

# Do Institutional Reforms Increase Firm Performance and Eliminate Rents?

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This paper applies institutional theory to investigate the impact of reforms on performance of firms from Central and Eastern European countries from 1998 to 2006. We find that competition-enhancing liberalization measures have more impact on state owned firms as compared with domestic and foreign owned firms. In contrast, the effects of 'second stage' institutional reforms are less clear. The impact of reforms on profitability vis-à-vis productivity diverges, which we interpret as an indication that profitability is an ambiguous measure of performance.

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Previous research suggests a causal relationship between institutional reform and economic performance at both the macro and micro level (LaPorta, Lopez-de-Silanes, Shleifer, & Vishny, 1997, 1998, 1999, 2000). The perceived mechanisms by which institutional reform stimulates development are via reducing risk and generating greater returns to private sector investment and innovation. Based on this, the developing and transition countries are urged by multilateral agencies to improve their institutions and national governance structures. The expectation is that domestic industries will benefit in the long run, which will translate into increased economic growth. However, any such benefits may not be equally shared among different types of firms. This highlights one of the issues with studies in this area. There is a burgeoning literature on the impact of institutions on economic growth (Mauro, 1995; Ehrlich & Lui, 1999), and in turn on the links between institutions and on inequality (Abed and Gupta, 2002). Some investigate these relationships directly, while others look at this more indirectly, using trade as the mechanism by which institutions impact on welfare (Helble, Shepherd, & Wilson, 2009; Abe & Wilson, 2008). This literature however is essentially a macro literature, and seldom connects with the more micro literature on the impact of ownership change on firm performance (Estrin, Hanousek, Kočenda, & Svejnar, 2009).

Building on this we seek to contribute to the literature in a number of ways. Firstly, while there is a body of research that seeks to examine the links between institutional quality and firm location, this typically fails to consider firm performance. In focusing on the latter, we seek to position our work at the nexus of three related, but distinct literatures. The first develops from the resource based view of the firm, and focuses on a firm's decision to choose different environments, focussing on location factors such as labour

costs. This strand of literature is typically divorced from empirical studies that seek to explain firm performance, which base their analysis on agency theory, while also focusing empirically on market structure, competitiveness and competition. Any consideration that this second type of literature has for institutions places the emphasis on competition policy. Thirdly, there is a large and growing literature on firm location and capital movements that centres on institutional quality, notably as proxied by freedom from corruption. However, it is not often that this research considers the spectrum of institutions in more detail, and compressing institutions to one dimension comes at cost of less relevance to policy and management.

What is also surprising is that these literatures are seldom related to one another. The strategy and economics based literatures place emphasis on market structure, the nature of competition and competition policy, and yet there is little work that examines the importance of institutions for firm performance more generally. However, an issue discussed in some detail by Frynas, Mellahi, & Pigman (2006) but somewhat ignored by the more general literature is that low institutional quality can also create market failures: dominant players, including foreign firms, may take advantage of institutional failure by capturing markets and generating high price-cost margins. This highlights the importance of cross sectional differences in the analysis, both in terms of heterogeneity between firms, but also in terms of differences across countries. The purpose of this paper is to therefore both extend the more general literature, building on Cuervo-Cazzura & Dau (2009), but exploring the nexus between this and the opportunism/ market failure literature on which Frynas et al. (2006) is based. We seek to do this through a number of distinct contributions. Firstly, in considering institutions, it is important not to view institutional reforms as an

aggregate concept, but to analyse its multiple components separately, because each may have different effects. Secondly, it is also beneficial to have not only a time series element to the data, but also a significant cross sectional element, and more specifically in our context: a large range of locations. Thirdly, it is important to consider not only the dominant players in an industry, but also the remainder of the smaller firms. Finally, one needs to consider ownership, both in terms of foreign ownership of firms, and also state ownership, building on Angelucci, Estrin, Konings, & Zolkiewski (2002). To achieve these objectives, we use a sample reaching beyond largest stock exchange quoted companies, we control for selectivity bias in ownership, and we look more closely into differential impact of various components of reforms. In order to do this, we perform a multi-country study. The nations we consider have all engaged in large scale institutional reform, but to different extent, even if from a similar starting point.

## **THEORY AND HYPOTHESIS**

### **Institutional theory**

Our overarching theoretical framework is institutional theory. Drawing on Williamson (2000) we view institutions as a hierarchy ordered according to frequency of change and the corresponding degree of applicability of economising behaviour: elements of institutions that are modified more frequently are also potentially more likely to respond to changing technological and outside conditions in a way that could ensure lower transaction costs. Accordingly, the highest institutional level relates to embeddedness (cultural norms, informal institutions), which evolve over generations and are not subject to any direct economising adjustment. In turn, embeddedness affects the formal constitutional

rules: these reflect general criteria according to which the legal order is built, especially determining how the given systems score along the scale defined by the rule of law (and protection of property) on one end of the spectrum and arbitrary intervention by government on the other. Next, the constitutional level rules and embeddedness affect jointly the more detailed formal architecture of governance that includes government regulation on one hand but also private governance (including corporate governance and ownership structures at the firm level). Finally both public governance frameworks and private governance structures affect decisions of economic actors most directly, including firms choices over resource allocation, which also result in performance outcomes. We adopt this fundamental framework for our analysis. In addition, both agency and resource based theories can be applied to explore some more specific issues within the general institutional theory framework; these relate to the influences on firms behaviour leading from governance to resource allocation.

We therefore seek to build on and extend Cuervo-Cazurra & Dau's (2009) work by allying their analysis based on agency theory, to institutional theory. The fundamental hypothesis of Cuervo-Cazurra & Dau (2009) is that institutional reform improves market discipline, introducing more transparency, thus reducing the principle agent problem, and improving firm performance. We seek to extend their work both theoretically, by linking institutional theory more directly to the problem, and also in making two empirical improvements. First, as discussed above, a possible approach is to seek to combine indicators of institutional quality at various levels (ranging from micro to macro) into one or more indicators of overall institutional quality. Alternatively, to focus on one aspect of institutional quality, and *freedom from corruption* has been a convenient choice, as an

indicator that reflects all institutional levels. This, it is argued encompasses cultural norms of behaviour, rule of law (or lack of it) and impact of (dysfunctional or more efficient) regulatory structures. We seek to go beyond this type of analysis, by employing a range of institutional features across countries: we need to understand not just how some aggregate institutional indicators correlate with firms' choices, but which particular elements of regulation and governance framework matter most. We believe that this is the approach that produces conclusions that have more value both from policy- and managerial practice perspective. Accordingly, we investigate the extent to which ownership (building on Angelucci et al., 2002), financial liberalization (building on Carluccio & Fally, 2010; and Antràs, Desai, & Foley, 2006), but also other types of competition-enhancing liberalization (extending Cuervo-Cazzura & Dau, 2009) explain the contribution that FDI makes to firm performance. Second, we seek to strengthen the existing literature methodologically by allowing for the sample selection effect within a large firm level data set, while investigating the broad range of governance dimensions.

### **Impact of institutional reforms on productivity versus profitability**

There is now a large literature based on country level data that suggests that weak institutions deter foreign firms from entering a given location. This is confirmed by emerging firm level analysis (e.g., Javorcik & Wei 2009). However, this literature does not consider subsequent firm performance. Yet one would expect institutional reform to impact both on the performance of the stock of firms in a given location, and also on the 'quality' of that stock of firms, as better institutions may attract "better" firms, in terms of technology, management practices and finance. For example Driffield, Mickiewicz, Pal, &

Temouri, (2010) show that higher institutional quality is associated with higher levels of FDI, and also more FDI undertaken by high tech firms. Building on this, and linking to the resource based view of the firm (RBV), we argue that foreign ownership should not, as has been the case in much of this literature, merely be treated as an exogenous event. This is erroneous within the theory of international business. For example, in their critique of why RBV should be employed within mainstream economics, Lockett & Thompson (2001) argue that an efficient institutional framework is one which minimises the sum of transaction, organisation and production costs. International business theory therefore argues that firms respond to these differences by engaging in FDI, such that firms will seek to locate where it is more efficient. In the context therefore of a study of institutional reform and performance, FDI becomes an endogenous event as firms select where to (re)locate. As such, the cross-border selection of location by foreign entrants must be controlled for. This calls for a multi-country study, where firms from a range of home countries can be considered. Consistent with this framework, firms, first of all, decide whether to engage in FDI, and secondly where to invest.

Moreover, it is important to consider not only the dominant players in an industry, but also the remainder of the smaller firms, and finally to consider ownership, building on Angelucci et al. (2002). The ownership of the firm influences its level of capital, access to frontier technology, and access to global markets, therefore impacting directly on productivity.

Accordingly, we use a sample reaching beyond largest stock exchange quoted companies, we control for selectivity bias in ownership, and we look more closely into differential impact of various components of reforms. In order to do this, we perform a

multi-country study. The countries of Central and Eastern Europe, which correspond to the ‘natural experiment setting’ (Campos and Kinoshita, 2002) as far as institutional reforms are concerned, provide us with sufficient degree of short run variability in institutional indicators.

Total factor productivity (TFP) and profitability as indicators of performance and argue that they measure related but distinctive phenomena. While much of the international business literature (perhaps rather erroneously) sees productivity and profitability as synonymous, Girma, Thompson, & Wright (2006) argue that productivity refers to the returns achieved by internal stakeholders: increases in productivity boost discretionary resources potentially available to both the internal stakeholders (‘the insiders’) and the external stakeholders (in particular: the shareholders and the tax collectors). In contrast, profits represent only those returns that are available to external shareholders: the residual after internal stakeholders have taken their return. In particular the shareholders benefit both directly from profits distributed as dividends and indirectly from retained profits that may increase the firm’s net present value.

### **Hypotheses: ownership, reforms**

We hypothesise that foreign-owned firms perform best in transition economies thanks to both imported quality of governance, and better resource endowment along other dimensions (e.g. management techniques, knowledge of global markets, access to finance, technological know-how). In addition, especially given the extensive size of state sectors in transition economies, agency problems are particularly severe under state ownership. These



expectations are consistent with the empirical results on the links between ownership and performance (Estrin et al., 2009). Accordingly, we posit:

*Hypothesis 1. Foreign firms outperform domestic private firms, which in turn perform better than state owned enterprises, along the internal productivity dimensions. In contrast, differences related to external performance (profitability) may be mixed.*

We now turn to institutional reform. In what became known as ‘transition’ literature, developed in the context of the process of change that followed the implosion of command economy system in the former Soviet block, researchers typically rely on the set of institutional measures developed by the European Bank for Reconstruction and Development (EBRD, 1995-2009), which all belong to the governance and regulation level as illustrated by our Figure 1 above. Following EBRD, we distinguish between two broad clusters of institutional reforms. The first one relate to liberalization measures, which include (i) internal price liberalization, (ii) liberalization of foreign trade and exchange rate and finally (iii) freedom of entry, where the latter is also associated with small scale privatisation that is with privatisation of small enterprises, typically in services. From the technical, but not necessary from the political economy point of view, those three reforms can be implemented quickly, as they consist of removing existing barriers. They are also expected to bring immediate and wide effects on behaviour of firms, establishing basic conditions of market competition, both internal (from existing and new businesses) and external (via imports) (Mickiewicz, 2010).

In contrast, what is described in EBRD terminology as ‘second stage’ reforms (EBRD, 2009) relates to cluster of regulatory reforms characterised by higher ‘legal intensity’; all of them require building of new institutions, which due to the technical challenge are difficult to be implemented instantaneously. These include: reforms of the financial sector (split between (iv) banking and (v) non-banking institutions), (vi) corporate governance legal framework, (vii) anti-trust regulatory frameworks and policies, and finally (viii) the process of privatisation of large companies and building of legal framework regulating it. While important, the effects of this set of ‘second stage’ reforms may be extended over time, as they imply a slower process of adjustment (for example, resulting from a new pattern of financing) and more selective effects (for example, in the case of anti-trust regulation, which mostly affects only some specific sectors, network industries in particular).

While there is a broad literature linking these reforms with economic growth (see Falcetti, Raiser, & Sanfey, (2002); Falcetti, Lysenko, & Sanfey, (2006)), less is known about their impact at the micro level. Here, we expect that the first cluster of reforms (liberalization measures) will have an effect on productivity that would be easier to identify and more pronounced. This is also consistent with the view, that liberalization has inherent efficiency-enhancing value, which is not necessary or not entirely conditional on implementation of other reforms, ‘second stage’ in particular.

*Hypothesis 2a. Institutional reforms in general and liberalization measures in particular will have positive impact on total factor productivity.*

In contrast, the impact of institutional reform on firm profitability may be more ambiguous. Institutional reforms are often associated with improved capital market performance, so that investment financing is better allocated, and better performing investment projects are funded (Demirguc-Kunt & Maksimovic, 1998; Cuervo-Cazzura & Dau, 2009). However, Frynas et al., (2006) point to how corruption, or more precisely the ability of certain firms to enter into agreement with corrupt officials, can be a source of first mover advantage. Removing the corruption may therefore reduce the profitability of incumbents, while benefiting new entrants. Alternatively, “honest” incumbents may find themselves squeezed out by new entrants who have sought to gain advantage through the same process. As such, the relationship between institutional reform and firm *financial* performance is more complex than the literature hitherto has suggested.

Theoretically, if institutional reforms do act to reduce agency costs to the stakeholders of firms, then the impact on internal and external returns (on productivity and profitability) may differ. For example, reforms may reduce the agency problem, thus increasing internal efficiency, while at the same time increasing the rigour of competition, thus having an adverse effect of profitability. To the best of our knowledge this is the first paper to consider these competing effects.

Further, it is clear that where institutions fail to protect minority or outside shareholders, total factor productivity and profitability are likely to diverge. Moreover, in weak institutional environments, the link between productivity and profitability may also be broken because of the differential impact of government intervention, which may create special gains for some categories of firms. That is, higher profitability may result from political rents and state capture (Havrylyshyn, 2006; Hellman 1998; Hellman, Jones, &

Kaufmann, 2002, 2003; Slinko, Yakovlev, & Zhuravskaya, 2005; Mickiewicz, 2009). We expect therefore that the impact of institutional reform on profitability is more varied (compared with its impact on total factor productivity), depending on the nature of the reform, and the type of firm concerned. The impact on profitability is less clear, due to the competing forces of increased competition, less corruption and reduced agency problems.

*Hypothesis 2b. Productivity gains from institutional reforms do not translate into profitability improvements.*

### **Hypotheses: differential effects of reforms on foreign firms**

We now turn to the interactions between institutions and ownership. It is typically accepted that weak institutions deter FDI. In direct contrast, some studies have shown a positive impact of weak institutions on FDI, as for example, Egger & Winner (2005). One possible reason for these rather contradictory results may be that as much of the analysis focuses on investment flows at the country level, it sheds little light on the motivation of firms to engage in FDI in a given location. Notable exceptions that are not confined to the aggregate level are Smarzynska & Wei (2009) and Driffield et al. (2010) who, while arguing that weak institutions impact on the firm's decision to undertake FDI, posit that the relationship is far from a simple one.

Despite the rather confused picture that emerges from the empirical literature, it nevertheless remains true that locations with weak institutions, or institutions that would be seen as being "non standard" in western terms, still attract large quantities of FDI. In many middle and low income countries with dysfunctional institutions, large foreign investors are

sheltered from the negative impact of the business environment by operating in enclaves protected by relational capital with the host country government. Good examples of such a situation relate to resource-rich economies, where large rents are shared with foreign investors, based on government privilege instead of general rule of law.<sup>1</sup>

A different line of argument is that foreign companies' productivity may also be driven to some extent by international scale of their operations, therefore remaining independent of local conditions. Combining those two, we expect that in contrast with effects on profitability, the effects of institutional reform on productivity of foreign companies (or internal performance, in our terminology) may be weaker. Consistent with this, we posit:

*Hypothesis 3a. Institutional reforms will have smaller positive impact on foreign companies' productivity compared with domestic and state-owned firms. In contrast, the reforms may have a negative differential effect on profitability with respect to foreign-owned companies.*

### **Hypotheses: differential effects of reforms on state owned firms**

With dismantling of the communist apparatus of surveillance and centralised administration, the government was unable to exert any effective ownership control on thousands of the state owned enterprises, which led to insider control of those companies operations. Accordingly, a strand of theory that has been applied to Central Eastern Europe (e.g. Blanchard, 1997) model state firms as controlled by insiders, labour in particular.

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<sup>1</sup> Azerbaijan, may be a good example here. It scores very low on institutional quality measures, but creates relatively good business conditions for foreign investors within the oil sector.

Here, due to lack of property rights, those who control the companies cannot separate distributional decisions from optimisation decisions, which affects performance. In particular, it will only be by coincidence that the labour-control companies set the employment level at the value that maximises total factor productivity. In a typical case it will either be too large (in case where a private owner would rather shed employment in need to restructure), or too small (when insiders may restrict employment growth to maximise internal rents per employee). In both cases, employment will be chosen at a suboptimum level. We may notice, that this perspective implies that the framework adopted by Girma et al., (2006) (see section 2.2 above) may be too simple, as the latter assumes that allocational decisions within companies (affecting internal performance) may be easily separated from distributional decisions (affecting external performance).

Moreover, it is in the state sector, where opportunities for ‘political capitalism’ are most likely to emerge. Shleifer & Vishny (1994) discuss bargaining between politicians and state firms in order to realise mutual special interests at cost of economic efficiency. They argue that this type of bargaining is more likely to succeed in the case of state firms than between politicians and private owners, as it is less costly to compensate the managers of state firms for adoption of politically motivated objectives for their operations; they do not need to be compensated for opportunity cost of lower returns. As a result, (internal) productivity of those firms may be lower. Moreover, we can posit that opportunities for such outcomes diminish with institutional reform.

The (implicit) contracts between the politicians and state firms may typically imply effects related to the size of employment and remuneration of labour, as jointly captured as

a ratio of the size of total wage fund to value added (Shleifer & Vishny, 1994). This may constitute the primary effect driving lower (internal) productivity of state companies.

Political economy perspective represented by Shleifer & Vishny (1994) is akin but not identical to the theory of soft budget constraint (Kornai, Maskin, & Roland, 2003) that may also help us to understand why weak institutions affect state companies more than others. Unlike Shleifer & Vishny's (1994) model of collusion between opportunistic politicians and managers, here, the government needs not to be assumed as driven by private benefits. A benevolent government may still not be able to eliminate inefficiency, if its informational asymmetries vis-à-vis state sector firms are particularly severe. The soft budget constraint describes a situation, where the government would like to enforce better performance, but the managers of state companies behave opportunistically and the outcomes of their actions are only observed with delay. Once the performance data is revealed the government may choose to subsidise the firms, as bankruptcy of a state firm comes with negative utility to politicians (which may reflect their private welfare function but may also represent social welfare, or a combination of those two). Thus, the government faces a problem of post-contractual opportunism, which is akin to moral hazard. This creates soft budget situation generating disincentives to perform. Institutional reforms may alleviate the problem both by diminishing informational asymmetries between the government and the firms, and by creating credible commitment to non-subsidisation (for instance, by imposing the EU competition rules that restrict arbitrary opportunities for public assistance).

We may combine these approaches and place them in the context of institutional change. With market reforms, and withdrawal of government support guarantees, the state

companies face stronger incentives to enhance their productivity to protect themselves against external shocks and the risk of bankruptcy. That makes the predicted effect of reforms on internal productivity positive and unambiguous.

In contrast, the effects on profitability may be subject to conflicting influences. Some of enhanced internal productivity will be transformed into higher profitability. On the hand, it is the loss of government support, especially in terms of entry barriers for competition, preferential credit, and direct subsidies, which is likely to affect profitability in the negative way. Thus we posit:

*Hypothesis 3b. Institutional reforms will have stronger positive impact on state companies' productivity compared with their impact on other ownership type. In contrast, the reforms may have a negative differential effect on profitability with respect to state-owned companies.*

In between those two ownership categories (foreign owners, state owned companies), we find firms controlled by domestic private owners. In contrast to foreign owners, private domestic owners from transition countries are less likely to be exposed to global markets and to efficiency-enhancing opportunities and pressures. Therefore, economic reform (liberalization) is likely to have stronger positive impact on their internal performance compared with the case of foreign firms, but still weaker than in the case of state owned companies, as – for the reasons discussed above – private domestic companies are less likely to be involved in political exchange with the government; therefore there is also less scope for efficiency improvement.



To summarize, we present our prior knowledge about the impact of reforms and ownership on both internal performance (productivity) and external performance (profits) in Table 1 below.

{Insert Table 1 about here}

## **DATA AND METHODS**

### **The sample scope: general comments**

Previous work in this area has tended to focus on large publicly quoted companies, which while important will overall generate a somewhat biased sample. Stock markets may not correspond to the nationwide institutional frameworks within which most of companies, including large ones, operate (Shleifer & Vishny, 1997). Equally, while large firms dominate most sectors, they are not representative for a typical way that the institutional framework impacts on firms' behaviour and performance. Further, consistent with what we discussed above, in many transition economies, large companies may easily form some relational network capital with politicians and administrators that insulate them from some negative effects of weak institutional quality within the country, but - as another aspect of the same phenomena - may also lead to state capture and creation and maintenance of firm-specific rents (Hellman et al., 2003). This motivates our focus on a large spectrum of companies in our empirical design.

Futhermore, in order to extend the existing literature, we not only broaden the range of firms we consider, but we also benefit from our choice of cross-country variation. We focus on the post-Soviet 'transition' region of Central and Eastern Europe that offers most dramatic institutional variation, and also provides an interesting natural experiment setting.

In particular, the initial institutional setup was very similar in this group of countries until the time the reforms started (1989-1991), and the corresponding uniformity in the starting point makes it a robust set of economies to compare. The institutional differences in Central and Eastern Europe after ten-fifteen years of reforms result from alternative policy choices; thus, there is a relatively smaller risk that the variation in institutions captures some omitted country-level conditions related to institutions; in the initial point those economies were more homogeneous compared with other parts of the world. Therefore, the countries of Central and Eastern Europe provide us with sufficient degree of short run variability in institutional indicators.

### **Data and performance measures: detail**

We utilise a large database of European firms drawn from *Amadeus* which is a comprehensive and rich firm-level dataset provided by Bureau van Dijk, a leading electronic publisher of annual account information on private and public firms around the world. Compiling the information on firms operating in 12 CEE host countries produces a large data-set spanning the period 1998-2006. Our sample of host countries consists of Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Lithuania, Latvia, Poland, Romania, Russia, Slovakia and Ukraine.<sup>2</sup>

Table 2 shows the frequency distribution of firms across the sample countries. We included all firms for which we had at least one year worth of information on the variables of interest. Table 3 shows the distribution of percentage of types of ownership in our sample. In general average percentage of foreign ownership is high, the lowest showing

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<sup>2</sup> We did not include countries where we would had less than 5 firms (e.g. Macedonia, Moldova etc.). The smallest country in our sample has at least 100 firms at some point in the panel period.

58% in Ukraine. Significant inter-country variation in foreign ownership is noteworthy too: the average is as high as 89% in Czech Republic closely followed by Poland (87%), Estonia (83%), Slovakia and Romania (82%), Latvia (81%) and Hungary (81%). This is further reflected in the percentage distribution of firms with some foreign ownership: about 63% of all firms with positive foreign ownership have 90% or higher foreign ownership, while as high as 56% of sample firms with positive foreign ownership have sole foreign ownership.

{Insert Table 2 about here}

There is a wide range of home countries in our sample. The list is dominated by foreign investors from the US and also the old EU countries including France, Germany, Italy, Netherlands, UK, Denmark and Sweden. In addition, there are parent firms from other OECD (e.g., Australia, Canada, Japan), newly emerging (e.g., Brazil, China, India and Russia) as well as those from the Middle-East countries (e.g., Israel, Lebanon, Syria, Turkey). More detailed data on distribution of home countries is available on request.

{Insert Table 3 about here}

### **Dependent variables**

Table 4 offers summary statistics on the variables and measures used in the subsequent analysis. We aim to explore differences between total factor productivity (TFP) and profitability as indicators of performance and argue that they measure related but distinctive phenomena. These two measures are our dependent variables. To quantify the profitability of a firm (external performance), we use the ratio of earnings before interest and taxes to total assets, which proxies for the return on assets. This is a standard indicator which shows the return on investment undertaken. Internal performance is proxied by an estimate of total

factor productivity derived as the residual of the production function using the Levinsohn & Petrin (2003) approach<sup>3</sup>.

{Insert Table 4 about here}

### **Independent variables: EBRD reform indicators**

We focus on the core set of eight indicators of the institutional reforms, produced for all transition economies by the European Bank for Reconstruction and Development (EBRD) and published, along with complete definitions, in the annual Transition Reports (EBRD 1995-2009). All are briefly described below.

The first three indicators are clustered under the heading of liberalization and correspond to the set of competition-enhancing measures which are likely to have strongest impact on performance as argued above and summarized in our hypotheses.

In contrast, the remaining five components represent reforms that occur only in the longer term, and are referred to as “second stage” reforms (Mickiewicz, 2010). While important, their impact may be stretched over time and also apply primarily only to some specific sectors of the economy (e.g. anti-trust regulations) or to some selected firms (e.g. stock exchange that may be well-functioning but limited in scope).

The ‘first stage’ liberalisation indicators relate to the following:

(1) *Internal price liberalization*. This focuses entirely on the removal of administrative prices and price controls and the phasing out of state procurement at non-market prices. All the companies gain freedom to determine their prices, thus increasing competition.

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<sup>3</sup> This technique is widely used in the literature on firm performance to tackle the most common problem concerning the endogeneity which makes OLS estimation biased and inconsistent. The full description of this estimation and algorithm is beyond the scope of this paper. Readers interested in more detail are referred to the original work by Levinsohn and Petrin (2003).

(2) *External liberalization* consists of two main sub-components. (2a) Foreign trade: removal of most quantitative and administrative restrictions on import and export. (2b) Foreign exchange: no multiple exchange rates, full current account convertibility. Combined together, this reform implies strong competition from abroad; in this context, the role of imports is particularly important.

(3) *Small-scale privatization and freedom of entry*. This component relates to complete privatization of small companies resulting in ownership rights that can be transferred with no restriction. This measure complements opening up to competition from abroad by creating entry opportunities for domestic entrepreneurs, eliminating rents enjoyed by incumbent companies.

The 'second stage' reforms consist of:

(4) *Competition policy*: Competition and anti-trust institutions and legislation; enforcement actions to counteract any abuse of a dominant market position. While very important, the impact of this measure is typically focused on some selected sectors (e.g. network industries; industries dominated by large domestic incumbents).

(5) *Large-scale privatization*. Progress is measured by the percentage of large-scale enterprise assets being transferred to private owners. As we control for ownership effects on micro level, the impact of this reform indicates the extent to which competition which a given company faces is being additionally enhanced by the fact that other firms present on the same markets were also privatised.

(6) *Enterprise reform*: the extent to which effective corporate governance is provided by capital markets and a well-functioning market for corporate control. Again, within our

design, this captures additional environmental effects that are not already represented by changes in governance structures on micro level.

(7) *Bank reform and interest rate liberalization*: full interest rate liberalization; no preferential access to cheap refinancing; banking laws and regulations consistent with Bank for International Settlements (BIS) standards. As soft budget constraints offered by the banking sector may counterbalance the positive impact of product market competition on performance, this measure is potentially important, but inducing more a long term structural change than a short term impact.

(8) *Securities markets and non-bank financial institutions (NBFI)*: fully developed NBFI (collective investment schemes, private insurance and pension funds, leasing companies); substantial market liquidity and capitalization of the stock exchange; international standards set by the International Organization of Securities Commissions (IOSCO). This reform is very important, however an efficient capital market does not necessary imply its wide scope, so the economy-wide impact may remain limited.

We expect the ‘first stage’, liberalisation reforms to have a more distinctive impact on both performance and profitability.

### **Control variables**

We include a host of additional factors which may affect firm performance. First, we control for firm size and group enterprises into small, medium and large categories according to their assets. Using percentiles, we split the sample into three equal parts relying on the total value of assets. Based on it, we create dummy variables representing small, medium and large size companies correspondingly. Small size is our omitted

category. It is important to control for size; as argued above, the likelihood of extracting some political rents relates not only to ownership status but also to bargaining position as determined by the size of the firm. In addition, we may have some economies and diseconomies of scale affecting productivity. Use of size categories instead of a continuous variable comes at cost of precision of estimates, but alleviates the simultaneity bias between short-term variation in performance and size.

Second, we control for market share. We introduce a logarithm of market share estimated against all other firms in a given sector. That captures the effect that can be purely attributed to market position. Third, we control for the technology intensity of a firm. We introduce a dummy that identifies high-technology companies, applying Eurostat definition.

As our main hypotheses relate to macro level measures of reforms, we also need to control for alternative macro level influences. We introduce the level of GDP per capita (purchasing power parity) to control for the overall level of development. In turn, by using annual GDP growth rates we control for general business opportunities, which may not necessary be related to the advance in reforms. Similarly, we distinguish between more and less open economies by controlling for the ratios of both imports and exports to GDP. Those measures of openness may be correlated with reforms, but may also be driven by other factors such as size of the economy, with smaller countries likely to be more open. We also included full sets of industry, country and time dummies to control for industry-specific, country-specific and time-specific factors that may affect firm performance.

## **Method of Analysis**

Theoretically any firm in our sample can choose to locate within any of the sample countries. At the same time, while in practical terms there are limits to the extent that small domestic firms would relocate, the probability of MNEs or their subsidiaries relocating to more attractive locations has to be considered.

Further, we link to the international business theory discussed above. We allow for this by estimating the probability of firm setting up a subsidiary and thereby becoming a MNE. In practical terms, we seek to control for the non-random nature of this event. It is well understood in both conceptual and empirical analysis of the theory of the MNE that better performing firms become MNEs, and build on this firm specific advantage through their location decisions. Equally, institutional reform has then been linked empirically to greater FDI flows. Any study therefore that seeks to examine the links between institutional reform and firm performance should take this into account. Practically, we achieve this by augmenting the firm level data for the countries concerned (which includes both state owned firms, domestic private firms and foreign subsidiaries); with the firm level information on all firms who have invested in Central and Eastern Europe, and linking those to their subsidiaries across the Central and East European countries. We can also capture variation in ownership shares of subsidiaries, alongside other types of ownership.

Consistent with the discussion above, we apply a two stage estimation to control for the non-random nature of the sample of MNEs (that are typically the best performing firms). The first step essentially includes year-by-year probits where the dependent variable is binary (i.e. 1 if the firm is a MNE and 0 otherwise) and a host of main determinants



which are common in the literature on multinationality (e.g. productivity, firm-size, intangible assets, industry affiliation).<sup>4</sup>

Accordingly, in order to explain variation in firm performance, we employ an estimator based on Wooldridge (1995). This is essentially an extension of the famous Heckman (1979) model that has been widely used in this area (for a review, see Dustmann & Rochina-Barrachina [2007]). The essential premise is that if one seeks to link FDI to performance then one has to first control for selectivity bias in the sample of firms that are foreign owned. The method applied allows us not only to select the firms that have attracted foreign investors, but also to explain the share of foreign ownership in these firms after controlling for the year-specific selectivity bias. We apply the method proposed by Wooldridge (1995) that has the added advantage in that it not only corrects for selection bias (as in Heckman, 1979), but also control for the unobserved heterogeneity as in a standard fixed effects model. Further, it allows for unbalanced panels; the residual correlation property of this kind of model is not affected by a potential survivor bias.

## **RESULTS**

All our models come in pairs, where those numbered with odd numbers represent estimates of internal performance (TFP) and those numbered with even numbers relate to external performance (return on assets). With ownership measures, the omitted benchmark category is always ‘private domestic’.

As we distinguished between the overall impact of reforms and liberalisation measures in our Hypothesis 2, Table 5 documents first the tests based on the ‘first stage’

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<sup>4</sup> What is crucial for this procedure is to include a variable which affects the amount of foreign investment but not firm performance directly (exclusion criteria). In this paper we use the cash flow that a firm has at its disposal.

liberalization indicator taken as the average of the corresponding three liberalization sub-indices (external liberalization, price liberalization plus freedom of entry as discussed above). This is done in models (1), (2), (5) and (6). Next, we show results when measuring the overall impact of reforms by using the average of all eight sub-indices (models (3), (4), (7) and (8) in Table 5).

Hypothesis 1 is tested with ownership variables, Hypothesis 2 with both the average reform and the liberalisation component indicators, and Hypotheses 3a and 3b using the interactive terms between institutional indicators and ownership variables.

Table 6 and 7 offer an extension of our core set of results, investigating the impact of each individual reform dimensions, using their corresponding scores as reported by EBRD (models (9)-(24)). The purpose of this exercise is to verify in our theoretical framework, which led us to cluster reforms into two groups is consistent with empirics, as averaging the individual reform indicators could mask some idiosyncratic effects of individual reform components.

We found the basic order of productivity being consistent with the literature and Hypothesis 1, especially on privatisation effects in transition economies (Estrin et al., 2009; Djankov & Murrell, 2002). Foreign-owned firms demonstrate superior performance as compared with domestic private firm, which in turn dominate state owned firms. These results are represented by signs of simple ownership dummy coefficients in all but one odd-numbered models presented in tables 5-7.

{Insert Table 5 about here}

In turn, we cannot confirm Hypothesis 2 when we use the average of all eight EBRD reform indicators. We do not detect the catch-all short-run positive effects of our composite

measure of reforms on productivity (i.e. models (3) and (7)). The effect is positive but insignificant. A degree of ambiguity of results related to reforms is significantly reduced once we focus on liberalization component. However, once our measures of institutional reform become more focussed, hypothesis 2a is supported. Market liberalization measures have strong, unambiguous positive impact on performance (i.e. models (1) and (5) in table 5). However, in line with hypothesis 2B, the impact on profitability is not clear; the corresponding effect is insignificant (models (2) and (6)).

The reforms have differential impact on alternative ownership categories. In particular, consistent with Hypothesis 3, we find that the positive impact of aggregate reforms on state firms is significantly stronger than that on the domestic private companies (i.e. models (3) and (7) in table 5). In contrast, the impact of reforms on productivity of foreign owned companies is weaker compared with the other two categories, when ownership percentages are used (specification (3) in table 5), but insignificantly different when dominant owner dummy is applied (specification (7) in table 5).

With respect of the impact of reforms on profitability, we find some evidence that profitability of foreign firms decrease after reforms, indicating effects of competition and elimination of rents. This result is significant for dominant owner dummy (specification (8) in table 5) but insignificant for ownership percentage (specification (4) in table 5). In addition, while state sector productivity is unambiguously increasing as a result of reforms, its profitability is not (specification (3) and (7) in table 5). The differential coefficient for the state-owned firms is negative, but insignificant (models (4) and (8)).

We get more insights focusing on differential effects of liberalization on alternative ownership types. Consistent with Hypothesis 3, the state-owned firm productivity strongly

increases once liberalization measures are introduced, as compared with domestic-owned firms (models (1) and (5) in table 5). In contrast, the effects on state sector profitability are ambiguous; they come with negative sign but are insignificant (models (1) and (5) in table 5). There is some ambiguity related to differential effects on foreign firms, depending on the use of percentage and dominant ownership dummy as our measure. When dominant owner dummy is used for foreign ownership, we have a significant negative effect on profitability, consistent with our hypothesis related to elimination of rents (specification (6) in table 5). However, this effect becomes insignificant once this is replaced with ownership percentage (specification (2) in table 5). Taken together, these results indicate that it may be the presence but not necessary the share of foreign owner, which is associated with likelihood of some rents under unreformed regimes.

We get additional insights when we look into the impact of individual reforms as reported in tables 6 and 7-9. Table 6 shows estimates for the first stage (liberalization) EBRD indicators. Internal price liberalization is the component of reforms with the strongest positive impact on productivity (specification (9) in table 6). This is followed closely by external liberalization (specification (11)) and freedom of entry (specification (13) in table 6).

{Insert Table 6 about here}

Table 7 shows estimates for the second stage EBRD indicators. In contrast to the estimates for first stage reform indicators, it is impossible to detect a short-term positive effect, apart from an important exception of banking reform (specification (19) in table 7), highlighting the importance of improved efficiency in allocation of credit. We may also note that restructuring and governance comes with initial significant negative sign. That

however may represent some J-curve effects we are unable to detect with our short-term panel design of estimation.

{Insert Table 7 about here}

With respect to differential influence on alternative ownership types, it is again the impact of price liberalization that has the strongest effect on the state sector companies as represented by the sign of the interactive effect with the state ownership (specification (9) in table 6). In contrast, the corresponding effect for the interactive effect with foreign ownership is negative suggesting a weaker relative effect, again in line with our expectations.

While price liberalization that has by far the most dramatic positive impact on state-owned firm productivity, the next largest effect is from large scale privatisation, which increases competition in sectors that were dominated by state firms. Further, the expectation of privatisation may also have positive impact on the way state-owned firms behave, encouraging them to focus on the market. Interestingly, while price liberalization has the strongest positive effect on productivity of state firms, it has also the strongest relative negative effect on their profitability. This confirms our interpretation of the profitability results discussed above, stressing the impact of competition, and of removing rent protection previously maintained for political reasons.

In addition, it is notable that external liberalization also erodes state owned firm's profits strongly, while FO firm's profitability is increased by securities reforms. Foreign owned firms, being more credible are most likely to benefit from better access to funding on local stock exchanges. At the same time being listed creates strong incentives to focus on profits and to show profits to investors.

Finally, it is interesting to note some effects with respect to our control variables. Small firms are consistently more productive and more profitable than larger ones, and this effect cannot be attributed to simultaneity bias, as in that case the expected sign would be reversed. The explanation for this effect may be that in larger companies, the position of insiders may be stronger leading both to choice of factors quantities not consistent with value maximisation that is resulting in lower productivity and – more in line with Girma et al., (2006) – to distributional decisions that take the surplus away from external stakeholders resulting in lower profitability. Next, larger market share results in higher profitability, but also in higher productivity, indicating some potential simultaneity bias in the latter case. High technology firms are both more profitable and more productive, but only the former effect is consistently significant.

Turning to macro effects, the level of development as represented by GDP per capita, which proxies for the quality of business environment and infrastructure other than that covered by reforms indicator, comes across as highly significant for both productivity and profitability. In contrast, the impact of GDP growth is mostly insignificant, or marginally significant with unexpected negative sign. More clear-cut results relate to the measures of openness. Higher overall level of exports results in higher productivity indicating significant spill-over effects from exporters to other firms in the economy. In contrast, effects of imports on profitability are negative but not always significant. Both exports and imports affect profitability but do not affect productivity in any significant way.

## **CONCLUSIONS**

We investigate the links between institutional reforms and performance, using measures including freedom to decide prices, to trade and to entry into business, corporate governance and financial frameworks, and anti-trust regulatory structures. We contrast the effects of improvements in these indices on firm performance and profitability. Cuervo-Cazurra & Dau (2009) find that market reforms contribute to external performance of publicly quoted companies in Latin America, and that in turn the greatest effects are found for state owned firms (SO firms), where political interference becomes more limited. Our results on a wide sample of firms from the transition economies of Eastern and Central Europe confirm this finding, but also extend this analysis by looking at the relationships between institutions and performance, not merely in terms of profitability, but also productivity. We interpret this in the following ways.

Firstly, weak institutions are associated with excessive rents for the “favoured few” – SO firms, the largest state sector firms in particular. Institutional development increases competition, which generates productivity growth, but this does not translate into profits growth. Accordingly, this is supported by the fact that the strongest impacts of institutional reform are on the productivity of SO firms, suggesting that this is where internal returns grow fastest. These however contrast with the effect of reforms on profitability, which remain insignificant for state owned firms. We interpret this as evidence that reforms strongly improve internal performance of state-owned companies rather than their market performance, suggesting that institutional reforms are also associated with greater competition faced by the state sector.

We subsequently investigate this in the context of foreign investment. We show that institutional development has weaker impact on productivity growth in foreign owned firms. One would expect these firms to be at the technology frontier anyway, and operating with reference to international capital and goods markets. We also investigate this in terms of the differences between foreign ownership per se, and foreign ownership percentage. Higher levels of foreign ownership are associated with lower benefits of reform, which again suggests that firms at the frontier, with access to international knowledge benefit the least, because of their initial position.

More general implications of our research are that contrasting the internal and external measures of performance is important in order to distinguish between efficiency-enhancing and rent-reducing impact of institutional reforms. Following this perspective, we confirm that institutional reforms may produce effects that come with opposite sign for productivity and profitability: while the former may be enhanced, that does not apply to the latter. Moreover, we are able to shed more light on the differential impact of various types of reforms: in particular, we find that simple liberalization measures are sufficient to produce strong productivity effects, and those effects are strongest where the initial structures of ownership control are the weakest. Thus, to some extent, competition may substitute for ownership reform. This should not come as a surprise: under a genuinely competitive system, inefficient ownership forms will either evolve or become eliminated. However, here we do not account for political economy effects: it may also be the case that without ownership reforms, firms and sectors that benefited from weak institutional environment most, may have incentives and resources to reverse the reform process. We declare this as a limitation of our research; an issue that needs to be explored further.



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**TABLE 1**  
**Ownership and institutional factors affecting performance**

	Factors	Internal performance (productivity)	External performance (profitability)
H1	Ownership	FO > DO > SO	Ambiguous
H2	Institutional reforms, liberalization in particular	Positive	Ambiguous
H3	Institutional reforms: differential impact on ownership sectors	SO: strongest, DO: medium, FO: weakest	SO, FO: negative (elimination of rents)

Notes: SO – state-ownership, DO – domestic private ownership, FO – foreign ownership.

Here, liberalization is defined as ‘1<sup>st</sup> stage reforms’ that is: external liberalization, internal liberalization of prices and freedom of entry.

**TABLE 2**  
**Distribution of host firms in the sample (1998-2006)**

Country	Frequency	% of total observations
Bulgaria	1,682	2.80
Croatia	1,149	1.91
Czech Republic	4,025	6.70
Estonia	1,857	3.09
Hungary	121	0.20
Lithuania	1,427	2.38
Latvia	827	1.38
Poland	6,986	11.63
Romania	15,648	26.05
Russia	22,113	36.81
Slovakia	105	0.17
Ukraine	4,138	6.89
<b>Total</b>	<b>60,078</b>	<b>100.00</b>

**TABLE 3**  
**Distribution of ownership**  
**Mean (standard deviation); % of firms (1998-2006)**

Host countries	(1) % FO holding	(2) % SO holding	(3) % DO holding
Bulgaria	61.87 (36.39); 299	20.69 (29.78); 113	92.78 (20.09); 1,582
Croatia	74.26 (35.32); 201	39.94 (33.95); 12	95.04 (18.15); 1,046
Czech Rep.	88.73 (21.88); 591	100 (0.00); 1	95.16 (18.43); 3,646
Estonia	83.12 (26.95); 461	--	93.55 (20.02); 1,574
Hungary	79.62 (30.40); 32	--	89.89 (26.14); 106
Lithuania	75.67 (29.39); 116	--	96.79 (14.37); 1,369
Latvia	80.99 (29.03); 169	--	93.54 (20.27); 729
Poland	86.61 (24.84); 1,589	69.81 (39.01); 270	90.65 (25.05); 5,898
Romania	81.50 (27.84); 3,840	55.57 (36.78); 31	93.03 (21.45); 13,476
Russia	74.45 (33.13); 1,204	64.88 (37.88); 289	98.18(10.93); 21,354
Slovakia	82.40 (25.33); 95	--	48.63 (32.87); 55
Ukraine	58.00 (32.38); 483	77.09 (34.52); 672	90.71 (23.31); 3,645

Notes: SO – state-ownership, DO – domestic private ownership, FO – foreign ownership.

The means represent the ultimate owner or dominant shareholder in each ownership category.

**TABLE 4**  
**Summary Statistics of regression variables**

Variable	Measure	Value	Source	No of Obs.	Mean	Std. Dev.	Min	Max
Host firm size: small				387831	.72	.45	0	1.00
Host firm size: medium				387831	.20	.40	0	1.00
Host firm size: large*				387831	.03	.18	0	1.00
Host total factor productivity				293203	14.07	103.96	.00	29662.87
Host firm Market share				362622	.001	.01	0	.91
Profitability to Total Assets				365662	.09	4.05	-1900.98	1059.71
Foreign ownership percentage**				387831	12.99	31.78	.01	100.00
State ownership percentage				387831	1.92	13.01	.01	100.00
Domestic -owned percentage				387831	85.09	33.63	.01	100.00
High tech (Eurostat definition)				387831	.24	.42	.00	1.00
GDP per capita ppp				387831	10108.80	3363.26	3429.97	21673.73
GDP growth				387831	5.09	3.49	-6.10	12.23
Imports to GDP				387831	39.80	16.27	21.04	92.43
Exports to GDP				387831	40.45	12.76	22.62	85.38
Large scale privatisation ***				387831	3.33	.36	2.33	4.00
Governance and restructuring				387831	2.45	.53	1.67	3.67
Banking reform				387831	2.72	.65	1.67	4.00
Securities markets				387831	2.53	.60	1.67	4.00
Competition policy				387831	2.50	.31	2.00	3.67
EBRD 8 indicators				387831	3.18	.36	2.54125	4.00
EBRD 3 indicators				387831	3.97	.30	3.22	4.33

Source: Authors' calculations using Amadeus database. All monetary values are deflated and in thousands of US dollars.

\* We based our size variable on the total assets that a firm has. This however means that for some years, this variable is missing and the total therefore does not add up to one.

\*\* We report means within each ownership category, so for example the average percentage for firms who are foreign owned is 79.93 percent. We could make it add to one if we calculate over the entire sample.

\*\*\*The range of all EBRD transition indicators is from 1 (no reform) to 4.33

**TABLE 5**  
**Wooldridge estimation of performance**

VARIABLES	Average of liberalisation indicators		Average of all reform indicators		Average of liberalisation indicators		Average of all reform indicators	
	Model (1) Productivity	Model (2) Profitability	Model (3) Productivity	Model (4) Profitability	Model (5) Productivity	Model (6) Profitability	Model (7) Productivity	Model (8) Profitability
Medium firms	-0.344*** (0.019)	-0.131*** (0.021)	-0.340*** (0.019)	-0.130*** (0.021)	-0.343*** (0.020)	-0.129*** (0.021)	-0.340*** (0.019)	-0.129*** (0.022)
Large firms	-0.589*** (0.043)	-0.242*** (0.041)	-0.577*** (0.041)	-0.242*** (0.040)	-0.590*** (0.044)	-0.239*** (0.041)	-0.582*** (0.043)	-0.237*** (0.041)
Market share	0.257*** (0.007)	0.0641*** (0.013)	0.256*** (0.007)	0.0641*** (0.013)	0.256*** (0.007)	0.064*** (0.013)	0.256*** (0.007)	0.064*** (0.013)
Foreign ownership percentage	0.010*** (0.002)	0.001 (0.002)	0.005*** (0.001)	-0.001 (0.001)				
State ownership percentage	-0.012*** (0.003)	0.000 (0.001)	-0.010*** (0.001)	-0.001 (0.001)				
Foreign ownership Dummy					0.017 (0.016)	0.032** (0.015)	0.042** (0.016)	0.014 (0.020)
State ownership Dummy					-1.143*** (0.209)	-0.002 (0.082)	-0.948*** (0.132)	-0.049 (0.061)
Liberalization (average of 3 indicators)	0.496*** (0.145)	0.039 (0.094)			0.457*** (0.142)	0.039 (0.094)		
Foreign ownership percentage x Liberalisation	-0.002*** (0.000)	-0.000 (0.000)						
State ownership percentage x Liberalisation	0.002*** (0.001)	-0.000 (0.000)						
Foreign ownership Dummy x Liberalisation					0.010*** (0.004)	-0.017*** (0.004)		
State ownership Dummy x Liberalisation					0.246*** (0.053)	-0.018 (0.020)		
All reforms (average of 8 indicators)			0.370 (0.227)	-0.015 (0.192)			0.334 (0.225)	-0.015 (0.192)
Foreign ownership percentage x Reform			-0.001*** (0.000)	0.000 (0.000)				
State ownership percentage x Reform			0.003*** (0.000)	-0.000 (0.000)				
Foreign ownership Dummy x Reform							0.005 (0.005)	-0.016*** (0.004)
State ownership Dummy x Reform							0.243*** (0.042)	-0.007 (0.018)
High technology Dummy	0.045 (0.045)	0.049** (0.022)	0.045 (0.046)	0.048** (0.022)	0.041 (0.046)	0.049** (0.022)	0.042 (0.047)	0.049** (0.022)
GDP per capita x 10 <sup>-5</sup>	7.580*** (0.000)	1.780** (0.000)	6.180*** (0.000)	1.800** (0.000)	7.510*** (0.000)	1.790** (0.000)	6.150*** (0.000)	1.820** (0.000)
GDP growth	-0.0102* (0.0054)	-0.002 (0.002)	-0.010* (0.005)	-0.002 (0.002)	-0.010* (0.005)	-0.002 (0.002)	-0.010* (0.005)	-0.002 (0.002)
Imports to GDP	-0.000184 (0.003)	-0.003* (0.002)	-0.002 (0.004)	-0.003 (0.002)	-0.001 (0.003)	-0.003** (0.002)	-0.002 (0.004)	-0.003 (0.002)
Exports to GDP	-0.00264 (0.003)	0.006*** (0.00)	-0.003 (0.004)	0.006** (0.002)	-0.002 (0.003)	0.006*** (0.000)	-0.003 (0.004)	0.006** (0.002)
Intercept	3.014*** (0.586)	0.202 (0.577)	4.011*** (0.703)	0.443 (0.773)	3.201*** (0.577)	0.218 (0.576)	4.159*** (0.696)	0.450 (0.775)
Observations	287841	359540	287841	359540	287,841	359,540	287,841	359,540
R-squared	0.655	0.001	0.655	0.001	0.655	0.001	0.654	0.001

Robust standard errors in parentheses (clustered on country-years), Full set of industry, country and time dummies included.

\* p < 0.10

\*\* p < 0.05

\*\*\* p < 0.01

**TABLE 6**  
**Wooldridge estimation: individual EBRD indicators ('first stage', liberalization)**

VARIABLES	Price liberalization		Foreign trade and exchange rate liberalization		Small scale privatisation and freedom of entry	
	Model (9) Productivity	Model (10) Profitability	Model (11) Productivity	Model (12) Profitability	Model (13) Productivity	Model (14) Profitability
Medium firms	-0.343*** (0.019)	-0.131*** (0.022)	-0.345*** (0.020)	-0.132*** (0.021)	-0.341*** (0.019)	-0.131*** (0.021)
Large firms	-0.589*** (0.043)	-0.242*** (0.042)	-0.594*** (0.044)	-0.245*** (0.040)	-0.581*** (0.042)	-0.246*** (0.040)
Market share	0.257*** (0.007)	0.064*** (0.013)	0.257*** (0.007)	0.064*** (0.013)	0.257*** (0.007)	0.064*** (0.013)
Foreign ownership percentage	0.006** (0.002)	0.003 (0.003)	0.004*** (0.001)	0.001 (0.001)	0.006*** (0.001)	-0.003 (0.002)
State ownership percentage	-0.027*** (0.005)	0.002 (0.001)	-0.008*** (0.001)	-0.000 (0.001)	-0.010*** (0.003)	-0.002 (0.002)
EBRD price liberalization	0.317*** (0.114)	0.003 (0.057)	0.309*** (0.098)	0.042 (0.071)	0.252*** (0.081)	-0.015 (0.048)
Foreign ownership percentage x EBRD indicators	-0.001** (0.001)	-0.001 (0.001)	-0.001** (0.000)	-0.0003* (0.000)	-0.001*** (0.000)	0.001 (0.000)
State ownership percentage x EBRD indicators	0.006*** (0.001)	-0.001* (0.000)	0.002*** (0.000)	-0.0002* (0.000)	0.002*** (0.001)	0.000 (0.000)
High technology Dummy	0.037 (0.046)	0.050** (0.022)	0.042 (0.046)	0.050** (0.022)	0.035 (0.045)	0.047** (0.022)
GDP per capita x 10 <sup>-5</sup>	6.280*** (1.490)	1.800** (8.540)	6.660*** (0.000)	1.610** (0.000)	7.850*** (0.000)	1.710* (0.933)
GDP growth	-0.009* (0.005)	-0.002 (0.002)	-0.009* (0.006)	-0.002 (0.002)	-0.012** (0.005)	-0.002 (0.002)
Imports to GDP	-0.001 (0.004)	-0.003* (0.002)	0.002 (0.003)	-0.003 (0.002)	-0.000 (0.003)	-0.003* (0.002)
Exports to GDP	-0.005 (0.004)	0.006*** (0.002)	-0.003 (0.004)	0.007*** (0.002)	-0.004 (0.003)	0.006*** (0.002)
Intercept	3.918*** (0.442)	0.371 (0.362)	3.626*** (0.459)	0.157 (0.539)	4.163*** (0.326)	0.454* (0.265)
Observations	287841	359540	287841	359540	287841	359540
R-squared	0.654	0.001	0.654	0.001	0.655	0.001

Robust standard errors in parentheses (clustered on country-years), Full set of industry, country and time dummies included.

\* p < 0.10

\*\* p < 0.05

\*\*\* p < 0.01

**TABLE 7**  
**Wooldridge estimation: individual EBRD indicators ('second stage')**

VARIABLES	Large scale privatisation		Governance and restructuring		Banking reform		Securities markets		Competition policy	
	Model (15) Productivity	Model (16) Profitability	Model (17) Productivity	Model (18) Profitability	Model (19) Productivity	Model (20) Profitability	Model (21) Productivity	Model (22) Profitability	Model (23) Productivity	Model (24) Profitability
Medium firms	-0.342*** (0.02)	-0.131*** (0.0214)	-0.342*** (0.02)	-0.132*** (0.02)	-0.342*** (0.02)	-0.131*** (0.02)	-0.339*** (0.02)	-0.132*** (0.02)	-0.341*** (0.02)	-0.131*** (0.02)
Large firms	-0.587*** (0.04)	-0.244*** (0.04)	-0.584*** (0.04)	-0.246*** (0.04)	-0.585*** (0.04)	-0.243*** (0.04)	-0.576*** (0.04)	-0.246*** (0.04)	-0.581*** (0.04)	-0.245*** (0.04)
Market share	0.257*** (0.007)	0.064*** (0.013)	0.257*** (0.007)	0.064*** (0.013)	0.257*** (0.007)	0.064*** (0.013)	0.257*** (0.007)	0.064*** (0.013)	0.257*** (0.007)	0.064*** (0.013)
Foreign ownership percentage	0.00*** (0.001)	-0.00 (0.001)	0.00*** (0.00)	-0.00 (0.00)	0.00*** (0.00)	-0.00 (0.00)	0.00*** (0.00)	-0.00** (0.00)	0.00*** (0.00)	-0.00 (0.00)
State ownership percentage	-0.02*** (0.00)	-0.00 (0.001)	-0.01*** (0.00)	-0.00(0.00)	-0.01*** (0.00)	-0.00 (0.00)	-0.01*** (0.00)	-0.00 (0.00)	-0.01*** (0.00)	-0.00 (0.00)
EBRD_indicator	-0.085 (0.059)	-0.050 (0.034)	-0.169** (0.07)	-0.056 (0.039)	0.158** (0.070)	0.046 (0.030)	0.084 (0.061)	0.016 (0.069)	-0.086 (0.065)	-0.037 (0.046)
Foreign ownership percentage x EBRD indicators	-0.00*** (0.00)	0.00 (0.0003)	-0.00*** (0.00)	0.00 (0.00)	-0.00*** (0.00)	0.00 (0.00)	-0.00*** (0.00)	0.00* (0.00)	-0.00*** (0.00)	0.00 (0.00)
State ownership percentage x EBRD indicators	0.004*** (0.00)	0.00 (0.00)	0.001*** (0.00)	-0.00 (0.00)	0.00*** (0.00)	0.00 (0.00)	0.001*** (0.00)	0.00 (0.00)	0.002*** (0.00)	-0.00 (0.00)
High technology Dummy	0.04 (0.046)	0.05** (0.0221)	0.04 (0.0461)	0.05** (0.022)	0.04 (0.0454)	0.05** (0.0223)	0.04 (0.046)	0.05** (0.022)	0.04 (0.046)	0.05** (0.022)
GDP per capita	0.00*** (0.00)	0.00 (0.00)	0.00*** (0.00)	0.00** (0.00)	0.00*** (0.00)	0.00** (0.00)	0.00*** (0.00)	0.00** (0.00)	0.00*** (0.00)	0.00* (0.00)
GDP growth	-0.01 (0.005)	-0.001 (0.003)	-0.01** (0.004)	-0.003(0.002)	-0.009* (0.01)	-0.002 (0.002)	-0.01* (0.005)	-0.002 (0.002)	-0.01** (0.005)	-0.003 (0.002)
Imports to GDP	0.00510 (0.004)	-0.001 (0.002)	0.001 (0.003)	-0.003** (0.002)	0.000 (0.003)	-0.004** (0.002)	0.001 (0.004)	-0.003* (0.002)	0.000 (0.004)	-0.003* (0.002)
Exports to GDP	-0.009** (0.004)	0.004* (0.002)	-0.006 (0.004)	0.006*** (0.002)	-0.004 (0.003)	0.006*** (0.002)	-0.005 (0.004)	0.006*** (0.002)	-0.005 (0.004)	0.006*** (0.002)
Intercept	5.430*** (0.286)	0.566*** (0.179)	5.562*** (0.297)	0.558*** (0.173)	4.626*** (0.294)	0.226 (0.217)	5.022*** (0.264)	0.361 (0.307)	5.275*** (0.261)	0.437*** (0.154)
Observations	287841	359540	287841	359540	287841	359540	287841	359540	287841	359540
R-squared	0.654	0.001	0.655	0.001	0.655	0.001	0.654	0.001	0.654	0.001

Robust standard errors in parentheses (clustered on country-years), Full set of industry, country and time dummies included.\* p<0.10

\*\* p < 0.05

\*\*\* p < 0.01