

A Service of

ZBW

Leibniz-Informationszentrum Wirtschaft Leibniz Information Centre for Economics

Arora, Puneet; Chong, Alberto

Article

Government effectiveness in the provision of public goods: The role of institutional quality

Journal of Applied Economics

Provided in Cooperation with: University of CEMA, Buenos Aires

Suggested Citation: Arora, Puneet; Chong, Alberto (2018) : Government effectiveness in the provision of public goods: The role of institutional quality, Journal of Applied Economics, ISSN 1667-6726, Taylor & Francis, Abingdon, Vol. 21, Iss. 1, pp. 175-196, https://doi.org/10.1080/15140326.2018.1550593

This Version is available at: https://hdl.handle.net/10419/314046

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.



WWW.ECONSTOR.EU

https://creativecommons.org/licenses/by/4.0/

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.







Journal of Applied Economics

ISSN: 1514-0326 (Print) 1667-6726 (Online) Journal homepage: www.tandfonline.com/journals/recs20

Government effectiveness in the provision of public goods: the role of institutional quality

Puneet Arora & Alberto Chong

To cite this article: Puneet Arora & Alberto Chong (2018) Government effectiveness in the provision of public goods: the role of institutional quality, Journal of Applied Economics, 21:1, 175-196, DOI: 10.1080/15140326.2018.1550593

To link to this article: https://doi.org/10.1080/15140326.2018.1550593

© 2018 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.



0

Published online: 10 Dec 2018.

ſ	
ι	

Submit your article to this journal 🗹

Article views: 24462



View related articles

View Crossmark data 🗹



Citing articles: 13 View citing articles

ARTICLE

OPEN ACCESS Check for updates

Routledge

Taylor & Francis Group

Government effectiveness in the provision of public goods: the role of institutional quality

Puneet Arora^a and Alberto Chong^{b,c}

^aDepartment of Economic, Georgia State University, Atlanta, GA, USA; ^bDepartment of Economic, Georgia State University and Universidad del Pacífico, Atlanta, GA, USA; Universidad del Pacífico, Lima, Peru

ABSTRACT

While poorer countries have a much smaller public sector and correspondingly a smaller tax burden than richer countries, their economic performance has not been necessarily better. This paper discusses the role that institutional quality plays in determining government's effectiveness in delivering public goods and in, therefore, mediating the effects of higher taxation in an economy. A simple theoretical model shows that provision of public goods and optimal tax levels increase with improved institutional quality. Using firm-level perceptions data on the quality of public services and the tax burden, consistent with the predictions of our model, we find that a higher level of institutional quality bolsters positive perception of the quality of public services while at the same time moderating the view of the taxes as an obstacle to growth.

ARTICLE HISTORY

Received 6 November 2011 Accepted 7 November 2016

KEYWORDS

Institutions; taxes; quality of public services; regulation; development

1. Introduction

High taxation and a large public sector can potentially distort choices and also lead to political corruption and rent seeking, thereby afflicting government's effectiveness in the delivery of public goods and services.¹ Higher taxes also incentivize firms to move their investments from the formal to the informal sector and thus impeding economic growth. One of the most striking differences between the economies in advanced countries and in developing countries is in the role of the public sector, the former typically having a relatively large public sector, with a substantial commitment to public health, public education, infrastructure, and social security, whereas in developing countries these programs either do not exist or do not entail broad population coverage.² Consequently, the tax burden is substantially larger in developed than in developing countries.³ Yet, despite the overall lighter tax burden in developing countries, there has been remarkably little, if at

CONTACT Alberto Chong achong6@gsu.edu

¹See, e.g., Olken (2006) and references therein for work that documents, using micro-data, how taxation gives rise to corruption. ²For example, the average for central government spending as a share of the GDP between the years 1996 and 2000

was almost 40% in the high-income group of countries and less than 15% in the low-income group of countries (authors' calculations based on the World Bank Development Reports).

³Thus, for countries for which data is available, the share of the GDP collected in tax revenues in recent years was about 30% in high-income countries, but only around 10% in low-income countries. A strong robust relationship between the GDP and tax revenues across countries can be easily discerned from glancing at the data with some high-income countries such as Belgium, Italy, and the Netherlands collecting almost 50% of the GDP in tax revenues, whereas many low-income countries collect 10% and even less (World Development Report (1997) and World Development Report (2004)).

^{© 2018} The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/ licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited

all, convergence in incomes with the developed world and scarce evidence that growth in the latter has been impeded by a large public sector (see Lindert, 2004, for historical analysis; Easterly & Rebelo, 1993, for contemporaneous evidence).

One of this paper's goals is to reconcile these observations in light of the role that institutional quality plays in mitigating the detrimental effects of a large public sector and the consequential, high tax burden. We assume that law enforcement, bureaucratic efficiency (or political stability), and absence of political corruption constitute institutional quality for an economy. Public good provision with its corresponding tax burden, on the other hand, constitutes government effectiveness in an economy. It is argued by means of a simple model that, where the institutional quality is high, size of informal sector is smaller and taxation to finance public spending is much less detrimental than with a lax institution. This implies that the formal sector is bigger and optimal tax rates are higher, i.e., taxation is more affordable for an economy with better institutional quality, *ceteris paribus*. These results feed into the main theme of this paper which talks of improved provision of public goods due to better institutional quality. Adding this aspect of institutional quality to a relatively standard framework helps explain some of the empirical regularities related to public sector's effectiveness.

We then test some of the implications of the theoretical framework. The focus of our empirical analysis constitutes firm-level perceptions on the quality of public services (which parallels public good provision in our theoretical model) in general and in specific areas such as infrastructure, health, and education, and on the severity of the tax burden (which parallels the public good maximizing tax rate in our theoretical model). It suggests that, consistent with the model's implications, a better institutional quality reinforces the perceived effectiveness of the public sector and, therefore, lowers the perception of the tax burden as an obstacle to firms' business activity.

This paper is related to several literatures. One is the relatively small but evolving literature on the determinants and the growth effects of informality pioneered in De Soto (2000), see also Loayza (1996) and Sarte (2000), for some analytical approaches. Friedman, Johnson, Kaufman, and Zoido-Lobaton (2000), Johnson, Kaufman, McMillan, and Woodruff (2000), and Dabla-Norris, Gradstein, and Inchauste (2008) provide evidence that enforcement quality is a more important determinant of informality than fiscal policies. More recent papers (Manolas, Rontos, Sfakianakis, & Vavouras, 2013; Remeikiene & Gaspareniene, 2015; Shabab, Pajooyan, & Ghaffari, 2015; Bayar, 2016, Goel & Nelson, 2016) also provide empirical evidence on the negative and significant role that institutional quality plays in determining the size of the shadow economy.

Other related work emphasizes the role of public investment in development. Barro (1990) is a seminal contribution in this regard, which however disregards the informal sector in its model. There is also work on the determinants of the size and the capacity of the public sector (see Boix, 2001) that also contains a careful literature review. The more directly relevant literature on the effective capacity of the public sector is much more limited. La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1999) is the only contribution we are aware of in this regard, and we will comment on this paper more in detail below; our paper can be viewed as complementary to it in providing additional pieces of evidence on the determinants of government quality.

There is some recent work exploring the effect of specific institutional quality measures in various contexts. Desai, Dyck, and Zingales (2007) show how the effect of corporate taxes is mediated via the quality of corporate governance. Rajkumar and Swaroop (2008) show that differences in the efficacy of public spending in health and education can be largely explained by corruption and bureaucratic inefficiency. Lledó and Poplawski-Ribeiro (2013) investigate political and institutional constraints to fiscal policy implementation in Sub-Saharan Africa and find that planned fiscal adjustments or expansions are less likely to be implemented with weaker institutions framing. Hauner and Kyobe (2010) find that increased accountability of government institutions has an effect on improving efficiency from government expenditures on health and education. Abiad, Furceri, and Topalova (2016) show that public investment inefficiency (such as poor project selection, implementation, and monitoring) affects the output growth in an economy. Our work can be viewed as an extension for a broader measure of institutional quality while focusing on more elements of public good expenditures, other than health and education, and the corresponding tax burden on firms.

We now proceed as follows. Section 2 presents the basic analytical framework, followed by the empirical analysis of some of the theoretical implications in Section 3, and Section 4 concludes with brief remarks.

2. Conceptual framework

Our theoretical analysis models the interaction between government and firm of an economy, where the former decides about how much tax to charge the firm which is then used toward the provision of public goods, while the latter responds to government's tax choice by choosing the proportion of investment to be hidden in the informal economy. In this standard framework, we introduce two parameters, one for bureaucratic inefficiency and political corruption and another for law enforcement, both representing institutional quality.

The comparative statics analysis predicts that the detrimental effect of high taxation on informality is weakened in the presence of higher institutional quality, ceteris paribus. This result seems to be well consistent with various recent findings. While early work found that tax burden and government regulations lead to a larger informal sector (see Schneider & Enste, 2000), more recent research suggests that when institutional variables are included in the regression specification, they trump the tax and regulation variables (Chong & Gradstein, 2007). Further, using firm-level data, Friedman et al. (2000) and Johnson et al. (2000), in their analysis of transition economies, find that firms' trust in the rule of law explains their tendency to go informal much better than measures of the tax burden. Dabla-Norris et al. (2008), using firm-level data, find that, while both taxes and regulations tend to be associated with higher levels of informality, the rule of law emerges as its dominant predictor. Regression analysis indicates that the adverse effect of taxes in this regard is moderated by a high level of the rule of law as perceived by the firms, which is again consistent with our analytical findings; it also indicates that stronger rule of law is associated with more efficient government, which in turn also decreases the propensity to go informal.

The main focus of our theoretical model and our paper, however, is on how institutional environment is associated with the provision of public good and corresponding optimal tax rate (or perception of tax as an obstacle). Some preliminary insights here may be derived from La Porta et al. (1999), which exhibits highly significant correlations across countries between measures of institutional quality such as the political rights index on one hand and measures of the size of the public sector (the fraction of the labor force employed in the public sector) and its outcomes (such as in health, education, and infrastructure) on the other hand.⁴ Their cross-country regressions also reveal that institutional proxies are associated with the size of the public sector. These empirical findings are in alignment with the predictions of our theoretical model below.

2.1. The model

The illustrative framework presented is relatively standard. For the simplicity of our analysis, we consider an economy populated by only one economic agent, the firm, which has to make an investment, k. The production out of this investment will be subjected to a statutory tax at the rate of T, decided by government. The firm can, however, evade paying their tax dues by hiding their endowment or by moving their activity into the informal sector. Thus, we assume that the production out of a declared part of investment, 1 - h, is taxed at the rate of T, and the proceeds are used by government to provide the public good. The complementary part, h, is hidden from the tax authority and shifted to the informal sector.

In case of an audit, however, the agent is subject to a penalty. It is assumed that the penalty results in a net loss. This is presumably because of the outlays to cover the costs of monitoring and auditing, which increase the probability of detection of informal activities. These aspects are not explicitly modeled here as our interest is more with the implications of this interaction between the state and the agent rather than its micro-economic foundations.

Without specifying the details of the auditing procedure, we let $P(h; \phi) = \frac{\phi h^2}{2}$ denote the penalty – as a fraction of investment – imposed on an agent hiding *h*, where $0 < \phi < 1$ is interpreted as the law enforcement quality.⁵ The seminal paper by Allingham and Sandmo (1972) and the subsequent work provide useful framework for microeconomic analyses of tax evasion and auditing; this literature enables an endogenous derivation of the penalty and the evasion activity. As our interest here is less with these aspects and more with their macroeconomic implications, a reduced form specification as above is adopted. The share of hidden resources *hk* is interpreted as the size of the informal sector.

Our model also assumes that there is rent seeking behavior in the economy in the form of bureaucratic inefficiency (or policy instability) and political corruption to the extent of parameter γ .⁶ This is analogous to another tax that a firm has to pay on its production out of the declared investment in the formal economy. We assume

 $^{^{4}}$ For example, the correlation of the political rights index with the infant mortality variable is -0.57, with school _ attainment is 0.67, with the infrastructure index is 0.67.

⁵The particular quadratic formulation is mainly for tractability purposes.

⁶Correspondingly, $1 - \gamma$ is a measure of "political stability and absence of political corruption" used in the empirical analysis.

 $0 < \gamma < 1$. While some rent seeking would be present in almost every economy, McGuire and Olson (1996) explain why it would not be optimal for a government (even an autocrat) to expropriate all the income generated in the economy as tax or rent. Different countries will have different rent seeking behavior γ depending on their internal political and economic dynamics; however, it is usually expected to be higher in developing countries. We consider only one period decision-making in our model where we don't derive the optimal γ for an economy. We assume γ to be a constant and known to firms and government at the beginning of the period before they choose h and T, respectively. Measures of law enforcement, ϕ , and bureaucratic efficiency (or political instability) and absence of political corruption, $1 - \gamma$, determine the institutional quality in our economy.

We assume firm's production function (or the generated income) in this economy to be

$$z = (1 - T - \gamma)(1 - h)kA + \left(h - \phi \frac{h^2}{2}\right)k$$
 (1)

In this function, A > 1 is a parameter representing government investment in infrastructure that complements private investment, (1 - h)k, made in formal economy by firm. Although parameter A would increase in magnitude with greater tax collection and public good investment by government, it is assumed to be constant (by firms) in any given period. Parameter A is expected to be higher for developed countries. In a given period, (1 - h)kA represents the income generated out of firm's investment in formal sector and $(1 - T - \gamma)(1 - h)kA$ represents the share that firm gets to keep after paying tax T and rent γ . Additionally, we assume that money invested in informal sector, $(h_i - \phi h^2/2)k$, neither increases nor decreases in monetary value by the end of the period. This implies that informal sector does not get to enjoy the complementarities with government investment in infrastructure, given by parameter A. For simplicity, we assume firm consumes all its earnings from formal and informal sector at the end of this one-period model leaving nothing behind.

We assume that the government budget is balanced in each period, i.e., government spending on public goods equals its tax collection.

$$G = T(1 - h)kA \tag{2}$$

For simplicity, we assume rent, γkA , does not add either to production in the economy or to public good spending.

In this period, the government acting as a welfare maximizer, selects a tax rate, upon which the firm makes its decision, determining the fraction of unreported income or the size of informal economy.⁷ In equilibrium, these are mutually consistent.

2.2. Analysis

The government's end goal in this model is to maximize public good spending G which is a function of variables h and T. Since government is aware of the tendency of firm to

⁷A previous version also contained analysis of a political equilibrium, whereby the majority voting determines the tax rate; the analysis yields similar insights.

180 🕒 P. ARORA AND A. CHONG

react to a higher tax, T, by hiding a greater share, h, of investment in informal economy, they would find an optimal tax keeping firm's response function in mind.

The firm's decision about optimal h as a function of T is determined as below:

$$\max_{h} (1 - T - \gamma)(1 - h)kA + \left(h - \phi \frac{h^2}{2}\right)k$$

Maximizing this expression gives

$$h^{*}(T|\phi,, A) = min\left\{max\left\{0, \left(\frac{1}{\phi}\right)[1 - (1 - T - \gamma)A]\right\}, 1\right\}$$
 (3)

Given A > 1 and $0 < \phi < 1$, if both T = 0 and $\gamma = 0$ hold for an economy, we can check that $h^* = 0$. Intuitively, if firm faces no tax or rent seeking behavior, it will have no incentive to resort to informal economy. And if $T + \gamma = 1$, as would be expected of an autocrat when it is the "end of the world" period for him, $h^* = 1$. Intuitively, if firm has to pay all its income as tax or rent, it will have no incentive to invest in the formal economy. This suggests that, for any given period, a firm's investment share, h, in informal economy increases with tax T for given γ , ϕ , and A.

Let's assume $(1-T-\gamma)A < 1$, this yields an interior solution such that

$$h^*(T|\phi, A) = \left(\frac{1}{\phi}\right) [1 - (1 - T - \gamma)A]$$
 (4)

We can see that size of informal economy is an increasing function of the tax rate $(\frac{\partial h^*}{\partial T} = \frac{A}{\phi} > 0)$, more so when enforcement quality is lax $(\frac{\partial^2 h^*}{\partial T \partial \phi} = -\frac{A}{\phi^2} < 0)$; a decreasing function of both enforcement quality $(\frac{\partial h^*}{\partial \phi} = -(\frac{1}{\phi^2})[1 - (1 - T - \gamma)A] < 0)$ and political stability and absence of corruption $(\frac{\partial h^*}{\partial (1-\gamma)} = -\frac{A}{\phi} < 0)$. All these results are intuitively appealing wherein one would expect a developing country to have a lower ϕ and $1 - \gamma$, i. e., lower institutional quality, both causing a higher *h*, in comparison to a developed country. This also suggests that for two identical countries except for institutional quality, the country with better institutional quality has a bigger formal sector (Bayar, 2016; Goel & Nelson, 2016; Remeikiene & Gaspareniene, 2015; Shabab et al., 2015).

Given a firm's choice of informality as a function of tax, h^* , government will find an optimal tax rate, T^* :

$$\max_{m} G = T(1 - h^*)kA$$

s.t. $h^* = \left(\frac{1}{\phi}\right) \begin{bmatrix} 1 - (1 - T - \gamma)A \end{bmatrix}$ Consider $\frac{\partial G}{\partial \phi} = -TkA \frac{\partial h^*}{\partial \phi} = \left(\frac{TkA}{\phi^2}\right) \begin{bmatrix} 1 - (1 - T - \gamma)A \end{bmatrix} > 0$. This inequality is obtained using our previous assumption $(1 - T - \gamma)A < 1$ for an interior h^* solution. Additionally, consider $\frac{\partial G}{\partial(1-\gamma)} = -TkA \frac{\partial h^*}{\partial(1-\gamma)} = \left(\frac{TkA^2}{\phi}\right) > 0$. This shows that enforcement quality, and bureaucratic efficiency and absence of political corruption, enhances the public good provision. In other words, higher institutional quality bolsters public good provision, *ceteris paribus*. These results make intuitive sense, since for developing countries where we generally observe lower law enforcement, ϕ , and higher rent seeking behavior, γ , we usually find lower public good provision in comparison to developed countries.

On substituting for h^* from Equation (4) in the public good function G, we get

$$max G = aT - bT^2$$

where $a = \left(\frac{kA}{\phi}\right) [\phi - 1 + (1 - \gamma)A]$ and $b = \left(\frac{kA}{\phi^2}\right)$.

This reveals that the relationship between tax rate, T, and public good, G, is a nonmonotonic one, increasing initially and decreasing afterward. This is not surprising as, when the tax rate is high, the agent reacts by hiding a larger portion of the bequeathed resources, generating a decreasing portion of the Laffer curve.

Solving the above expression with respect to tax, T, yields the optimal tax rate as

$$T^* = \frac{(\phi - 1) + (1 - \gamma)A}{2A}$$
(5)

This public good maximizing tax rate, T^* , is an increasing function of enforcement quality $(\frac{\partial T^*}{\partial \phi} = 1/2A > 0)$, and of bureaucratic efficiency and absence of political corruption $(\frac{\partial T^*}{\partial (1-\gamma)} = \frac{1}{2} > 0)$. This shows that the public good maximizing tax rate increases as law enforcement, ϕ , or as bureaucratic efficiency and absence of political corruption, $1 - \gamma$, improve. In other words, higher institutional quality mediates some of the effects that higher taxes have on firms, *ceteris paribus*, consequently making them appear as less of an obstacle to investing in formal economy.

Collecting the results, we obtain

Proposition 1. The effect of taxation on informality $(\frac{\partial h^*}{\partial T} > 0)$ works through enforcement quality and is stronger when the latter is lax $(\frac{\partial^2 h^*}{\partial T \partial \phi} < 0)$. Also, informality is reduced with bureaucratic efficiency and absence of political corruption $(\frac{\partial h^*}{\partial (1-\nu)} < 0)$.

Proposition 2. Better enforcement quality implies a higher public good maximizing tax rate $(\frac{\partial T^*}{\partial \phi} > 0)$; bureaucratic efficiency and absence of political corruption have the same effect on public good maximizing tax $(\frac{\partial T^*}{\partial (1-\gamma)} > 0)$. This suggests that public good maximizing tax rate increases in institutional quality or, in other words, the perception of tax as an obstacle decreases in institutional quality.

Proposition 3. Public good provision increases in institutional quality due to a smaller optimal size of informal economy, h^* , and a larger optimal tax rate, T^* . Given optimal firm behavior, h^* , public good provision is a non-monotonic function of the tax rate, increasing first and then decreasing $(G = aT - bT^2)$.

Proposition 2 and 3 together imply that government effectiveness improves with institutional quality, where government effectiveness is given by public good provision and the corresponding tax as a burden on firms, and institutional quality is given by measures of law enforcement, bureaucratic efficiency, and absence of political corruption.

It must be noted that the static model considered above was simplified with assumptions of one firm: exogenously determined enforcement rate, ϕ , and rent, γ ;

convex penalty function $P(h; \phi) = \phi h^2/2$; and a constant complementarity measure, A, between a firm's formal sector investment and government investment on infrastructure. In this one-period context where the firm decides h and the government decides T at the beginning of the period, it makes sense to assume constant ϕ , γ , and A which would be the values firm and government perceive to be present in the economy. However, in the real-world multi-period and many firms setting, one would expect ϕ to be an increasing function of government's tax collection; rent, γ , to depend on the long-run motive of the social planner or the political system of the economy; penalty function, $P(h; \phi)$, to be linear rather than convex; and the complementarity parameter, A, to be an increasing function of government's spending on intermediate investment goods. While these parameter values will keep varying between periods in the general multi-period and many firms model in response to changes in government tax revenues and subsequent government spending, its analysis will give similar results as our one-period and one firm model.

The static model provides an important insight into the role that institutional quality may have played in the remarkably little convergence in incomes of developing countries with the developed world (Lindert, 2004). Government's tax revenue is majorly used toward the provision of final consumption goods (such as health and education) and intermediate investment goods (such as infrastructure), where the former adds directly to an economy's GDP while the latter affects GDP through its positive impact on the complementarity parameter, *A*, making private investments in the formal sector more productive. Better institutional quality (higher ϕ and $1 - \gamma$), therefore, increases GDP through increased government spending (on consumption and investment goods) out of higher tax collection, and through increased production and productivity in the formal sector. Improved institutional quality reduces the size of the not so productive informal sector. In other words, better institutional quality increases both private and public sector production, thus contributing to the income gap between nations with varying institutional quality, *ceteris paribus*.

3. Empirical evidence

Our theoretical analysis generates several implications. Proposition 1 talks about how taxation affects informality through the intermediation of institutional quality $(\frac{\partial^2 h^*}{\partial T \partial \phi} < 0)$. There is overwhelming evidence in favor of this result (Chong & Gradstein, 2007; Dabla-Norris et al., 2008; Friedman et al., 2000; Johnson et al., 2000). The focus of our paper, on the other hand, is on providing more disaggregated evidence to further enhance the preliminary insights derived from La Porta et al. (1999), consistent with the Proposition 3 of our model, namely, that better institutional environment is associated with better functioning public sector. The dataset generated through the World Business Environment Survey (WBES) by the World Bank allows us to provide such evidence. In addition, we also use this dataset to test our Proposition 2 in the model which suggests that better institutional environment reduces the perception of tax as an obstacle to growth. We now proceed by describing this dataset.

3.1. Data and empirical strategy

The survey was taken as an initiative of the World Bank Group, in partnership with many other institutions seeking to provide feedback from enterprises on the state of the private

sector in client countries; to measure the quality of governance and public services including the extent of corruption; to provide better information on constraints to private sector growth, from the enterprise perspective; to establish the basis for internationally comparable indicators which can track changes in the business environment over time thus allowing both for competitive assessment and impact assessments of market-oriented reforms; and to stimulate systematic public–private dialog on business perceptions and the agenda for reform. The field work was done between 1999 and 2000 by private polling of each country's firms that fulfilled the basic requirements. The survey was targeted to a representative sample of firms filling criteria as sector, size, location, and ownership characteristics.⁸ The objective was to gather information on a sizeable number of firms in several countries around the world, which was accomplished for most of the sample.⁹

The sample consists of firm level survey responses of thousands of firms in more than 80 countries, many of them developing and in transition. The survey asked each business to rank the constraints or problems impacting their operations. This process involved an extensive questionnaire undertaken via a face-to-face interview with either the firm managers or firm owners of each company. As a result, the survey reports comparative measurements based on firms' perceptions about their business environment as shaped by a variety of economic and policy factors.¹⁰

For testing the theoretical model's implications about public goods provision in Proposition 3, we use answers to questions regarding the quality of public services such as infrastructure, health and education, security, etc., and the efficiency of the government on delivering those services as proxies. A corresponding World Bank question in the survey is as follows: "how would you generally rate the efficiency of central and local government in delivering services?" with responses ranging from "1 = very inefficient" to "6 = very efficient." Also, as proxies to our main explanatory variable of interest, "institutional quality," we use answers to questions related to firm's perception of the quality of the judicial system and its functioning, as well as the main institutional stimulants for firm's growth, such as policy stability and absence of political corruption.¹¹ To test Proposition 2, we use answers to questions related to taxes and their regulation as obstacles posed to business' growth as proxies to the optimal tax or the tax burden.

Additionally, we also include country wide variables, in particular institutional quality, the logarithm of the GDP, and the tax rate. The former is taken from

⁸The particular requirements that had to be filled by the sample selected were as follows: Sector: in each country, the sectoral composition in terms of manufacturing (including agro-processing) versus services (including commerce) will be determined by relative contribution to GDP, subject to a 15% minimum for each category. Size: at least 15% of the sample shall be in the small and 15% in the large size categories. Ownership: at least 15% of the firms will have foreign control. Exporters: at least 15% of firms will be exporters, meaning that some significant share of their output is exported. Location: at least 15% of firms will be in the category "small city or countryside."

⁹The countries and number of firms (in parentheses) included in the survey are Argentina (76), Bangladesh (38), Belarus (101), Bolivia (72), Brazil (148), Bulgaria (84), Canada (87), Chile (80), Colombia (88), Costa Rica (51), Czech Republic (81), Dominican Republic (68), Ecuador (52), El Salvador (63), France (72), Germany (75), Guatemala (51), Haiti (71), Honduras (50), Hungary (102), India (123), Indonesia (70), Italy (67), Malaysia (43), Mexico (43), Nicaragua (62), Pakistan (72), Panama (49), Peru (77), Philippines (90), Poland (175), Portugal (78), Romania (114), Slovakia (23), Spain (82), Sweden (76), Thailand (71), Turkey (113), United Kingdom (59), United States (86), Ukraine (158), and Uruguay (57).

¹⁰In recent years, several researchers have employed these data, including Misch, Gemmell, and Kneller (2014), Hallward-Driemeier and Pritchett (2015), among many others.

¹¹These institutional measures are highly correlated with other standard institutional measures employed in the literature, such as BERI, ICRG, and the measures originally collected by Kaufmann, Kraay, and Mastruzzi (2006) A summary of such measures can be found at this World Bank site: http://info.worldbank.org/governance/wgi/#home.

International Country Risk Guide (2006), a well-known comprehensive index including the assessment of corruption within the political system, the strength and impartiality of the judicial system, the assessment of the popular observance of laws, and the institutional strength and quality of the bureaucracy. This index is taken as an average for the period 1998 and 2002, in order to assess the long-term quality of the institutional framework. As for the tax rate and the GDP, we use the value added tax (VAT) rate as of August 2004 which is taken from the International Monetary Fund (2006) and from the World Development Indicators, respectively. Finally, as basic controls, we base our specification on existing literature and, in particular, include basic firm characteristics, such as ownership, size, and industrial sector. Table 1 provides detailed definitions of all the variables used in this paper, and Table 2 provides corresponding summary statistics, whereas Appendix 1 exhibits the correlation matrix along with corresponding statistical significance.

3.2. Specification and results

Our analysis concentrates on testing some of the implications of the theoretical model above.¹² Table 3 presents our benchmark specification for determinants of government effectiveness in delivering public services. As our dependent variable is categorical, we run ordered probit regression and show the coefficients obtained.¹³

We find that, on average, government-owned firms perceive the government as relatively efficient in delivering public services. Also, the size of the firm is positively linked to the perception of the effectiveness of the government. In contrast, we do not find any significant relationship between the sector where the firm operates and the opinion on the efficiency of the government. Also, we do not find any robust evidence that size of the economy, as measured by the gross domestic product, is associated with the perception of government effectiveness in public goods provision.

Consistent with the model's predictions and similar to previous country level evidence (La Porta et al., 1999), we find a significant association between the quality of institutions and the efficiency in provision of public services at the firm level. Furthermore, in order to exploit the between and within country variation that our data allow, we include both country-level and firm-level variables that take into account the quality of institutions. As described above, at the domestic level, we use the institutional quality index from International Country Risk Guide (2006) and at the firm level, we use question on perceptions of institutions as growth obstacles, in particular, those related with policy stability, absence of corruption, and the overall assessment of quality of the judiciary. The evidence presented in Table 3 shows that there is a highly significant association between the quality of institutions and the effectiveness of government in providing public services. Particularly, our results show that firm

¹²In particular, we do not provide empirical results on the link between taxes and government efficiency as in this specific case endogeneity issues can be particularly problematic. When applying an IV approach similar to the one used in the paper, we find results consistent with the predictions of the model. Also, La Porta et al. (1999) provide some empirical tests on this link at the country level.

¹³Since our GDP term is not statistically significant, we also tested the same specification with (1) one and two-lagged terms of GDP, (2) a quadratic term in GDP, and (3) interactive terms of GDP and other controls. In all cases, the single GDP term remains statistically insignificant. One must bear in mind that while the coefficients obtained from ordered probit cannot be interpreted directly, as we need to calculate marginal coefficients, the significance and sign of such coefficients are normally reported. We provide marginal coefficients for benchmark results in Appendix 2. We would be happy to provide the additional marginal calculations upon request.

		<u> </u>
Variables	Definition	Source
Firm characteristics		WBES
Company is owned by a foreign investor	Answer to the question on the nationality of the owners. The variable takes the value of 1 if the company is owned by a foreign investor, and 0 otherwise	
Government owns the company	Answer to the question on the ownership of the firm. The variable takes the value of 1 if the company is owned by the government, and 0 otherwise	
Size: medium	A firm is defined as medium size if it has between 51 and 500 employees	
Size: large	A firm is defined large size if it has more than 500 employees	
Manufacturing	Firm belongs to the manufacturing sector	
Service	Firm belongs to the service sector	
Agriculture	Firm belongs to the agriculture sector	
Construction	Firm belongs to the construction sector	
Firm's perception about institution	onal quality	
Political stability ^a Absence of corruption ^b	Answer to the question: Please judge on a 4-point scale how problematic are the following factors for the operation and growth of your business: Policy instability/uncertainty. (1) Major obstacle, (2) moderate obstacle, (3) minor obstacle, and (4) no obstacle Answer to the question: Please judge on a 4-point scale how	WBES
Confidence in judicial system	problematic are the following factors for the operation and growth of your business: Corruption. (1) Major obstacle, (2) moderate obstacle, (3) minor obstacle, and (4) no obstacle Answer to the statement: "I am confident that the legal system will	
	uphold my contract and property rights in business disputes." The answer ranges from 1 to 6, where 1 = fully disagree, and 6 = fully agree	
Courts – enforceability	Answer to the question: In resolving business disputes, do you believe your country's court system to be decisions enforced. The answer ranges from 1 to 6, where 1 = never and 6 = always	
Courts – consistent	Answer to the question: In resolving business disputes, do you believe your country's court system to be consistent. The answer ranges from 1 to 6, where $1 =$ never and $6 =$ always	
Courts – affordable	Answer to the question: In resolving business disputes, do you believe your country's court system to be affordable. The answer ranges from 1 to 6, where $1 =$ never and $6 =$ always	
Courts – quick	Answer to the question: In resolving business disputes, do you believe your country's court system to be quick. The answer ranges from 1 to 6 where 1 – pever and 6 – always	
Courts – honest	Answer to the question: In resolving business disputes, do you believe your country's court system to be honest/uncorrupt. The answer	
Courts – fair and impartial	Answer to the question: In resolving business disputes, do you believe your country's court system to be fair and impartial. The answer ranges from 1 to 6, where 1 – never and 6 – always	
Firm's perception about quality	of nublic services	
Efficiency of government in	Answer to the question: How would you generally rate the efficiency of	WBES
delivering services	central and local government in delivering services? The answer	
	ranges from 1 to 6, where $1 = very$ inefficient and $6 = very$ efficient	
Quality of education	Rating of the overall quality and efficiency of services delivered by the	
	Industry public agencies or services: education services/schools.	
Quality of public health	Answer ranges from 1 = very bad to 6 = very good Rating of the overall quality and efficiency of services delivered by the following public agencies or services: public health care service/	
Quality of water	hospitals. Answer ranges from 1 = very bad to 6 = very good Rating of the overall quality and efficiency of services delivered by the following public agencies or services: the water/sewerage service/	
Quality of power	agency. Answer ranges from 1 = very bad to 6 = very good Rating of the overall quality and efficiency of services delivered by the following public agencies or services: the electric power company/	
Quality of telephones	agency. Answer ranges from 1 = very bad to 6 = very good Rating of the overall quality and efficiency of services delivered by the following public agencies or services: the telephone service/agency.	
Quality of public works	Answer ranges from 1 = very bad to 6 = very good Rating of the overall quality and efficiency of services delivered by the following public agencies or services: roads department/public works.	
	Answer ranges from $1 = \text{very bad to } 6 = \text{very good}$	

Table 1. Variable definition.

Table 1. (Continued).

Variables	Definition	Source
Country level institutional qualit	у	
Country level institutional qualit Quality of institutions index	^y Average of the index in the period 1998–2002. The aggregated index comprises (a) corruption – assessment of the corruption within the political system. The most common form of corruption met directly by business is financial corruption in the form of demands for special payments and bribes connected with import and export licenses, exchange controls, tax assessments, police protection, or loans. It is also more concerned with actual or potential corruption in the form of excessive patronage, nepotism, job reservations, "favor-for-favor," secret party funding, and suspiciously close ties between politics and business, (b) law and order – law and order are assessed separately, with each subcomponent comprising 0–3 points. The law subcomponent is an assessment of the strength and impartiality of the legal system, while the order subcomponent is an assessment of popular observance of the law. A country can enjoy a high rating – 3 – in terms of its judicial system, but a low rating – 1 – if it suffers from a very high crime rate or if the law is routinely ignored without effective sanction (e.g., widespread illegal strikes), and (c) bureaucratic quality – the institutional strength and quality of the bureaucracy is another shock absorber that tends to minimize revisions of policy when governments change. High points are given to countries where the bureaucracy has the strength and expertise to govern without drastic changes in policy or interruptions in govern without drastic changes in policy or interruptions in	ICRG
	government services. Countries that lack the cushioning effect of a strong bureaucracy receive low points because a change in government tends to be traumatic in terms of policy formulation and day-to-day administrative functions. The index takes values between 0 and 18	
Log(GDP)	Log of the gross domestic product for the year when the interview was done	WDI
Taxes		
General constraint – taxes and regulations	Answer to the question: Please judge on a 4-point scale how problematic are the following factors for the operation and growth of your business: policy instability/uncertainty. (1) Major obstacle; (2) moderate obstacle; (3) minor obstacle; and (4) no obstacle	WBE2
Current VAT rate	Data correspond to the current standard VAT rate as of August 2004. The information was composed of the IMF "VAT Database: VAT Rates for Fund Member Countries," which in turn was based on calculations by the International Bureau of Fiscal Documentation; and Corporate Taxes 2003–2004, Worldwide Summaries (PricewaterhouseCoopers)	IMF
Instruments		
Legal origin	Dummies related to the origin of the commercial law of a country: British, French, Scandinavian, Socialist or German	La Porta et al. (1998)
Region	Dummies of the regions that are covered in the sample: Transition, East Asia, South Asia, Latin America, and OECD	WDI
Legal organization of the company	Answer to the question: What is the legal organization of this company: (1) single proprietorship, (2) partnership, (3) cooperative, (4) corporation, privately held, (5) corporation listed on stock exchange	WBES
Firm's ownership	Answer to the question: Which of the following best describes the overall control of your firm, where control means making major decisions concerning the enterprise's direction? (1) Individual owner (s), (2) a family, (3) a company group, (4) a bank, (5) its board of directors/supervisory board, (6) its managers, (7) its workers, and (8) others	WBES

All the data are retrievable at this site:

http://www.enterprisesurveys.org.

^aThe survey calls it "political instability" while we call it "political stability" since higher value of this parameter represents greater political stability.

^bThe survey calls it "corruption" while we call it "absence of corruption" since higher value of this parameter represents lower corruption.

Variables	Obs	Mean	Std. Dev.	Min	Max
Firm characteristics					
Company is owned by a foreign investor	9673	0.19	0.39	0	1
Government owns the company	9645	0.12	0.33	0	1
Size: medium	10,007	0.40	0.49	0	1
Size: large	10,007	0.19	0.39	0	1
Manufacturing	9141	0.36	0.48	0	1
Service	9141	0.43	0.50	0	1
Agriculture	9141	0.07	0.26	0	1
Construction	9141	0.10	0.29	0	1
Firm's perception about institutional quality					
Political stability	9034	2.21	1.08	1	4
Absence of corruption	8376	2.47	1.15	1	4
Confidence in judicial system	9539	3.76	1.43	1	6
Courts – enforceability	8902	3.42	1.47	1	6
Courts – consistent	8614	3.13	1.41	1	6
Courts – affordable	8875	3.18	1.46	1	6
Courts – quick	9067	2.35	1.28	1	6
Courts – honest	8814	3.35	1.50	1	6
Courts – fair and impartial	9012	3.44	1.44	1	6
Firm's perception about quality of public services					
Efficiency of government in delivering services	7786	3.16	1.20	1	6
Quality of education	8874	3.59	1.27	1	6
Quality of public health	9227	3.23	1.35	1	6
Quality of water	9390	4.00	1.29	1	6
Quality of power	9485	4.11	1.28	1	6
Quality of telephones	9518	4.17	1.24	1	6
Quality of public works	9035	3.35	1.36	1	6
Country level institutional quality					
Quality of Institutions index	8935	8.55	2.78	0	15.88
Log(GDP)	10,032	24.14	1.98	20.32	29.79
Taxes					
General constraint – taxes and regulations	9382	2.86	1.01	1	4
Current VAT rate	9467	16.20	4.63	5	25

Table 2. Summary statistics.

perception of a lesser corrupt political system, a more stable and predictable policy environment, and a more reliable judiciary imply firm perception of a more efficient government in delivering public services.¹⁴ This result concurs with Proposition 3 of our model.

According to these findings, an increase of one standard deviation in the quality of institutions index – equivalent to moving from the institutional quality level of Mexico (7.8) to the one in Spain (11.7) – is associated with a 0.3 percent increase in the probability of ranking the performance of government as "very efficient." Similarly, at the firm level, an improvement in political stability represented by a move from a response that policy instability poses a "minor obstacle to growth" to "no obstacle at all" is associated with an increase of about 0.7 percent in the probability of ranking the government as "very effective."¹⁵

¹⁴When we add Barro and Lee's measure of education (years of secondary school) and a political rights measure (freedom house), the statistical significance and signs of our (1) index of quality of institutions, (2) the general constraint–political stability variable, (3) the General constraint–absence of corruption variable, (4) and the confidence in judicial system variable do not change. However, since the number of observations is reduced drastically in relation to our core results (to 3500 observations approximately), we do not report these findings but they are available upon request.

¹⁵Appendix 2 shows the marginal coefficients of our variables of interest based on our benchmark regression on the first column of Table 3.

	Dependent variable: (1 = v)	Efficiency of government very inefficient, 6 = very ef	in delivering services ficient)
Company is owned by a foreign investor	0.033	0.032	0.002
	(0.70)	(0.68)	(0.040)
Government owns the company	0.136**	0.094	0.102
	(2.13)	(1.39)	(1.60)
Size: medium	0.107**	0.084	0.078
	(2.00)	(1.45)	(1.42)
Size: large	0.207***	0.181***	0.118*
	(3.48)	(2.80)	(1.94)
Manufacturing	-0.148	-0.127	-0.156
	(-0.63)	(-0.51)	(-0.65)
Service	-0.149	-0.150	-0.150
	(-0.63)	(-0.61)	(-0.62)
Agriculture	-0.287	-0.321	-0.270
	(-1.15)	(-1.22)	(-1.04)
Construction	-0.249	-0.209	-0.245
	(-1.06)	(-0.83)	(-1.00)
Log(GDP)	0.008	-0.006	0.005
	(0.26)	(-0.19)	(0.15)
Quality of institutions index	0.039*	0.048**	0.040*
	(1.88)	(1.99)	(1.88)
Political stability	0.215***		
	(6.96)		
Absence of corruption		0.162***	
		(5.48)	
Confidence in judicial System			0.277***
			(11.8)
Observations	6039	5721	6107
Num. of countries	55	55	55
Log pseudo-likelihood	-9264	-8827	-9138
Pseudo <i>R</i> -sq	0.0294	0.0247	0.0526
Chi-sq	216.4	132.7	284.9

Table 3. Institutiona	l quality	and	public	services	(ordered	probit).
-----------------------	-----------	-----	--------	----------	----------	----------

Robust *z*-statistics in parentheses. Standard errors clustered at the country level. *Significant at 10%; **significant at 5%; ***significant at 1%.

Further, we present evidence on firm's perception of the tax rates and regulation as obstacles for growth as determined by firm characteristics, overall institutional quality, current tax rates, and the quality of public goods provided by the government, see Table 4. As expected, higher tax rates, measured by the VAT rate, are positively related with the perception of taxes as an obstacle for growth while the quality of public services is negatively related with it. Most specific to our interest is the result that the institutional quality index is negatively associated with the perception of taxes as an obstacle for growth.¹⁶ This result concurs with Proposition 2 of our model.

3.3. Robustness

Table 5 presents some further evidence on the impact of institutional quality on the quality of public goods serviced by government. We use various dependent variables that capture quality in the delivery of public goods, in particular education, public health, water service, electric power, postal system, and the overall quality of public works. We find that there is a robust, positive, and statistically significant link between the measures of institutional quality and the quality of government services.

¹⁶A table with the corresponding marginal coefficients may be provided upon request.

	-						
		Genera	constraint – taxes and	d regulations (1 = no	obstacle, 4 = major ob	ostacle)	
Quality of institutions index	-0.065	-0.070	-0.065	-0.068	-0.076	-0.068	-0.072
	(3.87)***	(3.81)***	(3.30)***	(3.48)***	(4.09)***	(3.84)***	(4.19)***
Current VAT rate	0.044	0.049	0.047	0.046	0.049	0.045	0.048
	(2.95)***	(3.37)***	(2.99)***	(2.98)***	(3.20)***	(3.11)***	(3.46)***
Quality of education							-0.110 (5.27)***
Quality of public health						-0.115 (5.46)***	
Quality of water					-0.048 (1.88)*		
Quality of power				-0.059 (2.18)**			
Quality of telephones			-0.089 (3.21)***				
Quality of postal system		-0.075 (3.54)***					
Quality of public works	-0.110 (5.57)***						
Observations	6604	6733	6760	6782	6803	6436	6349
Num. of countries	70.00	70.00	69.00	69.00	70.00	70.00	70.00
Log pseudo-likelihood	-8083.57	-8278.03	-8386.86	-8435.30	-8387.58	-7857.42	-7758.01
Pseudo R-sq	0.06	0.05	0.05	0.05	0.05	0.06	0.06
Chi-sq	319.03	313.35	240.28	245.66	267.76	367.13	327.24
All the regressions also include the large or medium, whether the inv judicial system. The results are a *significant at 10%; **significant	same controls as the dustry is manufacturin analogous. These varia at 5%; ***significant a	ones employed in Table g, agriculture, construc bles have been omitte t 1%.	e 3, namely whether th tion, or services, the lo d for the sake of econ	ie company is owned igarithm of the GDP, p iomy. Robust z-statisti	by foreigners or the st. oolitical stability, absen cs in parentheses. Sta	ate, whether the size on the size of corruption, and of the one of corruption, and of the one of th	of the company is confidence in the at country level.

Table 4. Taxation as an obstacle (ordered probits).

189

	Quality of education	Quality of public health	Quality of water	Quality of power	Quality of telephones	Quality of pub- lic works
Quality of	0.052	0.075	0.090	0.083	0.074	0.041
institutions index	(1.82)*	(2.51)**	(5.52)***	(3.64)***	(3.46)***	(1.78)*
Confidence in	0.174	0.173	0.136	0.152	0.144	0.128
judicial system	(9.85)***	(9.08)***	(7.97)***	(8.47)***	(7.88)***	(7.49)***
Observations	6786	7055	7169	7206	7222	7052
Pseudo R-sq	0.03	0.04	0.05	0.05	0.04	0.02
Quality of	0.048	0.072	0.087	0.080	0.077	0.042
institutions index	(1.65)*	(2.32)**	(5.81)***	(3.69)***	(3.63)***	(1.82)*
Absence of	0.152	0.159	0.104	0.104	0.057	0.048
corruption	(6.04)***	(5.81)***	(4.13)***	(3.48)***	(2.40)**	(1.84)*
Observations	6442	6689	6817	6842	6861	6714
Pseudo R-sq	0.02	0.03	0.04	0.04	0.03	0.01
Quality of	0.054	0.074	0.085	0.080	0.075	0.034
institutions index	(1.76)*	(2.25)**	(5.70)***	(3.73)***	(3.45)***	(1.44)
Political stability	0.129	0.142	0.123	0.120	0.080	0.105
	(4.66)***	(4.84)***	(5.59)***	(4.97)***	(3.11)***	(4.05)***
Observations	6214	6451	6562	6577	6591	6465
Pseudo R-sq	0.02	0.03	0.04	0.04	0.03	0.02

Table 5. Institutional quality and public services (robustness checks).

Only relevant coefficients are shown. The dependent variables are shown in the first line, and the independent variables, as well as some relevant statistics, are in the first column. Coefficients obtained after estimating models similar to those specified in Table 3. Robust z-statistics in parentheses. Standard errors clustered at the country level. *Significant at 10%; **significant at 5%; ***significant at 1%.

Since the survey does a detailed coverage of firms' perceptions of the legal system, it further enables us to do the analyses of its various features, such as its speed, fairness and impartiality, enforceability, and others as the determinants of government effectiveness in public good provision. As can be seen in Table 6, each of the aspects of legal system is positively related to the government perception as an effective provider of services. As the country-level institutional proxy remains highly significant and, with a positive effect, also does our measures of the effectiveness of the courts.

To address the potential bias generated by endogeneity in the perceptions data, we employ an instrumental variables approach. In particular, we use a two-stage procedure that includes both country- and firm-level instruments for our two variables of interest, namely, our index of quality of institutions and our political stability variable. In the case of the former, a country-level variable, we use continental dummies and legal origin as country-level instruments. As has been shown in the literature (e.g., La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1997, La Porta et al., 1999), legal origin is a very strong determinant of the current institutional quality of a country. Furthermore, it is reasonable to assume that the legal origin of a country may be minimally related to the effectiveness of the government in their delivery of public services as, unlike the overall quality of the institutions of a country, it is more likely that effectiveness in the delivery of services may be determined by short-run conditions rather than those that originated in the legal framework of the country some time ago (La Porta et al., 1999).¹⁷

In the case of political stability, a firm-level variable, we also use the ownership and legal organization of the firm obtained from the WBES dataset. The first instrument reflects whether the owner is public or private, and if the latter then whether it is an individual, a

¹⁷In fact, the pairwise correlation between legal origin and provision of public services is below 0.15 and it is not statistically significant at conventional levels.

	Efficiency of c	overnment in	delivering serv	ices (1 = very i	nefficient, 6 =	very efficient)
Company is owned by a	0.014	0.006	0.039	0.023	0.017	0.005
foreign investor	(0.36)	(0.17)	(0.98)	(0.52)	(0.44)	(0.13)
Government owns the	0.089	0.099	0.057	0.076	0.061	0.086
company	(1.44)	(1.53)	(0.86)	(1.10)	(0.96)	(1.28)
Size: medium	0.050	0.045	0.093	0.059	0.063	0.080
	(0.99)	(0.84)	(1.93)*	(1.09)	(1.33)	(1.42)
Size: large	0.124	0.129	0.184	0.136	0.142	0.157
5	(1.99)**	(1.97)**	(2.92)***	(1.94)*	(2.37)**	(2.29)**
Manufacturing	0.010	0.082	-0.065	-0.060	0.032	-0.048
-	(0.04)	(0.30)	(0.29)	(0.19)	(0.11)	(0.16)
Service	0.010	0.089	-0.079	-0.063	0.046	-0.056
	(0.04)	(0.33)	(0.35)	(0.20)	(0.16)	(0.19)
Agriculture	-0.177	-0.057	-0.318	-0.244	-0.122	-0.200
	(0.64)	(0.20)	(1.33)	(0.72)	(0.40)	(0.63)
Construction	-0.097	-0.012	-0.211	-0.185	-0.063	-0.158
	(0.37)	(0.04)	(0.93)	(0.58)	(0.21)	(0.52)
Log(GDP)	-0.002	-0.003	0.009	0.007	-0.002	0.001
	(0.07)	(0.10)	(0.28)	(0.21)	(0.06)	(0.03)
Quality of institutions	0.044	0.044	0.059	0.071	0.049	0.055
index	(2.20)**	(2.17)**	(3.10)***	(2.96)***	(2.37)**	(2.44)**
Courts – enforceability						0.154
6						(6.13)***
Courts – consistent					0.231	
C (C) (C)				0.100	(9.40)***	
Courts – affordable				0.128		
Counter avriale			0.270	(5.31)^^^		
Courts – quick			0.279			
Courts bopost		0 100	(9.01)			
Courts – nonest		(9 50)***				
Courts - fair and impartial	0 210	(8.50)				
	(9 17)***					
Observations	5949	5814	5997	5882	5897	5886
Num, of countries	55.00	55.00	55.00	55.00	55.00	55.00
Log pseudo-likelihood	-8993.31	-8812.52	-8986.35	-9013.30	-8881.35	-8987.55
Pseudo R-sq	0.04	0.04	0.05	0.03	0.04	0.03
Chi-sq	205.98	185.19	183.17	128.36	214.04	152.07

Table 6. Institutional quality, courts, and public services (ordered probits).

Robust *z*-statistics in parentheses. Standard errors clustered at the country level.

*Significant at 10%; **significant at 5%; ***significant at 1%.

family and whether or not it has supervisory board members. We believe that this is a good instrument because political stability may be directly correlated with the behavior of a firm given the potential influence of the State.¹⁸ In fact, even non-state companies may be subject to political stability via influence of board members with specific interests, or direct links between top management and government officials.¹⁹ On the other hand, the other instrument, legal organization of the firm, reflects whether it is formed as a partnership, a cooperative, or a privately held corporation and is the analogous to legal origin at the country level. The manner in which the firm is legally organized may be prone to having more links with the political system. It is believed that some types of arrangements may better shield for such external influence (Sokolov & Solanko, 2017).

¹⁸A current example would be the case of the state oil company PDVSA in Venezuela.

¹⁹An example is Fisman (2001) who shows how the stock value of several firms changed dramatically once the dictator Suharto died.

	Efficiency of government in delivering services $(1 = very inefficient, 6 = very)$
	efficient)
Company is owned by a foreign	-0.055
investor	(-0.97)
Government owns the company	-0.000
	(-0.00091)
Size: medium	0.167***
	(2.83)
Size: large	0.244***
-	(3.60)
Manufacturing	-0.245
	(-1.60)
Service	-0.306*
	(-1.83)
Agriculture	-0.085
	(-0.42)
Construction	-0.348**
	(-2.15)
Log(GDP)	-0.048
	(-1.04)
Quality of institutions index	0.082**
	(2.02)
General constraint – political stability	0.987***
	(2.83)
Observations	5343
Log pseudo-likelihood	-8213.6397
Pseudo R-sq	0.0139
Chi-sq	97.23

Table 7. Institutional quality and public services: ordered probits with instrumental variables (benchmark regression).

We instrument the institutional variables at the country and firm level using legal origin and region dummies for quality of institutions index; and legal origin dummies, firm's owner (individual owner, board of directors/supervisory board, its workers, and government), and legal organization (partnership, cooperative, and corporation-privately held) for political instability. For these first stage regressions, we run an ordinary least squares specification (for the institutional index), and a linear probit for the firm-level institutional variables. Robust *z*-statistics in parentheses. Standard errors clustered at the country level. *Significant at 10%; **significant at 5%; ***significant at 1%.

Table 1 provides detailed definitions of these variables. It is reasonable to expect that such firm-level instruments may have an impact on our firm-level variables of interest; it seems also unlikely that such variables have any bearing on the perception of the quality of provision of public services. The results are shown in Table 7.²⁰ Overall, we find that institutions quality index at country level when instrumented by legal origin of the country and political stability at firm level when instrumented by ownership and legal organization of the firm still yield significant effects on the quality of public goods provided by the government.

4. Conclusions

This paper's starting point is the observation that neither the size of government nor the tax burden in themselves seem to impede economic performance in a cross section of countries. It then provides a theoretical model whereby the effect of taxes is mediated through institutional quality of the economy. The results then indicate that the optimal tax rate, hence the size of the public sector, increases with the institutional quality.

²⁰We also instrumented the other regressions obtaining similar results. For space reasons, we do not present these results but will be happy to provide them upon request.

We then test these results using firm-level data that contain information about satisfaction with public services and the extent to which taxation is viewed as an obstacle to growth. It turns out that institutional quality affects both: the better it is, the better public services are perceived and the less detrimental taxation seems to be. All this lends support to the, analytically derived and commonly observed across countries, positive association between institutional quality and government effectiveness.

An important direction for additional work would deal with the endogenization of institutional quality, possibly by studying how it interacts with the determination of the tax rate. Another, empirical direction would be an examination of the effect of both on firms' growth. We plan to address these aspects in future research.

Acknowledgment

We are very thankful to Mark Gradstein who coauthored an older version of the paper, three anonymous referees, the editor, Jorge Streb, and to seminar participants at George Washington University, Universidad del Pacifico, and the World Bank for comments and suggestions. All remaining errors are obviously ours.

Disclosure statement

No potential conflict of interest was reported by the authors.

Notes on contributors

Puneet Arora is a PhD candidate (2014-2020) in the Department of Economics at Andrew Young School of Policy Studies, Georgia State University, USA. He pursued his graduate studies in Economics at Delhi School of Economics, University of Delhi, India (2011-2013).

Alberto Chong is Professor of Economics at Georgia State University and Universidad del Pacifico.

References

- Abiad, A., Furceri, D., & Topalova, P. (2016). The macroeconomic effects of public investment: Evidence from advanced economies. *Journal of Macroeconomics*, 50, 224–240.
- Allingham, R. G., & Sandmo, A. (1972). Income tax evasion: A theoretical analysis. *Journal of Public Economics*, 1, 323–338.
- Bayar, Y. (2016). Public governance and shadow economy in Central and Eastern European countries. *Administratie Si Management Public*, 27, 62–73.
- Boix, C. (2001). Democracy, development, and the public sector. American Political Science Review, 45, 1–17.
- Chong, A., & Gradstein, M. (2007). Inequality and informality. *Journal of Public Economics*, 91, 159–179.
- Dabla-Norris, E., Gradstein, M., & Inchauste, G. (2008). What causes firms to hide output? *Journal of Development Economics*, 85, 1–27.
- De Soto, H. (2000). *Mystery of capital: Why capitalism Triumphs in the west and fails everywhere else.* New York, NY: Basic Books.
- Desai, M., Dyck, A., & Zingales, L. (2007). Theft and taxes. Journal of Financial Economics, 84, 591-623.
- Easterly, W., & Rebelo, S. (1993). Fiscal policy and economic growth: An empirical investigation. *Journal of Monetary Economics*, 32, 417–458.

194 👄 P. ARORA AND A. CHONG

- Fisman, R. (2001). Estimating the value of political connections. *American Economic Review*, 91(4), 1095–1202.
- Friedman, E., Johnson, S., Kaufman, D., & Zoido-Lobaton, P. (2000). Dodging the grabbing hand: The determinants of unofficial activity in 69 countries. *Journal of Public Economics*, *76*, 459–492.
- Goel, R. K., & Nelson, M. A. (2016). Shining a light on the shadows: Identifying robust determinants of the shadow economy. *Economic Modelling*, 58, 351-364.
- Hallward-Driemeier, M., & Pritchett, L. (2015). How business is done in the developing world: Deals versus rules. *Journal of Economic Perspectives*, 29(3), 121–140.
- Hauner, D., & Kyobe, A. (2010). Determinants of government efficiency. *World Development*, 38(11), 1527–1542.
- International Country Risk Guide. (2006). Retrieved from http://www.icrg.org
- International Monetary Fund. (2006). Retrieved from http://www.imf.org
- Johnson, S., Kaufman, D., McMillan, J., & Woodruff, C. (2000). What do firms hide? Bribes and unofficial activity after communism. *Journal of Public Economics*, 76, 495–520.
- Kaufmann, D., Kraay, A., & Mastruzzi, M. (2006). Governance matters V: Aggregate and individual governance indicators for 1996–2005. World Bank Policy Research Working Paper 4012.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. (1998). Law and finance. Journal of Political Economy, 106(6), 1113-1155.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. (1999). The quality of government. *Journal of Law, Economics, and Organizations, 15,* 222–279.
- Lindert, P. (2004). *Growing public: Social spending and growth since the eighteenth century*(Vol. 1). Cambridge: Cambridge University Press.
- Lledó, V., & Poplawski-Ribeiro, M. (2013). Fiscal policy implementation in Sub-Saharan Africa. *World Development*, 46, 79–91.
- Loayza, N. (1996). The economics of the informal sector: A simple model and some empirical evidence from Latin America. *Carnegie-Rochester Conference Series on Public Policy*, 45, 129–162.
- Manolas, G., Rontos, K., Sfakianakis, G., & Vavouras, I. (2013). The determinants of the shadow economy: The case of Greece. *International Journal of Criminology and Sociological Theory*, 6 (1), 1036–1047.
- McGuire, M. C., & Olson, M., Jr. (1996). The economics of autocracy and majority rule: The invisible hand and the use of force. *Journal of Economic Literature*, 34, 72–96.
- Misch, F., Gemmell, N., & Kneller, R. (2014). Using surveys of business perceptions as a guide to growth-enhancing fiscal reforms. *The Economics of Transition*, 22(4), 683-725.
- Olken, B. (2006). Corruption and the costs of redistribution: Micro evidence from Indonesia. *Journal of Public Economics*, 90, 853–870.
- Rajkumar, A., & Swaroop, V. (2008). Public spending and outcomes: Does governance matter? *Journal of Development Economics*, 86, 96–111.
- Remeikiene, R., & Gaspareniene, L. (2015). Evaluation of the shadow economy influencing factors: Lithuanian case. Paper presented at the 9th International Conference on Business Administration, Dubai, United Arab Emirates.
- Sarte, P.-D. (2000). Informality and rent-seeking bureaucracies in a model of long-run growth. *Journal of Monetary Economics*, 46, 173–197.
- Schneider, F., & Enste, D. H. (2000). Shadow economies: Size, causes, and consequences. *Journal* of *Economic Literature*, 38, 77–114.
- Shabab, M. R., Pajooyan, J., & Ghaffari, F. (2015). The effect of corruption on shadow economy: An empirical analysis based on panel data. *International Journal of Business and Development Studies*, 7 (1), 85–100.
- Sokolov, V., & Solanko, L. (2017). *Political influence, firm performance and survival*. Higher School of Economics Research Paper No. WP BRP 60/FE/2017. Available at SSRN: https://ssrn.com/abstract=3000367 or http://dx.doi.org/10.2139/ssrn.3000367
- World Development Report. (1997). The state in a changing world. Washington, DC: World Bank.
- World Development Report. (2004). *Making services work for poor people*. Washington, DC: World Bank.

Matrix	ation coefi
orrelation	below correl:
Appendix 1. C	<i>p</i> -Values shown

<	efficients.	
	8	
	ion	
	at	
	rel	
1	or	
3	2	
J.	õ	
	bel	
,	1	
	FA .	
	ho	
<	്ഗ്	
5	ıe	
	alı	
5	>	
	ć	- 1

\ppendix	1. Correl	ation Ma	trix											
<i>p</i> -Values sł	nown below	correlation	ı coeffic	ients.										
	Company is owned by a foreign investor	Government owns the company	Size: medium	Size: large	Manufacturing	Service A	Agriculture	Construction	General con- straint-politi- cal instability	General con- straint- absence of corruption	Confidence in judicial system	Efficiency of government in delivering services	Quality of institutions index	General con- straint-taxes and regulations
Government owns the company Size: medium	-0.056 0.000 0.039 0.000	0.150												
Size: large Manufacturing	0.207 0.000 0.115 0.000	0.117 0.000 0.036 0.001	-0.401 0.000 0.057 0.000	0.144 0.000										
Service Agriculture	-0.060 0.000 -0.077	-0.047 0.000 0.049	-0.102 0.000 0.098	-0.103 0.000 -0.012	-0.659 0.000 -0.208	-0.240								
Construction Political stability Absence of	-0.035 0.001 0.000 0.000	- 0.038 0.000 0.038 0.000 0.038 0.088	0.003 0.767 -0.032 0.002 0.019	-0.049 0.000 0.042 0.000 0.030	-0.245 0.000 0.627 0.627	-0.283 -0.283 0.000 0.022 0.048	-0.089 0.000 -0.063 0.000	0.005 0.651 -0.055	0.414					
corruption Confidence in judicial	0.006 0.047	0.000	0.082 0.008	0.006 0.093	0.436 0.036	0.000 0.007	0.210 0.038	0.000 -0.025	0.000 0.216	0.223				
Efficiency of government in delivering	0.000 0.045 0.000	0.000 0.061 0.000	0.434 0.016 0.171	0.000 0.058 0.000	0.001 0.037 0.002	0.536 0.002 0.894	0.000 0.038 0.001	0.021 0.034 0.004	0.000 0.259 0.000	0.000 0.223 0.000	0.366 0.000			
services Quality of Institutions index	0.037	0.023	0.004	-0.003	0.004	0.089	-0.084	-0.010	0.302	0.365	0.207	0.177		
Taxes and regulations Current VAT rate	0.001 -0.125 0.000 -0.104 0.000	0.036 -0.022 0.034 0.162 0.000	0.705 0.069 0.070 0.070 0.070	0.770 -0.118 0.000 -0.090 0.000	0.709 0.002 0.827 -0.052 0.000	0.000 0.010 0.372 -0.009 0.396	0.000 0.048 0.000 0.082 0.000	0.356 0.004 0.705 0.029 0.008	0.000 -0.421 0.000 0.000 0.000	0.000 -0.262 0.000 0.000 0.000	0.000 -0.224 0.000 -0.113 0.000	0.000 -0.296 0.000 -0.173 0.000	-0.122 0.000 0.079 0.000	0.205 0.000

	Efficiency	y of government	in delivering serv	ices (1 = very ine	efficient, 6 = very	efficient)
	$\Pr[Y = 1 X]$	$\Pr[Y=2 X]$	$\Pr[Y = 3 X]$	$\Pr[Y = 4 X]$	$\Pr[Y = 5 X]$	$\Pr[Y = 6 X]$
Quality of Institutions index	-0.007 (-1.87)*	-0.007 (-1.88)*	-0.001 (-1.42)	0.008 (1.94)**	0.006 (1.87)*	0.001 (1.48)
Political stability	-0.036 (-7.02)***	-0.038 (-6.53)***	-0.008 (-1.94)**	0.043 (6.94)***	0.032 (5.99)***	0.007 (3.03)***

Appendix 2. Institutional quality and public services

The number of observations is 6039, the log-likelihood is -9264.29, the pseudo-*R*-squared is 0.03, and the corresponding Chi-squared is 193.15. Robust *z*-statistics in parentheses. Standard errors clustered at the country level. *Significant at 10%; **significant at 5%; ***significant at 1%.

Selected marginal coefficients for benchmark regression.