

Regulatory Environment and Development Outcomes: Empirical Evidence from Transition Economies¹

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Abstract

The objective of this paper is to investigate the effect of the regulatory environment and the institutional quality on economic growth and the share of the informal economy in transition economies. We use a sample of 30 transition economies over the period 2005 – 2011 and observe the relationships within three geographic sub-groups, three regulatory sub-groups and pre- versus during the recent crisis. Results suggest that less cumbersome regulation improves growth if combined with better institutions. Both channels – the direct one working via firm creation and the indirect one working via informal economy reduction – are found to exert positive and significant effect on growth. The composite effects are the strongest for countries with less business-friendly regulations and institutional environment, for regulatory chapters potentially relevant for the entire life-cycle of the firm, such as investors' protection, contract enforcement and trade, and during the crisis.

Keywords: *regulatory burden, institutional quality, transition economies*

JEL Classification: L51

1. Introduction

Countries frequently face negative shocks which are detrimental for the growth prospects of the economy. In order to achieve sustained growth, economies need to build buffers against these shocks and take advantage of growth opportunities.

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However, regulation can often impose rigidities and distort incentives for factor allocation, capital accumulation, competition and innovation (Loayza, Oviedo and Servén, 2005). Making regulatory framework more stringent and cumbersome can then negatively affect the process of firm creation and hence production growth. In consequence, many firms will likely evade regulations by operating in the informal economy (De Soto, 1989). In turn, expanding informal sector will negatively affect growth through using but not paying for public goods (Loayza, 1996). Hence, the effect of the regulatory environment can be channelled in two ways: thorough production dynamics and through the emergence and evolution of the informal economy.

Though, the final outcome of a regulatory system can be assessed against the yardsticks of effectiveness and efficiency (Jalilian, Kirkpatrick and Parker, 2007). Effective regulation achieves the social welfare goals, while the efficient one does that at the lowest costs. However, effectiveness and efficiency in transition economies are frequently compromised by the achievement of the wider goals for achieving growth and alleviating poverty and the subsequent budget allocations for these needs. The latter, hence, implies that quality of the regulation framework might suffer if institutions are not sufficiently developed (Gerxhani, 2004). Moreover, Claessens and Klapper (2005) argue that countries with better institutions tend to create a regulatory environment conducive to overall business conditions rather than privilege a few interest groups. The latter is an important aspect for transition economies. Hence, the outcomes of the regulatory framework in transition economies are highly likely to be affected by the quality of the institutional context in which regulation is imposed. An economy with a developed institutional capacity is more likely to be able to design and implement effective regulation, which should contribute to improved economic growth and reduced informal economy. Weaknesses in institutional capacity to deliver 'good' regulation may be predicted to affect economic development adversely (World Bank, 2002).

The objective of this paper is to investigate the effect of regulatory environment and the quality of the institutional setting on economic growth and informal economy in transition economies. Results suggest that less cumbersome regulation improves growth if combined with better institutions. Both channels – the direct one working via firm creation and the indirect one working via informal economy reduction – are found to exert positive and significant effect on growth. The composite effects are the strongest for countries with less business-friendly regulations and institutional environment, for regulatory chapters potentially relevant

for the entire life-cycle of the firm, such as investors' protection, contract enforcement and trade, and during the crisis.

The remainder of the paper is organized as follows. Section 2 portrays some stylized facts about regulation and development outcomes in transition economies. Section 3 gives a brief overview of the respective literature. Section 4 presents the methodology used. Section 5 presents the results and offers a discussion. The last section concludes.

2. Stylized Facts

Transition economies face considerable regulatory burden positioning about 50 percentage points (p.p.) away from the frontier constructed from the best performances across all transition economies and across time,² and being on average about 20% lower than that in the OECD economies. At the same time, their institutional quality is at about the 60th percentile between complete institutional inferiority and very high institutional quality, and being about 35 p.p. below the OECD institutional quality.

Figure 1 suggests that both regulatory burden and institutional quality remained stable over years and irrespective of the crisis (shaded area), but differences are apparent among country groupings. The regulatory burden is similar between Southeast Europe (SEE) and the Commonwealth of Independent States (CIS), although SEE is more homogenous, while the countries of Central Europe (CEE) have the friendliest-to-business regulatory environment. On the other hand, the level of institutional quality differs more: the quality in CIS is almost half of the quality in SEE and a third of that in CEE.

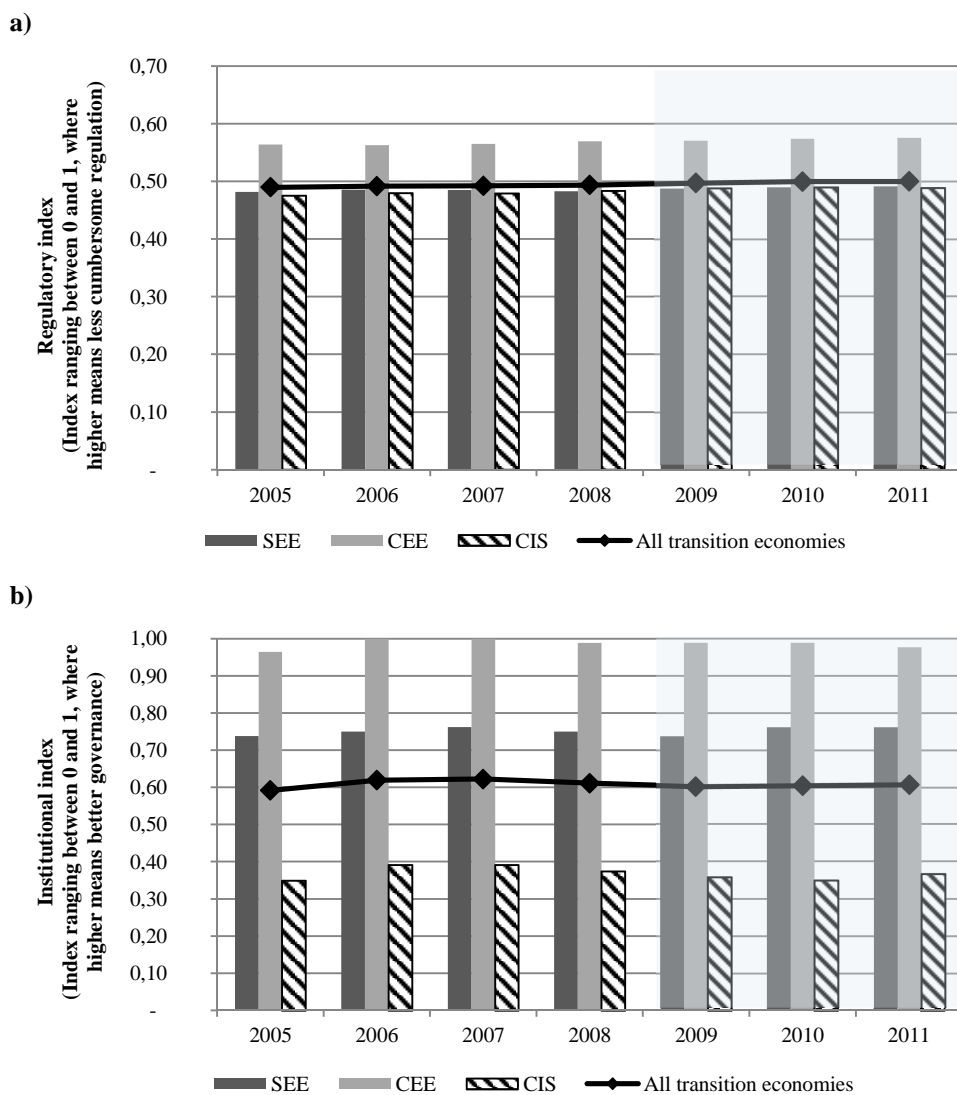
On the other hand, transition economies face large informal sector, on average constituting third of the total economy (Figure 2a). However, differences between regions are apparent: CEEs have the lowest participation of the informal economy, while CISs the highest among the three. In addition, in all three regions, the onset of the crisis was accompanied by increasing informal economy share, although the years after (2010 and 2011) saw a slight reduction. The three regions are also heterogeneous in terms of GDP growth per capita (Figure 2b).

The cross-country comparison for the transition economies, presented on Figure 3, suggests that transition countries with less cumbersome regulation likely impair economic growth (3a), but curb the expansion of the informal economy (3b). However, the Figure 3a might be driven by the two outliers with regard to the per capita growth – Azerbaijan and China, from which at least the

² Practically, the frontier is represented by the transition country in the year when regulation has been the least cumbersome.

former has a regulatory burden around the average. Without considering these two, the relationship between the regulatory burden and growth is inconclusive. A clearer picture is obtained by observing regulation and the informal economy, whereby the relationship is negative and suggests that more business-friendly regulation likely enables space for more firms to escape the grey zone.

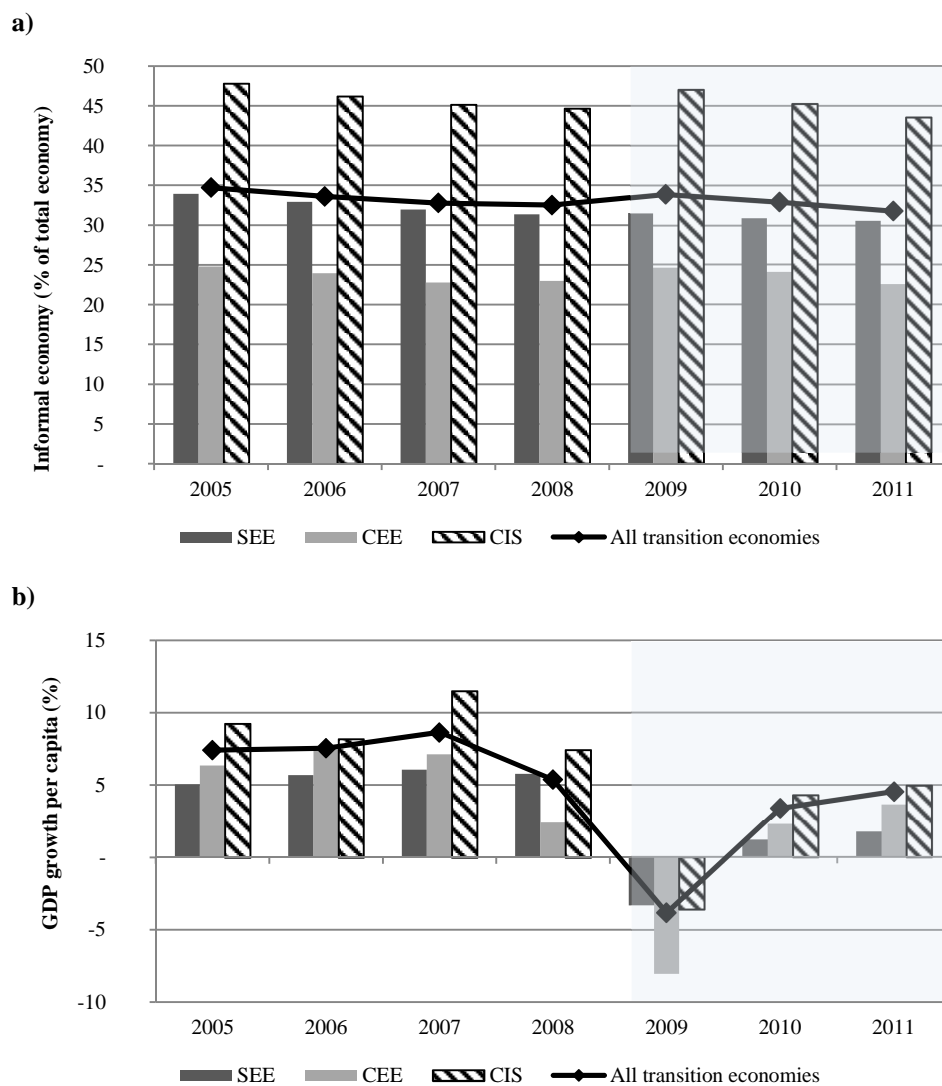
Figure 1
Regulation and Governance over Years and Regions



Note: The construction of the regulatory index is explained in Section 4.1. All variables on the figures are averages for the period 2005 – 2011.

Source: WB Doing Business and Freedom House.

Figure 2
Informal Economy over Years and Regions



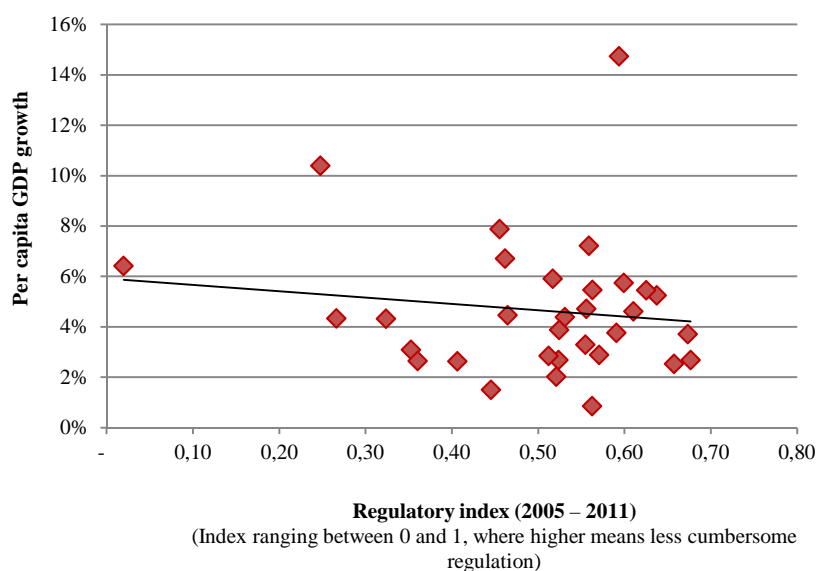
Notes: All variables on the figures are averages for the period 2005 – 2011. The sample on informal economy share obtained from Schneider, Buehn and Montenegro (2010) is extended to 2011 by applying their procedure, as explained in Appendix 1.

Source: Schneider, Buehn and Montenegro (2010).

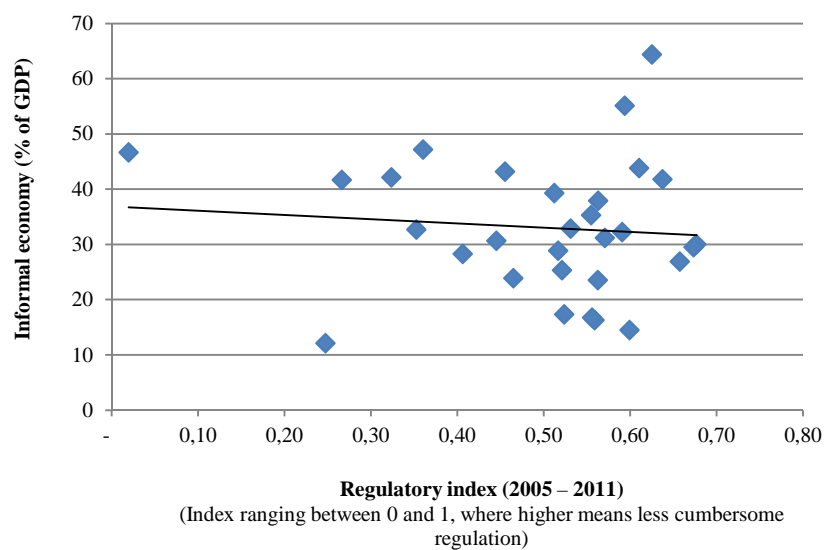
However, the coupling of regulatory framework with the institutional quality cannot be observed on Figure 3. “Institution building” including building a “good” regulatory regime is one of the most difficult problems facing transition economies (Kirkpatrick and Parker, 2004).

Figure 3
Regulation, Growth and Informal Economy

a)



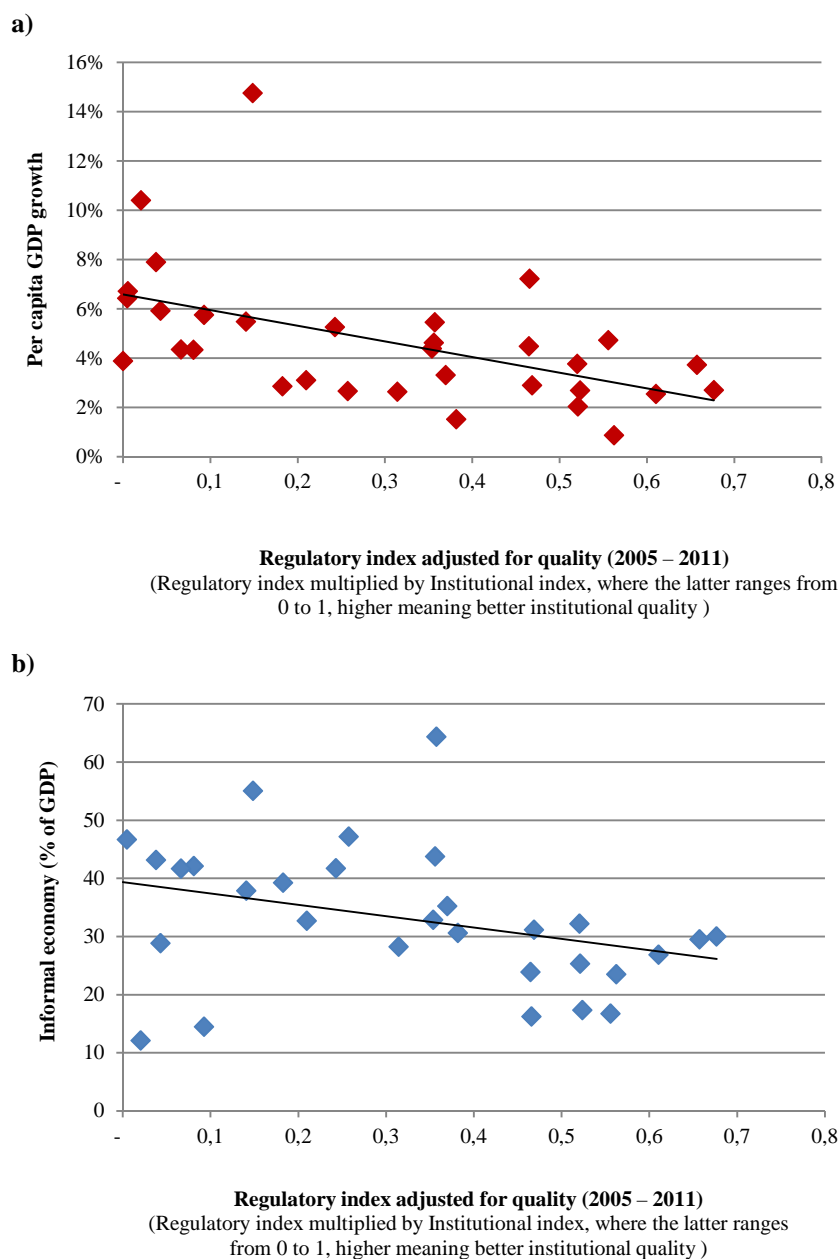
b)



Notes: The construction of the regulatory index is explained in Section 4.1. All variables on the figures are averages for the period 2005 – 2011.

Source: WB Doing Business; Schneider, Buehn and Montenegro (2010); IMF databases.

Figure 4
Outcomes of Regulation Adjusted for Quality



Note: The construction of the regulatory index is explained in Section 4.1. All variables on the figures are averages for the period 2005 – 2011.

Source: WB Doing Business; Schneider, Buehn and Montenegro (2010); IMF databases.

Figure 4 presents the transition cross-country evidence of the effect of regulatory environment adjusted for the institutional quality on GDP per capita growth (a) and on the informal economy (b). The relationship between well-governed regulation and growth in transition economies is apparently negative suggesting that a business-friendlier regulation exercised through improved institutions may be associated with lower growth: this may be the process of ‘creative destruction’ when firms cannot grip the regulatory burden which is well enforced and exercised, although less cumbersome, and probably stop functioning. However, Figure 3 does not imply causation. The effect on the informal sector is further favourable when the institutional quality is considered.

However, as here we are observing only simple correlations, a deeper analysis is needed to establish the causation between the analysed relationships.

3. Overview of the Literature

On the literature front, many studies deal with the issue of regulation’s and institutional-governance effects on development outcomes. Loayza, Oviedo and Servén (2005) and Jalilian, Kirkpatrick and Parker (2007) investigate these effects on a cross-country sample and conclude that regulation adversely affects growth, but the effect vanishes once regulation is coupled with better governance. In addition, the first study finds decreasing effect on informal economy. Similar evidence is scarce for transition economies, however. Majority of the research has been descriptive, pointing to the disappointing results of the regulation governance/quality. Reasons may be manifold: lack of political support for regulation implementation (Ugaz, 2003); regulation occurring after privatization and not concurrently (Campbell-White and Bhatia, 1998); lack of clear roles and responsibilities among regulatory institutions (Cave and Stern, 1998) and so on.

Johnson, Kaufmann and Shleifer (1997, 1998) investigated how the taxation, regulatory burden and provision of public goods affect the size of informal economy and the economic growth in transition economies from Eastern Europe and the former Soviet Union. Results suggest that liberalization, privatization, fairer taxation and fewer regulations are all associated with a smaller informal economy. They also find that while formal rules may matter in some instances, what really matters is how regulations and tax rules are actually implemented. Good rules on paper with officials having a great deal of discretion in interpretation and implementation leads to a higher effective burden on business, more corruption, and a greater incentive to move to the informal economy. Better provision of public goods to the official economy is associated with a relatively larger official economy, while businesses respond to politicization by going “underground.”

Instead of registering their activities, managers prefer not to pay taxes and not to benefit from key publicly provided services, such as legal enforcement of contracts. For the economies in transition there is evidence of a downward spiral, in which firms leaving the official sector reduce state revenue, which reduces publicly provided services, and further reduces the incentive to register in the official sector. Most of the former Soviet Union has thus ended up in a “bad” equilibrium with low tax revenue, high unofficial economy, and low quality of publicly provided services (Johnson, Kaufmann and Zoido-Lobaton, 1998).

Jalilian, Kirkpatrick and Parker (2007) tested the relationship between quality of regulation – i.e. how well regulation is exercised through the institutions – and economic performance. As a measure for the regulation quality, besides governance quality index, they used the government effectiveness index that measures the quality of public services provision, competence of civil servants and the credibility of government decisions. Using a sample of 117 developing countries for the period 1980 – 2000, they found a strong casual link between regulatory quality and effectiveness, and economic growth. Kauffman and Kraay (2002), Barro (1997) and the World Bank (2002) found the same result. Papers use a variety of measures for the institutional quality, among which: regulatory quality (measures of the incidence of market-unfriendly policies such as price controls or inadequate bank supervision and perceptions of the burdens imposed by excessive regulation in areas such as foreign trade and business development), rule of law (indicators that measure the extent to which agents have confidence in and abide by the rules of society), voice and accountability (the process by which governments are selected, monitored, and replaced), political stability (indicators that measure perceptions of the likelihood that the government in power will be destabilized or overthrown by possibly unconstitutional or violent means, including terrorism), government effectiveness (perceptions of the quality of public service provision, the quality of the bureaucracy, the competence of civil servants, the independence of the civil service from political pressures, and the credibility of the government’s commitment to policies), and control of corruption (perceptions of corruption, conventionally defined as the exercise of public power for private gain).

Another strand of literature examined the casual chain between regulatory quality/governance and other economic outcomes. Some studies find that the quality of governance and institutions is important in explaining rates of investment, suggesting that one way in which better governance can improve economic performance is by improving the climate for capital creation (World Bank, 2002). Kirkpatrick, Parker and Zhang (2006) assessed the impact of regulatory governance on FDI (Foreign Direct Investment) inflows in infrastructure projects

(water and sanitation, power, transport and telecommunications) in middle- and low-income countries and discovered positive relation as well that investors in infrastructure are more likely to be influenced in their decision by the overall governance environment than by the existence of an independent utility regulatory authority. Hall and Jones (1999) tested the hypothesis that differences in capital accumulation, productivity, and therefore output per worker are fundamentally related to differences in social infrastructure, i.e. institutions and government policies that determine the economic environment within which individuals accumulate skills and firms accumulate capital and produce output. They found a powerful and close association between output per worker and measures of social infrastructure.

Overall, the existing literature about the relationship between regulatory environment and development outcomes suggests that only better-governed regulation has a positive impact on the economy. Only countries with a developed institutional capacity are likely able to design and implement effective regulation, which should contribute to improved economic growth, higher investment rates and better productivity. More business-friendly regulation and larger tax burdens, in addition, lowers the share of informal economy in GDP.

4. Model and Methodology

4.1. Data and Sample

We construct composite indices to measure various facets of regulatory environment: firm entry, construction permits, registering property, getting credit, protecting investors, paying taxes, foreign trade, enforcing contracts and insolvency rules. The five-step procedure to obtain the composite indices is explained in Appendix 1. The components used to construct the nine composite indices are obtained from Doing Business of the World Bank. The sample covers 30 transition countries³ (World Bank definition) over the period 2005 – 2011. Note that the data of the Doing Business published in the current year are collected and refer to the previous year.

To assess the quality of regulation, we will use an institutional-quality index obtained by combining the political rights and civil liberties indicators published by Freedom House. Another option is to derive an index from the perceptions of businesses on tax rates and administration, licensing, political instability, corruption

³ Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Cambodia, China, Croatia, Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyz Republic, Laos, Latvia, Lithuania, Macedonia, Moldova, Mongolia, Poland, Romania, Russian Federation, Serbia, Slovak Republic, Slovenia, Tajikistan, Ukraine, Vietnam.

and courts expressed within the Business Environment and Enterprise Performance Survey conducted by the EBRD and the World Bank. This is apparently better option from the viewpoint of its comprehensiveness. However, a drawback is its irregularity, i.e. data are available for certain years and not for the entire time span. We therefore decide to use the first institutional index.

The data for the informal economy are taken from Schneider, Buehn and Montenegro (2010). Since their sample terminates in 2007, their algorithm is used to extend the sample until 2011. The approach of Schneider, Buehn and Montenegro (2010) is briefly explained in Appendix 2. The data to extend their sample and other control variables used throughout the analysis are obtained from the World Bank Database, World Economic Outlook and the International Financial Statistics of the IMF. Details on data are given in Appendix 3, while Appendix 4 presents a cross-correlogram of the data used.⁴

4.2. Economic Model

In order to pursue the investigation of how changes in regulatory environment affect growth of GDP and that of the informal sector, we need two economic models. We start with the model where we regresses the changes in the share of the informal economy into GDP on the initial per capita GDP and the changes in the regulation variables. Despite the parsimony, the only control variable seems sufficient to capture the different facets of the economic development and is important as a control, given its usually strong relationship with both informal economy and regulation (Loayza, Oviedo and Servén, 2005). To this, we will add the changes in the regulatory variable and then the changes of the regulatory variable interacted with the institutional variable, as defined in section 4.1. Note that taking changes instead of levels has both economic and statistical explanation: (i) governments usually talk about the impact of the economic reforms and from that viewpoint the speed rather than the level of the regulatory reform is more important for the developmental outcomes; (ii) to avoid working with potentially non-stationary panel – which may inflict unnecessary complexity – we choose to secure each variable being stationary, i.e. taking its growth rate. This setup will enable quantifying the effect of regulation and the quality of the governance (regulation conduct) on the informal economy. The economic model is as follows:

⁴ Note that the correlogram also presents the Distance to Frontier (DTF) measure produced by the World Bank Group. The procedure of calculating the composite indices herein is equivalent to the DTF procedure, except that it compares all observations in the regulatory index to the transition country in the year when regulation has been the least cumbersome instead of comparing to an observed best case (DTF). However, the correlogram suggests that our index and the World Bank's DTF are jointly considerably correlated, including the case when both are adjusted for the institutional quality, and show similar pattern of correlation with the other included variables.

$$\begin{aligned} \Delta \text{Informal economy in GDP}_{i,t} = & \alpha_0 + \beta \cdot \text{initial GDP}_i + \psi_1 \cdot \Delta \text{regul}_{i,t} + \\ & + \psi_2 \cdot \Delta \text{regulinst}_{i,t} + \delta_i + (u_i + \varepsilon_{i,t}) \end{aligned} \quad (1)$$

where $\Delta \text{regul}_{i,t}$ stands for the year-on-year (y-o-y) changes in the regulation index – overall and the sub-indices – while $\Delta \text{regulinst}_{i,t}$ is the y-o-y changes in the regulatory index adjusted for institutional quality (i.e. the changes of the interacted regulatory index with the institutional index). δ_i is a time-specific fixed effect; $(u_i + \varepsilon_{i,t})$ is the composite error term, where: u_i is a country-specific error term; and ε_{it} is the usual i.i.d. error term. Our main interest will be coefficients ψ_1 and ψ_2 : the former will measure the change in informal economy driven by a unitary change in regulation index, while the latter – the additional change in the informal economy driven by a unitary change in institutional quality on top of that of the regulation index.

The second model we estimate is a standard growth model, whereby the per capita GDP growth is regressed on the standard set of control variables, including the initial conditions and policy variables (see further in: Barro and Sala-i-Martin, 2004). To the standard set, we add the changes of the regulatory variable and that of the regulatory variable interacted with the institutional variable, as defined in section 4.1. We also add the growth of the informal economy share to test whether (better-governed) regulation affects growth through affecting informal economy. The model is as follows:

$$\begin{aligned} \Delta \text{Per capita GDP}_{i,t} = & \alpha_0 + \sum \beta X_i + \sum \gamma Y_{i,t} + \lambda_1 \cdot \Delta \text{regul}_{i,t} + \lambda_2 \cdot \Delta \text{regulinst}_{i,t} + \\ & + \rho \cdot \Delta \text{Informal economy in GDP}_{i,t} + \delta_i + (u_i + \varepsilon_{i,t}) \end{aligned} \quad (2)$$

whereby X_i contains the initial conditions (initial GDP per capita level, initial education level and initial life expectancy); $Y_{i,t}$ the policy variables (government expenditure growth, trade openness and inflation); while the remaining notations are as explained before. Our main interest will be coefficients λ_1 and λ_2 , the counterparts of ψ_1 and ψ_2 in model (1), and the coefficient ρ : if the shrinking informal economy due to (better-governed) regulation transfers into formal, then this coefficient should appear significant and negative; if when better-governed regulation is imposed, the informal economy simply ceases to exist, this coefficient should be insignificant. In these specifications, λ_1 and λ_2 will capture the “creative destruction” effect of regulation (more stringent regulation potentially adversely affects firm growth – direct channel; Section 1), while ρ will capture the “transferring” effect from the informal into the formal economy due to the regulatory efforts (indirect channel).

Regressions are estimated for different regulation sub-groups. Regressions will also make a distinction between CEE, SEE and CIS as three important regions comprised of transition economies. Finally, pre- versus during-crisis period will be observed. The coefficients in the above models will be estimated through a fixed effects technique, as is usually done in the literature. Note that we use FE (Fixed effects) estimation since we have a panel of all transition economies and we are not interested in making broader inferences (Judson and Owen, 1999). The disadvantage of an FE estimator is that it does not give the parameters of the predetermined variables (like the log of the initial income), as these are time-invariant and are wiped out. However, as we are not interested in obtaining separate estimates for the coefficients of the predetermined variables – they are in the regression, but separate coefficients are not available – we continue with an FE.

5. Results and Discussion

5.1. Regulation and Informal Economy

Table 1 presents the baseline results of our informal economy model (1). Results robustly suggest that a business-friendlier regulation has a statistically significant shrinking effect on the informal economy only if accompanied by better institutions. In order to give intuition of the estimated results and to obtain the changes in the informal sector brought about by changes in regulations and institutional quality, we will estimate the average effects which are given toward the bottom of Table 1.

Significance is reproduced for convenience. If a typical transition country has made regulation less cumbersome then there would not have been any effect on informal economy, given that the regulatory index itself is robustly statistically not different from zero. This suggests that making the business environment friendlier to business without securing its proper implementation and enforcement might not reduce the share of the informal economy. However, if regulation improvement by a third of one standard deviation (achieving, approximately, a third of the way to the level of regulatory burden of the OECD economies) is accompanied by an increased institutional quality by a third of a standard deviation (achieving, approximately, a third of the way to the level of institutional quality of the OECD economies), then its informal sector would shrink by a statistically significant 1.2 p.p. of GDP. Apparently, this cannot be argued to be a large decrease, given the large effort needed to reach a third of developed-economies level of their well-governed regulatory environment. However, what

may matter is if and at which rate the ceasing of informal economy translates into formal one, which is what we estimate in the next section.

As mentioned in Section 2, transition economies are quite diverse group, constituted of countries ranging from as developed as the Czech Republic to underdeveloped as Tajikistan or Lao; from countries with large informal sector, like Ukraine to countries with small one like Slovakia. Moreover, regulation itself is quite diverse, ranging from more cumbersome in the area of finance to moderate in the area of infrastructure. Finally, the period covers an entire economic cycle, both boom and crisis. Therefore, the three aspects may shed different light on the relationships explored here and may help in designing distinct policy recommendations for different groupings.

Columns (2) to (4) look at the relation between regulation and its quality on one side with the share of informal economy on the other, in three sub-regions of transition economies: CEE, SEE and CIS. The differences among the three observed in Section 2 may effectuate on how these countries may tackle informal economy. The average effects suggest that friendlier and better governed regulation reduces informal economy by 1.0, 0.6 and 1.2 p.p., on average, in SEE, CEE and CIS, respectively. Overall, these findings may suggest that investing in friendlier-to-business and better-governed regulation may have a shrinking effect on the informal economy, in particular when informal economy share is large (as in CIS).

Columns (5) to (7) disaggregate the overall regulatory index on regulation on the product market, financial conditions and regulation related to initial infrastructure. The objective of the disaggregation is to look at subgroups of the regulation and serve robustness checks. The product market sub-index is obtained by averaging the indices on firm entry, trade, investors' protection, contract enforcement and solvency as all these relate to firms' survival on the product market. The financial conditions sub-index is obtained by averaging tax and credit indices as they relate to the financial constraints in which a firm operates. The initial infrastructure sub-index is obtained by averaging the index on registering property and obtaining construction permit, as they relate to the initial effort the firm needs to make on infrastructure. Despite small differences, this type of disaggregation is also suitable from the viewpoint of the 'severity' of the regulatory burden: infrastructure regulation is the least cumbersome of the three and more heterogeneous than the other two; the product-market regulation is in the middle and the financial-conditions one is the most cumbersome among the three. Findings suggest that regulation and institutional quality matters in all three groups, but in all three the effects for the informal sector are similar.

Table 1
Results for Model 1 – Informal Economy

Dependent variable: Year-on-year change in the share of informal economy in GDP (in p.p.)	Baseline regression	Geographical grouping				Regulatory chapter grouping			Time	
		SEE	CEE	CIS	Product market	Financial conditions	Initial infrastructure	Pre-crisis	During crisis	
Regulation (Changes in index ranging between 0 and 1, where higher means less cumbersome regulation)	(1) 0.369	(2) 0.302	(3) 0.767	(4) 0.387	(5) 0.365	(6) 0.087**	(7) 0.380	(8) 0.323	(9) 0.549	
Regulation adjusted for institutional quality (Changes in regulatory index multiplied by Institutional index, where the latter ranges from 0 to 1, higher meaning better institutional quality)	-0.148***	-0.121**	-0.162*	-0.163*	-0.114**	-0.116***	-0.088**	-0.133**	-0.09**	
Constant	-0.008***	-0.007***	-0.01***	-0.009***	-0.007***	-0.007***	-0.008***	-0.009***	-0.008***	
Observations	205	48	66	49	205	205	205	115	90	
Average effects										
<i>Change in informal economy (p.p.) when regulation becomes better governed and less cumbersome by a third of a s.d.</i>	-1.2***	-1.0**	-0.6*	-1.2*	-1.1**	-1.1***	-0.9**	-1.1**	-0.7**	

Note: *, ** and *** denote a statistical significance at the 10, 5 and 1% level, respectively. Wherever possible, standard errors have been adjusted for arbitrary heteroscedasticity and autocorrelation of order one.

Source: Author's estimations.

Finally, columns (8) and (9) look at the results pre- versus during crisis whereby the baseline results are largely reproduced and the shrinking effect of better-governed regulation is slightly lower during the crisis. The latter is expected given the difficulties other than regulation experienced by the firms in crisis (like the tightened credit conditions and reduced liquidity, failure of foreign markets), which likely reduced the pace with which better-governed regulation affects firms' potential formalization.

The overall conclusion is that only less cumbersome regulation accompanied by improved governance may have a shrinking effect on informal economy. However, at least the heterogeneity of the countries and the period analysed appear to be important in reaching final conclusion. At higher levels of informal economy, as in CIS, and in normal times, friendlier regulation to businesses along investing in quality enforcement and conduct may have stronger and significant effect on informal economy reduction.

5.2. Regulation and Growth

Table 2 presents the baseline results of our growth model (2). In a similar fashion as with Table 1, we first analyse the results for all transition economies and then disaggregate by geography, regulatory groups and crisis time. Two pieces of information are at hand from Table 2: the direct effect through which making the regulatory framework friendlier may potentially positively impinge onto the process of firm creation and hence production growth (De Soto, 1989); and the indirect effect through which the shrinking informal sector under less cumbersome regulatory framework will positively affect growth (Loayza, 1996).

Similarly as for the effect on the informal economy, we find that the regulatory environment itself does not play role for growth if not accompanied by well-governed institutions securing proper conduct and enforcement. So, regulation combined with institutional quality is found to be robustly significant and positive for growth, which is in line with the theoretical predictions (De Soto, 1989) and some empirical findings for developed and developing economies (e.g. Loayza, Oviedo and Servén, 2005). If regulation and institutional quality improve by a third of a standard deviation (so as to reach a third way of the level of the OECD economies), results predict that growth will increase by considerable 4 p.p. This magnitude is expected given the magnitude of the effort needed by governments to improve regulatory environment and institutions to reach approximate the OECD level by a third. The sub-group analysis suggests that the effect is the largest in CIS – which is at the lowest level of both regulatory friendliness and institutional quality – and during the crisis, while the differences among the regulatory sub-groups appear not important.

Table 2

Results for Model 2 – Per capita Growth

Dependent variable: Per capita GDP growth (%)	Baseline regression	Geographical grouping				Regulatory chapter grouping			Time	
		SEE	CEE	CIS	Product market	Financial conditions	Initial infrastructure	Pre-crisis	During crisis	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
Regulation (Changes of an index ranging between 0 and 1, where higher means friendlier regulation)	-0.7	0.326	-1.424	-0.941	0.741	-0.329*	0.00687	-0.748	-0.598	
Regulation adjusted for institutional quality (Changes of the regulatory index multiplied by 0 to 1, higher meaning better institutional quality and based on Freedom House)	0.490***	0.457*	0.352***	0.684***	0.397***	0.367***	0.345***	0.295*	0.565**	
Informal economy share (change)	-1.968***	-1.329**	-4.201***	-1.736***	-2.059***	-2.016***	-2.059***	-2.375***	-1.519***	
Trade openness (% of GDP)	0.0024***	0.0014	0.0006	0.0044**	0.0024***	0.0024***	0.0024***	0.0028**	0.0025***	
Inflation (%)	0.0003	0.0034	0.0066***	-0.0010	0.0002	0.0002	0.0002	-0.0022**	-0.0016***	
Government consumption (% of GDP)	0.0038**	-0.0023	0.0036	0.0064***	0.0040*	0.0036**	0.0040*	0.0121***	0.0019*	
Constant	-0.289***	-0.0936	-0.157*	-0.469**	-0.297***	-0.287***	-0.291**	-0.428***	-0.275***	
Observations	202	48	66	49	210	210	210	114	90	
Average effects – direct channel										
<i>Change in per capita growth (p.p.) when regulation becomes better governed and less cumbersome by a third of a s.d.</i>										
	4.0***	3.9*	1.3***	5.1***	3.8***	3.5***	3.6***	2.4*	4.7**	
Average effects – indirect channel										
<i>Change in per capita growth (p.p.) when regulation becomes better governed and less cumbersome by a third of a s.d.</i>										
	2.4***	1.4**	2.6***	2.1***	2.3***	2.2***	1.9***	2.6***	1.1***	
Total effect										
<i>Change in per capita growth (p.p.) when regulation becomes better governed and less cumbersome by a third of a s.d.</i>										
	6.4***	5.3***	3.9***	7.2***	6.1***	5.7***	5.5***	5.0***	5.8***	

Note: *, **, and *** denote a statistical significance at the 10, 5 and 1% level, respectively. Wherever possible, standard errors have been adjusted for arbitrary heteroscedasticity and autocorrelation of order one.

Source: Author's estimations.

The working of the direct channel during the crisis is twice more powerful than before the crisis, suggesting that achieving friendlier regulation during crisis is more important in times when firms face other constraints.

The second result in Table 2 is the working of the indirect channel through which less cumbersome regulation and improved regulatory governance reduce informal economy, which then translates into growth – on average, by additional 2.4 p.p. This could be considered as the rate at which informal economy translates into formal economy due to less cumbersome and better-governed regulatory framework. It is likely that the indirect channel exerts diverse effect on growth only when considered before versus during the crisis. In the latter case, the rate with which informal economy cessation converts into formal one, is smaller than before the crisis, likely suggesting that some firms faced with better governed regulation during crisis simply cease to exist.

Overall, results suggest that improving regulatory friendliness and its governance by a third of the magnitude needed to reach the OECD average produces fairly large effect for growth – on average, 6.4 p.p. of additional growth. The effect has been found to be the strongest for the CIS whereby both regulatory friendliness and institutional quality are the lowest. Second, the composite effect is found to be slightly stronger for the product-market sub-group of regulation, likely due to this chapter being relevant over the entire life-cycle of the firm. Finally, the growth effect is slightly higher during the crisis, led by the process of ‘creative creation’ whereby friendlier regulation encourages the creation of new firms but opposed by the slower pace of translating existing informal firms into formal ones.

Conclusion

The objective of this paper is to investigate the effect of regulatory environment and institutional quality on economic growth and informal economy in transition economies. We used a sample of 30 transition economies and observed the relationships within three geographic sub-groups, three regulatory sub-groups and pre- versus during the crisis. The observed period is 2005 – 2011. Results suggest that regulatory environment is important for developmental outcomes only if accompanied by good governance and institutions capable of proper enforcement. In this light, both channels – the direct one working via firm creation, and the indirect one working via informal economy reduction in a business-friendlier regulatory environment – are found to exert positive and significant effect on growth. Achieving an improvement of third way needed to reach the regulatory and institutional level of the OECD countries by a typical transition economy is estimated to reduce informal economy by 1.2 p.p. in GDP, on average, which then translates into a 2.4 p.p. additional growth. In addition, friendlier

and better-governed regulatory environment spurs the creation of new firms, so that the same magnitude of change is found to result in additional 4 p.p. of growth. The composite results are found to be the strongest for countries with less business-friendly regulations and institutional environment, for chapters potentially relevant for the entire life-cycle of the firm and during the crisis.

Important policy implications stem out for governments' regulatory efforts during crisis. The most important message is that making regulation further friendlier to businesses may exert large positive effect on growth during crisis only if accompanied with better institutional governance. During crisis, governments may consider faster pace of regulatory reforms, as the direct channel is very strong, but should also find ways to facilitate the other constraints firms face, so as to help them formalize instead of cease to exist. The largest effects of less cumbersome and better-governed regulation may actually accrue in countries which have larger share of the informal economy. Also, large effect can be achieved in regulatory chapters which are relevant for the entire lifecycle of the firm, and not only for a specific phase.

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Appendix 1

Calculation of the Composite Regulatory Index

Composite regulatory index is obtained in a five-step procedure. *In the first step*, year-to-year changes are computed for each indicator within the Doing Business survey. The symmetric alternative to the conventional percent change formula is used:

$$\Delta x_t = 200 \cdot (X_t - X_{t-1}) / (X_t + X_{t-1}) \quad (\text{a1.1})$$

In the second step, Δx_t 's are adjusted to equalize the volatility of each component. Standard deviations v_x of the changes in each component Δx_t are computed. These statistical measures of volatility are inverted

$$w_x = 1/v_x \quad (\text{a1.2})$$

their sum is calculated

$$k = \sum_{t=1}^x w_i \quad (\text{a1.3})$$

and they are restated so the index's component standardization factors sum to one

$$r_x = w_x/k \quad (\text{a1.4})$$

The adjusted contribution in each component is the yearly contribution multiplied by the corresponding component standardization factor

$$m_t = r_x \cdot x_t \quad (\text{a1.5})$$

In the third step, the growth rate of the regulatory index is obtained as:

$$i = \sum_{i=1}^x m_{i,t} \quad (\text{a1.6})$$

In the fourth step, the regulatory index is created so that the mean across countries and periods is taken to be a hundred and the other numbers are calculated respective to it.

In the fifth step, the regulatory index is recalculated on a scale from 0 to 1, where growing index means business-friendlier regulation. The maximum number per index gets a value of one and the others are rescaled with respect to it.

A p p e n d i x 2

Calculation of the Informal Economy Shares

As explained in Section 4.1, informal economy shares are obtained from the paper of Schneider, Buehn and Montenegro (2010). However, since their sample terminates in 2007, we use their methodology to extend the time span of the sample up to 2011.

Schneider, Buehn and Montenegro (2010) use a method based on the statistical theory of unobserved variables, which considers multiple causes and indicators of the phenomenon to be measured, i.e. it explicitly considers multiple causes leading to the existence and growth of the shadow economy, as well as the multiple effects of the shadow economy over time. They use a Multiple Indicators Multiple Causes (MIMIC) model – a particular type of a structural equations model (SEM) – to analyze and estimate the shadow economies of 162 countries around the world. The main idea behind SEM is to examine the relationships among unobserved variables with respect to the relationships among a set of observed variables by using the covariance information of the latter. In particular, SEM compare a sample covariance matrix, i.e. the covariance matrix of the observed variables, with the parametric structure imposed on it by a hypothesized model. The relationships among the observed variables are described in terms of their

covariances and it is assumed that they are generated by (a usually smaller number of) unobserved variables. In MIMIC models, the shadow economy is the unobserved variable and is analyzed with respect to its relationship to the observed variables using the covariance matrix of the latter. For this purpose, the unobserved variable is first linked to the observed indicator variables in a factor analytical model, also called a measurement model. Second, the relationships between the unobserved variable and the observed explanatory (causal) variables are specified through a structural model. Thus, a MIMIC model is the simultaneous specification of a factor model and a structural model. In this sense, the MIMIC model tests the consistency of a “structural” theory through data and is thus a rather confirmatory than exploratory technique. In fact, in a confirmatory factor analysis a model is constructed in advance; whether an unobserved (latent) variable or factor influences an observed variable is specified by the researcher, and parameter constraints are often imposed. The mathematical representation of the procedure can be found in Schneider, Buehn and Montenegro (2010, pp. 10 – 13).

Schneider, Buehn and Montenegro (2010) obtain the following estimates of the MIMIC structural equation:

$$\tilde{\tau}_t = 0.14 \cdot x_{1t} - 0.06 \cdot x_{2t} - 0.05 \cdot x_{3t} - 0.27 \cdot x_{4t} \quad (\text{a2.1})$$

whereby x_{1t} equals size of government, x_{2t} and x_{3t} denote the fiscal and business freedom index, and x_{4t} represents GDP per capita. According to the MIMIC approach, all variables are taken as standardized deviations from mean. The estimated MIMIC coefficients allow determining only relatively estimated sizes of the shadow economy ($\tilde{\tau}_t$), which describe the pattern of the shadow economy in a particular country over time. In the second step, this index is converted into absolute values of the shadow economies, which take up a base value in a particular base year. The base values necessary for this final step of the calibration procedure are from the year 2000 and taken from Schneider, Buehn and Montenegro (2010). Thus, the size of the shadow economy $\tilde{\tau}_t$ at time t is given as:

$$\tilde{\tau}_t = \frac{\tilde{\tau}_t}{\tilde{\tau}_{2000}} \cdot \hat{\tau}_{2000} \quad (\text{a2.2})$$

whereby $\tilde{\tau}_t$ denotes the value of the MIMIC index at t according to equation (a1), $\tilde{\tau}_{2000}$ is the value of this index in the base year 2000, and $\hat{\tau}_{2000}$ is the exogenous estimate (base value) of the shadow economies in 2000. Applying this benchmarking procedure, the final estimates of the shadow economy in transition countries are calculated for the period 2005 – 2011. The data used for finding $\tilde{\tau}_t$ in equation (a1) are obtained from the World Development Indicators and the International Financial Statistics.

Appendix 3

Data and Sources

Variable	Explanation	Source
Regulatory index	Index ranging between 0 and 1, where higher means less cumbersome regulation	Author's calculations as per Section 4.1, based on data from Doing Business
Changes in the regulatory index	Year-on-year changes of the regulatory index (in index points)	Author's calculations
Institutional quality	Index ranging from 0 to 1, where higher means better institutional quality	Author's calculations based on the Civil liberties and Political rights indices of Freedom House; Rescaling applies
Changes in regulation adjusted for institutional quality	Year-on-year changes in the product of the regulatory index and institutional quality variables	Author's calculations
Share of informal economy	The share of informal economy in the total economy (%)	Schneider, Buehn and Montenegro (2010) and author's calculations based on Schneider, Buehn and Montenegro (2010)'s algorithm; see Appendix 1 for further details
Per capita GDP growth	Per capita GDP growth (%)	World Development Indicators
Inflation	Inflation (% p.a.)	World Development Indicators
Trade openness	Trade openness (% of GDP)	World Development Indicators
Government consumption	General government final consumption expenditure (% of GDP)	World Development Indicators
GDP per capita	GDP per capita, PPP (constant 2005 international USD)	World Development Indicators; International Financial Statistics
Business freedom	Subcomponent of the Economic Freedom Index. It measures the time and efforts of business activity. It ranges from 0 to 100, where 0 = least business freedom, and 100 = maximum business freedom.	Heritage Foundation
Fiscal freedom	Subcomponent of the Economic Freedom Index. It measures the fiscal burden in an economy, i.e., top tax rates on individual and corporate income. It ranges from 0 to 100, where 0 = least fiscal freedom, and 100 = maximum degree of fiscal freedom.	Heritage Foundation

Appendix 4

Cross-correlations

	Share of informal economy (change)	GDP per capita growth	Regulation (self-calculated, change)	Regulation (self-calculated) adjusted for institutional quality (change)	Distance to frontier (WB, change)	Distance to frontier (WB) adjusted for institutional quality (change)
Share of informal economy (change)	1					
GDP per capita growth	-0.4202	1				
Regulation (self-calculated, change)	0.0496	-0.0291	1			
Regulation (self-calculated) adjusted for institutional quality (change)	-0.1028	0.1696	0.1634	1		
Distance to frontier (World Bank, change)	-0.0213	0.1325	0.5540	0.1353	1	
Distance to frontier (World Bank) adjusted for institutional quality (change)	-0.0897	0.1639	0.1733	0.9232	0.398	1

Source: Author's calculations, based on data from Doing Business, The World Development Indicators and Schneider, Buehn and Montenegro (2010).