare and Gerard Turley (ed.) *The Economics and Political Economy of Transition Handbook*. Routledge 2012.

Introduction

When transition began, planning was abandoned, prices were liberalized and the new entry of firms was permitted. Although there was wide variation in the methods and speed of privatization of large firms, the privatization of small enterprises and shops was accomplished quickly in virtually every transition economy. The process of legalizing the start-up of new firms and the rapid privatization of small enterprises (mainly to managers) created the opportunity for new firms and new activities in existing firms to emerge across transition. This can be considered as a more or less uniform treatment effect of transition. In this contribution we investigate the interaction between the external environment such firms faced with the widespread opportunities for new business activities. The business environment for firms includes physical infrastructure, the availability of an educated labour force, the provision of administrative and judicial services, the control of corruption and crime, and the stability of the macroeconomic environment.

We address the following three questions. First, are the mainly new small or medium-sized enterprises (SMEs) in the transition economies different from firms outside transition in how their characteristics (such as their size and whether they are expanding their level of employment) affect their responses to the different elements of the business environment? Second, is there a difference at the country level between the average transition economy (TE) and the average non-transition economy (NTE) in how the seriousness of different elements of the business environment is rated? Finally, is there a systematic difference between TEs and NTEs at the country level in the relationship between the level of development or per capita income and elements of the business environment?

To answer these questions, we use data on TEs in the second decade of transition deriving from surveys of firms conducted in 2002-2005, after the upheavals of early transition and of the Russian crisis. We would expect differences between TEs and NTEs to reflect both the legacy of the planning period and of the policies implemented during transition.

Two specific characteristics of the planned economies of the ex-Soviet bloc affected the supply of public goods at the outset of transition.[1] First, the economic history of the planned economies shows that some of these public goods – physical infrastructure and education – were provided in the planning era more universally across countries than is the case in market economies spanning the same levels of development. Associated with the more rapid industrialization of poor countries than would have occurred under market conditions were higher levels of physical infrastructure and schooling. Second, all of the planned economies lacked well-developed market economy institutions at the beginning of transition.

Economists anticipated that the abolition of planning, freeing up prices, allowing new firms to enter and the opening up of the economies to international trade would be followed by rapid catch up (e.g. Blanchard, 1997; Kornai, 2000). It was widely believed that the relatively good endowments of these countries with physical infrastructure and human capital would facilitate catch-up. Yet all of these countries experienced a period with output below

[1] See Carlin *et al*. (2012) for a detailed analysis.

its pre-transition level (Blanchard, 1997). After a decade of transition, a new consensus emerged that the quality of market institutions was central to convergence (e.g. Roland, 2000; Svejnar, 2002). We use data from inside and outside transition to test for the existence of the impact of differences in infrastructure and institutions between TEs and NTEs at the level of the firm.

Challenges in using firm-level survey data on the business environment

Since the late 1990s, the EBRD and the World Bank have systematically surveyed large numbers of firms in many different countries, asking managers about the quality of the business environment in which they operate. The standard question asked of managers is 'How much of an obstacle is X to the operation and growth of your business?', and the respondent rates the severity on a 5-point scale of 0 (no obstacle) to 4 (very severe obstacle). The dimensions of the external environment asked about include the following: telecoms, electricity, transport, skills availability, macroeconomic stability, tax administration, customs administration, labour regulation, legal system, corruption and crime.

Acemoglu *et al*. (2001) and similar studies provide evidence that institutional quality matters for economic development, but are not very informative about which specific institutions are more important. The attraction of firm level data on the business environment is that they appear to greatly increase the sample size and therefore to make it possible to identify separately the effect of different institutions on growth. Commander and Svejnar (2011) and Commander and Nikoloski (2011) analyze transition economies and are the most relevant studies of this kind. However, the attempt to use firm-level data to test for the relative importance of a wide range of public inputs in the papers by Commander and co-authors did not produce clear results. The problem here is that the appearance of a large sample size is misleading: because all the firms in a country (or region) face the same set of institutions, the effective sample size is driven primarily by the number of countries rather than the number of firms. We use the same type of data as Commander *et al*. but propose a different framework in which to interpret them.

Before setting out our alternative, it is important to clarify the research strategy that uses firm-level data and is based on the estimation of an augmented production function (e.g. Commander *et al*.). The idea is that the business environment varies at the level of the firm and that this enables the researcher to get a handle on the effect of different aspects of the business environment on productivity by using a production function augmented by these indicators. However, as many of the papers using this approach make clear, their effect on performance can only be estimated if there is a way of isolating the quality of such a firm-level micro-business environment from the firm's characteristics.

A simple example illustrates the problems. It is plausible that a higher productivity firm will attract more attention from rent-seeking bureaucrats: a naïve regression of firm performance on the firm's report of the burden of business regulation would produce a positive estimate of the effect of bureaucratic attention on performance. The main research strategy adopted to get around this problem and uncover the effect of business regulation on firm performance separate from the effect of firm performance in attracting inspections has been to use the so-called 'cell averages' approach. Instead of using the firm's own report of

the burden of business regulation, the average reports of firms with similar characteristics (such as firm size, industry and location) is used.

However, the cell averages approach does not necessarily solve the problem of the endogeneity of the measure of the firm's micro business environment. The reason is that unobservable characteristics that raise the productivity of the firm in question will also tend to raise the productivity levels of the other firms in the cell (e.g. a local demand or industry-specific shock will boost capacity utilization and performance). This will tend to raise the prevalence of inspections, expenditure on abatement such as bribes and the seriousness of this element of the business environment reported by the firm. This is an example of Manski's (1993) 'reflection problem' where a researcher tries to infer the impact on the individuals comprising a group of average behaviour in the group. As noted in Carlin *et al*. (2010), the econometric challenge in trying to tease apart differences in the institutional environment faced by firms in a single country while avoiding the problem of endogeneity is too much for the data to bear. And this may explain why the careful studies by Commander *et al*. that tried to do this found largely null results once country fixed-effects were included.

A framework for analysing firm-level evidence on the business environment

The problems with attempting to uncover the relevance of elements of the business environment by estimating a production function that includes business environment indicators can be avoided by taking a different approach. The approach outlined here is set out in more detail in Carlin *et al*. (2006, 2010), and has been applied to analysing the business environment in transition and developing economies by ourselves, the World Bank and the EBRD (Carlin *et al*. 2012, Mitra *et al*. 2010, EBRD 2010, World Bank 2012).

We take as our starting point that the business environment is external to the firm and that to an important extent, firms in a country share the same environment. This is especially obvious in the case of elements of the environment such as macroeconomic stability. In large countries there is likely to be substantial regional variation for some elements of the business environment, which, with sufficient data, could be tested. Thinking of the business environment as a public rather than a private input suggests that firm-level information be used in a different way from the augmented production function method. We look for a method of drawing inferences about the role of the business environment by using the indicators as dependent rather than independent variables.

Specifically, we formulate predictions as to how a firm's response to its business environment in terms of its evaluation of the costs imposed on it by deficiencies in infrastructure and institutions vary with its characteristics, including its performance. When taken to the data, these predictions indicate, for example, whether it is the case that improvement in a particular element of the business environment is likely to benefit well- or poorly-performing firms; and whether there are important differences between the constraints faced by internationally engaged firms as compared with those that are purely domestic in their inputs, markets and ownership. This is our 'within-country' analysis.

The key point here is that the survey responses on the seriousness of obstacles imposed by the business environment are not estimates of the quality or quantity of a country-wide public input or even of the public input supplied to the firm in question; they are *valuations* of the public input. A simple and intuitive interpretation is that the 'reported

cost' RC_i to firm i of a public input is the gap between the firm's profit in the hypothetical situation where the public input provided is of such high quality that it poses a negligible obstacle to the firm's operations, and the firm's profit in reality, given the actual quality of public input provided.

In our previous work we show how these reported costs can be interpreted as the *shadow prices* of public inputs. Formally, we can think of the profit function π_{ij}^{*} as resulting from a constrained maximization by the firm, where the public input $\overline{B}_j$ is supplied to the firm at a level or quality that means the firm would prefer a higher quality or more of it. By the envelope theorem for constrained maximization, the derivative of the profit function π_{ij}^{*} with respect to a constrained or fixed input is simply the shadow price of the input.[2]

Figure 1 summarizes the predicted relationship between A_i, firm-level total factor productivity (TFP, or another indicator of firm quality or productivity) and the reported cost of a public input constraint, RC_i. In the left hand panel, as TFP rises, the reported cost goes up. More productive firms incur higher costs from inadequate quality or quantity of their business environment. In the right hand panel, we see that holding the firm's TFP constant, an improvement in the quality of public inputs is associated with lower reported costs.

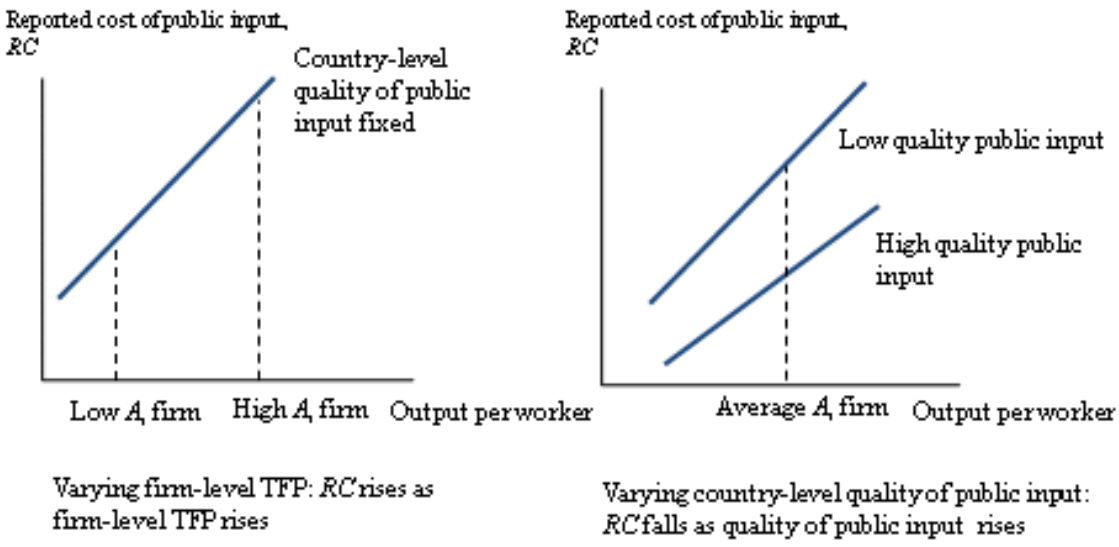

Figure 1. Reported costs of public input constraints: variation with firm-level TFP (left panel) and country-level quality of the public input (right panel)

To bring this framework to the data, we relate the reported cost of public inputs by firms to firm characteristics. The choice of firm-level characteristics to define the benchmark firm and to vary for the within-country analysis is fairly straightforward. Size is a standard

[2] More precisely, the reported costs in these surveys correspond to evaluations of discrete changes in quality of public inputs faced by firms. The marginal analogue to these discrete changes is the shadow price of the public input. See Carlin *et al*. (2012).

control, motivated, for instance, by the standard finding that firm size and firm productivity are positively correlated. We also include a measure of firm performance, namely whether or not the firm has expanded permanent employment in the previous 3 years (TFP or some other direct measure of $\boldsymbol{A}_{ij}$ for firm *i* in country *j* is not available). This allows us to test the basic prediction of the model that higher productivity firms report higher costs of public input constraints. International engagement is expected to be correlated with productivity and hence with higher constraints, with some possible exceptions where, for example ownership by a foreign firm may enable firms to avoid reliance on or reduce the costs of a low-quality public input. By looking at how shadow prices of public inputs vary with firm characteristics, we can see whether there are any systematic differences between firms inside and outside transition.

We are also interested in understanding how different constraints are rated in terms of severity by the average firm, and how these ratings vary across groups of countries – here, between transition economies and their market economy peers. This is illustrated in Figure 2 for a single country (or group of countries). The two *RC* lines represent the relationship between firm productivity A_i and the shadow prices of the two public inputs. The vertical distance between the two lines captures the difference in the valuations by the average firm of the two inputs. This difference in valuation can be estimated separately for two different sets of countries and compared. This is the basis for the first part of the between-country analysis, where we compare how different constraints are rated by the average TE and NTE firms.

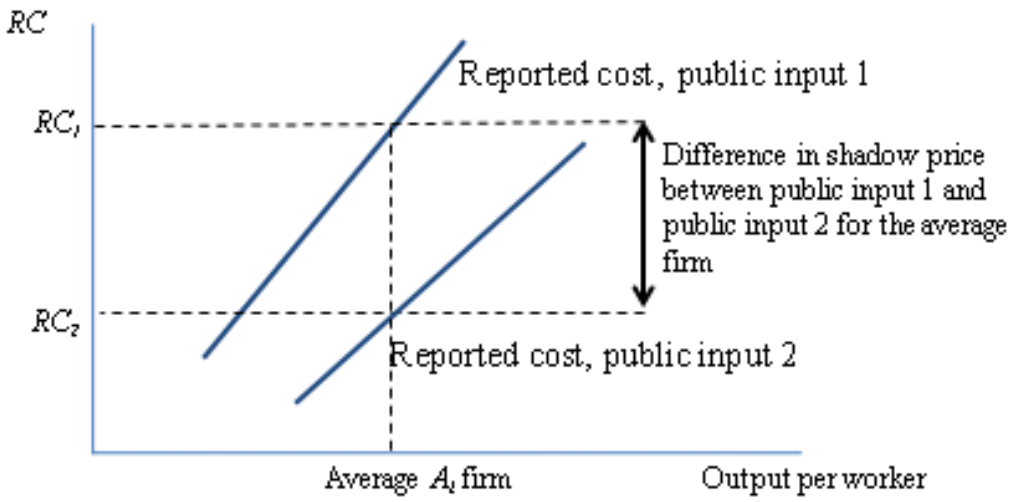

Figure 2. Difference in the reported cost of two different public inputs

Lastly, we are also interested in how the effects of higher productivity and higher public input provision interact at the country level. Public input provision – the supply of $\overline{B}_j$ in country *j* – varies across as well as within countries. Causality runs in both directions: richer countries can afford better developed economic institutions, physical infrastructure, and human capital. Moreover, they are richer in large part because of the higher quality of their business environments. It is not possible to observe the flow of services from a public

input to the firm. What the survey data provide is a window into how more or less burdensome a public input is, and we can look at how this varies as a country's income increases.

This is illustrated in Figure 3, where the level of development as measured by GDP per capita is taken to be synonymous with the average productivity of firms in country *j*, $\overline{A}_j$. The average cost of the public input constraint reported by firms in a country with low GDP per capita, which is characterized by low productivity firms and low quality of the public input, is shown on the left of the diagram and for a rich country with higher productivity firms and better quality public input, on the right. In the left hand panel is an example where the income-constraint locus slopes downward reflecting the fact that as the country becomes richer, it improves the quality of the public input ahead of the additional demands placed on it by higher productivity firms. In the right hand panel, the opposite is the case – improvement in productivity at the firm level and the associated greater intensity of use of the public input dominates the country-level improvement in its supply. We wish to analyse how the relationship between level of development and the average reported shadow price differs between TEs and NTEs, and across the different public inputs.

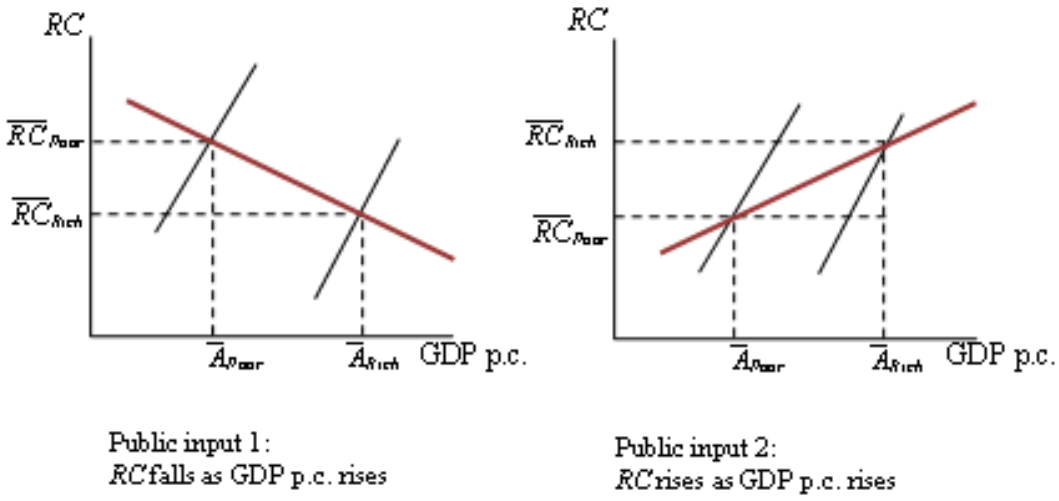

Figure 3. Variation of average reported costs of public input constraints with GDP per capita

Using the above framework, we address the following three questions:

- Are SMEs in transition countries different from firms outside transition in how their characteristics affect their responses to institutions and the business environment more generally?
- Is there a difference at the country level between the average TE firm and the average NTE firm in the relative importance of different elements of the business environment?
- Is there a systematic difference between TEs and NTEs at the country level in the relationship between level of development and elements of the business environment?

Data and empirical strategy

The surveys used here were conducted over the period 2002-2010, and covered around 58,000 manufacturing firms in 175 separate surveys in 112 countries. Basic statistics on the surveys are presented in Table 1. Most of the surveyed firms are SMEs; mean log employment is 3.53, equivalent to 34 persons employed. Most of the data on firms in transition countries, and a small number of surveys of firms in market economies, were collected in the Business Environment and Enterprise Performance Surveys (BEEPS) conducted by the EBRD; data on firms from the rest of the world, and a handful of additional surveys for transition countries, come from the World Bank's Enterprise Surveys (ES). We limit the analysis to manufacturing firms only.

For our within-country analysis, we estimate two regressions for each public input k using data on firm i in country j:

$$\begin{aligned} RC_{ijk} &= \alpha_{jk}^{TE} + \beta_{1k}^{TE} L30_{ij} + \beta_{2k}^{TE} FO_{ij} + \beta_{3k}^{TE} EX_{ij} + \beta_{4k}^{TE} IM_{ij} + \beta_{5k}^{TE} LGrow_{ij} + u_{ij} \\ RC_{ijk} &= \alpha_{jk}^{NTE} + \beta_{1k}^{NTE} L30_{ij} + \beta_{2k}^{NTE} FO_{ij} + \beta_{3k}^{NTE} EX_{ij} + \beta_{4k}^{NTE} IM_{ij} + \beta_{5k}^{NTE} LGrow_{ij} + u_{ij} \end{aligned} \quad (1)$$

where the variable *L30* is log(L/30) and the remaining variables are dummies corresponding to the following characteristics: *FO* denotes more than 10% foreign ownership, *EX*, exporting more than 10% of sales, *IM,* a direct importer of inputs, and *LGROW,* the firm has expanded permanent employment in the previous 3 years. The first question we ask is whether the relationship between a firm characteristic and the shadow price of a public input *k* in a transition economy, captured by β_k^{TE}, is different from the same relationship in a non-transition economy, captured by β_k^{NTE}.

The same regressions are used for our between-country analysis. The reported costs of unreliable public inputs provide information on the importance of different elements of the business environment to firms in different countries. The simplest procedure would be to use the unconditional country means of the RC_{ijk} reported by firms (Table 1). However, the comparisons would be hampered by differing sample compositions such as different distributions of firm size. The estimations above address this problem by providing *conditional* country means in the form of the estimates of the intercepts α_{jk}. The conditional means α_{jk} can be interpreted as the estimated reported cost for public input *k* in country *j* for a 'benchmark firm' – a firm with a defined set of characteristics that is the same for every

country. The benchmark firm here has 30 employees,[3] less than 10% foreign ownership, is exporting less than 10% of its sales, is not a direct importer of inputs, and has no reported change in permanent employment in the previous 3 years. These conditional means are the focus of our between-country analysis.

Our analysis calculates the estimated mean constraints as reported by the benchmark firm in TEs (captured by the estimates of α_{jk}^{TE}) and NTEs (α_{jk}^{NTE}) across the public inputs. We can see which public inputs are more burdensome to firms in TEs and whether these are the same as in NTEs.

Finally, we use the same estimates of α_{jk} to look at the relationship between the level of development and public input provision. The analytical technique is simple – we report simple scatterplots and regression lines of the estimated country conditional mean reported cost of constraint *k*, α_{jk}, vs. GDP per capita.[4] We do this separately for TEs and NTEs.

In the analysis in this contribution, the data from transition come from the stable years of 2002 and 2005, after the Russian crisis and before the period of rapid growth prior to the global financial crisis. Another round of surveys was conducted in 2008 on the eve of the global financial crisis. We analyse how firms report their external constraints in a period of strong growth in Carlin *et al*. (2012).

Results

Our first question is whether firms in TEs differ from firms in NTEs in how they value elements of the business environment. Do characteristics of firms in TEs – size, growth, and international engagement – vary systematically with the shadow prices of public inputs? Does this systematic variation differ from what we observe in firms in non-transition economies?

The results of the estimations of (1) are presented in Tables 2a (size), 2b (growth) and 2c (international engagement). The sample uses observations from transition economies in the 2002-05 period only (the BEEPS II-III surveys). Estimations of (1) employ survey-specific fixed effects; statistical tests are robust to arbitrary within-country correlation (clustering). In all cases we report the size and statistical significance (difference from zero) of the two estimated coefficients for the public inputs, β_k^{TE} and β_k^{NTE}, along with a test of whether they are different from each other.

The results in Tables 2a and 2b are broadly consistent with the model's predictions. Larger firms generally report that public inputs are a greater obstacle to how they do business than is the case for smaller ones. The interpretation offered by the modelling framework is that the shadow prices of these public inputs are higher for larger firms; this is not surprising given the standard correlation in firm-level data between size and productivity. The findings are similar for firms that are expanding permanent employment; they too tend to report larger constraints – higher shadow prices – than firms that are not expanding. One constraint worth

[3] It is for this reason that our measure for firm size is defined as L30≡log(L/30); it is zero for a firm with 30 employees.

[4] GDP per capita is measured at PPP in 2005 US$; the source is the World Bank's *World Development Indicators*.

noting that does not follow this pattern is 'access to finance'. The negative relationship between size and the difficulty of obtaining finance is not surprising – unlike the other constraints in the analysis, access to finance does not fit into our modelling framework because it is not a public input. In both TEs and NTEs, larger firms find access to finance easier to obtain – a standard finding.[5]

The most notable results in Tables 2a and 2b concern what *isn't* there. With just a single exception (telecoms), the relationship between firm valuations of public inputs vs. firm size and growth is statistically indistinguishable in transition and non-transition economies. This does *not* mean that the provision of these public inputs is the same in the two groups of countries; the finding relates to the demand for public inputs rather than the supply. Rather, it means that valuations of public inputs increase with firm size and firm growth in transition countries in much the same way they do in other economies.

The picture with respect to international engagement by firms is different. Table 2c shows that there *are* systematic differences in how internationally engaged firms value public inputs in TEs vs. NTEs. The most striking difference is in how importing firms value public inputs. In NTEs, importing firms are significantly more constrained – place a higher shadow price on – almost all public inputs compared to non-importing firms. In transition economies, this duality between importing and non-importing firms is absent. We note also that import activity by these SMEs in TEs is considerably more common than in NTEs (33% vs. 24%; see Table 1). Our interpretation of this finding is that openness to trade has 'levelled the playing field' in transition economies more so than in other economies; importing firms in TEs, unlike those elsewhere in the world, are not significantly more constrained than firms that are not internationally engaged.

Our second set of questions asks whether there is a difference at the country level in how the average TE firm rates public inputs as constraints compared to the average NTE firm. Table 3 reports estimates of α_{jk}^{TE} and α_{jk}^{NTE} along with tests of the difference between them; we report results for TEs for both the 2002-05 period. The estimated levels of the individual coefficients are reported along with tests of whether they are different from the overall mean constraint of 1.1. Bold-italic cells in the level columns indicate that the reported mean is significantly greater than 1.1; bold (non-italic) and shaded indicates the reported mean is significantly less than 1.1. The same coding is used for reporting whether $(\alpha_{jk}^{TE} - \alpha_{jk}^{NTE})$ is greater or less than zero.

There are some clear commonalities between how firms in TEs and NTEs rate public inputs as constraints. Macroeconomic and policy instability and tax administration are rated as very costly constraints; telecoms, transport and access to land are relatively less costly. But clear differences between the two country groups are also apparent. When we compare TEs with NTEs, we see that transition economies are less constrained with respect to physical infrastructure and human capital: electricity supply, telecoms, transport, and labour skills are

[5] The same pattern is visible in Table 2c with respect to foreign ownership. Foreign-owned firms in both TEs and NTEs find access to finance to be less of a problem, and the degree to which foreign ownership eases access to finance is no different in the two groups of countries.

all less costly constraints as perceived by firms in TEs vs. firms in NTEs. Conversely, the constraints which firms in TEs rate as more costly compared to NTE firms are primarily those relating to economic institutions: tax administration, business licensing, customs, and courts.

We interpret this as reflecting the inheritance of central planning. The transition countries entered the transition with certain legacies of decades of socialism, not all of which were negative. The industrialization strategies followed by the planners left these countries well-endowed with public infrastructure such as electricity supply and a well-educated labour force. The persistence of this legacy – abundant supply of physical infrastructure and human capital – is why firms in these economies rated these constraints as relatively less costly when compared with firms in other economies. Conversely, the same decades of socialism damaged, destroyed or prevented the development of market economy institutions, and the lack of these institutions is why firms in these countries report the corresponding constraints as relatively costly. We explore this theme in more detail in Carlin *et al*. (2012).

Our third set of questions is whether these systematic differences between the valuations of public inputs reported by firms are related to the level of economic development. In Carlin *et al*. (2012) we argue the answer is 'yes', and we refer the reader to that paper for a detailed analysis. In brief the argument is that the experience of planning had different implications for countries that were already industrialized when planning was adopted (e.g. Czechoslovakia) vs. those which had not yet industrialized and where central planning brought industrialization with it (e.g. the countries of Central Asia). The aforementioned advantages of central planning – large-scale investment in public infrastructure and education – were distinctly more advantageous for the latter group of poor and underdeveloped countries.

Figures 4 and 5 illustrate these patterns for the constraints of electricity and the operation of the courts. In each figure, we plot the average estimated α_k for constraint *k* for each country survey. NTEs are indicated by the symbol 'N'; TEs are indicated by 'T'. OLS regression lines are also plotted – in each case, the TE line is the shorter one, reflecting the narrower range of levels of GDP per capita in the transition economies.

Figure 4 shows that the cost to firms of electricity as a constraint declines in non-transition economies as the economy develops: demand by firms grows, but the quality of the public input improves still more, so that the shadow price declines. It also shows how in 2002-05, more than a decade after the collapse of central planning, the electricity infrastructure in poor TEs was still abundant compared to other economies at a similar level of development, but the advantageous legacy was essentially absent for the richest of the TEs.

In Figure 5, for the operation of the courts, we see a less clear relationship between level of development and the reported cost of the constraint for the non-transition economies. Transition economies report a higher cost of this constraint compared to NTEs of similar income; the cost reported by firms is higher relative to NTEs for the richer countries. The interpretation we suggest is again in terms of the legacy of central planning. The inheritance of weak institutions, in this case the court system, was still visible almost two decades after the collapse of socialism in how firms reported the shadow price of this public input, and it was more evident in the richer TEs.

Conclusions

Did the new population of small and medium-sized firms in the transition economies encounter more or less serious obstacles to their activities from their surroundings than was the case for similar firms outside transition and is there evidence of legacy effects from the planning era? In a first step, we tested whether firms with different characteristics (size, growth, international engagement) experienced different constraints from their business environment. Our model predicts that higher quality firms report higher shadow costs of constraints. This finding is confirmed for firms both inside and outside transition. The one notable difference related to transition was that importing firms in the transition economies were indistinguishable from non-importing firms whereas outside transition, importing firms reported themselves more constrained. This may reflect the greater openness of the transition economies.

In the cross-country analysis, we found clear evidence consistent with legacy effects of planning extending well into the transition period. The bench-mark transition firm was less hampered by inadequate physical infrastructure and education among the work-force than was the case outside transition. This is consistent with the emphasis on industrialization of the planning regimes. Unsurprisingly, it was the poor transition economies that benefited most from the investments in physical infrastructure and schooling undertaken under planning. Conversely, in transition, it was the inadequacy of market institutions that were rated more significantly troublesome than was the case for firms outside transition – and this legacy of separation from the market had a higher cost for the richer transition economies.

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Table 1. Summary data

	ALL	NTEs	TEs
Number of:			
Firms	57,832	52,000	5,832
Countries	112	84	28
Surveys	175	114	61
Means, firm characteristics:			
Log(L)	3.53	3.54	3.42
L (=exp(Log(L))	34	34	30
Expanding	0.48	0.48	0.46
Foreign-owned	0.12	0.11	0.16
Exporter	0.29	0.28	0.34
Importer	0.25	0.24	0.33
Means, reported costs of public inputs:			
Electricity	1.46	1.56	0.65
Telecoms	0.68	0.72	0.47
Transport	0.92	0.96	0.59
Access to Land	0.83	0.84	0.67
Skills	1.17	1.18	1.09
Macroeconomic instability	1.90	1.93	1.77
Gov. Policy Uncertainty	1.62	1.59	1.78
Tax Administration	1.41	1.39	1.62
Labour Regulation	1.00	1.00	0.98
Customs	0.99	0.96	1.19
Business Licensing	0.94	0.93	1.05
Courts	0.91	0.87	1.19
Corruption	1.56	1.59	1.29
Crime, Theft, Disorder	1.14	1.16	0.94
Access to Finance	1.48	1.47	1.58

Table 2a. Within-country analysis: reported cost of constraint by size of firm

	TE	NTE	Diff?	Obs	Countries
	Size (log L)	Size (log L)			
Electricity	-0.008	-0.012		55,964	110
Telecoms	-0.014	0.026**	**	36,345	99
Transport	0.008	0.023**		55,452	109
Land Access	-0.042**	-0.046**		54,404	110
Skills	0.022*	0.035**		55,692	110
Macro instability	0.027*	0.038**		37,455	100
Gov policy unc	0.021	0.046**		31,603	79
Tax Administration	-0.012	0.001		55,301	110
Labour Regulation	0.044**	0.054**		55,256	110
Customs	0.038**	0.050**		51,759	110
Licenses	-0.003	0.004		54,747	110
Courts	0.043**	0.037**		44,712	100
Corruption	-0.006	-0.027		54,598	110
Crime	-0.028*	-0.005		53,540	107
Access to Finance	-0.036*	-0.063**		53,859	107

Table 2b. Within-country analysis: reported cost of constraint by whether firm expanded permanent employment or not

	TE	NTE	Diff?	Obs	Countries
	Expanding	Expanding			
Electricity	0.038	0.029		55,964	110
Telecoms	0.053	0.058**		36,345	99
Transport	0.065*	0.037**		55,452	109
Land Access	0.085*	0.072**		54,404	110
Skills	0.135**	0.072**		55,692	110
Macro instability	-0.038	0.031		37,455	100
Gov policy unc	-0.019	0.036		31,603	79
Tax Administration	0.030	0.003		55,301	110
Labour Regulation	0.035	-0.018		55,256	110
Customs	0.058*	0.054**		51,759	110
Licenses	0.051	0.037**		54,747	110
Courts	-0.007	0.001		44,712	100
Corruption	-0.016	0.043*		54,598	110
Crime	0.005	0.067**		53,540	107
Access to Finance	-0.049	-0.022		53,859	107

Table 2c. Within-country analysis: reported cost of constraint by international engagement

	TE	NTE	Diff?	TE	NTE	Diff?	TE	NTE	Diff?	Obs	Countries
	Foreign-owned	Foreign-owned		Exporter	Exporter		Importer	Importer			
Electricity	-0.008	-0.019		-0.013	0.018		-0.053	0.315**	**	55,964	110
Telecoms	0.008	0.096**	*	0.016	0.050*		-0.010	0.021		36,345	99
Transport	0.070	0.025		0.002	0.010		0.007	0.293**	**	55,452	109
Land Access	0.096*	-0.076**	**	-0.029	0.009		-0.015	0.092*	*	54,404	110
Skills	0.038	-0.107**	**	0.116**	0.005	**	0.074	0.366**	**	55,692	110
Macro instability	-0.013	-0.056		0.078	0.107*		0.038	0.060		37,455	100
Gov. policy uncertainty	-0.058	-0.009		-0.004	-0.015		0.046	0.074		31,603	79
Tax Administration	0.019	-0.061		0.029	0.004		0.077	0.346**	**	55,301	110
Labour Regulation	0.007	-0.065**		0.094*	0.055*		0.021	0.268**	**	55,256	110
Customs	0.125**	0.089*		0.278**	0.202**		0.313**	0.685**	**	51,759	110
Licenses	0.085**	-0.034	**	0.018	0.007		0.057	0.251**	**	54,747	110
Courts	0.008	-0.030		-0.093	0.010		0.070*	0.303**	**	44,712	100
Corruption	-0.016	-0.072*		-0.035	0.002		0.065	0.459**	**	54,598	110
Crime	-0.013	-0.039		-0.042	-0.059*		0.020	0.257**	**	53,540	107
Access to Finance	-0.263**	-0.295**		-0.017	0.004		0.025	0.158*		53,859	107

Table 3. Reported costs of public input constraints for the bench-mark firm: TEs vs. NTEs

	TE		NTE		TE vs. NTE
	Level	**N**	**Level**	**N**	**Diff**
Electricity	**0.652***	5,798	***1.468****	50,166	**-0.815***
Telecoms	**0.444***	5,728	**0.655***	30,617	**-0.211***
Transport	**0.543***	5,772	**0.863***	49,680	**-0.320***
Access to Land	**0.632***	5,386	**0.798***	49,018	**-0.166***
Skills	**0.956***	5,706	**1.068***	49,986	**-0.113***
Macro Instability	***1.749****	5,674	***1.861****	31,781	**-0.112***
Gov Policy Uncertainty	***1.783****	5,667	***1.548****	25,936	***0.235****
Tax Administration	***1.566****	5,690	***1.309****	49,611	***0.257****
Labour Regulation	**0.925***	5,653	**0.929***	49,603	-0.005
Customs	**0.925***	5,306	**0.686***	46,453	***0.240****
Business Licensing	**0.992***	5,577	**0.853***	49,170	***0.139****
Courts	***1.192****	5,352	**0.792***	39,360	***0.401****
Corruption	***1.292****	5,108	***1.472****	49,490	**-0.180***
Crime, Theft, Disorder	**0.949***	5,521	1.090	48,019	**-0.141***
Access to Finance	***1.640****	5,682	***1.485****	48,177	***0.155****

Note: Mean constraint for subset of 13 constraints; All tests are robust to heteroskedasticity. Columns may not sum due to rounding.

Figure 4. Reported cost of electricity constraint by country and GDP per capita: TEs vs. NTEs

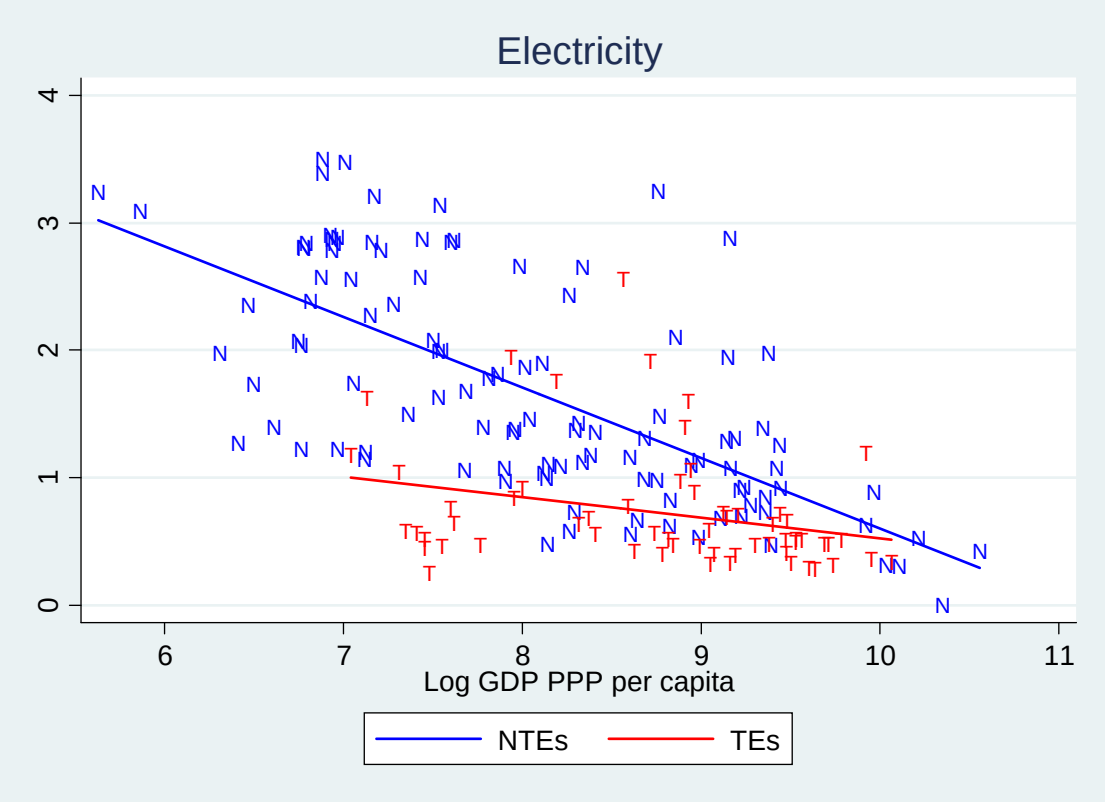

Figure 5. Reported cost of courts constraint by country and GDP per capita: TEs vs. NTEs