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Corruption, Public Finances, and the Unofficial Economy

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In this sample of 49 Latin
American, OECD, and
transition economies, it is the
ineffective and discretionary
administration of tax and
regulatory regimes — not
higher tax rates alone — as
well as corruption, that
increases the size of the
unofficial economy And
countries with a larger
unofficial economy tend to
grow more slowly

Summary findings

Johnson, Kaufmann, and Shleifer (1997) found that, in post-communist economies, the unofficial economy's share of GDP is determined by the extent of control rights held by bureaucrats and politicians.

Exploring in detail the role of taxation and bribery, and using data from an expanded data set of 49 Latin American, OECD, and transition economies, Johnson, Kaufmann, and Zoido-Lobatón find that the unofficial economy accounts for a larger share of GDP where there is great bureaucratic inefficiency and discretion, and where firms experience a greater tax and regulatory burden, as well as more bribery and corruption. The unofficial economy is also much larger where there is less state revenue and where the rule of law is weak. They also find that countries with a larger unofficial economy tend to grow more slowly. Thus, this framework suggests an additional channel whereby corruption and ineffective regulatory and tax administration can result in lower growth: the unofficial economy.

Wealthy OECD economies and some Eastern European economies find themselves in the "good equilibrium" of relatively low regulatory and tax burden (not necessarily low statutory tax rates), sizable revenue mobilization, good rule of law and control of corruption, and a small unofficial economy.

Several countries in Latin America and the former Soviet Union exhibit characteristics consistent with a "bad equilibrium": the discretionary application of heavy regulatory and tax burdens, the weak rule of law, heavy bribery, and an active unofficial economy.

In this large country sample (unlike in the earlier framework for transition economies only), the authors find that it is the ineffective and discretionary application of regulatory and tax regimes in many countries — not higher tax rates by itself — that increase the size of the unofficial economy. The tax burden reported by firms appears to be more a function of regulatory and bureaucratic inefficiency and discretion rather than of tax rates alone.

Corruption, Public Finances and the Unofficial Economy

Simon Johnson, Daniel Kaufmann and Pablo Zoido-Lobatón

MIT, The World Bank, The World Bank *

Index

Diagrams, Tables, and Figures

I. Introduction

The study of unofficial actives in the development field was typically done from a labor market perspective (Todaro, Tokman and many others), stressing the labor market regulatory regime in understanding the evolution of the informal sector. This "sector" was traditionally studied independently of the dynamics of the overall economy. Alternatively, we can take a political economy perspective, asking what motivates politicians to exercise certain rights on enterprises, and analyzing the public finance implications of such actions by politicians. Within a public finance framework we can then attempt to integrate the analysis of the unofficial economy into the dynamics of the overall economy.

Politicization of economic activity means the exercise of control rights over firms by politicians and bureaucrats. In most countries politicians maintain property rights in firms, typically in the form of residual control rights as defined by Grossman and Hart (1986). These control rights may have served an ideological agenda in the past. But they are often used to further the private agenda of politicians and bureaucrats, and particularly so nowadays where ideological differences have narrowed. A recent but rapidly growing literature has established the presence of these problems in countries as diverse as Peru, France, Russia and Ukraine (de Soto 1989, Shleifer and Vishny 1993, Kaufmann and Siegelbaum 1997). But how widespread are these rights and how damaging are their effects around the world?

For Eastern Europe and the former Soviet Union since 1989, Johnson, Kaufmann and Shleifer 1997 (thereafter referred as JKS) show that 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 from communism 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.

Our previous work, focusing on transition economies (JKS), suggests three general propositions. First, that the share of the unofficial economy in GDP should be higher when there is more regulation and more discretion for officials regarding how the regulatory system operates. Second, a higher share of the unofficial economy should be correlated with lower tax revenue as a percent of GDP. Third, a larger unofficial economy should be correlated with weaker publicly provided services, as measured by corruption and the "rule of law" (particularly the legal protection provided to private sector business investments).[1]

The overall framework of JKS can be applied and tested more broadly as well, which we undertake in this paper for a larger sample of countries as well as for a wider set of public finance variables. We generalize our previous framework and suggest that the politicization of economic life can be usefully thought of as exercise by politicians of control rights over business anywhere. Such control rights may include regulatory powers

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[1] Loayza (1995) has similar theoretical results for Latin America. In his model unregistered firms use but do not pay for public services, thus leading to congestion costs for public goods, such as roads, and thus lower growth.

over privatized and private firms, the ability to regulate and restrict entry, control over the use of land and real estate that private businesses occupy, the determination and collection of taxes on businesses, the rights to inspect firms and close them if regulations are violated, control over international trade and foreign exchange transactions, and in some cases, even the power to set prices. Typically, many politicians use these rights to pursue their own interest, such as maintaining employment in certain firms, supporting politically friendly and punishing of politically unfriendly entrepreneurs, and subsidizing their allies. Politicians can also use these rights to enrich themselves by offering firms relief from regulation in exchange for bribes.[2] Political control generally reduces profitability of doing business, and therefore adversely influences entrepreneurial activity and economic growth.[3] When profits or potential profits are taken away from firms through regulation, taxation, or corruption, entrepreneurs choose not to start firms or expand less rapidly than they might otherwise. But entrepreneurs have another option, namely to operate unofficially.[4] JKS hypothesize that in many economies one of the consequences of politicization has been the emergence of the unofficial economy, in which firms can avoid taxes and regulations.

Specifically, we show that the movement of production into the unofficial economy has significant consequences for public finance. Since firms in the unofficial sector largely escape taxation, the reallocation of resources into that sector undermines tax collections, and consequently the ability of the government to provide public goods in the official sector. Such public goods include law and order, effective tax and regulatory institutions, and relatively uncorrupted public administration. The lack of provision of such market-supporting public goods makes operating in the official sector even less attractive to firms, and can set off a collapse of public finances as more and more firms escape into the unofficial economy.

Economies may find themselves in either of two very different equilibria. In the first, tax distortions and regulations are low, government revenues are high, the provision of public goods in the official sector is good, and therefore the unofficial sector is small. In the second equilibrium, taxes and regulations are prohibitive, public finances are precarious, public good provision in the official sector is inadequate, and as a consequence, much of the economic activity is concentrated in the unofficial sector. If firms are more productive in the official than in the unofficial sector, the second equilibrium is associated with worse aggregate performance than the first.

By stressing the role of politicization and depoliticization of economic activity, we focus on the political and institutional determinants of entrepreneurial response, and in particular, on the allocation of resources between the official and the unofficial sectors. The role of depoliticization has been stressed in the study of economies in transition, as well as the importance of building market-supporting rather than market-distorting institutions.[5] In this tradition, our paper focuses on the implications of excessive

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[2] Shleifer and Vishny (1993); Kaufmann (1997).

[3] De Soto (1989).

[4] Kaufmann and Kaliberda (1996); Kaufmann (1997); Loayza (1996)

[5] See Frydman and Rapaczynski (1991), Boycko, Shleifer and Vishny (1995, 1996), Kaufmann and Siegelbaum (1997), and JKS

regulation, taxation and corruption for the government's budget and for provision of public goods required by a market economy.

We emphasize the public finance determinants and implications of corruption and the unofficial economy. We do so by focusing our empirical analysis on the consequences of the escape by new firms from the official economy on the government's budget, and on the provision of potentially beneficial public goods as well as public "bads" such as bribery and corruption. Law and order, protection of property rights and bureaucratic efficiency are key public goods that can be measured empirically. Further, we address the issues relating to the financing of a range of market-supporting government institutions, including regulatory agencies, a reasonably honest public administration, and so forth. We look at the relationship between taxes and regulations, government budgets, and the provision of public goods, and examine the consequences of the condition of public finances for the unofficial economy.[6]

In the next four sections of the paper, we present a simple model, discuss some key assumptions of the model, describe our data, and present the evidence on the effects of political control on the unofficial economy. We conclude stressing some salient policy and institutional implications.

II. A Simple Model

The basic model, drawn from JKS, captures some of the ideas described above. We consider the allocation of labor between the official and the unofficial sectors of the economy. The government imposes taxes on the official sector and provides public goods from the tax revenues. These public goods, such as law and order, increase the productivity of firms in the official sector. The unofficial sector does not pay official taxes, but neither does it have access to the public goods provided by the government. Instead, it may pay fees to private protection agencies to provide some public goods, such as protection from thieves and contract enforcement.[7] We examine the allocation of labor between the two sectors, and its implications for tax revenues, law and order, and the efficiency of the economy.

We present here a sketch of the model described in more detail in JKS. Denote by t the generalized tax rate on output in the official sector. The generalized tax rate t includes taxation, regulation, and corruption (that is, bribes). Taxes raise revenue for the government, but some of the generalized taxes, such as regulation and bribes, do not. For now, let t be the share of output that the government in various ways removes from each firm in the official sector and obtains for its budget.

Let T be the tax revenue in the official sector and Q be the quantity of the public

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good, such as law and order provided to firms operating in the official sector; i.e. here Q captures the public goods from which firms operating unofficially can be excluded. For instance, firms in the unofficial sector do not have access to police, courts, public protection of property rights or administrative assistance from the government. In contrast, such public services as roads are accessible to all firms, even those in the unofficial sector, and hence Q does not properly capture these goods.

Let L be the aggregate labor force, and let the wage rate be normalized to one. Finally, let F and I be the subscripts denoting the official and the unofficial sectors respectively, so L_F and L_I denote the labor employed, Π_F and Π_I the after-tax profits, and Y_F and Y_I the output in each sector.

The production function in the official sector is assumed to be given by:

(1) $\qquad Y_F = QL_F$

The quantity of the public good directly enhances the productivity of the official sector. As a consequence, after tax profits are given by:

(2) $\qquad \Pi_F = (1-t)QL_F - L_F$

Tax revenue, T, is given by $T = tQL_F$. We assume that the supply of public goods is increasing and concave in tax revenue; that is, $Q = Q(T)$, with $Q' > 0$ **and** $Q'' < 0$. This does not mean that government resources are spent entirely on the provision of public goods; indeed, a large portion might be stolen or wasted. We only assume that at least some share of the marginal dollar is spent on public goods.

This assumption raises an important point, namely that the cost of providing market supporting public institutions may be low; thus the JKS assumption that a decline in government revenue leads to a deterioration in the supply of public goods may miss the mark. Nevertheless, our assumption may still apply, because, despite their enormous benefits, market-supporting public goods are often among the first to be cut when the budget deteriorates. In such a situation, the government may be weak or under pressure by powerful interests to maintain the level of less socially useful expenditures, such as agricultural and industrial subsidies and defense spending.

From the government's budget constraint, one obtains $Q = Q(tQL_F)$. Eliminating Q from the right hand side, we write $Q = q(tL_F)$. For q expressed only as a function of tL_F, it is easy to verify that $q' > 0$ and, in some cases, $q'' > 0$. This is the first possible increasing return in the JKS model: as public good provision increases, so does the productivity of the private sector and the tax revenues that it furnishes, which finances a further increase in public good provision. The q function exhibits increasing returns if the government is sufficiently productive in converting revenues into public goods. For example, if $Q(T) = T^\alpha$, **and** $\alpha > 1/2$, **then** $q'' > 0$.

Diagram 1 presents the equilibria in the model detailed in JKS. In equilibrium, the labor market clears so that $L_I + L_F = L$. The figure graphs the tax revenue and quality of public goods against the share of the unofficial economy. The solid line shows that the

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higher is the share of the unofficial economy, the lower are the official tax collections, and hence the supply of public goods to the official sector. The dotted line –the firm mobility function—shows that the higher is the supply of public goods in the official economy, the fewer firms choose to operate unofficially. The dotted line generally cuts the solid line from below.

In general, there are three equilibria in this model: one in which all resources are concentrated in the official sector, one in which all resources are in the unofficial sector, and a knife-edge equilibrium in which the two sectors coexist. The existence of the extreme equilibria is independent of the possible convexity of the q function; that is, there is a second, and totally separate, source of increasing returns to sector size.

When all resources are concentrated in the unofficial sector, government tax collections in the official sector are zero, hence so is the amount of the public good supplied in that sector, as well as its productivity. As a consequence, all firms choose to stay in the unofficial sector. This equilibrium is stable. When nearly all firms are in the unofficial sector, government revenues do not suffice to provide the level of public goods needed to draw firms back into the official sector; in fact, further resources move to the unofficial sector.[8]

Similarly, if all resources are concentrated in the official sector, the tax revenues *(T)* and public good provision *(Q)* in that sector are high enough that all firms choose to stay there. The equilibrium is stable because, when only a few firms are operating unofficially, it is to their advantage to switch back and access to official public goods (in Diagram 1 the dotted line is below the solid line when the size of the unofficial sector is near zero).[9]

By contrast, the knife-edge intermediate equilibrium is unstable. As we can see in Diagram 1, if starting from this equilibrium, a firm tips over from the unofficial to the official sector, the resources of the official sector rise, hence so do tax collections and the quantity of public goods supplied, and finally, the productivity in that sector. More firms then switch into the official sector, and the intermediate equilibrium breaks down.

Although the JKS simple formal model is static, it can be given a "cobweb" dynamic interpretation suggested by the arrows in the above Diagram 1. Suppose that an economy because of a positive budgetary shock ends up on the "good" side of the intermediate equilibrium, that is, at a point where the unofficial economy is relatively small and tax revenues are relatively large. Firms that are operating unofficially then recognize that the combination of taxes and public goods in the official sector is attractive enough for them to switch. As they move, tax revenues in the official sector rise, and hence so does the provision of public goods in that sector. As this happens, more firms operating unofficially switch, and so on, until this virtuous cycle leads to a fully official economy. Conversely,

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[8] In Diagram 1, this equilibrium is stable because the dotted line is above the solid line when all, or nearly all, the resources are in the unofficial sector.

[9] The forces causing the multiplicity of equilibria in this model are general, and are closely related to the idea of fiscal increasing returns of Blanchard and Summers, even though more realistic specifications would generate less extreme outcomes. Blanchard and Summers (1987) present a model in which an increase in government spending reduces unemployment, raises the level of economic activity, and may recover more in increased tax revenues than the government has spent in the first place.

suppose that an economy ends up on the bad side of the intermediate equilibrium, with a relatively large unofficial economy and low tax revenues. Firms operating officially then recognize that they are better off in the unofficial sector and move. Their move has a deleterious effect on the budget and the provision of public goods in the official sector, which causes more firms to switch to the unofficial economy. This vicious cycle ends up at the extreme equilibrium where the whole economy is unofficial.[10]

Diagram 1:

The Model:
The Unofficial Economy and the Collapse of Public Finances
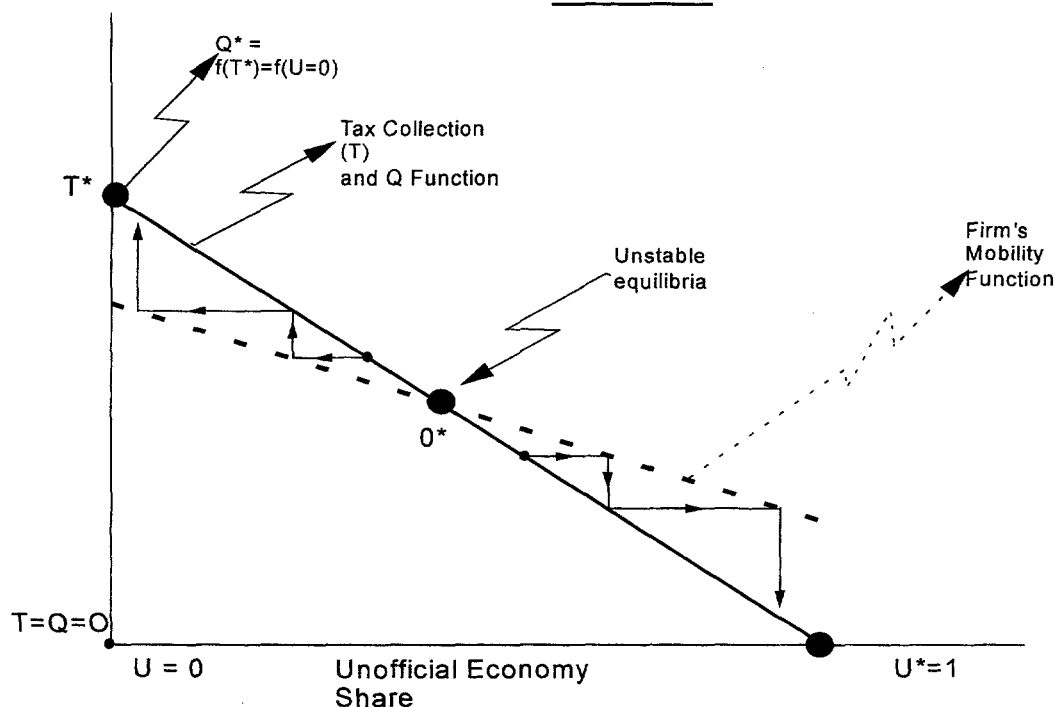
To interpret this model and its predictions, it is useful to think of an augmented framework in which, for reasons outside the model, some firms choose to operate in the official sector (for example, state firms dealing mostly with the state) and others choose to operate in the unofficial sector (for example, they infringe on patents). In this case, the forces that we describe still operate, but both sectors coexist in equilibrium. What does

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[10] Costs of congestion in the unofficial sector, suggested by Loayza (1996), put a lower limit on the proportion of the economy that remains official. Similar results would emerge from increasing probability of detection as the extent of unofficial operations grows. Thus, in practice the model's "extreme" outcomes ought to be seen as illustrating very large or very small unofficial economy outcomes, rather than the absolute dominance or absence of unofficial activities. Yet we observe that the evidence from the former Soviet Union and some other countries indicate few limits imposed by the (rather small) congestion costs or likelihood of penalty for unofficial activities, suggesting that a priori the variations in the extent of unofficial economies can be very large.

the analysis say about such situations?

The key prediction of the model is the potential separation of economies into two distinct groups. In one, the government offers a sufficiently attractive combination of tax rates, regulations, honest public administration and public goods that most firms choose to stay in the official sector. In this group, government revenues suffice to provide the public goods, and the unofficial sector is small because the government outcompetes it. In the other group, the government does not offer firms a sufficiently attractive combination of tax burden, regulations, and public goods (including rule of law and an honest and efficient public administration) to keep them operating officially, and hence many of them end up in the large unofficial sector, which offers a more attractive combination. The government budget in these countries does not suffice to offer more public goods to firms operating in the official sector, and hence the unofficial sector wins the competition for firms.

In sum, the model is partly driven by the assumption of increasing returns to the provision of Q. In particular, there are a number of reasons for increasing returns in the legal protection function. First, higher or better provision of legal protection for investments means higher productivity for the *official* private sector, which increases tax revenues and enables the government to further improve legal protection. Second, if legal protection for investment improves, firms will *move out of the unofficial* sector and into the official sector. This movement of firms will improve tax revenues and provide the revenues that can be used for a further improvement of legal protection. Third, the *government* may become *more efficient* in its provision of legal protection when that protection already operates at a high level, i.e. there are economies of scale in the provision of law and order. For example, if there is already a well functioning court system, measures to stamp out organized crime are more likely to be effective. Finally, and not modeled explicitly, if the *probability of tax evasion* detection increases with less tax evaders, then firms would be more likely to comply with taxes when fewer firms are in the unofficial sector.

These are the stylized predictions of a stylized model. We evaluate these predictions empirically below. But first, we revisit a few key assumptions responsible for these results.

The potential bifurcation of economies into exhibiting a large or small share of unofficial activities and their divergent institutional and public finance outcomes matters for *overall economic performance. If one also makes the plausible assumption that the official* sector is more productive at generating public goods, then the overall growth performance of economies with a small unofficial sector is superior. There are several reasons why the government may be more efficient at converting revenue into public goods than private sector competitors such as the mafia or other protection agencies: there are increasing returns to the production of some goods, such as defense and laws; the government already has some expertise at producing some of these goods; private providers might not be able to credibly commit to long term delivery of some services. On the nexus between the unofficial economy and overall growth, see also Loayza 1995. Further, the behavior of firms in the official and unofficial economy differ regarding perceived risk and thus investment behavior. Higher private investment in the official economy would also positively affect long term growth.

III.   On Key Assumptions of the Model.

A. Taxation, Regulation, and Corruption.

The analytical results of the JKS model are driven by the assumption that excessive taxes force firms out of the official sector. Taxation itself, however, has an offsetting benefit. At least on the increasing part of the Laffer curve, higher taxes raise more money for the government, some of which is spent on public goods. This is not the case with generalized "regulatory" taxes. These are more detrimental to the official sector than high taxes proper, since they bring all the distortionary effects but no government revenue. If we included regulation in the model, the tendency toward bifurcation would be even stronger. In the empirical work, we consider both taxation and regulation.

The effects of corruption are somewhat different from those of taxation and regulation. Entrepreneurs generally pay bribes precisely to avoid paying taxes or following regulations, and therefore corruption reflects payments to evade government control. In general, the higher the level of taxation and regulation (t), the greater are the bribes that politicians can extract from entrepreneurs in return for excusing them from paying taxes or following regulations. Tax and regulatory burdens are therefore highly correlated with the level of corruption, which, in turn, can serve as a proxy for t. Similar to regulation, however, corruption does not raise any revenues for the government.

B. Government Does Not Restrict the Movement of Firms.

A key assumption in the JKS model is that entrepreneurs are free to switch resources from the official to the unofficial sector in seeking a better mix of taxes and public goods. But the government may be able to punish anyone who leaves the official sector through political repression or particularly strict enforcement of laws and regulations. For example, it could use tax revenue to penalize firms that are operating unofficially directly, through raids and expropriations. A government that establishes itself as a successful repressive monopolist would charge high taxes, collect substantial revenues, yet provide few public goods, instead using the revenues to line its own pockets and to fuel the machinery of repression. Although we do not model this explicitly, some countries in the Former Soviet block, such as Belarus and Uzbekistan, both repressive states, appear to be outliers in the data, and are consistent with a model of a monopoly government that restricts mobility, collects taxes yet produces few public goods.

C. Labor Supply

One final assumption that warrants a comment is that of fixed labor supply. In our model, entrepreneurs move between sectors in search of the best combination of taxes and public goods. Another response to poor government performance is not to produce at all, or to produce in the household sector, which uses no public goods and pays no taxes to either the government or the mafia. The introduction of elastic labor supply would strengthen our conclusion about bifurcation of economies, because a government offering an unattractive combination of taxes and public goods would see its tax base further eroded by the withdrawal of labor supply. The introduction of elastic labor supply would also strengthen our predictions concerning growth, since bad combinations of taxes and public goods now lead not only to the reallocation of labor between the official and unofficial economy, but to a first order reduction in output, as labor supply is reduced.

IV.   The Data.

In our empirical work, we try to obtain empirical estimates of t, T and Q, as well as of the size of the official and unofficial sector (U).   Then we examine the relationship between t, T and Q, on the one hand, and the size of the unofficial sector U, on the other. We also examine the validity of the public finance mechanisms operating in our model; that is, the relationship between the tax, bribery and regulatory burden (t), the budgetary revenues (T), and the supply of public goods (Q).

We examine whether these propositions hold in a broad set of countries for which there exist at least roughly comparable estimates of the unofficial economy in the 1990s. We have measures for the unofficial economy for 49 countries in three regions of the world: Latin America, the OECD, and the former Soviet bloc, including Eastern Europe. The available work on the unofficial economy from different parts of the world draws from studies utilizing different methodologies for each region, yet the estimates appear to be comparable. We thus proceed with the appropriate cautionary caveats. The sample for our OLS regressions varies between 34 and 49 countries, depending on the coverage of right-hand side variables. We have not found comparable data for the unofficial economy in East Asia or for Africa, so these countries are excluded from our empirical investigation.

We use independent variables measuring regulation, taxation, rule of law, and corruption, some based on business surveys and others on expert evaluations. On average, richer countries exhibit relatively low levels of regulatory interventions and also a relatively small unofficial economy. This may be because industrialized countries have less regulatory interventions, are better able to operate a regulatory system without causing a measurable "regulatory burden" on enterprises, or operate complex regulatory systems without allowing the discretionary application of regulations which often results in corrupt practices. We therefore control for income level in correlating the size of the unofficial economy with policy variables, a control which also serves as proxy to capture other omitted variables relating to the country's overall development stage.

Measures of the Unofficial Economy (U)

The "unofficial economy" constitutes such activity that is not reported to the state statistical office. It may differ from the unrecorded economy in official statistics, however, since central statistical offices often make some adjustments to account for these underreported activities in the unofficial economy.   The set of economies for which we can obtain data comprises 49 countries of Latin America, the OECD, and the post-communist countries of Eastern Europe and the former Soviet Union (excluding the former Yugoslavia, Albania, and a few in the former Soviet Union and Latin America, for which there is very little data).

Our data sources differ for the three regions. Data on Eastern Europe and the former Soviet Union are from JKS (1997). Estimates were based on the evolution of total electricity consumption to compare total output growth and unofficial activity across countries.   Electricity consumption offers a rough measure of overall economic activity; around the world, the short-run electricity-to-GDP elasticity is usually close to one.

Measured GDP by definition captures only the official part of the economy, so the difference between overall and measured GDP gives an estimate of the size of the unofficial economy. In JKS (1997) further adjustments are made to allow for differences in the elasticity of demand across countries. For Latin America, estimates of the unofficial economy's share in GDP come from Loayza (1996), who uses the MIMIC (Multiple-Indicator Multiple Cause) approach to estimate the unofficial economy size. This statistical method infers the size of the unofficial economy from a variety of economic variables.[11] Finally, estimates of the unofficial economy share for OECD countries were obtained primarily from two sources: F. Schneider (1997), and C. Williams and J. Windebank (1995).[12] Both sources base their estimates on studies that assume the use of cash is correlated with unofficial activities.[13]

Measures of Policy (t) and provision of Public Goods (Q)

As measures of policy we use, first, index ratings published by four organizations: the Fraser Institute, the Heritage Foundation, Freedom House, and Political Risk Services (ICRG). These evaluations are primarily based on expert opinions and published statistics. Second, we also use results from surveys conducted by the World Economic Forum's Global Competitiveness Survey, Transparency International, and Impulse magazine in Germany.

Here we briefly review the methodology of each source and country coverage. In most cases we are not able to get the full 49 country coverage of the unofficial economy estimates for the possible correlate variables, although the vast majority of the countries are normally covered, and the minimum is 34. We also explain what each index measures. The numerical results for each are discussed in more detail when we present the regression results, and substantial detail on each variable is provided in Table 1 below as well. Further, Table A1 in the Appendix presents much of the data.

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[11] As right-hand variables, Loayza uses the highest statutory corporate income tax in the country, Rama's index of government imposed restrictions on labor markets, and a composite average of Political Risk Services' indices for the quality of the bureaucracy, corruption in government, and rule of law. The proxy variables serving as indicators of the unofficial economy itself (left hand side variables in Loayza's model) are the rate of value-added tax evasion (C. Silvani and J. Grondolo 1993) and the percentage of the nonagricultural labor force which does not contribute to social security (World Bank 1995). Given that our analysis will regress the unofficial economy on a few similar variables, selected data on Latin America needs to be interpreted with caution.

[12] Williams and Windebank use data from Dallago (1990) and European Community. Schneider (1997) uses the "currency-demand approach," which assumes shadow transactions take place in the form of cash. The paper reports results from several authors, and when the data was not available for 1990 (i.e. Austria, Denmark, Germany, France, Ireland, Italy, Netherlands, Norway, Spain, Sweden, Switzerland, UK, USA) Schneider offers his own calculations. When a range was offered we took the average value.

[13] More specifically for OECD countries: For Belgium, Germany, Spain, France, Ireland, Italy and Netherlands we used the simple average from the Schneider (1997) and Williams and Windebank (1991). For Canada and Japan the only estimates we could find were from Bruce Bartlett (1990). For Greece and the United Kingdom, our data are the average of the estimates by Bartlett (1990) and Williams and Windebank (1991). For Norway and Sweden we averaged estimates by Bartlett (1990) and Schneider (1997). For the United States we averaged Bartlett (1990), Schneider (1997), and the estimate by Richard J. Cebula (1997).[13] For three countries there was only one available estimate: Portugal (Williams and Windebank (1991)), Switzerland (Schneider (1997)), and Austria (Schneider (1997)). Most of these estimates are for the early 1990s.

The Fraser Institute has measured dimensions of "Economic Freedom" at five-year intervals since 1975 for all the countries for our sample (for which estimates of the unofficial economy exists), except for some in the former Soviet Union (Gwarney and Lawson 1997). We use relevant variables from their data series for 1995.[14] Their Freedom to Compete index measures whether the policy environment allows businesses to compete in the marketplace. The taxation variable measures the top marginal income tax rate and the income threshold at which it applies; Ukraine is the only sample country not included for such variable. Fraser Institute also rates separately the average tax rate on international trade; the sample size is 39 because Ukraine, Slovakia, Hungary, and Honduras are not covered. The legal framework is rated through their index of the equality of citizens under the law and access to a nondiscriminatory judiciary.

The Heritage Foundation surveys economic freedom every year. We use their ratings from the 1997 Index of Economic Freedom (Bryan Johnson and T. Sheehy), which measures the situation in 1996. For each measure, Heritage Foundation evaluates all the countries in our core sample, except Kazakhstan and Uzbekistan, so our sample size using these measures is 47. A number of Heritage Foundation indices are relevant for our study. "Regulation" measures whether a license is required to operate a business and how easy it is to obtain such a license.

It also measures whether there is corruption within the bureaucracy. "Trade Policy" measures the extent to which a government "hinders the free flow of commerce" using tariff and non-tariff barriers. "Taxation" measures average taxes on corporate profits and income. "Property Rights" measures the protection of private property against the government and all forms of expropriation.

Political Risk Services' International Country Risk Guide (ICRG) has data for 39 of the countries in our sample (Political Risk Services, no date). It does not cover 10 post-communist countries. We use two indices from ICRG's Political Risk Services: their "law and order" index and "corruption" index. Both measures are based on expert opinions, primarily obtained from qualitative data.

The Global Competitiveness Survey (GCS) is a questionnaire answered by about 2800 managers in 59 countries during 1996-97 (GCS of the World Economic Forum 1997).[15] The respondents are local firms serving domestic market, local firms exporting and investing abroad, and foreign firms which have made direct investment in that country. Each question asks about one aspect of the business environment and respondents provide a rating of the country on a scale of 1 (poorest rating) to 7 (perfect rating). We use data from eight different questions on tax burden as reported by the firm, regulatory burden, government intervention in the enterprise sector, regulatory discretion and enforcement, extent of bribery payments[16], police effectiveness, and labor regulations such as flexibility

[14] Unless otherwise noted, the Fraser Institute provides data on 43 of the 49 countries in our basic sample. The countries not covered are in the former Soviet Union: Azerbaijan, Belarus, Georgia, Kazakhstan, Moldova, and Uzbekistan.

[15] This survey is used by the World Economic Forum of Davos and the Harvard Institute for International Development in their Global Competitiveness Report.

[16] The question to firms was: how common are "irregular, additional payments connected with import and export permits, business licenses, exchange controls, tax assessments, police protection or loan applications."

in hiring and firing, in number of hours employees can work and minimum wage regulations. The GCS variables include data for 34 countries in our sample, and excludes 11 transition economies as well as Bolivia, Ecuador, Panama, and Paraguay.

J. Lambsdorff of Transparency International (TI) reports on an extended TI index which summarizes the results of a maximum of seven survey-based sources per country, of which we use one directly (as described above): ICRG's Political Risk Services. The extended TI corruption index by Lambsdorff covers 43 countries, excluding very few in our sample. The 1997 index uses data from 1996 and 1997.

One further measure of bribery is a survey of German business people conducted in 1992-94 by Peter Neumann at Impulse (a German business publication). Respondents were typically exporters conducting frequent business at least one of 103 countries. We use responses to the question about the prevalence of bribes in securing contracts for a particular country. On average 10 people were interviewed for each country, with a minimum of 3 exporters per country. Of our core sample, this source has data on all the countries except Moldova and Panama.

Table 1—Variables Description

Unofficial Economy

Name	Source	Years	Notes
Unofficial Economy as a % of GDP	Johnson, Kaufmann, Zoido-Lobatón.	1990s	See description on data section. Basic original sources: Latin America, Loayza, Transition Economies, Johnson, Kaufmann and Shleifer, and OECD, Schneider.

Taxation

Name	Source	Years	Notes
Average Corporate and Income Tax Rate Index	Heritage Foundation, *Index of Economic Freedom 1997*. Washington, D.C., 1997.	1997	Average of income taxes and corporate taxes, adjusted for other taxes such as value added taxes, sales taxes, and state and local taxes. As for the income taxes both the top income tax rate as rate that applies to the average taxpayer (tax rate applicable to GDP per capita were analyzed. Low taxes (below 10%) means a better score (1, a lower score means more freedom). Note that a higher value means less free (1-5). • What is the top income tax rate? • What tax rate applies to the average income level? • What is the top corporate tax rate? • What other tax exist?
Top Marginal Income Tax Rate (and income threshold at which it applies)	Fraser Institute, *Economic Freedom of the World 1997*. Washington, D.C., 1997.	1995	The lower the top marginal income tax rate (for a corresponding income threshold) the higher the score. Note that a higher score means more freedom, scores go from (1-10). Original sources: Price Waterhouse, *Individual Taxes: A Worldwide Summary*.
Taxes on International Trade as a Percent of Exports Plus Imports	Fraser Institute, *Economic Freedom of the World 1997*. Washington, D.C., 1997	1995	Revenue from taxes on international trade transactions Table A, line 6 divided by exports plus imports, the score is higher the lower the percentage. Note that a higher score means more freedom, scores go from (1-10). Original sources: IMF, *Government Finance Statistics Yearbook* for tax revenue, and *International Financial Statistics* from exports and imports.
Tariff and Non-Tariff Trade Barriers	Heritage Foundation, *Index of Economic Freedom 1997*. Washington, D.C., 1997.	1997	Measures the degree to which a government hinders the free flow of foreign commerce. The lowest (highest) score goes to countries with less (more) than 4% (20%) average tariff rates or very low (high) non tariff barriers. Note that a higher value means less free (1-5). • What is the average tariff rate? • Are there any significant non-tariff barriers? • Is there corruption in the customs service? Original sources: Sources of the average tariff rate: GATT and IMF, ratio of tariffs and duties revenue to total imports when not available or US trade representative's office, Commerce Department and State Department publications. If non-tariff barriers were significant, according to the authors, scores were moved up by one point.
Tax Burden Reported by the Firm	World Economic Forum (WEF) *Global Competitiveness Survey 1997* (GCS97), Geneva, 1997.	1997	Executives' responses to the question : "The tax system in your country hinders (enhances) business competitiveness."(v2_10) Evaluations range from 1 to 7, were a higher value means a better score for private business.

Government Revenues

Name	Source	Years	Notes
Total Government Revenues as % GDP	International Monetary Fund (IMF) and World Bank (WB).	1992-1995	Total Government Revenues as a % of GDP. data from the World Development Indicators. International Monetary Fund (IMF) *World Economic Outlook* database, World Bank (WB), *World Development Indicators 1997 CD-ROM* (for Venezuela), and WB *MultiQuery for Cross Country Comparisons Europe and Central Asia Department II.* (for Czech Republic and Slovak Republic).

REGULATION

Name	Source	Years	Notes
Regulatory Burden Reported by the Firm	Kaufmann and Sachs, "Determinants of Corruption", forthcoming 1998, original source GCS97.	1997	Executives' responses to the question: "Government regulations impose (do not impose)a heavy burden on business competitiveness." (v2.02). Note that a higher score means less regulatory burden (1-7).
Government Interference on Firms	Kaufmann and Sachs, "Determinants of Corruption", forthcoming 1998, original source GCS97.	1997	Executives' responses to the question: "Excepting the state-controlled sector, state interference in private business is pervasive (minimal)." (v2.04). Note that a higher score means less interference (1-7).
Regulatory Enforcement	Kaufmann and Sachs, "Determinants of Corruption", forthcoming 1998, original source GCS97.	1997	Executives' responses to the question: "Government regulations are vague and lax (precise and fully enforce)." (v2.08). Note that a higher score means less discretion (1-7).
Regulations	Heritage Foundation, *Index of Economic Freedom 1997*. Washington, D.C., 1997.	1997	Countries with lower (higher) scores fulfill more(less) of the following conditions that they met. Note that a higher value means less free (1-5). • Is a license required to operate a business? Is it easy to obtain? • Is there corruption within the bureaucracy? • Does the government force businesses to subscribe to established work weeks , paid vacations, maternity leave, etc.?
Freedom of Private Businesses and Cooperatives to Compete in Markets	Kaufmann and Sachs, "Determinants of Corruption", forthcoming 1998, original source GCS97.	1995	• Are there free businesses or cooperatives? Original sources: Freedom *House, Survey of Political Rights and Civil Liberties 1995-96*, item 9 on their check list of 13 civil liberties, with some adjustments. Note that a higher score means more freedom, scores go from (1-10).
Minimum Wage Regulations	World Economic Forum, *Executive Survey. Global Competitiveness Report 1997* (GCS97). Geneva, 1997.	1997	Executives' responses to the question: "Minimum wage regulations are a barrier to (do not significantly increase the costs of) hiring unskilled or young workers." (v7.08). Note that a higher score means less regulation (1-7).
Hiring and Firing Regulations	World Economic Forum, *Executive Survey. Global Competitiveness Report 1997* (GCS97). Geneva, 1997.	1997	Executives' responses to the question: "Hiring and firing practices are severely restricted by government (are flexibly determined by employers." (v7.09). Note that a higher score means less regulation (1-7).
Flexible Number of Hours	World Economic Forum, *Executive Survey. Global Competitiveness Report 1997* (GCS97). Geneva, 1997.	1997	Executives' responses to the question: "Labor regulations impede (facilitate) the adjustment of working hours to meet unexpected changes in demand." (v7.10). Note that a higher score means less regulation (1-7).

LEGAL INSTITUTIONS AND CORRUPTION

Name	Source	Years	Notes
Rule of Law	Coplin and O'Leary, *Handbook of Country and Political Risk Analysis*, Political Risk Services, East Syracuse, New York, 1994.	1990-1997	"A country with an established law and order tradition (high score) has sound political institutions, a strong court system, and provisions for an orderly succession of power. This indicator reflects the degree to which the citizens of a country are willing to accept the established institutions to make and implement laws and adjudicate disputes." Note that a higher score means stronger tradition (0-6). The average for 1990 to 1997 was used.

Property rights	Heritage Foundation, *Index of Economic Freedom 1997*. Washington, D.C., 1997.	1997	A lower (higher) score represents private property more (less) guaranteed. Note that a higher value means <u>less</u> free (1-5). • Is the legal system free form government influence? • Is there a commercial code defining contracts? • Does the country allow foreign arbitration of contract disputes? • Can property be expropriated by the government? • Is there corruption within the judiciary? • Are there major delays in receiving judicial decisions? • Is private property legally granted and protected?
Equality of Citizens Under the Law and Access of Citizens to a Non-discriminatory Judiciary	Fraser Institute, *Economic Freedom of the World 1997*. Washington, D.C., 1997.	1990, 1995	• Are citizens equal under the law, with access to an independent, nondiscriminatory judiciary and are they respected by the security forces? Original sources: Freedom House, *Survey of Political Rights and Civil Liberties 1995-96* item 5 on their check list of 13 civil liberties, with some adjustments. Note that a higher score means more freedom, scores go from (1-10).
Police Effectiveness	World Economic Forum, *Executive Survey. Global Competitiveness Report 1997* (GCS97). Geneva, 1997.	1997	Executives' responses to the question: "The police in your country do not (do) effectively safegard personal security so that it is not an important consideration in business activity." (v7.10). Note that a higher score means <u>less</u> regulation (1-7).
Bureaucratic Quality	Coplin and O'Leary, *Handbook of Country and Political Risk Analysis*. Political Risk Services, East Syracuse, New York, 1994.	1990-1997	A high quality bureaucracy is characterized by its strength and expertise to government without drastic changes in policy or interruptions in government services. In other words, in countries with a high quality bureaucracy a change in government will not lead to traumatic changes in terms of policy formulation and day-to-day administrative functions. A high quality bureaucracy is also somewhat autonomous from political pressure and has an established mechanism for recruitment and training. Note that a higher score means better quality (0-6).The variable used in our analysis is the average index from 1990 to 1997
ICRG Corruption Index	Coplin and O'Leary, *Handbook of Country and Political Risk Analysis*, Political Risk Services, East Syracuse, New York, 1994.	1990	"A highest rating tend to signify a democratic country whose government has been in office for less than five years, and where government officials do not often seek special payments. The lowest ratings are given to countries that usually are non-democratic, where the government has been in power for more than 10 years, high government officials are likely to demand special payments, and illegal payments are generally accepted throughout the society" A Business Guide to Political Risk, PRS Chapter 8 Forecasting--The ICRG Way. Note that a higher score means less corrupt (0-6). The average for 1990 to 1997 was used.
Transparency International Corruption Index (extended)	Johan G. Lambsdorff, "Corruption Perception Around the World", draft paper presented at the AICC Lima; 1997.	1997	Note that a higher score means more free (0-10). Countries included in this index which are excluded from the officially published TI index are subject to less reliability in estimated corruption perception index, the outcome of less number of surveys the composite estimate is based on.
Global Competitiveness Survey Bribery Index	World Economic Forum, *Executive Survey. Global Competitiveness Report 1997*. (GCS97) Geneva, 1997.	1997	Executives' responses to the question: "Irregular, additional payments connected with import and export permits, business licenses, exchange controls, tax assessments, police protection or loan applications are common (1) - not common (7)." (v8.03).
Impulse Exporter Bribery Index	Peter Neumann "Böse: Fast Alle Bestechen", Impulse Jan. 4, 1994.	ca. 1994	Incidence of bribery in public sector in foreign country as reported based by German traders and investors abroad.
Growth	World Bank, World Development Indicators.	1986-1996	GNP per capita average annual growth rate (from 1986 to 1993 for all countries, except transition economies for which we average from 1993 to 1996. Initial GDP per capita refers to 1986 (and 1993 for transition economies)

V. Results

In order to make it easier to check our results, we have kept the original signs on variables. The reader should exercise care because organizations' ratings differ in whether a high numerical value corresponds to "better" policies for business and private investment (i.e., lower regulations or taxation) or "worse" policies for business. To help understand the scaling for each variable, in addition to the regression results we report individual highest and lowest scores in our sample, as well as the ratings for Russia and Brazil (as comparators) as well as the numbers for particularly noteworthy individual cases. Further, in the regression tables we indicate which direction the particular index needs to be interpreted. Regression results are presented in tables 2 to 7, included at the end of the paper, and in the plot figures immediately thereafter.

Taxation and the Unofficial Economy

We explore empirically the relationship between various variables of the tax regime as well as at government revenues as a percent of GDP. Within the tax regime we look at tax rates and tax burden. In all we have six measures from five independent sources.

For transition economies, utilizing indices available for that region only, JKS find that higher tax burden is associated with a higher unofficial economy share. Loayza similarly models and analyzes the unofficial economy for Latin America. Consequently, a priori we would have expected to find corroboration of such relationship for our broader combined country sample. However, some of our results appear surprising at first.

In the Heritage Foundation measure of average corporate and income tax rates, a higher score (on a scale of 1-5) means more onerous taxation, i.e., higher average and marginal tax rates. Perhaps surprisingly for this kind of cross-country measure based on expert assessments, OECD countries typically have a score that is *higher* than that for transition economies and for Latin America. For example, the US scores 3.5, UK scores 4, and Italy scores 5, while among the transition economies Georgia scores 2.5, Russia scores 3.5, and Ukraine scores 4.5 and in Latin America, Brazil scores 2.5 and Argentina scores 3.5. In other words, according to this measure the US has higher marginal and average tax rates than does Russia. The regression results in table 2 shows that this measure of taxation is significant with and without controlling for log GDP; however, *higher* taxation is correlated with a *lower* share of the unofficial economy. Raising taxation by one point, according to this measure, implies that the share of the unofficial economy falls by 11.8 percent. Controlling for log GDP per capita reduces the effect to 5.3 percent, but the coefficient is still significant.

The Fraser Institute measure of top marginal income rates is higher for countries that have lower tax rates, on a scale of 1-10. Again, the "best" tax rates are in seemingly unlikely places: Bolivia and Uruguay both score a perfect 10.[17] The worst (i.e., highest) tax rates are in Italy, Belgium, Sweden, Denmark, and Romania, all of which score the lowest attainable value of 1. The US scores 7, the UK scores 5, while Russia and Brazil both score 8. Chile scores 4, which is the best in Latin America. Table 2 shows that a one-point

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[17] Bolivia's recent tax reform is presumably reflected in this rating.

increase in this index (i.e. a *lowering* in tax rates) is associated with a 3.5 percentage point *increase* in the share of the unofficial economy (see also figure 1). Controlling for log GDP per capita reduces the coefficient on this index to 1.9, but it remains significant, therefore the "wealthy" country effect alone does not account for the bulk of this surprising result.

The Fraser Institute's measure of taxes on international trade is higher when these taxes are lower, again on a scale of 1-10. Outside the OECD, the best scores are in Panama for Latin America, and in the Czech Republic, Estonia, Lithuania, and Latvia for transition economies. The lowest scores in our sample are in Russia, which earns a 2, and Poland, which earns a 4.[18] A one-point improvement in this index reduces the share of the unofficial economy by 3.7 percentage points (see Table 2). But the observations are highly clustered between 6 and 10 and controlling for income makes the international trade tax variable insignificant.

The Heritage Foundation offers an index of the tariff and non-tariff barriers to trade, and as such partially captures international trade taxation (and the rest trade regulations). This index is higher when there are more restrictions i.e., when trade is less free. The highest score of 5 is awarded to Azerbaijan, Russia, and Belarus; Brazil scores a 4. The best score of 1 is awarded solely to the Czech Republic, while the US earns a 2. Table 2 shows that a one-point increase in this index is associated with an 8.9 percent increase in the unofficial economy (see also Figure 2). Controlling for log GDP per capita reduces this to a 3.6 percent increase which is significant at the 10 percent level.

The above four indices on taxation therefore provide mixed results: the two income and corporate taxes are negatively related to the unofficial economy, while international trade taxes are positively related to it (although less significantly). The fifth index at our disposal, namely the tax burden rating, as reported by the firms themselves in the GCS, provides additional complexity: the higher the index rating from 1 (worse tax burden) to 7 (best), the lower the unofficial economy share. The highest score goes for the UK, 4.60, and the US scores 3.43, while Ukraine holds the worst score, 1.59, and in Latin America Brazil scores 2.22. Here the results are highly significant even after controlling for GDP per capita (table 2, and figure 3). Overall, considering the results of the various tax variables, it appears that there is a substantial difference between the impact of different *types* of taxes on the unofficial economy (trade versus other taxes), and between *statutory tax rates*, on the one hand, and *tax burden* on the firm, on the other. The latter distinction suggests that institutional issues of tax administration may matter at least as much as tax regime issues relating to tax rates. We will return to this issue. Yet let us note now that while the adverse "price" effect of higher official tax rates and eventual tax burden provides an incentive to move to the unofficial economy, our public finance model also includes the compensating effect of higher revenues resulting in better provision of public goods for the official sector—assuming that the revenue curve is not in the "Laffer" range.

Thus, it is pertinent to test what the unofficial economy empirical response function to higher revenue generation is. The last row in table 2 reports the results on revenues. Using the standard IMF and World Bank data on revenue as a percent of GDP indicates tax revenue being around 50% of GDP in Hungary, the Czech Republic, and

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[18] It appears likely that this rating for Poland is out of date.

Slovakia; in contrast with Guatemala and Georgia where it is less than 10%. Brazil has revenues around 16 percent of GDP while Russia is around 26 percent of GDP.[19] Table 2 (and figure 4) shows that a one-percent increase in tax revenue (as a share of GDP) is associated with a 0.7 percentage point fall in the unofficial economy (as a share of GDP). Controlling for income per capita reduces the coefficient to 0.5 but it remains significant at the 5 percent level. Thus, as predicted by our model, countries with a higher share of tax revenues in GDP actually have a lower share of the unofficial economy.[20]

Regulation and the Unofficial Economy

For regulation we have five different measures produced by three independent organizations measuring overall regulations on enterprise, and three measures from the same source for labor regulations.

The Global Competitiveness Survey's measures of regulatory burden, government intervention and regulatory enforcement are higher, on a scale of 1 to 7, when regulations are considered "better" for business. For instance, the variable measuring regulatory enforcement/discretion from the GCS has a separate measure of regulatory enforcement/discretion, and, as the others in the GCS, is on a scale of 1 to 7. Russia and Ukraine have the lowest score in our sample with 2.0; Brazil rates better with 3.5, and most of the OECD countries score 4.5 or higher--Switzerland has the highest score with 5.6 in our sample (Singapore had the highest score worldwide in the survey, with 6.4). Table 3 shows that a one point higher score in this index is correlated with a 9-percentage point fall in the share of the unofficial economy (figure 4). However, this measure is not significant once we control for log GDP per capita. But as seen in Table 3 the other two GCS regulatory variables are significant in both specifications. When either of these two regulatory measures is one point better, the share of the unofficial economy is about 8 percentage points lower. When we control for the log of GDP per capita, this effect of one point improvement in the regulatory indices are lowered to 4-to-5 percentage points decline in the unofficial economy, yet they are still highly significant.

The Heritage Foundation's measure of regulation is higher, on a scale of 1 to 5, for countries that have regulations that are worse for business. The Czech Republic actually has the best score – it is the only country in our sample to get a perfect 1. Most OECD countries score 2. Russia and Ukraine score 4 (out of a possible 5), while Brazil scores 3. Table 3 shows that a one-point increase in this index is associated with a 14.7 percentage point increase in the share of the unofficial economy. Controlling for log GDP per capita reduces the coefficient on the regulation variable, to 8.1, but it remains significant.

The Fraser Institute's measure of the freedom to compete in 1995 is also higher when there is "more" economic freedom, i.e., greater freedom to compete (less regulatory barriers to entry). In this index Russia and Ukraine have the lowest score of 5, along with only Guatemala and Romania. The highest score of 10 is awarded to some OECD

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[19] An important caveat is that we have not been able to obtain accurate data on regional, local, and off-budget spending. This can affect comparisons for some countries. For example, Russia's general government spending is actually 40 percent of GDP, compared with central government spending of around 15 percent.

[20] Taking into account the unofficial economy fully would raise measured GDP and make the estimated relationship here even stronger.

countries, along with the Czech Republic, Hungary, and Argentina. The remaining countries are scored as 7.5.[21] Table 3 shows that a one point increase in this index is associated with a 4.7 percentage point drop in the share of the unofficial economy, while controlling for log GDP per capita reduces the coefficient to 2.3 percent (and significant only at the 10 percent level).

In summary, we find strong evidence that less regulation (i.e., a regulatory regime that is more business friendly and presumably represents less political control rights) is correlated with a lower share of the unofficial economy. However, countries with a higher income level also have a lower level of the unofficial economy, so when we control for income level the regulation variable has a lower coefficient and it loses some significance. Yet even after controlling for GDP per capita the evidence of the adverse impact on the unofficial economy of overall regulations on enterprise is still clearer than the much weaker results for labor regulations: as seen in the last three rows in table 3, not a single regression gave a significant result for any of the labor regulation variables. While this result requires further validation through additional tests with independent indices of labor regulations, if confirmed it would challenge a significant strand of the literature on the informal sector (Tokman, Todaro, Lubell, Loayza, others) positing that labor regulations is central to understand the dynamics of the unofficial sector. Indeed, the vast development literature on the "informal sector" takes a predominantly labor market approach to its analysis and measurement. We find suggestive evidence here that the explicit and implicit taxation of factors of production other than labor may matter at least as much, if not more, in the firm's decision-making function on mobility between official and unofficial activities. This, in turn, hints at the importance of also understanding the unofficial economy from a *public finance* rather than from a pure *labor market* perspective.

However, it would also be insufficient to analyze the unofficial economy from the narrow (public finance) perspective of measuring taxes and regulations only. Next we delve deeper into key institutional aspects of the public finance nexus.

Q effect on U: Rule of Law, Bureaucracy, Corruption and the Unofficial Economy

In our framework the overall quality of the legal environment is the key public good that can be made exclusive to official activities; as such it is a key measure of *Q*. Similarly, official activities will benefit more specifically from effective protection of property rights, an effective police, and the facilitation and pro-market services provided by a high quality government bureaucracy. These are also clear measures of *Q* in our model, for which there are empirical indices. Finally, and centrally in our framework, we test the relationship between various measures of corruption and bribery and the unofficial economy. Bribery, as a privately pocketed tax, can be still thought as a measure more closely capturing *t* -- while corruption more generally mirrors both *t and Q*, since it encompasses both the "tax" payments as well as the overall institutional failure in the public sector associated with a corrupt administration. We turn to the results of our analysis of all these measures against the share of the unofficial economy, presented in

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[21] Among Asian countries, Indonesia scores 5, Malaysia, Singapore, and Korea score 7.5, and Hong Kong scores 10. These ratings relative to the countries in our main sample are quite typical.

table 4 (and some of them are depicted in figures 6 to 9).

There are four indices which measure some aspect of the legal institutional framework, one measuring the quality of the bureaucracy, and four indices measuring bribery or corruption directly. These nine indices are the work of six separate organizations.

Political Risk Services' International Country Risk Guide contains a "rule of law index" which is higher where the rule of law is stronger, on a scale of 0-6. The US and several other OECD countries achieve the highest level of 6. In our sample, Colombia has the lowest score of 1.4. Russia scores 3.5. Table 4 shows that a one-point increase in the value of this index is associated with a 10.6 percentage point fall in the share of the unofficial economy. In this case log GDP per capita is not significant and including this rule of law control variable reduces the estimated coefficient on the index only to 9.3 while not affecting its high statistical significance.

The Heritage Foundation's index of property rights is lower where property rights are more secure, on a scale of 1-5. The only non-OECD country to score 1 is Chile. Four previously communist countries have the worst score of 4: Romania, Ukraine, Georgia, and Azerbaijan. Russia and Brazil score 3. Table 4 shows that a one-point increase in this index is associated with a 13.4 percent fall in the share of the unofficial economy. Controlling for log GDP per capita reduces the coefficient to 8.0, but it remains highly significant.

In the Fraser Institute measure of "Equality of Citizens Under the Law and Access of Citizens to a Non-Discriminatory Judiciary," a higher score means a "better" legal system, on a scale of 0-10. Only Belgium, Holland, Sweden, Norway, Denmark and Switzerland get the top score of 10. Italy, UK and USA score 7.5, while Russia scores 2.5 and some countries in South America receive even lower scores. Table 4 shows that a one-point increase in this index implies a 3.8 percentage point fall in the unofficial economy's share of total GDP. Controlling for log GDP per capita reduces the coefficient to 2.3 but it remains significant.

The GCS survey has a question to firms on their assessment on the effectiveness of the police in fulfilling their protective duties. Not surprisingly, the variation across countries is very large, and it is highly and significantly correlated with the share of the unofficial economy: a one point improvement in this index is associated with a 5.5-7.3 percent decline in the unofficial economy, depending whether GDP per capita is controlled for or not (table 4).

Political Risk Services (ICRG) rates the quality of the bureaucracy across countries and over time, in a scale of 1 (worst) to 6 (best, as in some Nordic countries). We average their ratings during the nineties, and find that the bureaucratic quality index is significantly associated with the share of the unofficial economy. Even after controlling for GDP per capita the effect of a one point improvement in this index is almost an 8 percentage point reduction in the size of the unofficial economy, and highly significant.

The various measures of bribery and corruption also suggest a significant association with the unofficial economy. The corruption index of ICRG, ranging between 1

and 6 (best) and averaged for the nineties, shows a significant association with the unofficial economy; the effect of a one point improvement in the index is about an 8-11 percentage point decline in the unofficial economy, and highly significant in both specifications (figure 8). The extended Transparency International measure of corruption, scaled between 0-10, where a higher score means less bribery and corruption, covers 43 of the countries in our sample.[22] Denmark has the highest score with 9.94 and in our sample Bolivia has the lowest with 2.1 (Nigeria is lower overall, however, and many other countries are not covered in this index). Russia scores 2.3 while Brazil scores 3.6. The best Latin American country is Chile with 6.1. Table 4 shows that a one-point increase in the corruption index is associated with a 5.1 percent point decrease in the unofficial economy (figure 9); if controlling for GDP per capita there is still a sizable and significant 3.5 percentage point effect.

In the Global Competitiveness Survey measure of bribery, a higher score means less corruption, scaled 1-7. Among countries for which we also have data on the unofficial economy, the highest score is Sweden with 6.6. The lowest scores are for several Central America countries, which are under 3, as well as Russia that scores 2.7. Table 4 shows that a one point increase in this index implies a reduction in the share of the unofficial economy by 8 percentage points (without the control variable) and by 3.9 percentage points (if we control for log GDP per capita).

In the Impulse index of corruption, a higher score is worse.[23] Russia and Brazil are both awarded 4 (one point away from the worst possible score). The highest score of 0 is awarded to the usual OECD countries plus Lithuania. Again, Chile is the highest ranked Latin American country, awarded a score of 1. As Table 4 shows a one-point increase in this index is associated with a 1.8 percentage point increase in the share of the unofficial economy. Controlling for GDP per capita more than halves the coefficient and makes it significant only at the 10% level.

In summary, the relationship between share of the unofficial economy and bureaucratic quality as well as rule of law (including corruption) is strong and consistent across nine measures provided by six distinct organizations. Countries with more bribery and corruption have a higher share of the unofficial economy. This is the case even when we control for income level.

Having explored in some detail the possible determinants (or at least controlled correlates) of the Unofficial economy, we briefly discuss the results of the potential determinants of other key variables in our model. Specifically, we consider first ,whether, as predicted by our model, various measures of Q appear to be associated with better government revenue (T) mobilization. Then we explore briefly the potential correlates with government revenues (determinants of T), and finally we ask what may be driving the measure of tax burden (t).

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[22] This index requires that countries have had only 2 (rather than 4) surveys.

[23] Among the 103 countries surveyed, the worst score is awarded to Bangladesh, Myanmar (Burma), Indonesia, Iran, Nigeria, Pakistan, the Philippines, and Thailand.

T effect on *Q*: ***Does Government Revenue matter for better provision of Q (Public Goods)?***

Table 5 summarizes the results of regressing various measures of Q on government revenues. All five measures of these public goods (Q) are positively influenced by higher revenue mobilization, and most specifications are significant at the 5% level. Specifically, Rule of law (ICRG), equality of treatment before the law (Fraser), and bureaucratic quality (ICRG) are highly significantly associated with government revenues even after controlling for GDP per capita (see also figures 10 and 11). The more narrowly defined indices of police effectiveness and protection of property rights are also of the right sign but only significant when GDP per capita is not controlled for. Overall, the results are supportive of an association between T and Q, although the customary qualifiers on causality direction probably apply even more strongly in this case. Thus, at a minimum we suggest that the evidence from simple and controlled correlations does not contradict our model's linkage between higher revenue mobilization and improved provision of public goods exclusive to official activities.

How does *t* affect *T* :   Possible Determinants of Government Revenues.

In the earlier empirical exploration of the determinants of the unofficial economy we observed that there was a complex and ambiguous relationship between various tax rate measures and the unofficial economy. Yet Government Revenues was negatively and positively associated with a lower share of the unofficial economy. To open a possible "black box", we consider the relationship between government revenues and various measures of *t*. Table 6, as well as figures 12-15, summarize the results of possible determinants of Government Revenues. Consistent with the earlier results of t on U, we find that higher corporate and income tax rates do generate higher tax revenues, yet the opposite is the case with international trade taxes, which negatively affect revenues.

Interestingly, the variable measuring tax burden as reported by the firm is *significantly and negatively* associated with government revenues if GDP per capita is not controlled for, and it is totally *insignificant* once income levels are controlled for. The evidence at least suggests, therefore, that higher overall tax burden on the firm does not lead to higher revenue mobilization. And different types of taxes may have differential effects on overall revenues; higher corporate and income tax rates may help, trade taxes may not. Further, the interpretation and application of such tax rates at the firm level matters.

By contrast, the effect of a corrupt bureaucracy is less ambiguous: higher corruption is associated with higher revenue mobilization, and in three out of four specifications the results are significant at the 5% level (see also figure 12). Tanzi and Davoodi (1997), using panel data with one corruption index, also find a highly significant effect of corruption on revenues.

What determines *t* ? : Possible determinants of Tax Burden on the firm.

Given the central importance of overall measures of *t* in determining the "mobility" decision of the firm, in table 7 we consider possible determinants of tax burden as reported by the firm. Consistent with our findings above, we observe a very insignificant (and

ambiguous sign) relationship between measures of corporate and income tax rates, on the one hand, and the measure of tax burden as reported by the firm, on the other (figure 16). Yet international trade taxes (and non-tariff barriers) are positively and significantly associated with the overall tax burden on the firm (figure 17). And the extent of bribery and corruption negatively affects the tax burden of enterprises; most specifications (although by no means all) are significant at the 5% level (figure 18).

These findings suggest, first, that overall tax burden on enterprise may respond differently to different types of taxation, and it is not merely a function of tax *rates*. Secondly, and perhaps more significantly, the institutional aspects of implementation of the tax regime may matter more than the statutory tax rate design issues; higher marginal income tax rates in an honest and non-arbitrary bureaucracy may result in less tax burden on the firm than lower statutory tax rates in a corrupt administration. This, in turn, helps explain the complex effect of various measures of t on the unofficial economy, since the firm's mobility will be affected by the overall tax burden, and not merely by statutory tax rates.

Does a large Unofficial Economy matter for overall economic performance?

As auxiliary assumption in our model we posited that, relative to unofficial activities, the official economy may be more productive in generating public goods, and that private official activities may tend to invest more. The corollary would then be that a smaller official economy is associated with higher rates of GDP growth. Our preliminary empirical work, summarized in table 8, supports such hypothesis. The empirical relationship appears to be very robust across specifications. The results suggest that a 20 percentage point difference in the size of the unofficial economy can affect the annual growth rate to the tune of about 3-3.5%. These results are also very significant when controlling for variables such as initial level of GDP per capita, rule of law, trade policies, the share of government revenues in GDP and even corruption. Figure 19 presents the residual plot figure of the relationship between GDP growth and the unofficial economy, controlling for initial GDP per capita levels.

We underscore the preliminary nature of this line of investigation; further runs with additional controls (such as investment ratio in GDP and other policy variables) are to be performed to confirm that the robustness of the unofficial economy coefficient is maintained. Further, we need to address issues of endogeneity, since lower growth performance may be a contributor to a higher unofficial economy, and not just the reverse causality. And finally, we need to note that official GDP data often underestimates the size of the unofficial economy. Insofar as the unofficial economy grew over the relevant period at a faster pace than the official economy (as it was the case in the FSU), data on GDP growth is a lower bound estimate of overall growth and our estimates would be biased upwards (if interpreted as the effect of the unofficial economy on *overall* growth-- they would be a better proxy for official economy growth estimates instead).

However, if the results can be validated by further tests, the implications are significant. Much has been written about the significant impact of corruption on growth in recent years (e.g. Mauro 1995 and 1997; Shleifer and Vishny 1994; Tanzi and Davoodi 1997). Many channels whereby corruption negatively affects growth are proposed in these writings, such as lower overall investment, increased misallocation of talent and resources,

excessive and unproductive public investments, reduced recurrent public expenditures (as key complement to public investments) and quality of infrastructure, and as also suggested here supporting Tanzi and Davoodi's findings, through reduced public revenues. Our framework of analysis and initial findings in table 8 suggest an important additional channel whereby corruption may affect growth, namely the unofficial economy. Corruption and bribery was shown to affect significantly the firms' mobility decision to the unofficial economy. And in turn, as suggested empirically in the controlled multiple regressions in table 8, the importance of the unofficial economy appears to matter more directly and significantly (than other variables) in negatively influencing the country's growth prospects.

VI. Conclusions and Implications.

The empirical study of unofficial activities, corruption and other institutional variables virtually by definition faces the daunting challenge of data availability and reliability. Thus, we need to caution against definitive conclusions or specific policy-making on the basis of the empirical work presented here. Additional empirical work is required, including in depth country specific researsh for specific policy design.

We have attempted to compensate for the existing data deficiencies by utilizing a wide array of indices to measure the variables in our framework. These indices and measures are drawn from multiple independent sources, and we have discussed in detail its characteristics. Perhaps surprisingly—given the "noise" expected a priori in much of this data—, we find that overall the variables in our public finance framework align themselves rather well with each other, and explain much of the variance of the unofficial economy in fifty countries.

The theoretical model of Johnson, Kaufmann, and Shleifer (1997) had three main predictions, which find at least some support in this data set for a broader set of countries in Latin America, OECD and transition economies. First, countries with more regulation tend to have higher share of the unofficial economy in total GDP. Second, there is strong support for the proposition that countries with more corruption tend to have a larger unofficial economy. Third, the model predicts that countries with a higher tax burden tend to have a larger unofficial economy. The model again finds support, with this broader data set, but only if we are careful in how we define the "tax burden", and we consider its interaction with the regulatory environment and the bureaucratic implementation of policies. Higher marginal income and corporate tax rates do not appear to be associated with higher overall tax burden as perceived by the firms themselves. Similarly, so far we find no evidence suggesting a significant effect of labor regulations. By contrast, international trade taxes, as well as the trade and overall regulatory burden on the firm (registration, licenses, etc.) do affect the firm's decision to move to the unofficial economy.

Perhaps more significantly, *discretion* in the application of the tax regime, and administrative corruption, may matter more for the overall tax burden on enterprise than marginal income or corporate tax rates *per se*. Just as predicted by the model, we find smaller unofficial economies in countries with higher tax revenue (in turn the outcome of a lower tax, regulatory and bribery "burden" on enterprise), and with better rule of law (financed by tax revenues).

The nature of tax data and our simple OLS regressions do not allow a definitive explanation of the causal mechanism between regulatory and tax burdens and the unofficial

economy, but the most likely explanation is as follows. The mere level of tax rates (and even possibly just the extent of regulations per se) in themselves do not cause the type of politicization of the economy which forces firms underground. Much more depends on how taxation and regulations are administered and implemented. For example, higher income countries can afford to run administrative systems "well," which means using clear rules and minimizing the discretion of lower level officials. It definitely helps that these countries have a strong legal tradition because this reduces opportunities to arbitrarily apply regulations and taxes and therefore limits the scope for bribery. They can thus "afford" a higher degree of complexity in their tax and regulatory regimes, which when administratively well run, will not necessarily translate into a higher overall tax burden on the firm.

In emerging and transition economies, higher levels of regulation lead to a significantly higher incidence of bribery. This amounts to a higher effective tax on official activity and therefore induces firms to move into the unofficial economy. Moving to the unofficial economy undermines public finance and further weakens the ability of the state to protect property rights. These recursive linkages suggest that there are two types of institutional outcomes, with major implications for public finance and the unofficial economy.

First, there are economies with relatively fair, moderate and well run tax regimes, with relatively light and non-discretionary regulatory frameworks, low corruption and bribery, substantial revenue mobilization and relatively good provision of public goods in the official sector. Not surprisingly, most of the countries of the OECD exhibit this good overall institutional outcome; more surprising is that already some countries in Eastern Europe, such as Poland and the Czech Republic, find themselves moving towards this "good equilibrium". In Latin America, only an exception such as Chile would be in this group. And second, there are economies with relatively high tax burden on the enterprise sector, onerous and discretionary regulations, high prevalence of bribery and corruption, and relatively poor provision of key public goods such as rule of law. These are concentrated in the former Soviet Union, yet a number of countries in Latin America are also in this group. Comparing these two groups "good" vs. "bad" equilibrium, the former has a much lower share of unofficial activity than the latter. As argued analytically and empirically in this paper and in JKS, this matters significantly, since the unofficial economy is a key indicator of overall economic, institutional and public finance outcomes. Further, we find evidence suggesting that a lower unofficial economy is significantly associated with higher rates of GDP growth. The unofficial economy may in fact be an important conduit of the negative effect of corruption and bribery on growth

Indeed, these findings pinpoint the crucial difference between OECD, some countries in Eastern Europe, a few exceptions in Latin America, on the one hand, with the countries in the former Soviet Union and many in Latin America on the other, regarding the progress of *institutional reform* and *institution-building*. The central policy question is therefore how to make the "good" scenario (the first described above) come true in many countries still stuck in (or moving too slowly away from) the institutional "bad equilibrium" of the second scenario. A number of specific areas of policy intervention suggest themselves from our analysis, particularly in tax, regulatory, legal and anti-corruption institutional reforms.

Before turning to the specific areas for domestic policy and institutional reforms, let

us consider the possible strategy of drawing on large scale foreign assistance or borrowing. The argument would be that given the importance of Q in our model, and that it is not highly revenue-demanding to generate the core of Q (e.g. rule of law) needed to move from a bad equilibrium to a better one, outside financing may substitute more difficult and time-consuming domestic reforms. The problem with this strategic option is that foreign economic assistance does not, by itself, assure the transition to growth through improvements in the budget situation. The political environment can lead to a very poor rate of conversion of public money into public goods. The domestic political, institutional and economic parameters are key to assure better revenue mobilization, less onerous overall effective tax burden on enterprise, and better conversion of public revenues to public goods.

Our analysis suggests that reforms must focus primarily on the elimination of the distortions associated with the existing government activities, including tax collection, and on the effectiveness of conversion of the available public revenues into market-supporting public goods. This approach would correspond to an upward shift in the Q (T) function in our model, which, if politically feasible and large enough, can eliminate the bad equilibrium. A central measure to affect an upward shift in the Q function would be improved rule of law institutions, for which improved public expenditure allocation would be warranted, as well as innovative legal and other than legal initiatives that account for the weaknesses in existing judiciary institutions.

One implication suggested by our analysis is that tax and regulatory blueprints borrowed from fully industrialized countries are unlikely to work in many emerging economies, at least not until they attain a certain level of institutional and bureaucratic sophistication (and lack of arbitrary discretion and rent-seeking). At a general level, for the case of taxes, our framework and evidence suggests that tax regimes need to be designed to ensure effective and non-discretionary implementation. Thus, simplicity, relative uniformity, elimination of special exemptions and exceptions would be called for in a number of settings. Further, our results are at least suggestive of the need to explore further the question of the differential impact of different types of taxes on the firm's tax burden and on the evolution of the unofficial economy. For instance, trade taxes may prove to be particularly onerous relative to others.

Integrating the unofficial economy into an overall analysis of emerging economies may also points to more specific suggestions related to taxation. In reality, our model's assumption of official taxes being levied only on official activities is restrictive; in practice different types of taxes have different potential to tax unofficial activities. For instance, value added at source, as well as toll road taxes are likely to many as well, in contrast with, say, income taxes. Countries which already exhibit a very high unofficial economy may find beneficial to emphasize further the use of these types of taxes.

The existence of administrative corruption and bureaucratic inefficiencies in many settings also affects the "conventional" positive relationship between tax rates and revenue mobilization. Programs to reduce administrative corruption and improve the bureaucracy (including, but not exclusively, enhancing tax administration) may have larger payoffs in many countries than mere changes in tax rates. Similarly, regulatory reforms are likely to have significant payoffs. Elimination of socially unproductive regulations, instituting a one-stop firm registration process, implementing simplified, transparent and market-based

environmental regulations are all likely to result in reduced corruption and bribery, less overall regulatory tax burden on the firm, better revenue mobilization and more firms staying in the official economy.

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List of Tables

TABLE 2—DETERMINANTS OF THE UNOFFICIAL ECONOMY (U): TAX RATES (t) AND GOVERNMENT REVENUES (T)

Independent Variable: Dependent Variable: Unofficial Economy as a percent of GDP

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Log GDP per capita	-8.16* [1.60]	-6.99* [1.61]		-9.46* [1.83]		-8.6* [1.6]		-7.30* [1.48]			-6.61* [1.64]	
Tax Regime												
Average Corporate and Income Tax Rate [b] (Heritage)	-11.84* [2.54]	-5.39* [2.40]										
Top Marginal Income Tax Rate [a] (Fraser)			3.52* [0.72]	1.90* [0.70]								
Taxes on International Trade [a] (Fraser)					-3.65* [1.31]	-0.19 [1.21]						
Tariff and Non-Tariff Trade Barriers [b, c] (Heritage)							8.87* [2.19]	3.61** [2.00]				
Tax Burden Reported by Firm [a] (GCS97)									-11.70* [2.41]	-6.51* [2.11]		
Government Revenues												
Government Revenues as a % of GDP (IMF/WB)											-0.82* [0.16]	-0.46* [0.16]
R-Squared	0.32	0.57	0.37	0.57	0.17	0.52	0.27	0.56	0.43	0.68	0.38	0.54
Number of Observations	47	47	42	42	39	39	47	47	34	34	49	49

Notes: OLS regressions; standard errors are in parentheses; * denotes significant at 5% level and ** denotes significant at 10% level
a) A higher value of this variable stands for a better score for private business.
b) A higher value of this variable stands for a worse score for private business.
c) Note that this Trade Barrier Index also captures non-tariff impediments and as such it is not only and index of tax rates.

TABLE 3—DETERMINANTS OF THE UNOFFICIAL ECONOMY: MEASURES OF REGULATION

Independent Variable: Dependent Variable: Unofficial Economy as a percent of GDP

Independent Variable																
Log GDP per capita		-8.49* [1.49]		-8.82 [1.39]		-7.41* [2.33]		-7.27* [1.57]		-8.6* [1.5]		-10.29* [1.57]		-9.43* [1.44]		-9.50* [1.48]
Overall Measures of Regulation																
Regulatory Burden on Firms [a] (GCS97)	-8.16* [2.62]	-3.90 [2.01]														
Government Interference on Firms [a] (GCS97)			-8.33* [3.21]	-5.03* [2.22]												
Regulatory Enforcement [a] (GCS97)					-9.21* [1.74]	-2.93 [2.51]										
Regulations [b] (Heritage)							14.71* [2.55]	8.06* [2.55]								
Freedom of Firms to Compete [a] (Fraser)									-4.74* [1.62]	-2.25** [1.30]						
Labor Regulations																
Minimum Wage Regulations [a] (GCS97)											3.43 [3.17]	-2.62 [2.28]				
Hiring and Firing Practices [a] (GCS97)													2.81 [2.55]	1.87 [1.68]		
Flexible Number of Hours [a] (GCS97)															2.80 [3.12]	0.58 [2.11]
R-Squared	0.23	0.63	0.17	0.64	0.47	0.60	0.43	0.62	0.17	0.54	0.04	0.60	0.04	0.60	0.02	0.58
Number of Observations	34	34	34	34	34	34	47	47	43	43	34	34	34	34	34	34

Notes: OLS regressions; standard errors are in parentheses; * denotes significant at 5% level and ** denotes significant at 10% level
a) A higher value of this variable stands for a better score for private business.
b) A higher value of this variable stands for a worse score for private business.

TABLE 4 – DETERMINANTS OF THE UNOFFICIAL ECONOMY: INSTITUTIONS AND CORRUPTION

Independent Variable: Dependent Variable: Unofficial Economy as a percent of GDP

Independent Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Log GDP per capita		-1.85 [1.65]		-4.78** [2.63]		-5.23* [1.93]		-2.81 [2.84]		-1.04 [2.90]		-3.94** [1.96]		-4.00* [2.33]		-5.78* [2.46]		-6.45* [1.88]
Legal Institutions																		
Rule of Law [a] (ICRG)	-10.60* [0.94]	-9.31* [1.49]																
Property Rights [b] (Heritage)			13.38* [1.81]	8.03* [3.44]														
Equality Before the Law [a] (Fraser)					-3.80* [0.56]	-2.32* [0.75]												
Police Effectiveness [a] (GCS97)							-7.32* [0.95]	-5.52* [2.05]										
Bureaucracy																		
Bureaucratic Quality [a] (ICRG)									-8.45* [1.01]	-7.73* [2.23]								
Corruption																		
ICRG Corruption Index [a]											-10.85* [1.32]	-7.80* [1.99]						
Transparency International Corruption Index (extended)[a]													-5.11* [0.69]	-3.48* [1.16]				
Global Competitiveness Survey Bribery Index [a]															-7.98* [1.27]	-3.90* [2.10]		
Impulse's Exporter Bribery Index [b]																	1.74* [0.36]	0.82** [0.41]
R-Squared	0.77	0.78	0.55	0.58	0.53	0.60	0.65	0.65	0.65	0.65	0.64	0.68	0.57	0.60	0.55	0.62	0.36	0.51
Number of Observations	39	39	47	47	43	43	34	34	39	39	39	39	43	43	34	34	44	44

Notes: OLS regressions; standard errors are in parentheses; * denotes significant at 5% level and ** denotes significant at 10% level
a) A higher value of this variable stands for a better score for private business.
b) A higher value of this variable stands for a worse score for private business.

TABLE 5—DETERMINANTS OF Q: (PUBLIC GOODS TO OFFICIAL ECONOMY)

Independent Variable:	Dependent Variable: Measures of Q (Public Goods to Official Economy)										
Log GDP per capita			0.55* [0.11]		1.19* [0.29]		-0.64* [0.07]		1.17* [0.14]		0.93* [0.10]
Government Revenues as a percent of GDP	Rule of Law [a] (ICRG)	0.08* [0.01]	0.04* [0.01]								
Government Revenues as a percent of GDP	Equality Before the Law [a] (Fraser)			0.17* [0.03]	0.11* [0.03]						
Government Revenues as a percent of GDP	Property Rights [b] (Heritage)					-0.04* [0.01]	-0.00 [0.01]				
Government Revenues as a percent of GDP	Police Effectiveness [a] (GCS97)							0.07* [0.02]	0.01 [0.01]		
Government Revenues as a percent of GDP	Bureaucratic Quality [a] (ICRG)									0.08* [0.01]	0.02* [0.01]
R-Square		0.60	0.75	0.51	0.65	0.26	0.74	0.31	0.79	0.50	0.82
Number of Observations		46	46	43	43	47	47	34	34	46	46

Notes: OLS regressions; standard errors are in parentheses; * denotes significant at 5% level
a) A higher value of this variable stands for a better score for private business.
b) A higher value of this variable stands for a worse score for private business.

TABLE 6–DETERMINANTS OF GOVERNMENT REVENUES

Independent Variable:	Dependent Variable: Government Revenues as a percent of GDP													
Log GDP per capita		3.26* [1.22]		3.16* [1.20]		5.21* [1.42]		6.02* [1.37]		6.91* [1.63]		3.59** [2.04]		2.45 [1.51]
Tax Regime														
Average Corporate and Income Tax Rate [b] (Heritage)	10.64* [1.61]	7.74* [1.87]												
Top Marginal Income Tax Rate [a] (Fraser)			-3.64* [0.47]	-2.80* [0.54]										
Taxes on International Trade [a] (Fraser)					3.89* [0.81]	2.00* [0.88]								
Tariff and Non-Tariff Trade Barriers [b, c] (Heritage)							-4.54* [1.67]	-0.43 [1.71]						
Tax Burden Reported by Firm [a] (GCS97)									4.56* [2.65]	-0.77 [2.53]				
Corruption														
Transparency International Corruption Index (extended)[a]											3.20* [0.61]	1.71 [1.04]		
ICRG Corruption Index [a]													8.32* [1.09]	6.45* [1.56]
R-Squared	0.46	0.52	0.57	0.63	0.35	0.51	0.12	0.36	0.07	0.38	0.37	0.41	0.57	0.59
Number of Observations	54	54	48	48	45	45	54	54	39	39	49	49	46	46

Notes: OLS regressions; standard errors are in parentheses; * denotes significant at 5% level and ** denotes significant at 10% level
a) A higher value of this index variable stands for a better score for private business (e.g. lower tax rates).
b) A higher value of this index variable stands for a worse score for private business (e.g. higher tax rates).
c) Note that this Trade Barrier Index also captures non-tariff impediments and as such it is not only and index of tax rates.

TABLE 7 — DETERMINANTS OF THE OVERALL TAX BURDEN REPORTED BY FIRM

Independent Variable:	Dependent Variable: Tax Burden Reported by Firm [a] (GCS97)													
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Log GDP per capita		0.38* [0.12]		0.38* [0.12]		0.06 [0.15]		0.11 [0.11]		0.10 [0.15]		0.23** [0.13]		-0.08 [0.17]
Tax Regime														
Average Corporate and Income Tax Rate [b] (Heritage)	0.25* [0.17]	-0.16 [0.20]												
Top Marginal Income Tax Rate [a] (Fraser)			-0.06 [0.05]	0.05 [0.06]										
Taxes on International Trade [a] (Fraser)					0.21* [0.06]	0.18** [0.09]								
Tariff and Non-Tariff Trade Barriers [b,c] (Heritage)							-0.49* [0.11]	-0.41* [0.15]						
Corruption														
Transparency International Corruption Index (extended) [a]									0.18* [0.04]	0.14** [0.8]				
ICRG Corruption Index [a]											0.28* [0.10]	0.11 [0.14]		
Global Competitiveness Survey Bribery Index [a]													0.38* [0.08]	0.44* [0.14]
R-Squared	0.06	0.26	0.03	0.22	0.27	0.27	0.37	0.38	0.31	0.32	0.17	0.24	0.42	0.42
Number of Observations	39	39	37	37	34	34	39	39	39	39	38	38	34	34

Notes: OLS Regressions; standard errors are in parentheses; * denotes significant at 5% level and ** denotes significant at 10% level

a) A higher value of this variable stands for a better score for private business.

b) A higher value of this variable stands for a worse score for private business.

c) Note that this Trade Barrier Index also captures non-tariff impediments and as such it is not only and index of tax rates.

TABLE 8—DOES THE UNOFFICIAL ECONOMY AFFECT PERFORMANCE?

Independent Variable:	Dependent Variable: Growth of Income per Capita											
Log of Initial GDP per capita		-1.87**	-1.74	-2.84*	-0.75	0.16	-3.18*	-3.26*	-2.54*	-1.62	-2.66*	-3.23*
		-[1.08]	[1.14]	[0.78]	[0.71]	[0.95]	[1.19]	[0.79]	[1.09]	[1.17]	[1.18]	[0.81]
Unofficial Economy [%GDP]	-0.12*	-0.19*					-0.22*	-0.16*	-0.17*	-0.20*	-0.21*	-0.16*
	[0.04]	[0.06]					[0.07]	[0.06]	[0.07]	[0.07]	[0.07]	[0.06]
Transparency International Corruption Index [extended] [a]			0.84**				0.22				-0.22	
			[0.47]				[0.52]				[0.55]	
Rule of Law [a] [ICRG]				2.37*				0.90				0.84
				[0.61]				[0.84]				[0.88]
Tariff and Non-Tariff Trade Barriers [b, c] [Heritage]					-2.31*				-1.88*		-1.57**	-0.19
					[0.72]				[0.83]		[0.84]	[0.60]
Government Revenues as a percent of GDP						0.02				-0.05		
						[0.07]				[0.08]		
R-Squared	0.13	0.18	0.07	0.27	0.17	0.006	0.30	0.43	0.31	0.19	0.36	0.43
Number of Observations	49	48	48	45	53	55	42	38	46	48	42	38

Notes: OLS Regressions; standard errors are in parentheses; * denotes significant at 5% level and ** denotes significant at 10% level
a) A higher value of this variable stands for a better score for private business.
b) A higher value of this variable stands for a worse score for private business.
c) Note that this Trade Barrier Index also captures non-tariff impediments and as such it is not only and index of tax rates.

List of Figures:

Figure 1: Unofficial Economy and Top Marginal Tax Rate
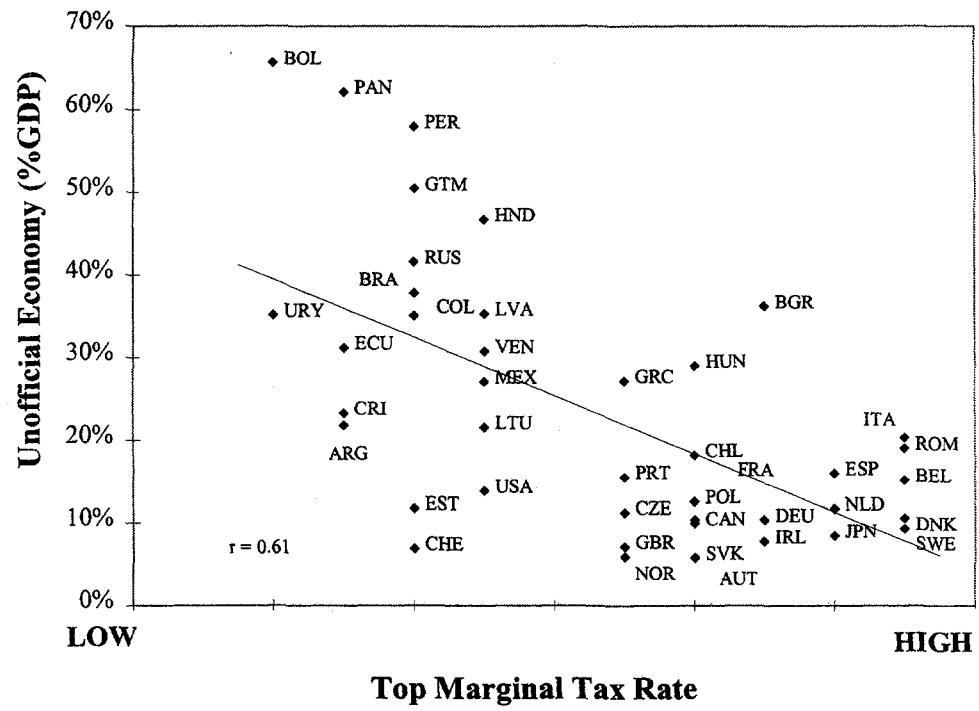
Figure 2: Unofficial Economy and Tax Barriers

41
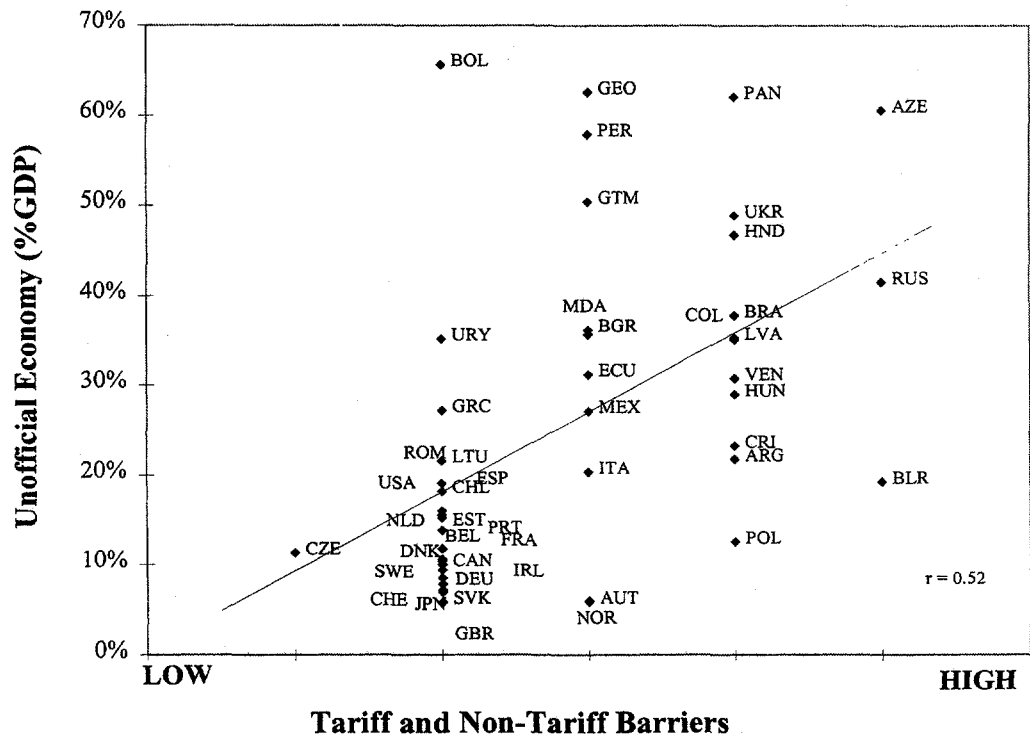
Figure 3:Unofficial Economy and Tax Burden on the Firm

Tax Burden on The Firm
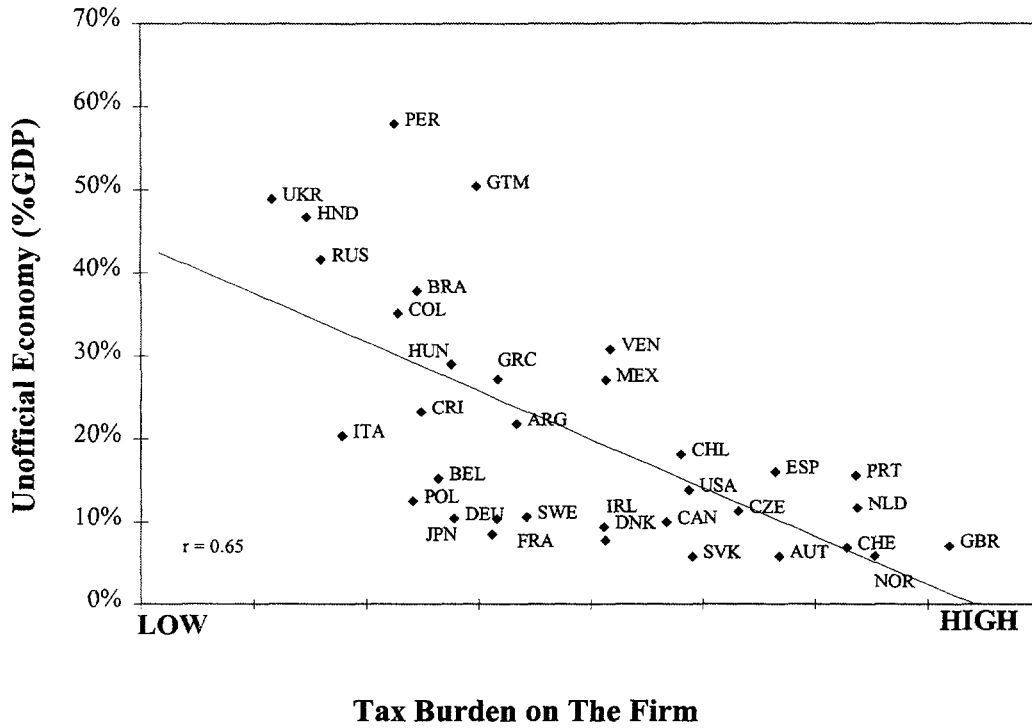
Figure 4: Unofficial Economy and Government Revenue

Government Revenue as a % of GDP
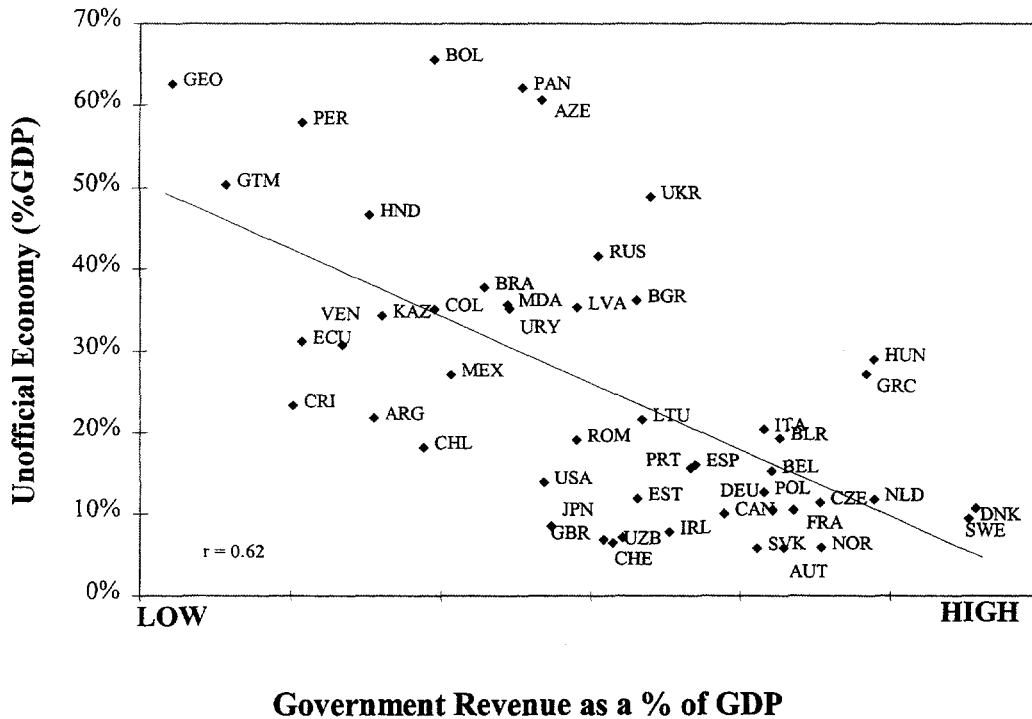
Figure 5: Unofficial Economy and Regulatory Discretion

Unofficial Economy (%GDP) vs Regulatory Discretion (LOW to HIGH). r = 0.68
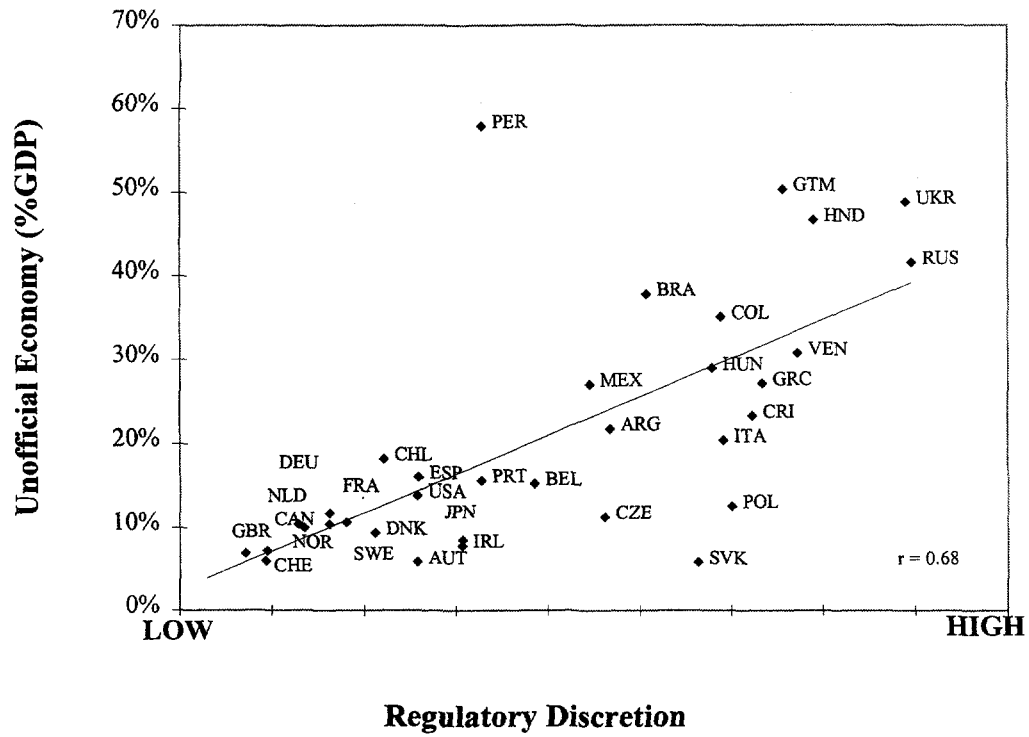
Figure 6: Unofficial Economy and Bureaucratic Quality

Unofficial Economy (%GDP) vs Bureaucratic Quality (POOR to GOOD). r = 0.81

43

Figure 7: Unofficial Economy and Rule of Law
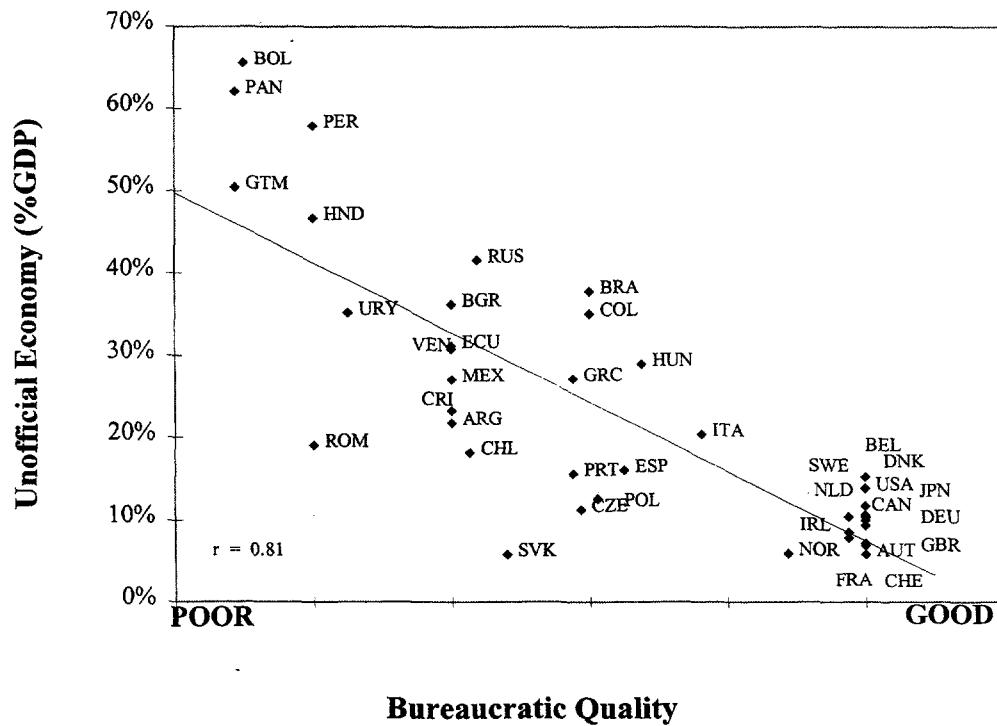
Figure 7: Unofficial Economy and Rule of Law

Figure 8: Unofficial Economy and ICRG Corruption Index
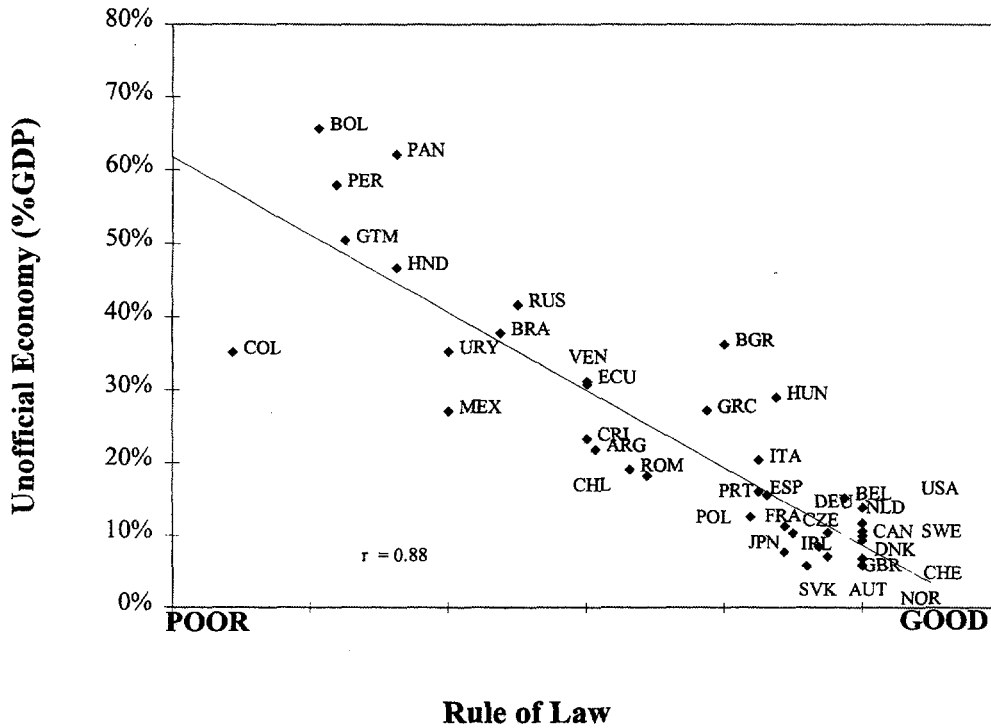
Figure 8: Unofficial Economy and ICRG Corruption Index
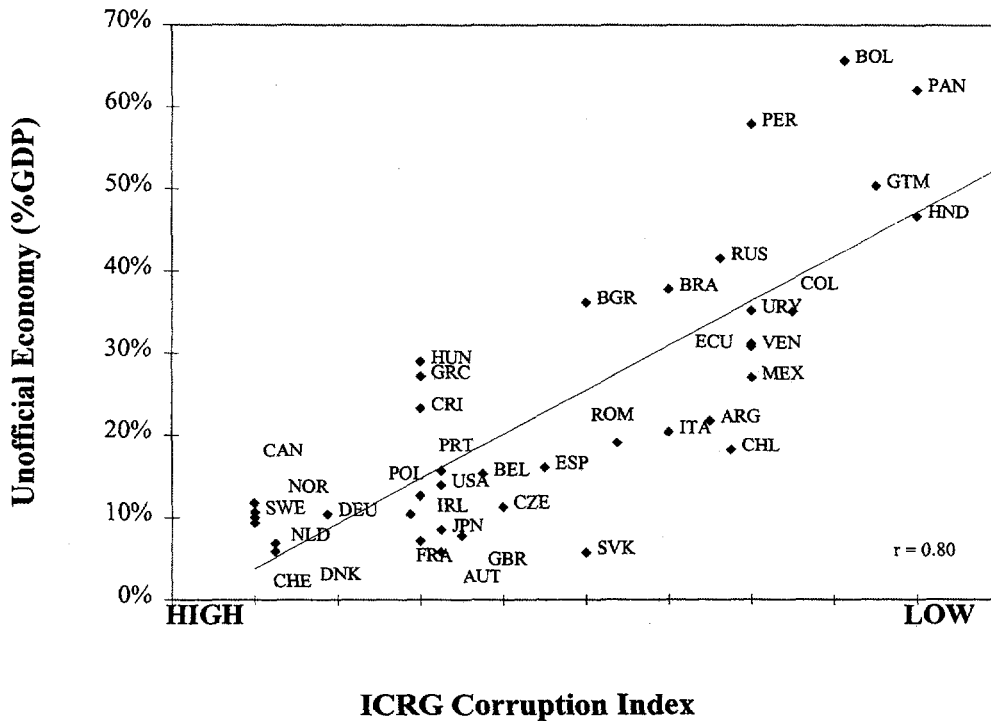
Figure 9: Unofficial Economy and Transparency International Corruption Index

Transparency International Corruption Index
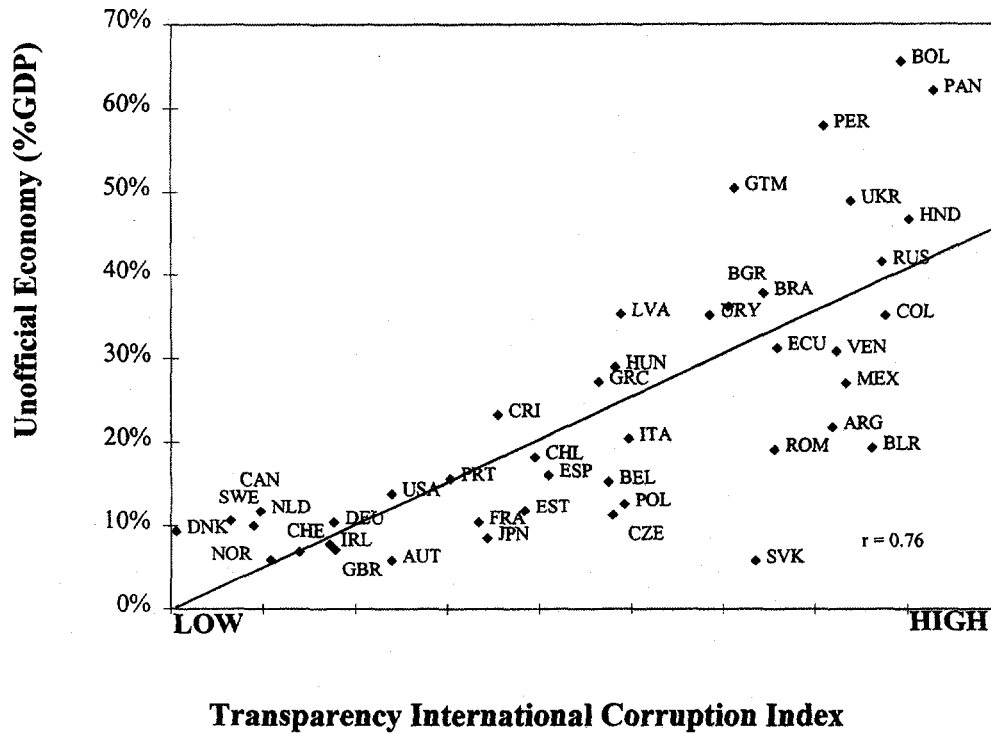
Figure 10: Bureaucratic Quality and Government Revenues

Government Revenues (%GDP)
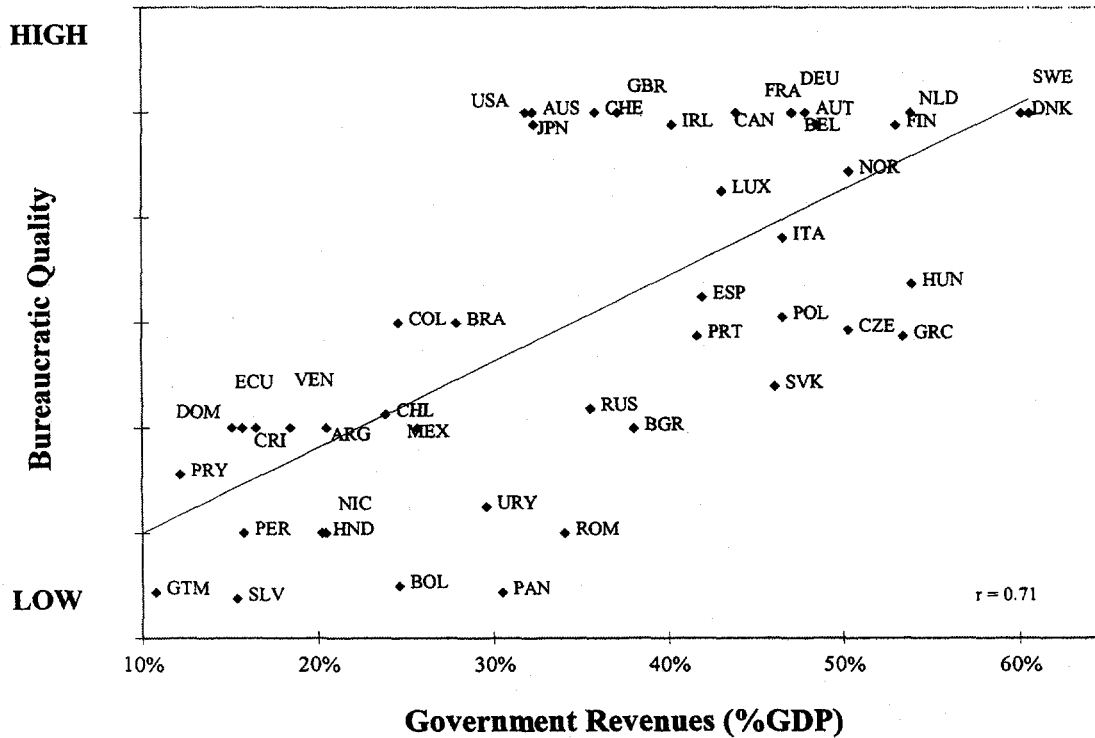
Figure 11: Rule of Law and Government Revenues

Figure 11: Rule of Law and Government Revenues

Rule of Law (vertical axis: HIGH to LOW)
Government Revenues (%GDP) (horizontal axis: 10% to 60%)

r=0.77

Figure 12: Government Revenues and ICRG Corruption Index

Figure 12: Government Revenues and ICRG Corruption Index

Government Revenues (%GDP) (vertical axis: 0% to 80%)
ICRG Corruption Index (horizontal axis: LOW to HIGH)

r = 0.75
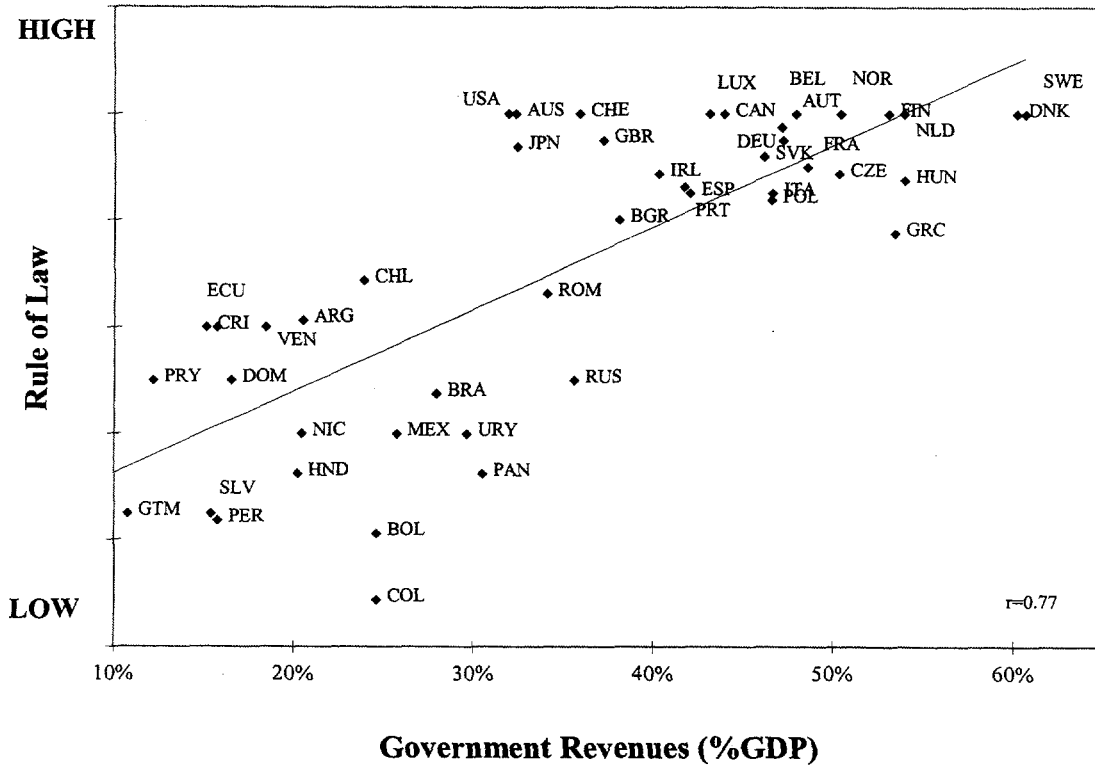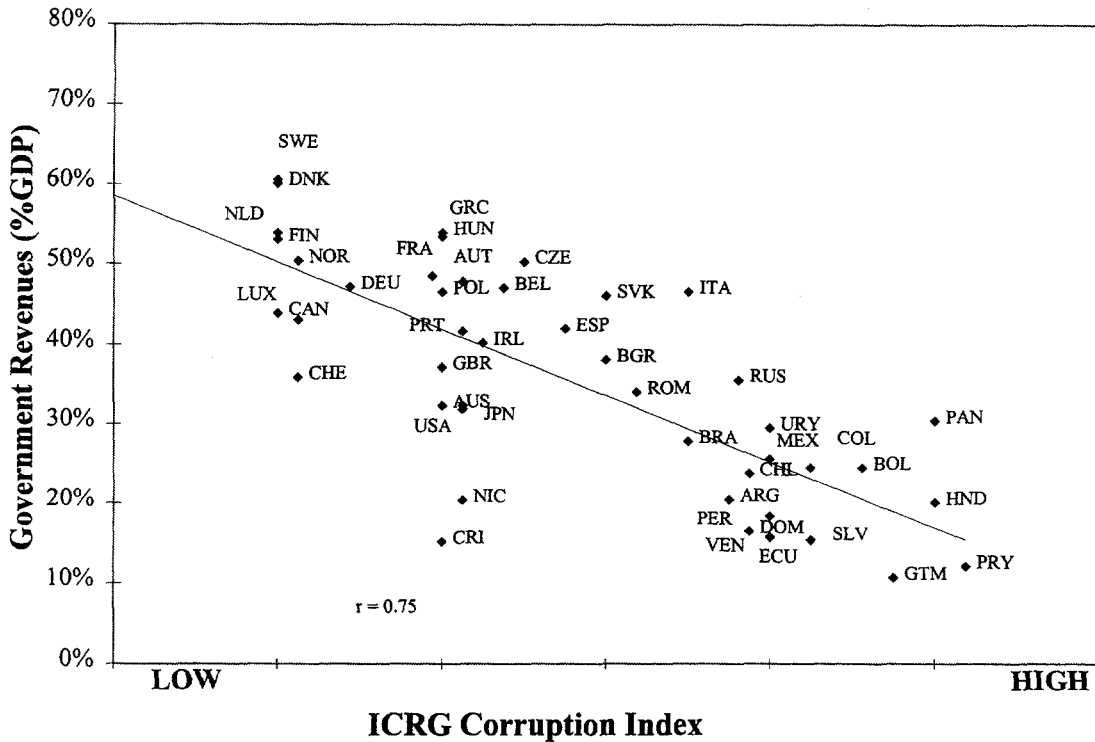
Figure 13: Government Revenues and Top Marginal Tax Rate

Scatter plot with Y-axis "Government Revenues (%GDP)" ranging from 0% to 70%, and X-axis "Top Marginal Tax Rate" ranging from LOW to HIGH. Data points labeled with country codes: SWE, DNK, NLD, FIN, ITA, BEL, NOR, GRC, HUN, CZE, AUT, FRA, SVK, POL, DEU, CAN, PRT, ESP, CHE, EST, LTU, RUS, IRL, BGR, LVA, USA, JPN, ROM, GBR, URY, PAN, AUS, BRA, BOL, COL, MEX, CHL, ARG, NIC, HND, ECU, DOM, SLV, VEN, CRI, PER, PRY, GTM. r = 0.75
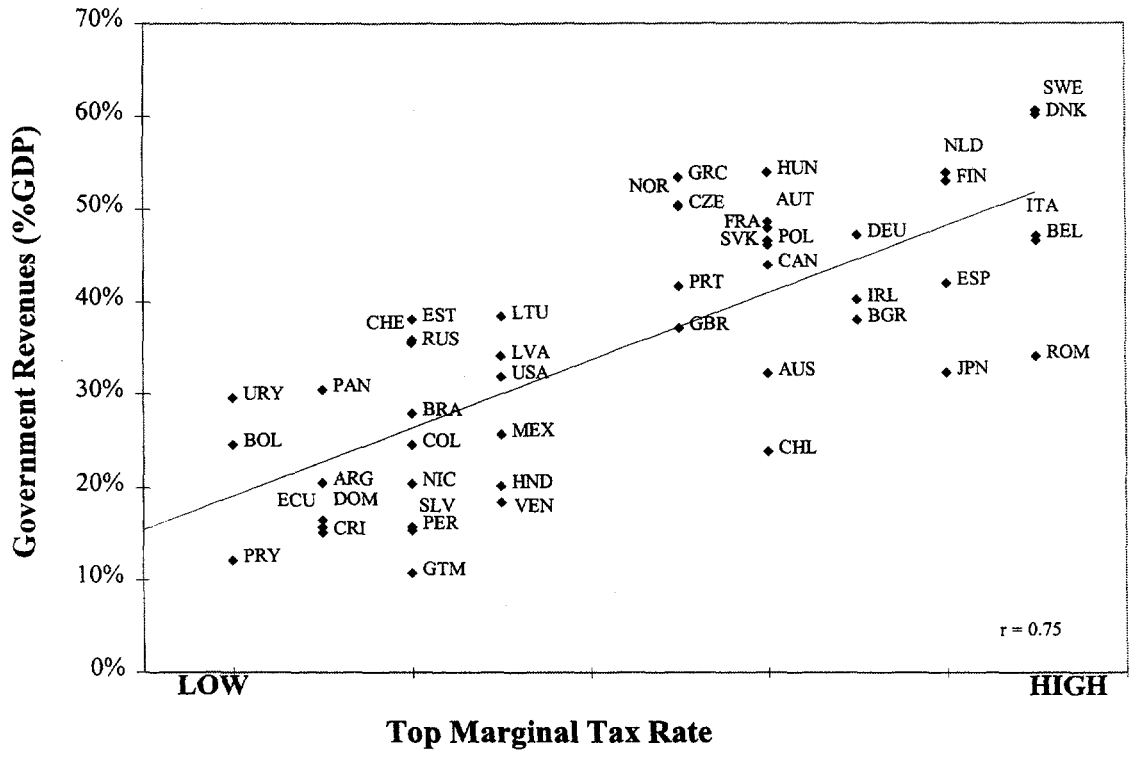
Figure 14: Government Revenues and Taxes on Trade

Scatter plot with Y-axis "Government Revenues (%GDP)" ranging from 0% to 70%, and X-axis "Taxes on Trade" ranging from LOW to HIGH. Data points labeled with country codes: DNK, SWE, NLD, GRC, FIN, NOR, ITA, FRA, CZE, AUT, BEL, DEU, CAN, PRT, ESP, LTU, GBR, EST, IRL, BGR, CHE, LVA, USA, PAN, AUS, JPN, ROM, URY, MEX, BRA, POL, RUS, BOL, CHL, COL, ARG, NIC, SLV, VEN, PER, DOM, ECU, CRI, PRY, GTM. r = 0.59

47
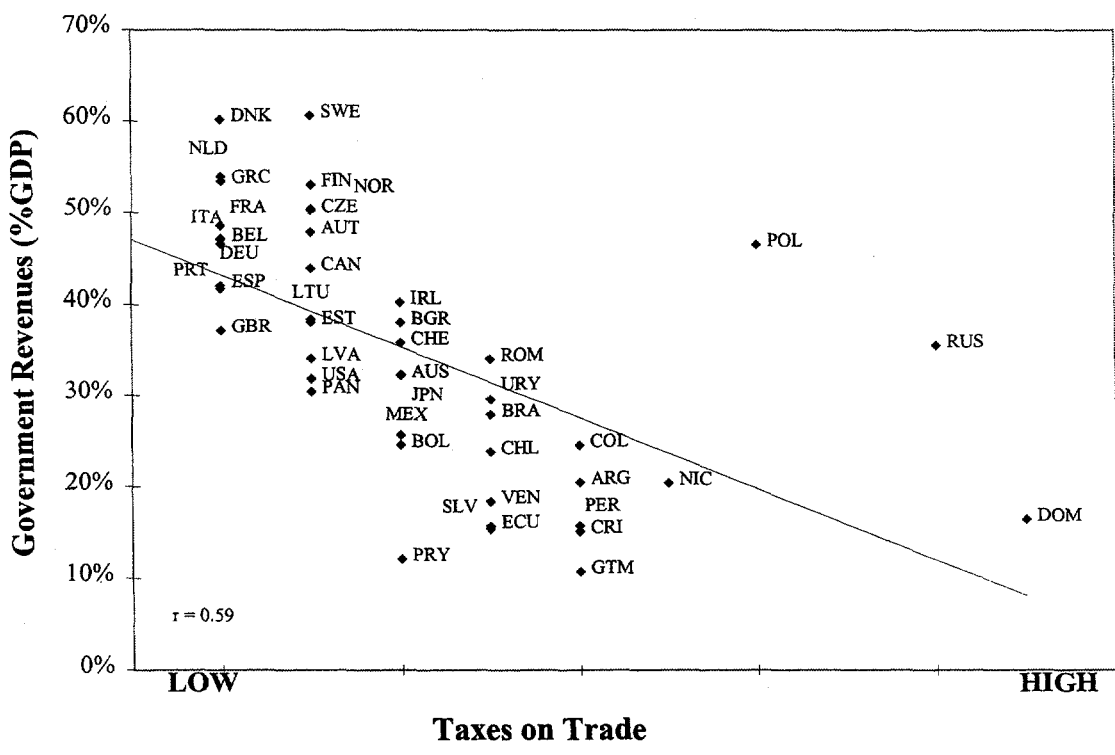
Figure 15: Government Revenues and Tax Burden on Firms

Figure 15: Government Revenues and Tax Burden on Firms

(Y-axis: Government Revenues (%GDP), 0% to 70%; X-axis: Taxes on Firms, LOW to HIGH)

r = 0.27

Figure 16: Tax Burden on the Firm and Top Marginal Tax Rate

Figure 16: Tax Burden on the Firm and Top Marginal Tax Rate

(Y-axis: Tax Burden on Firms (V2-10), LOW to HIGH; X-axis: Top Marginal Tax Rate, LOW to HIGH)

r=0.18
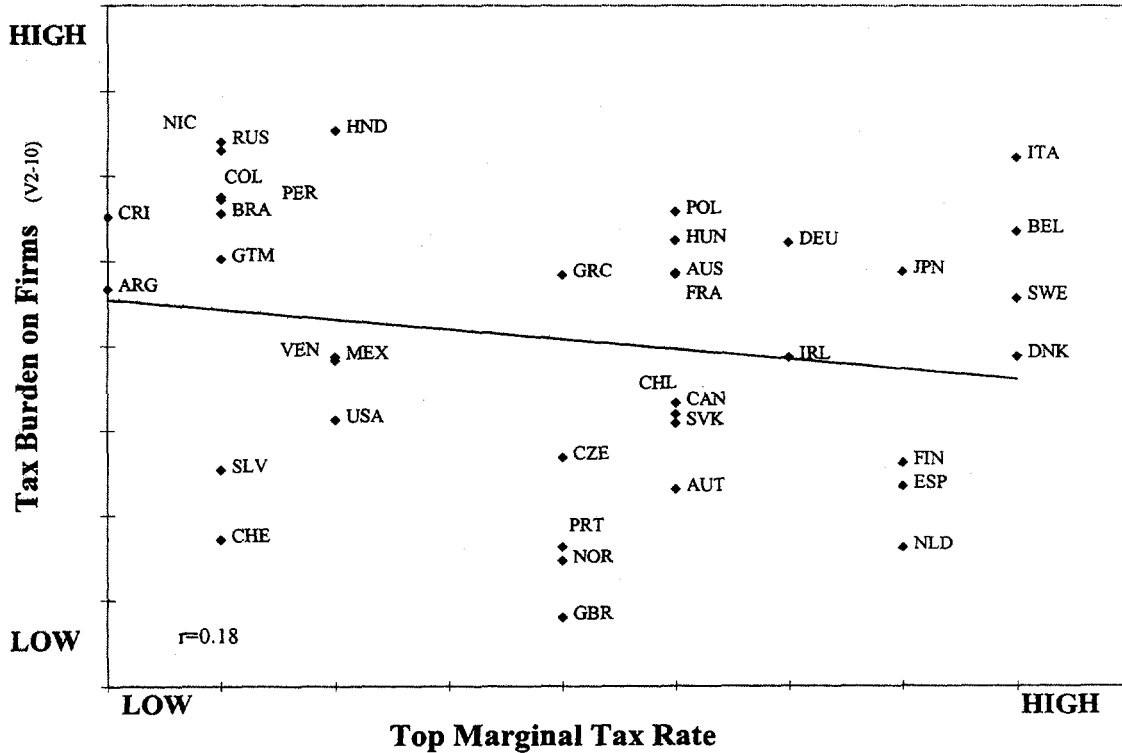
Figure 17: Tax Burden on Firms and Trade Barriers

Figure 17: Tax Burden on Firms and Trade Barriers

(Scatter plot: x-axis "Tariff and Non-Tariff Trade Barriers" from LOW to HIGH; y-axis "Tax Burden on Firms (V2-10)" from LOW to HIGH; r = 0.61)
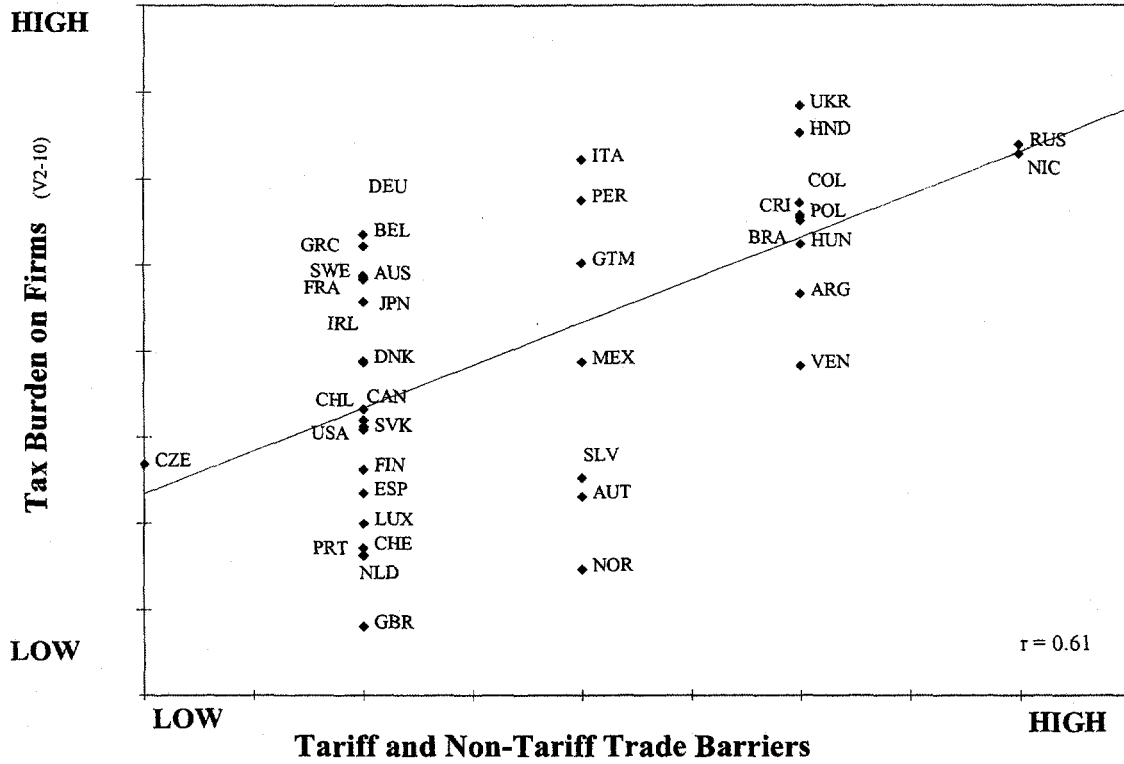
Figure 18: Tax Burden on the Firm and Transparency International Corruption Index (extended)

Figure 18: Tax Burden on the Firm and Transparency International Corruption Index (extended)

(Scatter plot: x-axis "Transparency International Corruption Index (extended)" from LOW to HIGH; y-axis "Tax Burden on Firms (V2-10)" from LOW to HIGH; r=0.61)
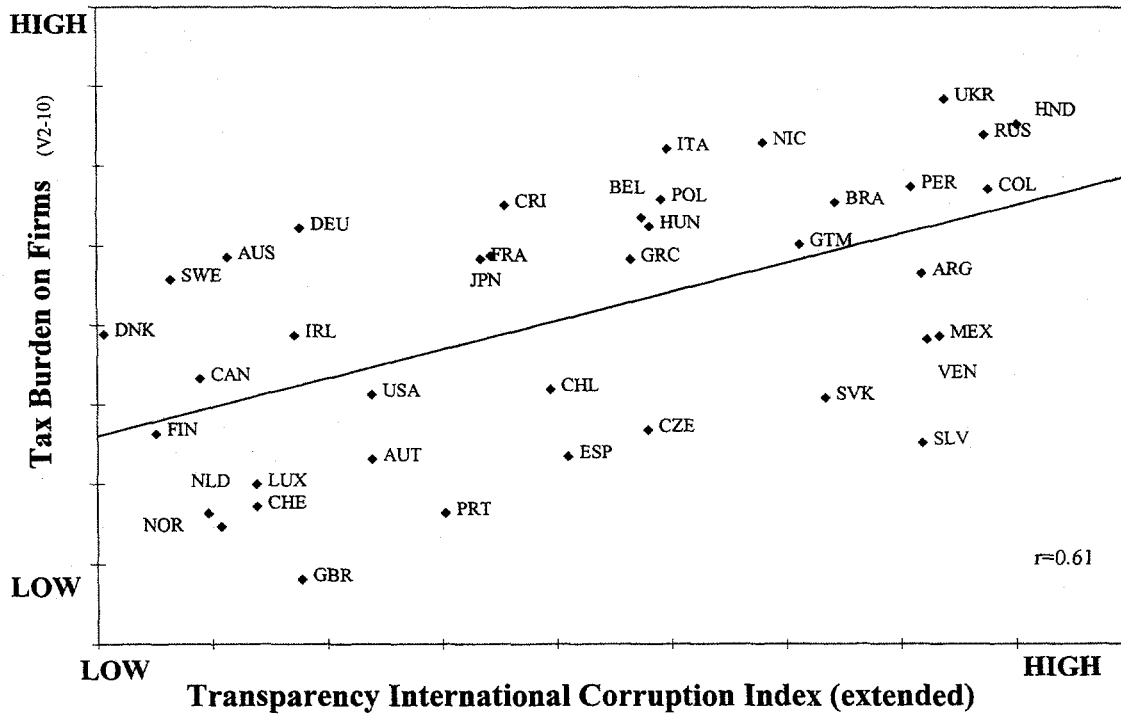
Figure 19: GDP Growth and Unofficial Economy
(Controlling for Initial Income)
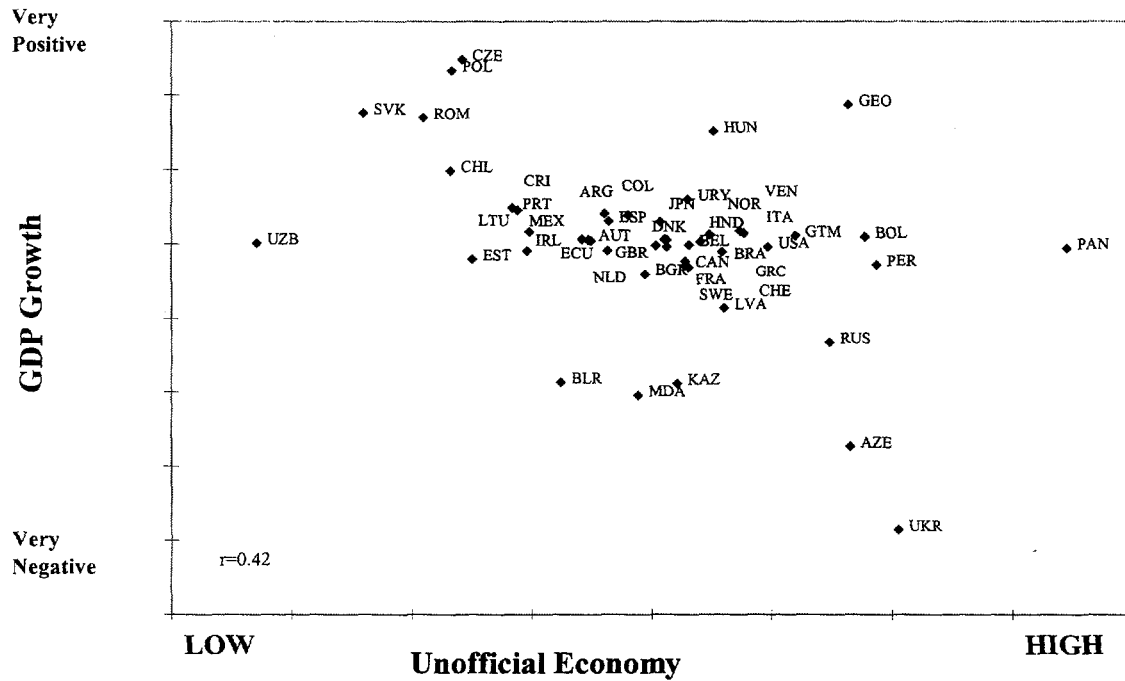
Note: Added variable plot, partial regression leverage plot: Each axis represent the residuals of the regressions of each variable against initial GDP per capita

50

TABLE A1 – BASIC DATA FOR SELECTED VARIABLES

Country, alphabetical order within regions: Latin America, Transition Econs., OECD	Unofficial Economy % Share in GDP	Top Marginal Income Tax Rate (Fraser Index)	Tariff and Non-Tariff Trade Barriers (Heritage)	Tax Burden Reported by Firms (GCS97)	Regulatory Burden on Firms (GCS97)	Regulations (Heritage)	Freedom of Firms to Compete (Fraser)	Labor Regulations: Hiring and Firing Practices (GCS97)	Rule of Law (ICRG)	Property Rights (Heritage)	Bureaucratic Quality (ICRG)
Argentina	21.80	9	4	2.67	4.22	2	10.0	3.02	4.06	2	3.00
Bolivia	65.60	10	2	..	..	4	7.5	..	2.06	3	1.50
Brazil	37.80	8	4	2.22	3.03	3	7.5	4.38	3.38	3	4.00
Chile	18.20	4	2	3.40	4.25	2	10.0	4.54	4.44	1	3.13
Colombia	35.10	8	4	2.14	1.64	3	7.5	3.11	1.44	3	4.00
Costa Rica	23.30	9	4	2.24	2.27	3	10.0	4.13	4.00	3	3.00
Ecuador	31.20	9	3	..	..	4	7.5	..	4.00	3	3.00
Guatemala	50.40	8	3	2.49	2.65	4	5.0	4.46	2.25	3	1.44
Honduras	46.70	7	4	1.73	2.22	4	7.5	3.06	2.63	3	2.00
Mexico	27.10	7	3	3.06	3.37	4	7.5	3.75	3.00	3	3.00
Panama	62.10	9	4	..	..	3	7.5	..	2.63	3	1.44
Peru	57.90	8	3	2.13	3.75	4	7.5	5.16	2.19	3	2.00
Uruguay	35.20	10	2	..	..	3	7.5	..	3.00	2	2.25
Venezuela	30.80	7	4	3.09	2.67	3	7.5	2.78	4.00	3	3.00
Azerbaijan	60.60	..	5	..	..	4	..	..	..	4	..
Belarus	19.30	..	5	..	..	3	..	..	..	3	..
Bulgaria	36.20	3	3	..	..	4	7.5	..	5.00	3	3.00
Czech Rep.	11.30	5	1	3.66	4.77	1	10.0	2.76	5.44	2	3.94
Estonia	11.80	8	2	..	..	2	10.0	..	..	2	..
Georgia	62.60	..	3	..	..	4	..	..	..	4	..
Hungary	29.00	4	4	2.38	2.85	3	10.0	4.88	5.38	2	4.38
Kazakhstan	34.30	..	..	..	..	..	..	..	..	..	..
Latvia	35.30	7	4	..	..	2	7.5	..	..	3	..
Lithuania	21.60	7	2	..	..	3	7.5	..	..	3	..
Moldova	35.70	..	3	..	..	3	..	..	..	3	..
Poland	12.60	4	4	2.21	4.06	3	7.5	4.00	5.19	2	4.06
Romania	19.10	1	2	..	..	4	5.0	..	4.31	4	2.00
Russia	41.60	8	5	1.80	4.05	4	5.0	4.08	3.50	3	3.19
Slovak Rep.	5.80	4	2	3.45	4.00	3	7.5	3.64	5.60	3	3.40
Ukraine	48.90	..	4	1.58	2.86	4	5.0	5.26	..	4	..
Uzbekistan	6.50	..	..	..	..	..	..	..	..	..	..
Austria	5.86	4	3	3.84	3.63	3	7.5	3.29	6.00	1	6.00
Belgium	15.25	1	2	2.32	3.21	3	7.5	2.96	5.88	1	6.00
Canada	10.00	4	2	3.34	3.77	2	7.5	4.87	6.00	1	6.00
Denmark	9.38	1	2	3.06	4.29	2	10.0	5.88	6.00	1	6.00
France	10.40	4	2	2.58	2.91	2	7.5	2.44	5.50	2	5.88
Germany	10.43	3	2	2.39	3.56	3	7.5	2.34	5.75	1	6.00
Greece	27.20	5	2	2.58	2.25	3	7.5	2.58	4.88	2	3.88
Ireland	7.80	3	2	3.07	3.80	2	7.5	3.73	5.44	1	5.88
Italy	20.40	1	3	1.89	2.89	3	7.5	2.22	5.25	2	4.81
Japan	8.50	2	2	2.56	2.67	2	7.5	4.15	5.69	1	5.88
Netherlands	11.75	2	2	4.19	4.78	2	7.5	3.16	6.00	1	6.00
Norway	5.93	5	3	4.27	4.67	3	7.5	2.60	6.00	1	5.44
Portugal	15.60	5	2	4.18	4.55	3	7.5	2.91	5.31	2	3.88
Spain	16.05	2	2	3.82	5.29	3	7.5	3.53	5.25	2	4.25
Sweden	10.63	1	2	2.71	3.48	3	10.0	3.00	6.00	2	6.00
Switzerland	6.90	8	2	4.14	4.21	3	10.0	5.29	6.00	1	6.00
U.K.	7.15	5	2	4.60	4.37	2	10.0	4.91	5.75	1	6.00
U.S.A.	13.87	7	2	3.44	3.39	2	10.0	5.05	6.00	1	6.00

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