Public Sector, Informal Sector, and Policy Commitment

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ABSTRACT

Governments in developed countries are much more active in providing productive public goods such as infrastructure and education - and levying higher taxes to this end - than in developing countries. Developed countries also typically have a much smaller informal sector than poorer countries. This paper offers a framework that purports to account for this nexus of relationships. It finds that the quality of law enforcement can explain these links. Moreover, viewing the quality of enforcement as endogenous, it argues that the credibility of policy commitment is what distinguishes weak and effective states, the latter generating higher levels of enforcement and productive public goods and smaller informal sector than the former. Consequently, growth is faster and inequality is smaller in countries whose governments are sufficiently strong to be able to create such commitments. The commitment regime has redistributive implications benefiting the poor majority at the expense of the rich minority.

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1. Introduction

Among the most striking differences between the economies in advanced countries and in developing countries is the role of the public sector. The former typically have a relatively large public sector, with a substantial commitment to public health, public education, infrastructure, and social security. In contrast, in developing countries these programs either do not exist, or do not entail broad population coverage. For example, the average for central government spending as a share of the GDP between the years 1996-2000 was almost 40% in the high-income group of countries and less than 15% in the low-income group of countries (author's calculations based on the World Bank Development Reports). This supports Wagner's law, that as the economy develops it spends a larger share of its resources on public goods, see Easterly and Rebelo, 1993, for additional more detailed discussion, and the World Bank Development Report, 1997, for a broad presentation of intertemporal trends in the evolution of the public sector in the post World War II period.

Consequently, the tax burden is larger in developed than in developing countries. Thus, the share of the GDP collected in tax revenues in recent years was about 30% in high-income countries, but only some 10% in low-income countries data on which are available. A strong robust relationship between the GDP and tax revenues across countries can be easily discerned from glancing at the data with some high-income countries such as Belgium, Italy, and the Netherlands collecting almost 50% of the GDP in tax revenues, whereas many low-income countries collect 10 percent and less (World Development Reports, recent years). Yet, the statutory tax burden is quite significant in developing countries, just a tick below the one in richer countries. As noted in Gordon and Li, 2005, the average maximum corporate tax, for example, is 26.7% in poor countries versus 29.6% in rich countries. Maximum

personal tax rates also do not dramatically differ. Thus, the difference in the statutory taxation in developed countries relative to developing ones is considerably smaller than the difference in de facto tax revenues.

Many areas of economic activity where public sector is especially strong in developed countries, such as education, health and infrastructure, are widely considered to be crucial for successful development. In fact, the governments in poor countries have been consistently blamed for failing to provide these productive inputs in adequate quantities and qualities, and the success of East Asian economies as compared to the dire economic performance in sub-Saharan Africa has often been attributed to an effective state activism (see Herbst, 2000; also the World Development Reports, 1997, 2004). At the same time, influential economic theories, such as in Meltzer and Richard, 1981, and Persson and Tabellini, 1994, contain warnings that excessive taxation is an impediment to growth, which can be viewed as the flip side of the same coin. Taken together these arguments seem to imply that, while some measure of government financing of productive goods is growth promoting, it can also be devastating when in extreme. Yet, empirically, Lindert, 2004, in a fundamental historical study fails to detect negative growth effects of an increase in the public sector in industrialized countries in the post World War II era, and Easterly and Rebelo, 1993, in their comprehensive empirical study that uses panel data find that neither average nor even marginal tax burden are significant impediments for growth.

Another stark difference between developed and developing countries is in the size of the informal sector, which is on average at least three times bigger in the latter group of countries. This is despite the lower tax burden, which arguably has a positive effect on the size of the informal sector, see Schneider and Enste, 2000; Gordon and Li's, 2005, calibrations attribute the difference between the statutory and the de facto burdens across

developing and developed countries to the varying degree of informality there.[1]

One of this paper's goals is to reconcile these observations. It argues that the law enforcing capacity of the state is crucial for the understanding of the relationship between public sector, informality and growth and focuses on the determination of this capacity. Where the enforcement quality is high, taxation to finance public spending is much less detrimental for growth than with a weak enforcement, and both redistributive taxes and the quality of enforcement reduce income inequality.

More importantly, perhaps, we distinguish between weak and effective states on the basis of their ability to commit to policies, suggesting that only strong states should be able to create such credible commitment. We find that effective states generate high level of enforcement and are able to effectively collect taxes in order to finance public goods, whereas weak states are unable to accomplish these goals. Consequently, growth is more rapid in the former type of states than in the latter; yet, weak states by engaging in lower redistribution benefit the individuals belonging to rich tail of the income distribution, which creates supportive political constituency. Whereas much economic literature, inspired by influential theories of Buchanan and Tullock, 1962, and Meltzer and Richard, 1981, stresses the benefits of a limited government, developing countries in Africa and Latin America have seen all too many states without effective capacity (Herbst, 2000).

Overall, therefore, this paper makes a contribution to the understanding of the role of the state in economic development, see the monumental work Finer, 1997, on the evolving concept of the state in its relation to society. An effective state is viewed as an engine of growth, whereas an ineffective state is an impediment to growth. This distinction is complementary to the literature that views state corruption as an obstacle to growth. While much work has been recently done on corruption and growth, see e.g., Mauro, 1995, for an

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[1] De Soto, 2000, makes forceful arguments as to the effects of informality on development. In particular, it has been pointed out that informality impairs on the government's ability to mobilize resources for the provision of

empirical evidence and Shleifer and Vishny, 1993, for a conceptual contribution, this paper's emphasis on the state's strength in making credible commitments as the means to generate productive public goods and decrease informality thereby promoting growth, is novel.

This paper is related to the relatively small but evolving literature on the determinants and the growth effects of informality. The significance of informality for capitalistic development is well articulated in De Soto, 2000. While earlier on the literature, reviewed in some more detail below, struggled with developing empirical measures of the informal sector, more recent analytical work in this regard includes Auriol and Warlters, 2005, and Sarte, 2000. This literature typically introduces government taxes or regulations and studies their effects on informality, but does not necessarily focus of the enforcement capacities of the state. Another related work emphasizes the role of public investment in development. Barro, 1990, is a seminal contribution in this regard, and Gonzalez and Neary, 2004, extend the framework to consider imperfect enforcement of property rights, which impedes the utilization public investment. This work, however, does not explicitly model an informal sector that emerges as a result of government policies. Rapidly developing empirical literature attests to the relevance of the various measures of institutional quality for economic growth, see e.g., Acemoglu et al., 2002, Hall and Jones, 1999, and Rodrik et al., 2004. Acemoglu, 2005, is an important theoretical contribution that distinguishes between weak and strong states in their impact on growth. This distinction, however, is based on the ease with which a ruler can be replaced, whereas here, in contrast, it is perceived as the government's commitment ability.

The rest of the paper proceeds as follows. The next section describes some basic facts pertaining to the informal sector in the development context. The analytical framework is presented in Section 3, followed by the equilibrium analysis which takes public policy as

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productive public goods and, indirectly, adversely affects economic growth (Loayza, 1996).

given in Section 4. Section 5 endogenizes the determination of public policies assuming that these are set by a social planner. Extensions are considered in Section 6, and Section 7 concludes.

2. Informal sector: background

An essential building block in this paper's argument is tax evasion by individuals who do so by shifting activities to an informal sector. It is, therefore, important to discuss the quantitative significance of informality and its empirical determinants. Earlier work on the informal sector, well summarized in Schneider and Enste, 2000, has relied on macroeconomic estimates of informality. These estimates indicate that the relative size of this sector can be very substantial reaching on average 35-40% in developing countries and 11-17% in industrialized countries. The informal sector in United States is one of the smallest, 9 percent of the GDP, and Bolivia's informal sector is among the largest, constituting 67 percent of the GDP.[2] Indeed, as is evident from Figure 1, which exhibits available data on the informal sector for more than 100 countries around the year 2000, a very strong negative relationship exists between a country's level of development – as measured, in this instance, by the per capita GDP – and the relative size of the informal sector. Early work on the determinants of informality based on these estimates typically finds that tax burden as well as government regulations lead to a larger informal sector (see Schneider and Enste, 2000). But this work ignores aspects of institutional quality, measures of which have only more recently been developed. When these measures, among them the rule of law, are included in the regression specification, the institutional variables turn out to

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[2] While there are two main methodological approaches to obtain these estimates – one based on monetary velocity and another based on changes in electricity consumption in relation to the GDP – the correlation

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be significant and, in fact, trump the tax variable (Chong and Gradstein, 2005).

INSERT FIGURE 1 HERE

Some more recent work uses institutional measures in conjunction with microeconomic estimates of informality based on firm surveys.[3] Thus, Friedman et al., 2000, and Johnson et al., 2000, in their analysis of the data for firms in transition economies find that firm trust in the rule of law explains their tendency to go informal much better than measures of the tax burden.[4] This is quite consistent with richer countries, with better institutions, having heavier taxation and bigger public sector yet smaller informal sector than poorer countries. This work also indicates that institutional variables are associated with higher government revenues. In fact, in their specifications higher taxes enhance government revenue, more so when the rule of law is strong, which is entirely consistent with the model below.

The World Business Environment Survey (WBES) conducted by the World Bank – a rich data set consisting of firm level survey responses thousands of firms in both developed and developing – allows for a further investigation of the determinants of informality. It reports on firm's perception of the quality and integrity of public services, the regulatory burden faced by the firms; taxes, legal rules and regulations, as well as on firm characteristics. More importantly, the survey has information about the propensity to operate informally. Specifically, the latter can be retrieved from answers to the question: "Recognizing the difficulties many enterprises face in fully complying with taxes and

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between the two series of estimates is generally very high. Consequently, and in order to save space, in this discussion we do not distinguish between the two.

[3] These estimates have an obvious advantage of allowing for a better identification than the macro-based cross-country analysis.

[4] In their specifications, when institutional variables are included in regressions, the tax variables turn out to be even negatively associated with informality, but insignificantly so.

regulations, what percentage of total sales would you estimate the typical firm in your area of activity keeps "off the books"? The survey also has a large number of questions on the nature of corruption, tax and regulatory, financing and legal constraints firm face. In the survey, enterprise managers were asked to rate the extent to which these obstacles constrained the operation of their business.

Dabla-Norris et al., 2005, employ these data to get further insights into the determinants of informality. They find that, while both taxes and regulations tend to be associated with higher levels of informality, the rule of law emerges as its dominant predictor, with the correlation of about -.24 (implying that better rule of law is associated with smaller informal sector). Regression analysis indicates that the adverse effect of taxes in this regard is moderated by a high level of the rule of law as perceived by the firms, which is again consistent with the analytical findings presented below. It also indicates that stronger rule of law is associated with more efficient government, which in turn also decreases the propensity to go informal.

This empirical literature seems to indicate, therefore, that higher taxes lead to higher revenues, hence public sector, more so when the rule of law is perceived to be strong, which alleviates the propensity to shift activity into the informal sector. We now proceed by constructing an analytical framework to explain these regularities.

3. Basic framework

The model economy is populated by a measure one of non-overlapping households indexed by i, operating in discrete time t. Each family consists of a parent and child, and the parents

make the decisions.[5] The initial level of household i's income is exogenously given at y_{io}, and the income level in period t, y_{it}, is endogenously determined. It is assumed that the median of the initial income distribution is smaller than its mean, and our framework ensures that this will hold in all subsequent periods.

Individuals receive parental investment, b_{it-1}, which is subject to a statutory tax at the rate of T_t. The individuals can, however, evade paying their dues by hiding their endowment or by moving their activity into the informal sector. Thus, we assume that a declared part of parental bequest, $1 - h_{it}$, is taxed at the rate of T_t, and the proceeds are used to provide the public good. The complementary part, h_{it}, is hidden from the tax authority and shifted to the informal sector. In case of an audit, however, the individual is subject to a penalty.[6] Without specifying the details of the auditing procedure we let

$$P(h_{it}; \phi_t) = \phi_t h_{it}^2/2 \qquad (1)$$

denote the penalty imposed on an individual hiding h_{it}, where $0 \leq \phi_t \leq 1$ is interpreted as the enforcement quality.[7] The aggregate share of hidden resources, $\int h_{jt} dj$, is interpreted as the relative size of the informal sector.

In each period, the households' income is allocated between consumption and investment.[8] Normalizing the prices to unity, we therefore write the budget constraint as follows:

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[5] Note that population size is constant over time; the adopted normalization also conveniently implies that aggregate economy-wide indicators will be identical to the average ones.

[6] It is assumed that the penalty results in a net loss. This is presumably because of the outlays to cover the costs of monitoring and auditing, which increase the probability of detection of informal activities. These aspects are not explicitly modeled here as our interest is more with the implications of this interaction between the state and the individuals rather than its microeconomic foundations.

[7] The particular quadratic formulation is mainly for tractability purposes.

$$y_{it} = c_{it} + b_{it} \tag{2}$$

Our assumptions imply that the share of disposable bequests is

$$s_{it} = (1 - T_t)(1 - h_{it}) + h_{it} - \phi_t h_{it}^2/2 = 1 - T_t + T_t h_{it} - \phi_t h_{it}^2/2 \tag{3}$$

Total income is a function of disposable parental bequests, which constitute net private investment, and of the amount of the publicly provided good, G_t. Assuming a linear production technology for simplicity we obtain:

$$y_{it} = s_{it} b_{it-1} + \beta G_t = (1 - T_t + T_t h_{it} - \phi_t h_{it}^2/2)b_{it-1} + \beta G_t \tag{4}$$

where β is the marginal productivity of the public good, relatively to that of the bequests; it will be assumed that $\beta > 1$, so as to ensure existence of an internal solution in the subsequent analysis. The linearity assumption will play a role in parts of the analysis, although it is not crucial for the main results; an alternative, concave specification is considered below. Our assumptions imply that public investment is more productive than private investment, presumably because of spillover effects that are internalized through public provision; some empirical support for this assumption is provided in Aschauer, 1989. Additionally, it will also be assumed that the public good fully depreciates at the period's end, and that the government budget is balanced in each period. The amount of the public good can be interpreted as the size of the public sector.

This good is financed by taxes, so that with balanced budget in each period its amount is

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[8] In a previous version, costs of improving enforcement quality were considered, but the results remained

$$G_t = B_{t-1}T_t \int (1 - h_{jt})dj \qquad (5)$$

where B_{t-1} is the aggregate level of bequests.

Parental utility is derived from current family consumption and from the investment bequest left to one's offspring. For tractability we specify the utility as follows:

$$u(c_{it}, b_{it}) = \gamma c_{it}^{1-\alpha} b_{it}^{\alpha} \qquad (6)$$

where we use the normalization $\gamma = (1-\alpha)^{-(1-\alpha)} \alpha^{-\alpha}$.[9]

An equilibrium consists of an intertemporal sequence of policy choices along with individual allocation and hiding decisions, which are mutually consistent. The decision making sequence will play an important role in the main analysis, and will be clearly spelled out below. In the following section, however, the equilibrium analysis is conducted under the assumption that the policy choices are exogenously given, whereas subsequently this will be removed.

4. Equilibrium analysis: exogenous policies

In this section we take the enforcement and tax policies as exogenous and focus on the determination of individual choices. This analysis, while a useful input for the subsequent sections dealing with endogenous policies, also allows us to draw some interesting conclusions on the relationship between government policies on the one hand and growth and

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basically unchanged.
[9] It can be shown that any homothetic utility function leads to exactly same results.

inequality outcomes on the other hand.

Given the policy variables, as well as family income, the utility (1) maximizing income allocation is

$$c_{it} = (1-\alpha)y_{it}, \; b_{it} = \alpha y_{it} \tag{7}$$

substitution of which back into the utility function yields

$$u_{it} = y_{it} = (1 - T_t + T_t h_{it} - \phi_t h_{it}^2/2) \, b_{it-1} + \beta G_t \tag{8}^{10}$$

Maximizing with respect to the share of hidden income, we obtain

$$h_t = h_{it} = \text{Min} \{1, T_t/\phi_t\} \tag{9}$$

so that informality is an increasing function of the tax rate, more so when enforcement quality is lax; and a decreasing function of enforcement quality. This is broadly consistent with empirical findings reviewed in Section 3, on the determinants of informality. Substitutions then yield

$$s_t = s_{it} = \text{Max} \{1 - \phi_t/2, \; 1 - T_t + T_t^2/2\phi_t\} \tag{10}$$

Recalling the definition of a public good and assuming for simplicity that $T_t < \phi_t$, so that the individuals hide just a part of their effort, substitutions yield

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[10] That income here is the sole determinant of utility in equilibrium is a very convenient modeling feature.

$$G_t = B_{t-1}T_t\left(1 - T_t/\phi_t\right) \tag{11}$$

Differentiation reveals that the relationship between the tax rate and the amount of the public good is a non-monotonic one, increasing initially, when $T_t < \phi_t/2$, and decreasing afterwards. This is not surprising as, when the tax rate is high, the individuals react by hiding a larger portion of the bequeathed resources, generating a decreasing portion of the Laffer curve. The public good maximizing tax rate, $T_t = \phi_t/2$, is an increasing function of enforcement quality. Further, differentiation reveals that enforcement quality enhances the public good provision.

　　More generally, we have

Proposition 1. The amount of the public good is a non-monotonic function of the tax rate, increasing first and then decreasing; and an increasing function of the enforcement quality. Also, better enforcement quality implies a higher tax rate that maximizes the amount of the public good.

This result has direct implications for the effect of policy variables on the economy's average income growth. Recall that income is determined from

$$y_{it} = s_{it}\ b_{it-1} + \beta G_t = (1 - T_t + T_t^2/2\phi_t)\ \alpha y_{it-1} + \beta\alpha Y_{t-1}T_t\left(1 - T_t/\phi_t\right) \tag{12}$$

Analysis of (12) reveals that income inequality is a decreasing function of both the tax rate and the enforcement quality. Indeed, let j and k be two individuals, with $y_{jt-1} > y_{kt-1}$; then the income gap between their respective descendants, $y_{jt} - y_{kt} = (1 - T_t + T_t^2/2\phi_t)\ \alpha(y_{jt-1} - y_{kt-1})$, decreases in T_t and in ϕ_t. Since this holds true for any pair of individuals, higher taxes and

enforcement decrease inequality. Note, however, that as long as the tax rate and the enforcement quality are positive income inequality decreases over time; otherwise, it remains constant.

Aggregating over the entire population, the average income is

$$Y_t = (1 - T_t + T_t^2/2\phi_t)\,\alpha Y_{t-1} + \beta\alpha Y_{t-1}T_t\,(1 - T_t/\phi_t) \tag{13}$$

and the economy's growth rate, therefore, is

$$g_t = Y_t/Y_{t-1} - 1 = (1 - T_t + T_t^2/2\phi_t)\alpha + \beta\alpha T_t\,(1 - T_t/\phi_t) - 1 \tag{14}$$

Differentiation reveals that, with our assumption on β, it is maximized for

$$T_t = \phi_t(\beta\text{-}1)/(2\beta\text{-}1) \tag{15}$$

which, again, is an increasing function of the enforcement quality; and comparison with the tax rate maximizing the level of the public good, $T_t = \phi_t/2$, reveals that growth maximization requires a smaller tax rate. This is because taxes lower the disposable level of bequests, in addition to their effect on the public good. Also note that, as seen by differentiating (14), the level of enforcement has a positive effect on growth – because the positive effect on the provision of the public good outweighs the negative effect of reducing net private investment.[11]

Collecting the main results we obtain

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[11] Further, as (14) is a concave function of both T_t and ϕ_t, mean preserving spreads in the tax rate and in the enforcement parameter respectively decrease the growth rate. This is interpreted to imply that uncertainty pertaining to government policies is detrimental to growth, which is consistent with empirical findings on adverse growth effects of policy instability, see Alesina et al., 1996.

Proposition 2.

(i) Income inequality decreases in the tax rate and in the quality of enforcement;

(ii) The economy's growth rate in each period increases in the tax rate initially and decreases afterwards; and increases in the level of the enforcement quality.

5. Endogenizing policy choices

In this section we examine the determination of the level of enforcement and of the tax rate. It turns out that the sequence of events is important here, and, consequently, we distinguish between two cases, where commitment to both is possible, and where the government cannot commit to either.[12] The former case will be interpreted as being associated with an effective strong state, whereas the latter possibility captures the case of a weak state. It will be assumed here that policy choices are made by a social planner whose objective is the maximization of aggregate utility,

$$U_t = \int u_{it} \, di \tag{16}$$

The following section extends by adopting a political economy perspective, but the results remain qualitatively unchanged.

5.1. Full commitment

We examine policy choices, assuming that they precede the individual decisions on hiding. Recall that, assuming an internal solution, the hiding decisions are $h_t = T_t/\phi_t$, so that $s_t = 1 - T_t$

$+ T_t^2/2\phi_t$, and $G_t = B_{t-1}T_t (1- T_t/\phi_t)$. Then the utility and income levels are

$$u_{it} = y_{it} = (1- T_t + T_t^2/2\phi_t)\; \alpha y_{it-1} + \beta\alpha Y_{t-1}T_t (1- T_t/\phi_t) \tag{17}$$

and aggregate utility is

$$U_t = Y_t = [1- T_t + T_t^2/2\phi_t + \beta T_t (1- T_t/\phi_t)]\; \alpha Y_{t-1} \tag{18}$$

Differentiating (18) with respect to ϕ_t and T_t respectively and assuming internal solutions we obtain, respectively,

$$\alpha Y_{t-1} [-T_t^2/2\phi_t^2 + \beta T_t^2/\phi_t^2] = \alpha Y_{t-1} (\beta - \tfrac{1}{2})\; T_t^2/\phi_t^2 > 0 \tag{19a}$$

and

$$-1 + T_t/\phi_t + \beta(1- 2T_t/\phi_t) = 0 \tag{19b}$$

so that the equilibrium is

$$\phi_t = 1 \;(\text{perfect enforcement}),\; T_t = (\beta - 1)/(2\beta - 1) = f(\beta) \tag{20}$$

Note that this solution also maximizes the economy's growth rate. In particular, the growth maximizing tax rate increases in the public good productivity and, depending on the value of the productivity parameter, varies between zero and 50 percent, $0 \le f(\beta) \le \tfrac{1}{2}$. Recall that the

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[12] Partial commitment possibilities could be considered, such as commitment to only a tax rate, or to a level of

empirically relevant estimates of β reflect the social value of public investment relative to its private value, that is, the externality effect of the publicly provided good. In any case, however, the growth maximizing tax rate never exceeds 50%, and for empirically relevant values of β is probably much lower than that. For example, when $\beta = 1.5$, so that the productivity of public investment exceeds that of private investment by 50 percent, the optimal tax rate is 25 percent.

Substituting back into the utility/income function in (17) we obtain:

$$u_{it} = y_{it} = (1 - f(\beta) + f(\beta)^2/2)\, \alpha y_{it-1} + \beta \alpha Y_{t-1} f(\beta)\, (1 - f(\beta)) \tag{21}$$

and aggregate values of

$$U_t = Y_t = [1 - f(\beta) + f(\beta)^2/2 + \beta f(\beta)\, (1 - f(\beta))]\alpha Y_{t-1} = h(\beta)\alpha Y_{t-1} \tag{22}$$

where $h(\beta) > 1$.

It then follows from (22) that the growth rate is constant at the rate of

$$g_t = Y_t / Y_{t-1} - 1 = h(\beta)\alpha - 1 \tag{23}$$

Moreover, arguments similar to those in the previous section establish that, from (21), income inequality decreases over time.

5.2. No commitment

Now we rule out the possibility of a credible commitment to the level of enforcement quality

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enforcement; they all, however, lead to very similar results.

or to a tax rate. Thus, the sequence of events is such that, first, the individuals allocate their disposable income and determine the share of resources to be moved to the informal sector; then the level of enforcement and the tax rate and, consequently, the level of public goods provision are determined.

We begin with the last stage. The only difference between the current case and the previous one is that the determination of the tax rate and of the enforcement quality no longer takes into consideration the adverse effect of policy choices on the individuals shifting into informal sector – decisions on which have already been made. Utility then decreases with respect to ϕ_t: whereas enforcement no longer has a deterrence effect, it imposes a penalty cost; thus, the optimal level of enforcement is zero. Further, if the chosen tax rate is positive then, from (9), the individuals in anticipation of lax enforcement hide all their output, which is inconsistent with the internal solution for the tax rate. This implies that, at equilibrium, the tax rate should equal zero as well. In this case, no revenue for the public good is raised, and parental bequests constituting private investment are the sole growth factor,

$$u_{it} = y_{it} = \alpha y_{it-1}, \ U_t = Y_t = \alpha Y_{t-1} \tag{24}$$

But then comparison with (20) reveals that the economy's growth, $\alpha - 1$, is smaller than in the previous case, given by (23), and the economy stagnates; and unlike there, income inequality does not decrease over time, but rather remains constant as each household income grows at the same rate.

Summarizing the above analysis, we obtain a central result of this paper,

Proposition 3. The ability to precommit is crucial to the economy's growth and the reduction of income inequality. In its absence, the chosen levels of enforcement quality and

public goods are minimal, resulting in stagnation.

The commitment ability can be interpreted as reflecting the quality of the state institutions. With this interpretation, institutional quality is crucial to the economy's evolution, in particular, its growth and equality prospects. Only an effective government with the capacity for policy commitment can possibly generate economic growth and reduction in inequality in this model. This, of course, echoes the emphasis on the importance of credible commitments in the context of monetary policies in North and Weingast, 1989, and Rogoff, 1985.[13]

We can also compare the individual utility levels achieved under the two regimes. This will allow us getting a glimpse at the political interests behind the lack of commitment and serve as a prelude to the political economy analysis of the next section. Note that the utility levels under commitment are given by (21), and without commitment they are $v_{it} = \alpha y_{it-1}$. Subtracting we obtain:

$$u_{it} - v_{it} = (1 - f(\beta) + f(\beta)^2/2)\, \alpha y_{it-1} + \beta \alpha Y_{t-1}\, f(\beta)\, (1 - f(\beta)) - \alpha y_{it-1} =$$

$$(-f(\beta) + f(\beta)^2/2)\, \alpha y_{it-1} + \beta \alpha Y_{t-1}\, f(\beta)\, (1 - f(\beta)) \qquad (25)$$

and differentiation reveals that this welfare differential decreases with income. Moreover, when $y_{it-1} = Y_{t-1}$, (25) must be positive as the utility comparison from the viewpoint of an individual with the mean income is identical to that of the social planner, and the latter obviously favors the commitment scenario. We obtain, therefore, that only sufficiently rich

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[13] The above result is also related to the literature that relates inequality and growth, in the following way. Much of the recent work in this area has argued that income inequality may be detrimental for growth through political pressure for fiscal redistribution that such inequality is likely to generate, see e.g., Persson and Tabellini, 1994. While the empirical literature has established a robust negative link between inequality and growth, no support has been found for the specific redistributional channel, Perotti, 1996. In contrast, the claim here is that both inequality and growth are jointly determined through institutional quality, which in turn hinges upon the ability of the state to precommit.

individuals may favor the lack of commitment regime, leading to

Proposition 4. Suppose that the society chooses which collective decision making regime to adopt, commitment or lack thereof. Only when this is done to primarily benefit the rich constituency will the latter regime prevails.

This proposition implies that the regime decision has redistributive consequences, and that the lack of commitment – while impairing economy's overall performance as discussed above – benefits the rich at the expense of the majority of the population.

Further, recalling that $f(\beta) = (\beta - 1)/(2\beta - 1)$, calculations reveal that the relative income level above which an individual would favor a weak state is given by

$$\rho = 2\beta^2/(3\beta - 1) \tag{26}$$

All individuals with a relative bequest above θ will obtain a larger income in a weak state than in a strong one and, therefore, will support bad institutions. As is revealed by differentiation, ρ increases in β implying that, quite intuitively, the more productive the public good is the richer with respect to the mean has to be an individual to trade off the efficiency gain of a strong state against an increased redistribution. Thus, an increase in the productivity of the public good reduces the fraction of the population in support of a weak state.

6. Extensions

6.1. The political economy perspective

Whereas the previous analysis was conducted under the premise that a social planner makes

collective decisions, it is now extended by assuming that these are determined through majority voting. This extension has also a substantive value as it enables us to draw conclusions about the value of credible policy commitments under different political systems. As in the previous section, we distinguish between the cases of policy commitment and lack of such commitment, beginning the analysis with the latter case.

Differentiating individual i's utility function in (17) with respect to the tax rate and substituting then the individual optimal choices we obtain

$$(-1 + T_t/\phi_t) \, \alpha y_{it-1} + \beta \alpha Y_{t-1}(1 - T_t/\phi_t) \geq 0 \qquad (27)$$

The left-hand side expression decreases with individual income implying that richer households favor lower tax rate. This also implies that the median income individual is decisive. As this income is smaller than βY_{t-1}, the analysis of the previous section applies, and the optimal choice for the decisive voter is $T_t = \phi_t = 0$. But then $y_{it} = \alpha y_{it-1}$, $Y_t = \alpha Y_{t-1}$, and the economy evolves over time exactly as before.

Now consider the commitment case. Differentiating (17) with respect to ϕ_t and T_t respectively we obtain the first order conditions:[14]

$$-\alpha y_{it-1} T_t^2/2\phi_t^2 + \beta \alpha Y_{t-1} \, T_t^2/\phi_t^2 \geq 0, \ \ \phi_t \leq 1 \qquad (28)$$

and

$$(-1 + T_t/\phi_t) \, y_{it-1} + \beta Y_{t-1} \, (1 - 2T_t/\phi_t) = 0, \, 0 < T_t < \phi_t \qquad (29a)$$

or

$$(-1 + T_t/\phi_t) \, y_{it-1} + \beta Y_{t-1} \, (1 - 2T_t/\phi_t) > 0, \ \, T_t = \phi_t \qquad (29b)$$

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[14] For analytical simplicity we assume that the preferred level of enforcement is positive. A fuller analysis with consideration of the case where some individuals favor $\phi_t = 0$ does not change the results.

or

$$(-1 + T_t/\phi_t)\, y_{it-1} + \beta Y_{t-1}\, (1 - 2T_t/\phi_t) < 0, \ \ T_t = 0 \tag{29c}$$

Differentiation reveals that the tax/enforcement quality ratio is a decreasing function of the relative individual income. Richer individuals favor smaller tax rates because fiscal policy here has redistributive nature.

Further, the utility function (17) satisfies the property of intermediate preferences, Grandmont, 1978, which implies that a majority voting equilibrium exists, and that the median individual is decisive (see Persson and Tabellini, 2000, for a simple exposition and existence proof). Thus, letting y_{mt-1} denote the median income in the parental generation, the equilibrium is given by (28) and (29), with y_{mt-1} replacing y_{it-1} there. In particular, note that the larger the median to mean income ratio – which is commonly interpreted as being associated with higher equality in the distribution of incomes – the smaller is the tax burden relative to the enforcement quality.[15]

Further analysis analogous to that in the previous section reveals that the equilibrium is given by

$$\phi_t = 1 \text{ and } T_t = (\beta - r_{t-1})/(2\beta - r_{t-1}) \tag{30}$$

where $r_{t-1} = y_{mt-1}/Y_{t-1}$ is interpreted as a measure of income equality, and the equilibrium tax rate decreases in it. Comparison with (20) reveals that the equilibrium tax rate is now higher as it is more responsive to popular redistribution pressure than in the social planner's case.

Substitution into (18) yields:

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[15] Thus, more equal economies tend to favor stronger enforcement at the expense of higher taxes, which is consistent with the recent work that explores more deeply the link between income inequality and poor institutional quality, see Cervelatti et al., 2005, Engerman and Sokoloff, 2002, Gradstein, 2004, and references

$$U_t = Y_t = [1 - T_t + T_t^2/2 + \beta T_t (1 - T_t)]\, \alpha Y_{t-1} \qquad (31)$$

Note that utility or income maximization requires the tax rate to be as in (20). In this case, it is excessively high, more so the larger is income inequality. Thus, inequality is detrimental for growth and aggregate welfare, which is consistent with another empirical finding often encountered in the literature, see e.g., Persson and Tabellini, 1994. More importantly for our purposes here, however, it can be shown that the bracketed expression in (31) is larger than one implying that aggregate income- hence, growth - and welfare are larger in this case than without the ability to commit.

Summarizing,

Proposition 5. The majority voting equilibrium exists. It leads to minimal enforcement and public goods levels when commitment is impossible; and to positive public goods levels and maximal enforcement under such commitment. Aggregate income, growth, and welfare are larger in the commitment case as well.

Thus, by and large the results qualitatively mirror those in the previous section, where social planner was in charge of the decision making.[16]

6.2. Concave specification

therein.

[16] Further, similar results are obtained when a weighted majority rule is used for making collective choices, with weights being positively related to incomes, implying that an individual richer than the one with the median income is decisive. This suggests that the details of the decision making process may be of a secondary importance relative to the state's capacity to create credible policy commitments. This is consistent with the economic success stories of countries in East Asia, the most recent example of which is China, where development has been achieved under autocratic rulers pursuing growth promoting policies, see Glaeser et al., 2004, making this point in a more general context.

We now examine the implications of a concave production function. Thus, suppose that income is generated through:

$$y_{it} = s_{it}\, b_{it-1} + G_t = (1 - T_t + T_t\, h_{it} - \phi_t h_{it}^2/2)b_{it-1} + G_t =$$

$$(1 - T_t + T_t\, h_{it} - \phi_t h_{it}^2/2)b_{it-1} + G(B_{t-1}T_t \int (1 - h_{jt})dj) \qquad (32)$$

where it is assumed that the production function of the public good satisfies $G(0) = 0$, $G' > 0$, $G'' < 0$, and the Inada condition holds. Proceeding as in the text above, optimal allocation of income implies that this can be written as

$$y_{it} = (1 - T_t + T_t\, h_{it} - \phi_t h_{it}^2/2)\, \alpha y_{it-1} + G(\alpha Y_{t-1}T_t \int (1 - h_{jt})dj) \qquad (33)$$

and, in the aggregate,

$$Y_t = (1 - T_t + T_t\, h_{it} - \phi_t h_{it}^2/2)\, \alpha Y_{t-1} + G(\alpha Y_{t-1}T_t \int (1 - h_{jt})dj) \qquad (34)$$

For given T_t and ϕ_t, the equilibrium hiding shares are given as in the text above implying that the utility/income levels are as follows:

$$u_{it} = y_{it} = (1 - T_t + T_t^2/2\phi_t)\, \alpha y_{it-1} + G(\alpha Y_{t-1}T_t\, (1 - T_t/\phi_t)) \qquad (35)$$

and, in the aggregate,

$$U_t = Y_t = (1 - T_t + T_t^2/2\phi_t)\, \alpha Y_{t-1} + G(\alpha Y_{t-1}T_t\, (1 - T_t/\phi_t)) \qquad (36)$$

Similar arguments to those above can be used to show, from (35), that income inequality is a decreasing function of both the tax rate and the enforcement quality.

To obtain the equilibrium values under commitment, we differentiate (36) with respect to ϕ_t and T_t respectively to obtain:

$$- (T_t^2/2\phi_t^2)\, \alpha Y_{t-1} + G'\, \alpha Y_{t-1}\, T_t^2/\phi_t^2 \tag{37}$$

and

$$(-1 + T_t/\phi_t)\, \alpha Y_{t-1} + G'\, \alpha Y_{t-1}\, (1 - 2T_t/\phi_t) \tag{38}$$

It can be easily seen that (37) and (38) cannot simultaneously equal zero, implying that there is no internal equilibrium. Further analysis available on request establishes that, at equilibrium, either $T_t = 0$ or $\phi_t = 1$. But – as in the former case no revenue is collected – aggregate utility can be shown to be higher in the latter case, which finally implies that, at equilibrium, $\phi_t = 1$, and the tax rate is determined from:

$$-1 + T_t + G'(\alpha Y_{t-1} T_t\, (1 - T_t))\, (1 - 2T_t) = 0 \tag{39}$$

The individual utilities/incomes then are given by:

$$(1 - T_t + T_t^2/2)\, \alpha y_{it-1} + G(\alpha Y_{t-1} T_t\, (1 - T_t)) \tag{40}$$

where the tax rate is determined from (39). The steady state, (T, Y) is then determined from:

$$-1 + T + G'(\alpha Y T(1 - T))\, (1 - 2T) = 0 \tag{41}$$

and

$$Y = (1 - T + T^2/2)\, \alpha Y + G(\alpha Y T(1 - T)) \tag{42}$$

Simulations using a constant elasticity production function G show that a steady state with a strictly positive income exists.

In contrast, without commitment, T_t and ϕ_t are determined by maximizing (34) after the hiding choices have been made. Proceeding similarly to the above, it can be shown that, as in the main analysis, $T_t = \phi_t = 0$, and the resulting utility/income levels are as in (26), so that, in particular, the economy stagnates, the average income converging to zero. We thus obtain the following analogy of Proposition 3:

Proposition 6. With production concavity, the ability to precommit to a tax rate is crucial to the reduction of income inequality and to a high steady state income level. In its absence, the chosen levels of enforcement quality and public goods are minimal, resulting in stagnation.

7. Concluding remarks

This paper is motivated by the observed link between economic development, the extent of the public sector and corresponding tax burden, and the size of the informal sector. Richer countries have much better developed public sector and seem to be more willing to impose taxes in order to finance it than developing countries. In the light of the well established literature on the growth impeding effects of distortive taxation, larger tax burden should have retarded growth. Moreover, the observed relationship between the tax burden and the extent of informality should have reinforced this tendency. Yet, studies employing different methodologies such as Easterly and Rebelo, 1993, and Lindert, 2004, do not detect any adverse effects of taxation on economic growth.[17]

It is argued here that the key factor in explaining these puzzling regularities is the

differing levels of institutional quality, in particular pertaining to law enforcement, between developing and developed countries. With better enforcement quality, as in the latter countries, taxation is much less detrimental both for informality and growth. Consequently, countries with better enforcement may impose heavier taxation yet achieve better economic performance – both in terms of average income growth and income inequality – than countries with poor enforcement.

In turn, high quality enforcement hinges upon the strength of the state, by which is meant its ability to create credible commitments. Distinguishing between strong – or, effective - states and weak states based on their commitment capacity, we obtain possibly diverging development paths: weak states lead to low levels of enforcement and public goods, slow growth and large income inequality, whereas strong states generate higher levels of enforcement, public goods, taxes, and economic growth, while also reducing inequality. Strong states overall benefit the poor at the expense of the rich - who prefer less redistributive weak states even though they lead to a slower growth of the economy as a whole.

Conducting the analysis first from the viewpoint of a social planner and then employing majority voting, we observe that these results are robust with respect to the procedure of making collective choices, which suggests that they should hold quite independently of the details of the political process. Thus, the characteristics of the political systems, such as the presidential versus the parliamentary system, or even democracy versus autocracy – potentially important distinctions that may play a crucial role in many other contexts, see Persson and Tabellini, 2003 – seem to be immaterial here: a state can be effective and implement policies leading to a good economic performance quite independently of these distinctions.

While the paper is an attempt to throw light on the relationship between development

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[17] In fact, Lindert, 2004, refers to the welfare state as a free lunch making the point that it has been growth promoting, thus achieving redistributional objectives while at the same time enhancing growth.

and capacities of the state as well as to conceptualize the latter, further work should concentrate on the determinants of these capacities. This will enable a better understanding not only of what makes an effective state and what prevents doing so, but also of the economic fundamentals leading to the building of state capacities.

References

Acemoglu, D., 2005, "Politics and economics in weak and strong states," mimeo.

Acemoglu, D., Johnson, S. and J. Robinson, 2002, "Reversal of fortune: Geography and institutions in the making of the modern world distribution," *Quarterly Journal of Economics*, 117, 1231-1294.

Alesina, A., Osler, S., Roubini, N., and P. Swagel, 1996, "Political instability and economic growth," *Journal of Economic Growth*, 2, 189-213.

Ashcuer, D., 1989, "Is public expenditure productive?" *Journal of Monetary Economics*, 23, 177-200.

Auriol, E. and M. Warlters, 2005, "Taxation Base in Developing Countries", *Journal of Public Economics*, 625-646.

Barro, R.J., 1990, "Government spending in a simple model of endogenous growth," *Journal of Political Economy*, 98, S103-S125.

Buchanan, J.M. and G. Tullock, 1962, *The Calculus of Consent*, University of Michigan Press, Ann Arbor, MI.

Cervellati, M., Fortunato, P. and U. Sunde, 2005, "Hobbes to Rousseau: Inequality, economic and political institutions, and development," IZA WP 1450.

Chong, A. and M. Gradstein, 2005, "Inequality and informality," mimeo.

Dabla-Norris, E., Gradstein, M. and G. Inchauste, 2005, "What causes firms to hide output?" IMF DP.

De Soto, H., 2000, *Mystery of Capital: Why Capitalism Triumphs in the West and Fails Evrywhere Else*, Basic Books, New York, NY.

Easterly, W. and S. Rebelo, 1993, "Fiscal policy and economic growth: An empirical investigation," *Journal of Monetary Economics*, 32, 417-458.

Engerman, S.L. and K.L. Sokoloff, 2002, "Factor endowments, inequality, and paths of development among New World economies," NBER WP 8512.

Finer, S.E., 1997, *The History of Government from the Earliest Times*, Oxford University Press, New York, NY.

Friedman, E., S. Johnson, D. Kaufman, and P. Zoido-Lobaton, 2000, "Dodging the Grabbing Hand: The Determinants of Unofficial Activity in 69 countries," *Journal of Public Economics*, 76, 459-492.

Glaeser, E., La Porta, R., F. Lopez-de_Silanes, and A. Shleifer, 2004, "Do institutions cause growth?" *Journal of Economic Growth*, 9, 271-303.

Gonzalez, F.M. and H.M. Neary, 2004, "Optimal growth policy under privately enforced property rights," mimeo.

Gordon, R. and W. Li, 2005, "Tax structures in developing countries: Many puzzles and a possible explanation," mimeo.

Gradstein, M., 2002, "Rules, stability, and growth," *Journal of Development Economics*, 67, 471-484.

Grandmont, J.-M., 1978, "Intermediate preferences and the majority rule," *Econometrica*, 46, 317-330.

Hall, R. and C. Jones, 1999, "Why do some countries produce so much more output per worker than others?" *Quarterly Journal of Economics*, 114, 83-116.

Herbst, J.I., 2000, *States and Power in Africa: Comparative Lessons in Authority and Control, Princeton University Press*, Princeton, NJ.

Johnson, S., D. Kaufman, J. McMillan and C. Woodruff, 2000, "What do firms hide? Bribes and unofficial activity after communism," *Journal of Public Economics*, 76, 495-520.

Lindert, P., 2004, *Growing Public: Social Spending and Growth since the Eighteenth Century*, Cambridge University Press.

Loayza, N., 1996, "The economics of the informal sector: A simple model and some empirical evidence from Latin America," *Carnegie-Rochester Conference Series on Public Policy*, 45, 129-162.

Mauro, P., 1995, "Corruption and growth," *Quarterly Journal of Economics*, 110, 681-712.

Meltzer, A. and S. Richard, 1981, "A rational theory of the size of government," *Journal of Political Economy*, 89, 914-927.

North, D. and B. Weingast, 1989, "Constitutions and commitment: The evolution of institutions governing public choice in seventeenth century England," *Journal of Economic History*, 49, 803-832.

Perotti, R., 1996, "Growth, income distribution, and democracy: What the data say," *Journal of Economic Growth*, 1, 149-187.

Persson, T. and G. Tabellini, 1994, "Is inequality harmful for growth?" *American Economic Review*, 84, 60-621.

Persson, T. and G. Tabellini, 2000, *Political Economics: Explaining Economic Policy*, MIT Press, Cambridge MA.

Persson, T. and G. Tabellini, 2003, *The Economic Effect of Constitutions*, MIT Press, Cambridge MA.

Rodrik, D., A. Subramanian and F. Trebbi, 2004, "Institutions rule: The primacy of institutions over geography and integration in economic development," *Journal of Economic Growth*, 9, 131-166.

Rogoff, K., 1985, "The optimal degree of commitment to an intermediate policy target," *Quarterly Journal of Economics*, 100, 1169-1190.

Sarte, P.-D., 2000, "Informality and rent-seeking bureaucracies in a model of long-run growth," *Journal of Monetary Economics*, 46, 173-197.

Schneider, F. and D. Enste, 2000, "Shadow Economies: Size, Causes and Consequences," *Journal of Economic Literature*, 38, 77-114.

Shleifer, A. and R.W. Vishny, 1993, "Corruption," *Quarterly Journal of Economics*, 108, 599-617.

World Development Report. The State in a Changing World, 1997, World Bank, Washington DC.

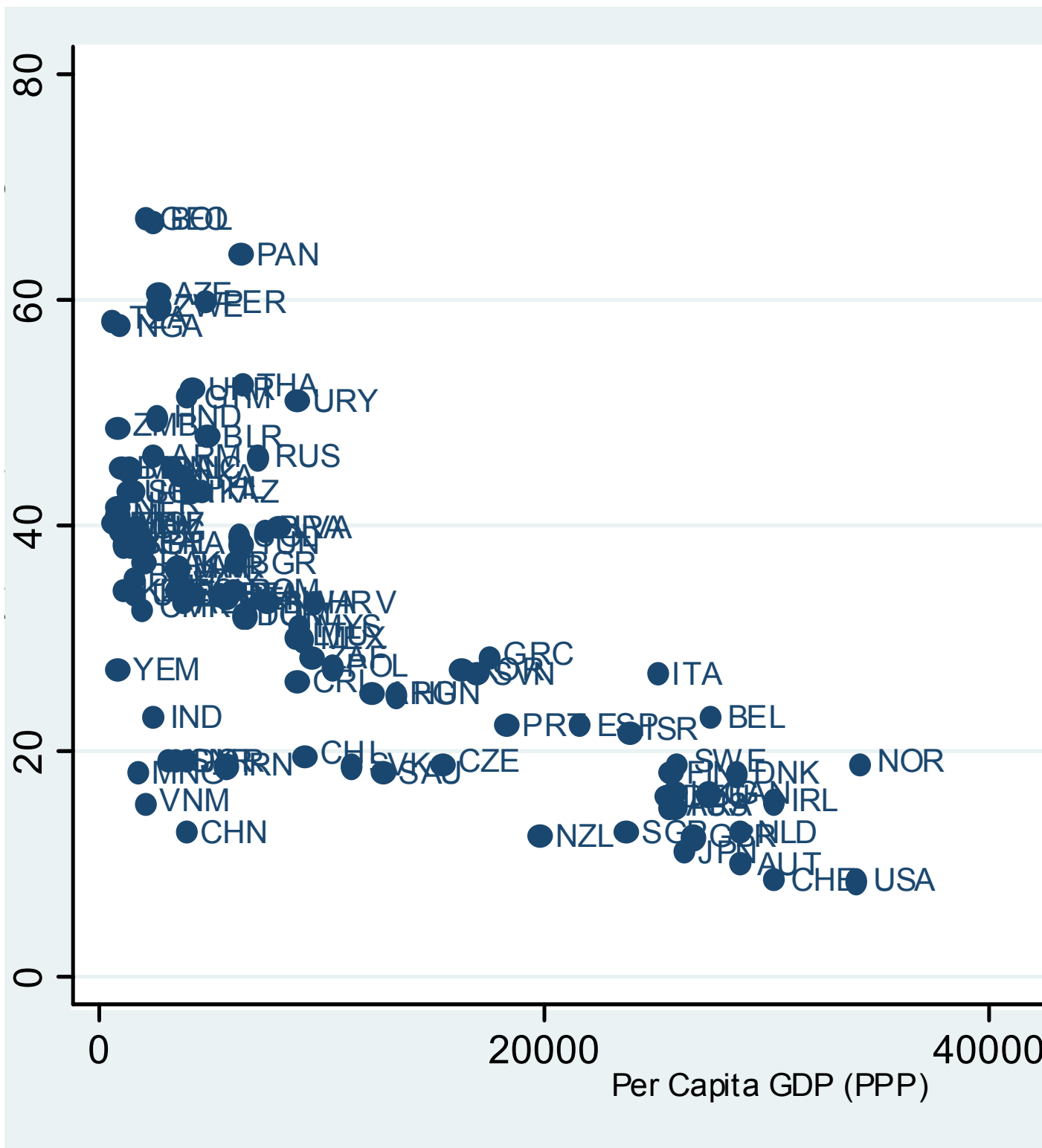**World Development Report.** Making Services Work for Poor People, 2004, World Bank, Washington DC.

Figure 1: The size of an informal economy as a proportion of the GDP, in relation to the GDP.
Sources: World Development Indicators; Chong and Gradstein, 2005.