Public Finance and Development*

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PRELIMINARY AND INCOMPLETE

Contents

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> "It is shortage of resources, and not inadequate incentives, which limits the pace of economic development. Indeed the importance of public revenue from the point of view of accelerated economic development could hardly be exaggerated." Nicholas Kaldor, 'Taxation for Economic Development," *Journal of Modern African Studies*, 1963, page 7

1 Introduction

Perhaps more than any other economist active in the post-war generation, Nicolas Kaldor appreciated the centrality of public finance to development. As Kaldor, we believe that the power to tax lies at the heart of state development. A moment's reflection on the history of today's developed countries and on the current situation of today's developing nations suggests that the acquisition of that power cannot be taken for granted. To be concrete, the central question in public finance and development is: "how does a government go from raising around 10% of GDP in taxes to raising around 40%"?

In the process of development, states not only increase the *levels* of taxation, but also undergo pronounced changes in *patterns* of taxation, with increasing emphasis on broader tax bases. Thus, some taxes – notably on trade – gradually diminish their importance. In the developed world, it is taxes on income and value added that do the heavy lifting in raising the revenue needed to support the productive and redistributive functions of the state.

Despite these facts, powers to tax are explicitly or implicitly taken for granted in most of mainstream public finance. What limits the ability to tax are incentive constraints tied to asymmetric information, or perhaps political motives, rather than the mere administrative capabilities of the state. Thus, public finance and development remains a relatively unexplored area in the field. Neither is it a major industry among scholars of development.

This chapter is about the powers to tax and how these change in the process of development. Some changes are natural corollaries of broader changes in economic activity as development proceeds. Others depend on political factors, such as the structure of political institutions and the degree of political instability. Changes in the power to tax may also reflect circumstances, e.g., threats of foreign conflicts that forge common interests in building a strong state. But there are also feedbacks from taxation to

development: to service the needs of the state, tax motives may encourage other aspects of state development in complementary ways.

Generally, we take the view that governments in poor countries can reasonably be thought of as doing their best in raising taxes, *given* the administrative structures in place and the political incentives to raise taxes. The real question is why these structures remain so weak in many places. This requires an analysis of endogenous *fiscal capacity* – the main topic of this chapter. Sometimes the literature refers to fiscal capacity just as state capacity. Crudely, the concept captures how much tax a government could potentially raise given the structure of the tax system and the powers of enforcement. Governments need not always operate at or near the level of fiscal capacity, however, so fiscal capacity may not be directly observable.

We approach these issues by viewing the creation of fiscal capacity as the product of investments in state structures – including monitoring, administration and compliance through such things as training tax inspectors and running the revenue service efficiently. Our approach gets us away from the false juxtaposition of positive or normative analyses of optimal taxes versus studies of tax administration and political economy where administration reflect the same degree of rationality or irrationality as the choice of taxes.

A key argument is that new tax bases like income taxes and value added can only become effective though extensive government investments in tax compliance. Low levels of revenue and disproportionate reliance on narrow tax bases reflect primarily constraints on achieving tolerable levels of compliance. This view dovetails with historical accounts of how tax systems have evolved, such as Brewer (1989) and Dincecco (2011). Looking at more the recent experience through the lens of effective administration, Bird (2004) observes that "the best tax policy in the world is worth little if it cannot be implemented effectively", underlining the need to put fiscal capacity at centre stage when studying public finance and development.

However, compliance is not only a technical issue. It also reflects the incentives that policy makers have to improve the tax system. Our starting point is that governments of the past, or in the developing world today, are about as rational and farsighted as those in the developed world today. But they may face incentives and constraints shaped by weakly institutionalized political environments. The key challenge for the study of public finance and development is to appreciate how these incentives and constraints work, and how – if at all – the situation could be improved for the benefit of citizens in those nations.

Section 2 of the chapter gives a background by laying out a number of facts regarding the levels and patterns of taxes in rich and poor countries. In Section 3, we present our analytical framework to study equilibrium choices of taxation and investment in fiscal capacity. Then, in Section 4, we apply this framework to identify different determinants of taxation and fiscal capacity: economic development, political institutions, social structures, values of public spending, non-tax revenues like aid and resocurce rents, and the administration of taxation. Section 5 concludes.

2 Background

The growth of the state and its capacity to extract significant revenues from its citizens is one of the most striking features of the economic history over the last two centuries. For example, Maddison (2001) documents that, on average, France, Germany, the Netherlands and the UK raised around 12% of GDP in tax revenue around 1910 and around 46% by the turn of the Millennium. The corresponding U.S. figures are 8% and 30%. Underpinning these hikes in revenue are a number of tax innovations, including the extension of the income tax to a wide population. To improve compliance, this required not only building a tax administration but also implementing withholding at source. Such investments in the fiscal capacity of the state have enabled the kind of mass taxation now considered normal throughout the developed world.

Figure 1 gives a very partial picture of how fiscal capacity has evolved *over time.* It plots the distribution of two kinds of upgrading of tax systems for a sample of 73 countries since 1800.[1] Red lines demarcate the introduction of the income tax and green lines whether or not a country has a VAT. Although the sample is limited, it illustrates clearly how such investments in tax collection have evolved over time. Income taxes began appearing in the mid nineteenth century and are fully prevalent in the sample in the interwar period. VAT was lagging further behind, with adoption still incomplete by the end of the twentieth century.

The model developed in this chapter is trying to explain the forces that shape such changes in the tax system. The changes illustrated in Figure 1 are all associated with investments in administrative structures that sup-

[1]The sample is limited by the set of countries for which we have confirmed data on when the income tax was introduced.

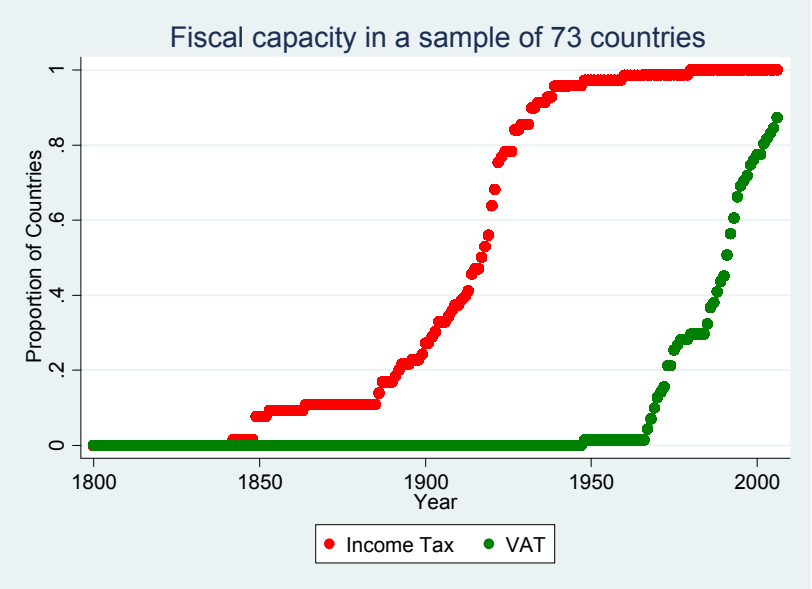

Figure 1: Historical evolution of fiscal capacity

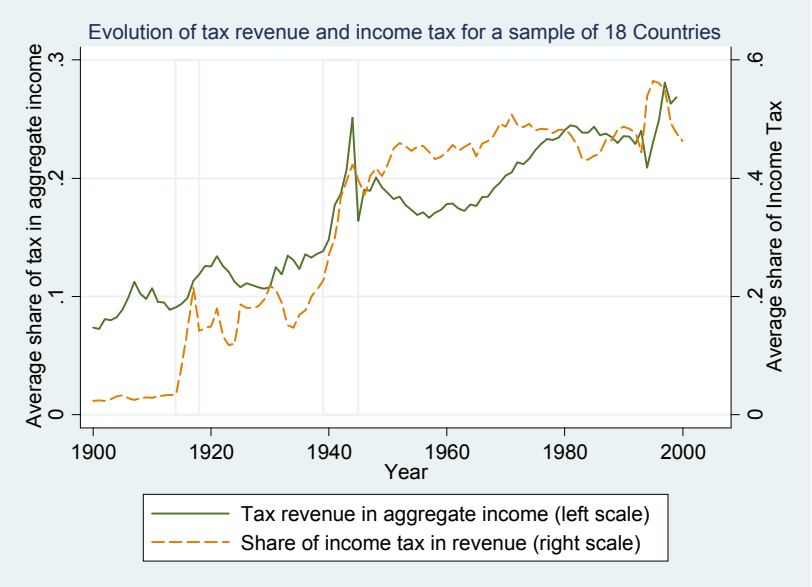

Figure 2: Taxes and share of income tax over time

port tax collection.[2] Figure 2 looks at the historical picture over the last 100 years for a more limited sample of countries, using data from Mitchell (2007). This sample only includes a number of countries that existed already in 1900, where we are reasonably confident that the data are comparable across countries and time.[3] Figure 2 illustrates how the average tax take has increased over time from around 10% in national income to around 25% in the sample as a whole. Equally striking is the increasing reliance on income taxation which made up about 5% in revenues in 1900 but about 50% by the end of the last century. The hikes of the income tax share in the years of the two world wars are striking, and these hikes induce a clear ratchet effect.

The narrow sample selection in Figures 1 and 2, however, ignores many of the poorer countries in the world. We would also like the model in this chapter to analyze how fiscal capacity varies *over countries* and *over time*. A first salient feature of the data is that richer countries tend to raise more tax revenue as a share of national income than poorer countries. This is illustrated in Figure 3, where the left panel plots the overall tax take as a share of GDP from Baunsgaard and Keen (2005) against the log of GDP per capita from the Penn World Tables, both measured around the year 2000, and distinguishing observations by income. The right panel looks at the same relationship using the time-series data from Mitchell (2007) to plot five-year averages of the tax share over the twentieth century against national income, distinguishing observations by time period. The cross-section and time-series patterns are strikingly similar. Higher-income countries today raise much higher taxes than poorer countries, indicating that they have made larger investments in fiscal capacity. Moreover, the tax share in GDP of today's developing countries does not look very different than the tax take 100 years ago in the now developed countries.

To get further indications of such differences across countries, it is interesting to look at the relative uses of different types of taxes, differentiated by the investments required for them to be collected. Arguably, trade taxes and income taxes are two opposite polar cases. To collect trade taxes just requires being able to observe trade flows at major shipping ports. Although

[2] Aidt and Jensen (2009) study the factors, such as spending pressures and extensions of the franchise, behind the introdcution of the income tax in panel data for 17 countries from 1815 to 1939.

[3] The countries in this sample are Argentina, Australia, Brazil, Canada, Chile, Colombia, Denmark, Finland, Ireland, Japan, Mexico, Netherlands, New Zealand, Norway, Sweden, Switzerland, United Kingdom, and the United States.

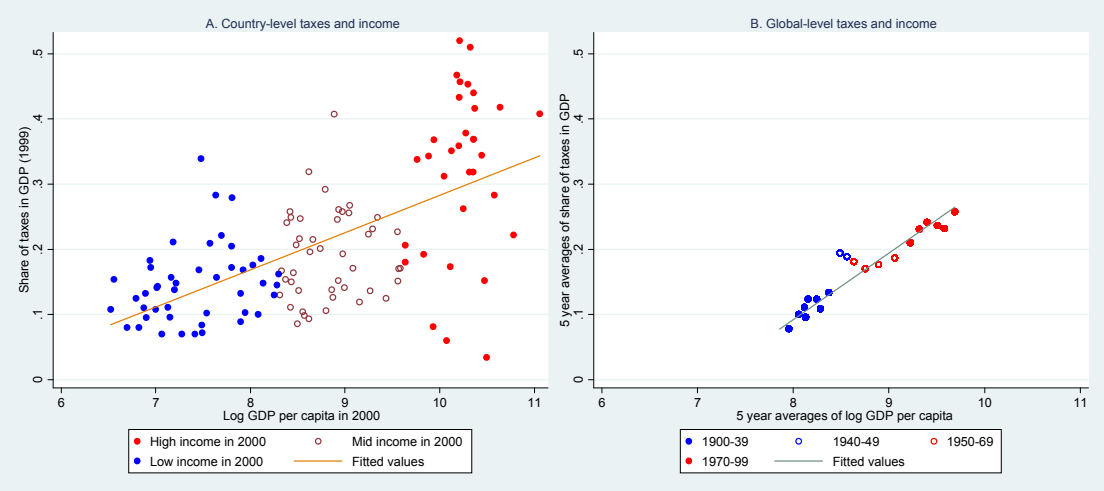

Figure 3: Tax revenue and GDP per capita

such tax allocations may encourage smuggling, this is a much easier proposition than collecting income taxes. The latter requires major investments in enforcement and compliance structures throughout the entire economy. We can thus obtain an interesting indication of fiscal-capacity investments by holding constant total tax revenue, and ask how large a share of it is collected from trade taxes and income taxes, respectively.

These shares are plotted against each other in Figure 4.[4] Again, we report the cross-sectional pattern for the year 2000, based on data from Baunsgaard and Keen (2005), and the time-series pattern over the last 100 years based on historical data from Mitchell (2007). The income-tax share is displayed on the vertical axis, and the trade-tax share on the horizontal axis. We observe a clear negative correlation: countries with a higher reliance on income taxes tend to have less reliance on trade taxes. The left panel also shows a striking pattern by income: high-income countries depend more on income taxes, while middle- and – in particular – low-income countries depend more on trade taxes. The right panel of Figure 4 shows that the move from trade to income taxes has also been a feature of the historical development of tax systems. Again, the cross-sectional and time-series patterns look strikingly

[4]Other taxes not included in either trade or income taxes include indirect taxes such as VAT, property and corporate taxes.

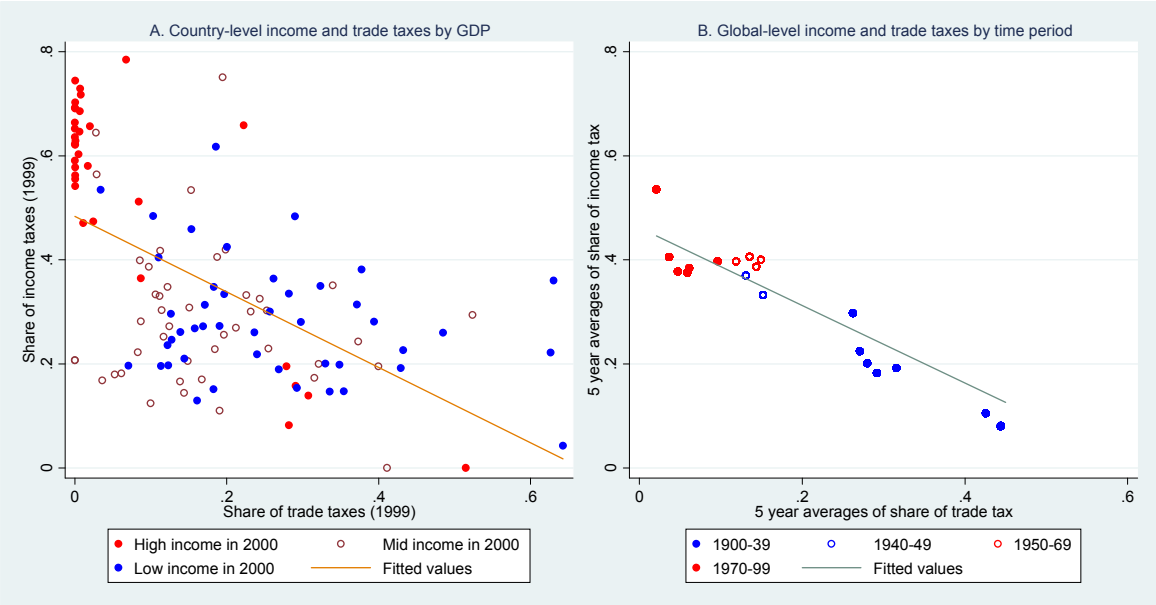

Figure 4: Income taxes and trade taxes

similar with a very similar slope of the regression lines.

Figure 5 zooms in on the income tax, plotting the relationship between the share of income taxes in total taxes and income per capita, in the current cross section as well as the historical time series. The left panel separates the observations into three groups by tax take: countries that raise more than 25% of taxes in GDP, countries that raise 15-25% of taxes in GDP, and countries that raise less than 15%. The countries in the high-tax group again look markedly different, raising much more of their tax revenues in the form of income taxes. The right panel again colors observations by time period. A striking similarity between the historical situation of this sample of older nations and the developing world today is again apparent.

Finally, another indicator of fiscal capacity is the relation between statutory tax rates and actual tax take. Figure 6 shows some indication of this by plotting the top statutory income tax rates in 1990s for the 67-country sample in Gordon and Lee (2005) against the share of total taxes in GDP from Baunsgaard and Keen (2005) The figure shows that the distribution of the top statutory rate is about the same amongst high-income and low-income countries. Obviously, the figure does not take aspects such as coverage and

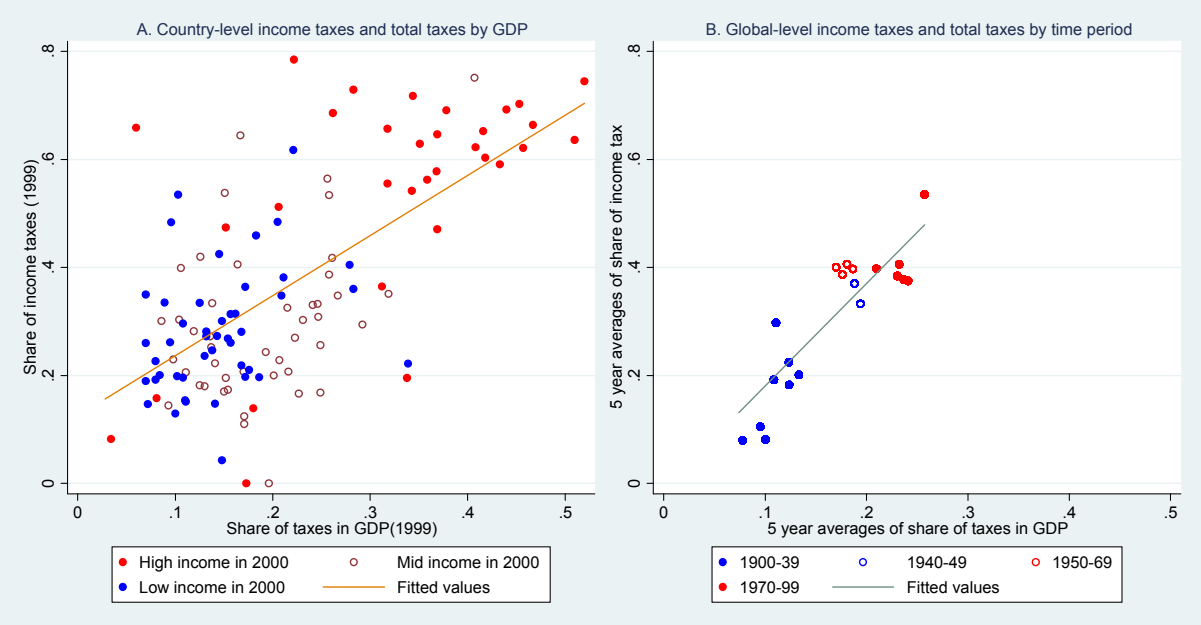

Figure 5: Income taxes and total taxes

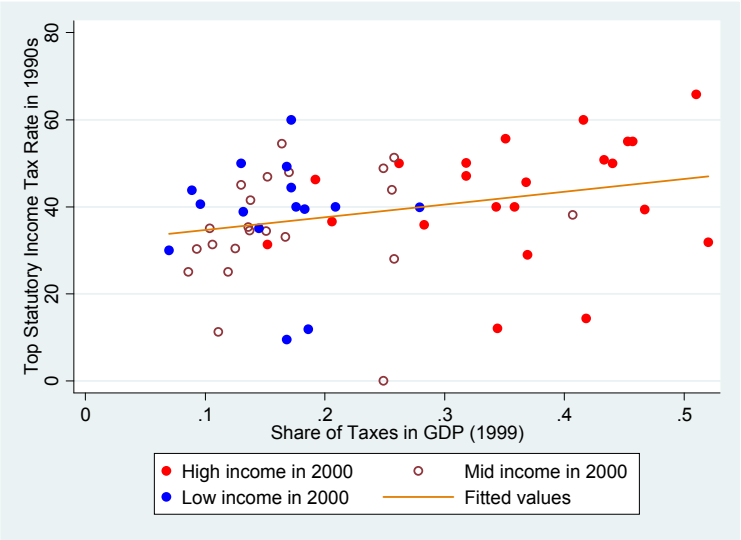

Figure 6: Top statutory income tax rate and total tax take

progressivity into account. With this qualification, the fact that high-income countries raise much more tax revenue than low-income countries suggests that narrower tax bases driven by compliance difficulties are much bigger issues among low-income countries. This reinforces the earlier observation that fiscal capacity is considerably less developed in poor countries.

Taken together, the cross-sectional and time series data suggest the following five stylized facts confirmed in cross sectional and time series data:

Stylized Fact 1: *Rich countries have made successive investments in their fiscal capacities over time.*

Stylized Fact 2: *Rich countries collect a much larger share of their income in taxes than do poor countries*

Stylized Fact 3: *Rich countries rely to a much larger extent on income taxes as opposed to trade taxes than do poor countries.*

Stylized Fact 4: *High-tax countries rely to a much larger extent on income taxes as opposed to trade taxes than do low-tax countries.*

Stylized Fact 5: *Rich countries collect much higher tax revenue than poor countries despite comparable statutory rates.*

Together, these facts strongly suggest that rich and high-tax countries have made considerably larger investments in fiscal capacity than have their poorer and low-tax counterparts.

Despite such clear patterns in the data, economists have not devoted a great deal of attention to the analysis of fiscal capacity. Indeed, most normative and positive theories of taxation hardly ever touch upon lacking administrative infrastructure as important constraints on the taxes that governments can raise.

Public-finance economists have certainly paid attention to the compliance and enforcement structures that facilitate efficient tax collection and deter tax avoidance – see e.g., Slemrod and Yitzhaki (2002) for an overview. But this body of research has a normative orientation, and does not study the building of such structures as a purposive, forward-looking activity by politically motivated incumbents. In this sense, our approach is related to the seminal theoretical and empirical work by Cukierman, Edwards, and Tabellini (1992) on how the use of seigniorage depends on the efficiency of the tax system, and how the strategic choice of the latter depends on factors like political stability and polarization.

The greater reliance on trade taxes (and seigniorage) than income taxes in developing countries has, of course, been noted and discussed by many authors – see Hinrichs (1966), Tanzi (1992) and Burgess and Stern (1993) for early contributions. More recently, Gordon and Li (2009) describe the tilted tax structures as a puzzle to understand. Their proposed explanation relies on an interplay between informality and undeveloped financial systems, but these features are basically taken as given and not seen as equilibrium outcomes of a dynamic process.

There is, however, extensive work by political and economic historians on the state's fiscal capacity, the crucial role of wars in stimulating the demand for such capacity, and the importance of this aspect of state building for the successful development of nation states. This research has yielded many interesting historical case studies such as Brewer (1989). But there are also attempts at broader generalizations, as in the work by Schumpeter (1918), Tilly (1985) and Levi (1988). Tilly, in particular, aims at explaining European exceptionalism. His work appears to have been greatly inspired by the encyclopedic scholarship of the German historian Hintze (1906). Some

authors, such as Centeno (1997) have claimed that Latin America may be an exception to the Tilly hypothesis that war was a major motive for building fiscal capacity.

Development scholars such as Migdal (1988) have emphasized the problem weak states in developing countries. Such states often lack the capacity to raise revenue and to govern effectively. Others, such as Herbst (2000), have ventured the hypothesis that some countries in Africa might have been able to strengthen their weak states if external wars had been more frequent on the continent.

3 Framework

The framework we develop in this section is a generalization of the models studied by Besley and Persson (2009, 2011). Our approach also builds on the recent literature on how taxable income responds to taxes allowing for a wider range of responses than the traditional view based on labor supply elasticities; see Feldstein (1995, 1999) for the original contributions and Slemrod (2001) for a setting close to the one we adopt.[5] This makes particular sense for a developing country context where non-compliance is such a significant issue and decisions to earn or spend in the informal (untaxed) sector is an issue. We build a framework to help us understand the forces behind the decisions to build a more effective tax system, where such decisions are made by a forward-looking government. In keeping with the stylized facts, we model greater effectiveness or fiscal capacity as increasing the yield on statutory taxes by reducing non-compliance.

The focus in this section is on taxation of labor income and of goods and services which fall directly on households. This neglects the important issue of taxation of firms. Neither does the framework deal with taxation of capital income.

Basic Set-Up Consider a population with $\mathcal{J}$ distinct groups, denoted by $J = 1, ...\mathcal{J}$, and where group J is homogenous and comprises a fraction ξ^J of the population. There are two time periods $s = 1, 2$. The economy has are $N+1$ consumption goods, indexed by $n \in \{0, 1, ..., N\}$. Consumption of these goods by group J in period s are denoted by $x^J_{n,s}$. There is also a public good

[5] See Saez, Slemrod and Giertz (2009) for a review.

g_s. Individuals in group J supply labor, L_s^J, and choose how to allocate their income across consumption goods. This is a small open economy with pre-tax prices of $p_{n,s}$. Wage rates ω_s^J are potentially group-specific and variable over time.

Taxation and tax evasion The government may levy taxes on all goods except the non-taxed numeraire good 0, and on labor. The post-tax price of each good is:

$$p_{n,s}\left(1+t_{n,s}\right), \quad n=1,2,..,N \ ,$$

while the net wage is:

$$\omega_s^J\left(1-t_{L,s}\right)$$

where $\{t_{1,s},...,t_{N,s},t_{L,s}\}$ is the vector of tax rates.

As in the standard model, statutory tax policy is a vector of tax rates for commodities and labor supply. However, to allow for the role of non-compliance, we suppose that tax payments can reduced by actions tax by those who are obliged to remit taxes to authorities. If the costs of non-compliance were large enough, this would not happen and we would be back in the standard model. But we suppose this may not be the case. Moreover, we allow the cost of non-compliance to depend on investments in fiscal capacity.

To capture these ideas simply, we assume that the tax payments to the government from group J in period s associated with the commodity tax imposed on good n is

$$t_{n,s}\left[p_{n,s}x_{n,s}^J-e_{n,s}\right] \ ,$$

which we assume to be non-negative. Thus, by spending $e_{n,s}$ (units of the numeraire good) the tax payment can be brought down – we can think of this as carrying out part of the consumption in the informal sector. The cost function for such tax evasion or avoidance is the same for all groups $c\left(e_{n,s},\tau_{n,s}\right)$, where c is increasing and convex in $e_{n,s}$. There is a parallel expression for labor taxes

$$t_{L,s}\left[\omega_s^J L_s-e_{L,s}\right]$$

with cost $c\left(e_{L,s},\tau_{L,s}\right)$. One way to interpret $e_{n,s}$ and $e_{L,s}$ is as the amounts of consumption and work that are undertaken in the informal sector.

The vector $\boldsymbol{\tau}_s = \{\tau_{1,s}, ..., \tau_{N,s}, \tau_{L,s}\}$ represents investments in fiscal capacity. For each tax base, $k = 1, ..., N, L$, we assume:

$$\frac{\partial c\left(e_{n,s}, \tau_{n,s}\right)}{\partial \tau_{n,s}} > 0 \text{ and } \frac{\partial^2 c\left(e_{n,s}, \tau_{n,s}\right)}{\partial e_{n,s} \partial \tau_{n,s}} \geq 0 \ ,$$

such that greater fiscal capacity makes avoiding taxes more difficult. Moreover, we postulate that $c\left(e_{n,s}, 0\right) = 0$, i.e., for a tax base where the government has made no investments in fiscal capacity the cost of evading taxes are negligible. If citizens evade taxes fully when it is costless of doing so, there will be no income from a tax base that the government has no fiscal capacity to tax.

For simplicity, we have assumed that fiscal capacity has a common effect on all individuals' abilities to avoid paying statutory taxes. As a consequence, every consumer in the model adjusts their tax-evading behavior on the intensive margin. An alternative way of modelling tax evasion would be to introduce heterogeneity in the cost of evasion (or in the stigma of being caught evading). This alternative formulation would introduce an extensive margin in tax evasion – to use the informal sector or not – but would otherwise lead to similar results. The most general approach would fashion both margins and heterogeneous effects according to economic circumstance, for example greater difficulties of measuring the value of labor earnings by owner-cultivators, or greater difficulty in measuring own production or bartered exchange in some sectors of the economy.

Costs of fiscal-capacity investments To some extent, sectorial differences like these can be represented by the costs of investing in fiscal capacity across the $N + 1$ tax bases $k = 1, .., N, L$. Thus, we posit a cost,

$$\mathcal{F}^k(\tau_{k,2} - \tau_{k,1}) + f^k(\tau_{k,2}, \tau_{k,1}) \text{ for } k = 1, ..., N, L \ ,$$

for investing in dimension k of fiscal capacity. We assume that the first part of the investment cost function $\mathcal{F}^k$ is convex in $\tau_{k,2,}$, with $\frac{\partial \mathcal{F}^k(0)}{\partial \tau_{k,2}} = 0$, i.e., the marginal cost at zero is negligible. Moreover, there may or may not be a fixed-cost component, depending on whether the period-1 government inherits a fiscal capacity of zero for tax base k

$$f^k(\tau_{k,2}, \tau_{k,1}) = \begin{cases} f^k \geq 0 \text{ if } \tau_{k,1} = 0 \text{ and } \tau_{k,2} > 0 \\ 0 \text{ if } \tau_{k,1} > 0 \ . \end{cases}$$

Let

$$\mathcal{F}\left(\boldsymbol{\tau}_2, \boldsymbol{\tau}_1\right) = \sum_{k=1}^{L} \mathcal{F}^k(\tau_{k,2} - \tau_{k,1}) + f^k(\tau_{k,2}, \tau_{k,1})$$

be the total costs of investing in fiscal capacity. The separability of the cost function across tax bases is made for analytical convenience. Another feature of this technology is that does not depend on the wage rate, even though it could be that investing in fiscal capacity costs more in a more productive economy.

In practical terms, the costs of fiscal capacity investment is more obvious for some tax bases than others. For example, levying an income tax requires building a monitoring and compliance system with trained inspectors and some kind of record keeping and the ability to cross check. We would thus expect a relatively large fixed-cost component, i.e., $f^k > 0$ for $k = L$. Equally, a VAT system requires being able to monitor and verify the use of inputs and the value of sales for *all* goods simultaneously (but the VAT does not directly fit the framework above). Levying border taxes usually takes place by monitoring ports and airports to measure trade flows. For such taxes, we would expect the fixed-cost component to be small or absent. Moreover, inspecting trade flows is easier for volumes than values, which might explain why so many border taxes are specific rather than ad valorem.

However, in all these cases, public resources need to be devoted to monitoring and compliance. Below, we will discuss in greater detail different options in introducing new technologies to improve compliance.

Household decisions Preferences are quasi-linear and given by:

$$x_{0,s}^J + u\left(x_{1,s}^J, .., x_{N,s}^J\right) - \phi\left(L_s^J\right) + \alpha_s^J H\left(g_s\right).$$

where u is a concave utility function and ϕ the convex disutility of labor. The utility of public goods is partly described by concave function H. We use α_s^J to parametrize the value of public goods, which we allow to be group and time specific. The individual budget constraint is:

$$x_{0,s}^J + \sum_{n=1}^{N} p_{n,s}\left(1 + t_{n,s}\right) x_{n,s}^J \leq \omega_s^J \left(1 - t_{L,s}\right) L_s^J + r_s^J + \sum_{k=1}^{L} \left[t_{k,s} e_{k,s} - c\left(e_{k,s}, \tau_{k,s}\right)\right] .$$

In this expression, r_s^J is a group-specific cash-transfer. The only non-standard feature is the last term, namely the total "profit" from reducing tax payments. What makes this formulation of the household problem simple is the

fact that tax incidence and behavior are still governed by the statutory tax rates as long as $e_{k,s} < p_{k,s}x^J_{n,s}$.

Maximizing the consumers' utility yields a vector of commodity demands and labor supply which are quite conventional. In particular, since there are no income effects on the potentially taxed commodities and each consumer faces the same prices and statutory tax rates, we have that the commodity demands are equal across groups $x^J_{n,s} = x_{n,s}$.

For the tax bases where the government has some fiscal capacity, $\tau_{k,s} > 0$, the decisions to reduce the tax burden, which we assume have an interior solution, [6] are also equal across groups, and implicitly defined by

$$t_{k,s} = c_e\left(e^*_{k,s}, \tau_{k,s}\right) \text{ for } k = 1, ..., N, L \text{ if } \tau_{k,s} > 0 \ . \tag{1}$$

It is straightforward to see that the convexity of the cost function makes equilibrium evasion $e^*_{k,s}\left(t_{k,s}, \tau_{k,s}\right)$ decreasing in the fiscal capacity investment, tax base by tax base. The household profits from such activities are:

$$q\left(t_{k,s}, \tau_{k,s}\right) = t_{k,s}e_{k,s} - c\left(e_{k,s}, \tau_{k,s}\right) \ ,$$

which are increasing in $t_{k,s}$ and decreasing in $\tau_{k,s}$.[7]

When there is no fiscal capacity, $\tau_{k,s} = 0$, any positive tax rate $t_{k,s}$ would give us a corner solution with $e^*_{k,s} = p_{k,s}x_{k,s}$ or $e^*_{L,s} = \omega^J_s L_{J,s}$. This is a case where all consumption could be sheltered from taxation in the informal sector where the individual has no tax liability. Thus, no tax income is raised at whatever level the statutory rate is set. To break this tie, we assume that in such cases the government just sets the statutory tax rate at zero.

[6] One special case of the model is where

$$c\left(e, \tau\right) = ec\left(\tau\right).$$

In this case $t \leq c\left(\tau\right)$ otherwise evasion is complete and we essentially back to the formulation of fiscal capacity Besley and Persson (2009) as an upper bound on the feasible tax rate.

[7] While we have formulated the model in terms of household decisions not to comply with taxes, it should now be clear that we could have formulated this as a series of firm-level decisions where consumers pay their taxes faithfully and firms decide whether to remit taxes to tax authorities. Profits of non-compliance would still appear as individual income for owners of firms. Our key assumption is that these non-compliance profits are distributed equally across the population with each individual getting his own per capita share. But it would be straightforward to generalize the model to allow for any sharing rule for these profits.

Indirect utility Let

$$Q\left(\mathbf{t}_s, \boldsymbol{\tau}_s\right) = \sum_{k=1}^{L} q\left(t_{k,s}, \tau_{k,s}\right)$$

be the aggregate per-capita profit from efforts devoted to tax-reducing activities where $\mathbf{t}_s = \{t_{1,s}, ..., t_{N,s}, t_{L,s}\}$ is the vector of tax rates.

The indirect utility function for group J becomes:

$$\begin{aligned} V^J\left(\mathbf{t}_s, \boldsymbol{\tau}_s, g_s, \omega_s^J, r_s^J\right) &= v\left(p_1\left(1+t_{1,s}\right), ..., p_{N,s}\left(1+t_{N,s}\right)\right) + v^L(\omega_s^J\left(1-t_{L,s}\right)) \\ &\quad + Q\left(\mathbf{t}_s, \boldsymbol{\tau}_s\right) + \alpha_s^J H\left(g_s\right) + r_s^J \end{aligned} \tag{2}$$

The first term on the right-hand side is the private surplus from the consumption of goods $n = 1, ...N$. The separable, quasi-linear preferences makes the private surplus additively separable in goods and labor – hence the second term. A convenient, but special, feature of the setup is that the gains from tax reduction are not group specific – hence the third, non-indexed term. These features help make the analysis much simpler but do not compromise the economic insights.

The policy problem Governments choose tax rates on all goods and labor and an expenditure policy, dividing the tax proceeds between public goods, transfers and investments in fiscal capacity.

Let

$$B\left(\mathbf{t}_s, \boldsymbol{\tau}_s\right) = \sum_{n=1}^{N} t_{n,s}(p_{n,s}x_{n,s} - e_{n,s}) + \sum_{J=1}^{\mathcal{J}} \xi^J t_{L,s}(\omega_s^J L_s^J - e_{L,s})$$

be the tax revenue from goods and labor, where the expression in the first sum relies on the fact that all groups choose the same consumption vector for non-numeraire goods. This is not true for labor supply, however, to the extent that different groups have different wage rates. The government budget constraint is then

$$B\left(\mathbf{t}_s, \boldsymbol{\tau}_s\right) + R_s \geq g_s + \sum_{J=1}^{\mathcal{J}} \xi^J r_s^J + m_s \ , \tag{3}$$

where

$$m_s = \begin{cases} \mathcal{F}\left(\boldsymbol{\tau}_2, \boldsymbol{\tau}_1\right) & \text{if } \ s = 1 \\ 0 & \text{if } \ s = 2 \end{cases}$$

is the amount invested in fiscal capacity (relevant only in period 1) and R_s is any (net) revenue from borrowing, aid or natural resources.

We now go on to consider first how a government will set taxes and spending, and then how it will choose to invest in fiscal capacity. We begin by studying the static (within-period) problem taking fiscal capacity as given.

The social objective of the government has fixed weights μ^J, one for each group, which are normalized so that $\sum_{J=1}^{\mathcal{J}} \mu^J \xi^J = 1$. Then the government maximizes:

$$\sum_{J=1}^{\mathcal{J}} \mu^J \xi^J V^J \left(\mathbf{t}_s, \boldsymbol{\tau}_s, g_s, \omega_s^J, r_s^J\right)$$

subject to (3). This is a more or less standard optimal tax cum public goods problem, along the lines first studied in Diamond and Mirrlees (1971). It is special only in that we have assumed quasi-linear utility and added the possibility of tax evasion.

Optimal taxation Taxes will follow a standard Ramsey like rule except for the fact that taxes affect non-compliance decisions, as well as consumption and labor supply decisions. To state the tax rules, define the effective tax bases:

$$Z_{n,s}\left(\mathbf{t}_s, \boldsymbol{\tau}_s\right) = p_{n,s}x_{n,s} - e_{n,s} \text{ and } Z_{L,s}(t_{L,s}, \tau_{L,s}) = \sum_{J=1}^{\mathcal{J}} \xi^J \omega_s^J L_s^J - e_{L,s} \ , \quad (4)$$

where $x_{n,s}$ and L_s^J are per capita commodity demands and (group-specific) labor supplies. The additive separability of the utility function makes the effective income tax base a function of the the income tax alone. With this notation, the Ramsey tax rule for commodities is

$$\begin{aligned} (\lambda_s - 1) Z_{n,s}\left(\mathbf{t}_s, \boldsymbol{\tau}_s\right) + \lambda_s \sum_{n=1}^{N} t_{n,s} \frac{\partial Z_{n,s}\left(\mathbf{t}_s, \boldsymbol{\tau}_s\right)}{\partial t_{n,s}} &= 0 \quad \text{for } n = 1, ...N \text{ if } \tau_{n,s} > 0 \\ t_{n,s} &= 0 \quad \text{if } \tau_{n,s} = 0 \ , \end{aligned}$$

where λ_s is the value of public funds. Given the possibility of reducing the tax burden, it is the demands net of avoidance $p_{n,s}x_{n,s} - e_{n,s}$ and the behavioral response of these net demands, that matters for the setting of tax rates.

For those goods where there is no fiscal capacity, the government (by assumption) sets optimal taxes at zero. Moreover, we focus on the natural

case where $e^*_{k,s} < p_{k,s}x_{k,s}$ whenever $\tau_{k,s} > 0$. This says that if the government has any fiscal capacity in some tax base then there is a non-trivial level of compliance. And in this case, we also expect that the optimal tax rate will be positive for any tax base where $\tau_{k,s} > 0$.

The optimal income tax solves:

$$\begin{aligned} -\tilde{Z}_{L,s} + \lambda_s \left[Z_{L,s}\left(t_{L,s}, \tau_{L,s}\right) + t_{L,s} \frac{\partial Z_{L,s}\left(t_{L,s}, \tau_{L,s}\right)}{\partial t_{L,s}} \right] &= 0 \quad \text{if } \tau_{L,s} > 0 \\ t_{L,s} &= 0 \quad \text{if } \tau_{L,s} = 0 \ . \end{aligned}$$

where $\tilde{Z}_{L,s} = \sum_{J=1}^{\mathcal{J}} \mu^J \xi^J \omega_s^J L_s^J - e_{L,s}$ is weighted net taxable labor income

allowing for heterogenous wages. The optimal-tax expression is similar to the optimal commodity tax in that it involves the total behavioral response of the tax base $Z_{L,s}$. However, the income transferred from citizens to government (the first term) is weighted by the social objective. In general, this term depends on the correlation between the group weights μ^J and wages ω_s^J across groups.

To illustrate how the lack of fiscal capacity to enforce income taxes affects choices, let us assume that wages are the same for all groups, $\omega_s^J = \omega_s$. In this case, the optimal income tax rate solves:

$$\frac{t^*_{L,s}}{1 - t^*_{L,s}} = \frac{(\lambda_s - 1) - (\kappa - 1)\,\varepsilon}{\kappa \eta} \ , \tag{5}$$

where η is the elasticity of labor supply with regard to the after-tax wage, ε is the elasticity of evasion with respect to the income tax rate and $\kappa = \omega_s L_s / \left(\omega_s L_s - e_{L,s}\right) > 1$ reflects the extent of non-compliance. The standard optimal income tax formula has $\kappa = 1$ so the inverse labor supply elasticity η and the value of public revenue λ_s, to be spent on public goods or transfers, determines the level of the optimal tax. In that case, λ_s above one is sufficient for the optimal tax rate to be positive. With non-compliance, the optimal tax rate is lower all else equal.

To see this, observe that, using equation (5),

$$\frac{\partial t^*_{L,s}}{\partial \varepsilon} < 0 \ \text{ and } \frac{\partial t^*_{L,s}}{\partial \kappa} < 0 \ .$$

So factors which make it easier avoid paying taxes or increase the extent of avoidance depress the incentive to use the income tax. Thus, we would

expect lower rates of taxation as well as lower collection of taxes, for a given rate, in countries with little investment in fiscal capacity for tax collection (in so far as fiscal capacity increases ε and κ).

The optimal-tax formulas above reflect the fact that, when citizens can reduce their tax liability, taxes raise less revenue than otherwise. The total behavioral response to taxation can, in principle, be larger or smaller than in the absence of tax avoidance, depending on the sensitivity of such activity to a higher tax. And these responses will be influenced by investments in fiscal capacity.

There is a direct link here to the literature on taxable income elasticities. However, these considerations should be applied to all tax bases, not just labor income. In many developing countries compliance with the VAT is big issue and the taxable demand elasticity would be relevant to understanding tax policy. As things stand, the evidence base regarding the total response of tax revenues to tax rates, and the sources of these effects, is only in its infancy for developing countries. This is true even for income taxes, the area where most progress has been made in the developed country literature. For an exception to this, however, see Kleven and Mazhar (2011) who present evidence on taxable income elasticities for Pakistan using administrative data. These elasticities turn out to be quite small, at least among those who are already registered to pay income taxes.

The analysis in this section suggests that to understand the fiscal facts about developing countries laid out in Section 2, we may be able to appeal to the fiscal-capacity investments that shape total behavioral responses to taxation through standard consumption and labor supply distortions but also through compliance decisions. The structure of taxes is influence by the fact that fiscal capacity is low or non-existent for some tax bases making it difficult to collect statutory taxes. This is particularly true for income taxes versus trade taxes, with the latter demanding much less in terms of fiscal-capacity investments. The low level of tax take may thus not reflect larger distortions in consumption and labor supply, for any given tax system, but larger opportunities for non-compliance. Hence, our emphasis on fiscal-capacity investments below.

Optimal public spending Before turning to fiscal capacity, we briefly deal with public spending. In this dimension, the government decides how much revenue to allocate to transfers and public goods, respectively. With

quasi-linear utility, an unconstrained government will direct all transfer spending, if any, to the group with the highest μ^J. This is very stark and unrealistic prediction (but in Section 4.2 we will introduce political constraints that potentially bring about more equal sharing). In the special Utilitarian case, where $\mu^J = 1$ for all J, we can assume without loss of generality that any transfer spending is spent equally. Let $\mu^{\max} = \max_J \left\{\mu^J; J = 1, .., \mathcal{J}\right\}$.

To define the optimal level of public spending, let $B\left(\mathbf{t}_s^*\left(\lambda\right), \boldsymbol{\tau}_s\right)$ be total tax revenue when taxes are set optimally and the marginal value of public funds is λ. There are two cases. If

$$\sum_{J=1}^{\mathcal{J}} \mu^J \xi^J \alpha_s^J H_g\left(B\left(\mathbf{t}_s^*\left(\mu^{\max}\right), \boldsymbol{\tau}_s\right) + R_s - m_s\right) > \mu^{\max}$$

then all spending will be allocated to public goods, i.e.,

$$\lambda_s = \sum_{J=1}^{\mathcal{J}} \mu^J \xi^J \alpha_s^J H_g\left(B\left(\mathbf{t}_s^*\left(\lambda_s\right), \boldsymbol{\tau}_s\right) + R_s - m_s\right)$$

This is the case where public goods are very valuable and/or tax revenue is scarce.

In the other case, the marginal value of public funds is $\lambda_s = \mu^{\max}$, tax revenues are $B\left(\mathbf{t}_s^*\left(\mu^{\max}\right), \boldsymbol{\tau}_s\right)$, public goods have an interior solution, and the remaining revenue is spent on transfers to the group defining $\mu^{\max}$.

Investments in fiscal capacity The main novelty in our approach to public finance and development is to study purposeful and forward-looking decisions by government to invest in alternative forms of fiscal capacity, i.e., in vector $\boldsymbol{\tau}_2$. We study this investment decision by making $\boldsymbol{\tau}_2$ endogenous and chosen by the government in period 1. Having done so, we will use the resulting conditions to consider which forces drive the creation of fiscal capacity and how these relate to economic, political and social development.

Let

$$W\left(\boldsymbol{\tau}_s, R_s + m_s; \{\mu^J\}\right) = \max_{g_s, t_s, r_s^1, ..., r_s^{\mathcal{J}}} \left\{ \sum_{J=1}^{\mathcal{J}} \mu^J \xi^J V^J\left(\mathbf{t}_s^*, \boldsymbol{\tau}_s, g_s, \omega_s^J, r_s^J\right) \quad \text{s t (3)} \right\} \tag{6}$$

be the maximized value of the government's payoff. Implicit in here are optimal taxes and spending chosen subject to the fiscal-capacity constraints.

Now we can formulate the fiscal-capacity investment decision, as choosing $\boldsymbol{\tau}_2$ to maximize:

$$W\left(\boldsymbol{\tau}_1, R_1 - \mathcal{F}\left(\boldsymbol{\tau}_2, \boldsymbol{\tau}_1\right); \{\mu^J\}\right) + W\left(\boldsymbol{\tau}_2, R_2; \{\mu^J\}\right). \tag{7}$$

This yields a series of conditions for creating fiscal capacity and investing in it once it has been created.

For fiscal capacity that is already in existence, i.e. $\tau_{k,1} > 0$ we have standard first-order conditions which have a very convenient and readily interpretable form. Using the envelope theorem to eliminate terms in optimal government (and private) choices, these first-order conditions can be written as:

$$\begin{aligned} \lambda_2 \frac{\partial B\left(\mathbf{t}_2^*, \boldsymbol{\tau}_2\right)}{\partial \tau_{k,2}} + \frac{\partial Q\left(\mathbf{t}_2^*, \boldsymbol{\tau}_2\right)}{\partial \tau_{k,2}} - \lambda_1 \frac{\partial \mathcal{F}\left(\boldsymbol{\tau}_1, \boldsymbol{\tau}_2\right)}{\partial \tau_{k,2}} &\leqslant 0 \text{ for } k = 1, 2, ..N, L(8) \\ \text{c.s. } \tau_{k,2} &\geqslant \tau_{k,1} > 0. \end{aligned}$$

Three terms govern the investment decisions. The first is the added revenue from better fiscal capacity weighted by the period-2 marginal value of public funds. The second term in (8) is the marginal cost imposed on citizens by higher fiscal capacity – essentially due to higher tax payments, as the profits from tax evasion fall when fiscal capacity is higher. The third term is the marginal cost of investing, weighted by the marginal cost of public funds in period 1.

The three terms in equation (8) nicely encapsulate the forces that shape fiscal capacity decisions. First, there are factors that make future revenue more valuable (cost of public funds λ_2 and the revenue function B) – these will have a disproportionate effect on investment in tax bases which are not very elastic. Second, there are circumstances shaping the utility cost of taxation, which depend on the lengths that governments have to go to increase compliance (the profit function Q). Third, there are features of the economy which make it more less expensive to invest – including a high current marginal cost of public funds (the cost function $\mathcal{F}$ and cost of public funds λ_1). The investment cost could be quite specific to some kinds of tax bases.

For the case where the government is thinking about introducing a new tax base, the reasoning is inherently non-marginal. Discrete gains or losses which have to be weighed against the fixed cost of the investment. So consider a decision by a government to add a tax base k where $\tau_{k,1} = 0$. This will

give a non-marginal change in indirect utility, which comes from changes in the use of existing tax bases as well as increased spending on public goods. It will also imply non-marginal changes in the profits from non-compliance with new tax base as the optimal taxes change. Together, these yield a discrete change in $W\left(\boldsymbol{\tau}_2, R_2; \{\mu^J\}\right)$, which must be evaluated at the level $\tau_{k,2}$ which solves (8). This must be weighed against the cost of the investment $\lambda_1\left[\mathcal{F}^k\left(\tau_{k,2}\right) + f^k\right]$. In general, this kind of non-marginal analysis will be quite complicated. That said, the main economic forces identified in our discussion of (8) remain the salient forces to shape the decision to invest in genuinely new tax bases. We will discuss this in detail in the next section for the specific case of the introduction of an income tax.

Next steps Having built a framework for studying investments in fiscal capacity, we will now develop insights offered by the approach and what we learn about differences between different societies at a point in time and the same society at different points in time.

In the next section, we introduce and discuss six sets of factors pinpointed by our modeling approach. First, we study the effect of economic factors on the incentive to build a tax system. Second, we turn to the role of politics, where we consider how the structure of political institutions and political instability affect the choice of fiscal capacity. Third, we look at social structure, including inequality, heterogeneity and polarization. Fourth, we study the demand side of state action and the factors that go into determining the value of public spending. Fifth, observing that many poor countries rely on aid to support state activities while others have access to natural resource rents, we explore how these non-tax income flows affect the incentives to build other kinds of fiscal capacity. Finally, we go into more detail on the technology for increasing tax compliance.

In all cases, we take a starting point in our general model. However, in each case it will prove convenient to specialize some features to home in on the particular issues at hand.

4 Applications

4.1 Economic Development

In this section, we discuss how changes in the economy might affect choices of fiscal capacity and the implications for observed taxation. Against the background of the stark time-series and cross-sectional facts discussed in Section 2, we focus on the role of economic development for the introduction and expansion of the income tax. We begin by discussing exogenous differences in the economy across countries or time, turning then to changes that are endogenous to the government's investment in state capacity.

Exogenous economic differences We noted in Section 2 (recall Figure 1) that today's rich economies all have taken the discrete steps of introducing the income tax and upgrading its efficiency via direct withholding during the last 150 years. In a contemporary cross section, we also saw (in Figures 2, 3 and 4) that rich and high-taxing countries rely much more on the income tax than their poor and low-taxing counterparts. Through which channels could our framework help explain such patterns in the data?

For that purpose, we specialize the model as follows. First, there is only one consumption good in addition to the numeraire good and labor – i.e., we set $N = 1$. Moreover, there are no fixed costs associated with building fiscal capacity for the taxable consumption good, whereas there may exist such fixed costs for the income tax – i.e., we have $f^1 = 0$ and $f^L \geq 0$. Of course, this stark difference is for illustrative purposes only. To keep things simple and to pin down the value of public funds, we specialize the utility function of public goods to be linear, i.e., $H(g_s) = g_s$, and the value of public goods to be equal across groups, i.e., $\alpha_s^J = \alpha_s = \lambda_s > \mu^{\max}$. These specialized assumptions will be relaxed in later sections on politics and the value of public spending. However, they allow us to focus on the case where the government spends only on public goods with a constant marginal value of funds.

We start by assuming that wages are be given by the simple expression

$$\omega_s^J = \Lambda_s \omega \ ,$$

i.e., every group J has the same wage. Different values of Λ_s could represent natural exogenous income differences between countries or over time due to, say, geography or productivity.

In this specialized framework, the marginal first-order conditions (8) associated with the two tax bases are

$$\alpha_2 \frac{t_{k,2}\partial Z_{k,2}(t_{k,2},\tau_{k,2})}{\partial \tau_{k,2}} + \frac{\partial q\left(t_{k,2},\tau_{k,2}\right)}{\partial \tau_{k,2}} - \alpha_1 \frac{\partial \mathcal{F}^k\left(\tau_{k,2}-\tau_{k,1}\right)}{\partial \tau_{k,2}} \quad \begin{array}{l} \leqslant \\ \text{c.s.} \end{array} \quad \begin{array}{l} 0 \text{ for } k=1,L \\ \tau_{k,2} \geqslant \tau_{k,1}. \end{array} \tag{9}$$

If there were no fixed costs, this expression would tells us that the government invests more in the tax base that raises more revenue on the margin at the future value of public funds (the first term), induces a lower utility cost for consumers via the cost of tax evasion (the second term), or has a lower marginal cost of investing at the current value of public funds (the third term). Provided the positive first term outweighs the negative second term, for $k=1,L$, we see positive investments in both types of fiscal capacity since $\frac{\partial \mathcal{F}^k(0)}{\partial \tau_{k,2}} = 0$.

We now revisit the questions when an income tax is worth levying at all and why economic growth should be associated with implementing an income tax, as we have seen historically. Suppose then that there is a fixed cost associated with fiscal-capacity building for the income tax and the period-1 level of this capacity is zero, $\tau_{L,1}=0$. Recall that the government raises no revenue at zero fiscal capacity. In order for the income tax to be introduced, the perceived welfare gains from doing so, by bringing fiscal capacity up to locally optimal level $\tau_{L,2}>0$ given by (9), have to be large enough to outweigh the effective fixed cost $\mathcal{F}^L\left(\tau_{L,2}\right)+f^L>0$ associated with setting up a compliance and monitoring system. Using the definitions and additive separability of the government payoff (6), the net tax bases (4), and the indirect utility function (2), and recalling that when $\tau_{L,2}=0$ we have $c(\cdot,\tau_{L,2}) = t^*_{L,2}=0$ (private evasion cost and taxes are zero), we can write the formal condition as follows:

$$\begin{aligned} &\Lambda_s\omega \int_0^{t^*_{L,2}} \left[\alpha_2 L^*\left(\Lambda_2\omega(1-t^*_{L,2})\right) - L^*\left(\Lambda_2\omega(1-t)\right]dt \right. \\ &+[q\left(t^*_{L,2},\tau^*_{L,2}\right) - (\alpha_2-1)t^*_{L,2}e^*\left(t^*_{L,2},\tau^*_{L,2}\right)] \geq \alpha_1[\mathcal{F}^L\left(\tau^*_{L,2}\right)+f^L] \end{aligned} \tag{10}$$

where $\tau^*_{L,2}$ solves (9).

There are basically three considerations. The term on the first line reflects the value of transferring funds from private incomes to public spending, recognizing that there there is deadweight loss associated with lower labor

supply. This expression is positive only if α_2 is sufficiently high (above one).[8] Also, this term is proportional to labor productivity, as this determines how lucrative is income as a tax base. The second term on the left-hand side reflects the possibility of non-compliance. It has two parts, the first reflecting the gain from having a new source of profits from non-compliance. However, this is offset by the fact that greater non-compliance reduces valuable public spending. If, at $\tau^*_{L,2}$, there was full compliance then this expression would be zero. Finally, the term on the right-hand side reflects the costs that are incurred by introducing a new tax base – fixed costs and the cost of the investment in fiscal capacity of $\tau^*_{L,2}$.

Notice that the tax base in the first term of (10) is increasing in productivity factor Λ_2. Moreover, the optimal income tax rate $t^*_{L,2}$ associated with a given level of fiscal capacity will generally be higher if income is higher – to see this, recall the Ramsey tax formula (5), where $t^*_{L,s}$ is decreasing in $\kappa = \omega_s L_s / (\omega_s L_s - e_{L,s})$ and hence increasing in ω_s (since κ is decreasing in ω_s).

Now, if Λ_2 captures how income grows over time, income growth can thus naturally explain the eventual introduction of an income tax, as in Figure 1, by reference to (10). If Λ_2 instead captures differences across countries at a given point in time, this can explain the higher reliance of the income tax in rich and high-tax countries, as in Figure 3 and 4. To explicitly link up with the data on income taxes vs. trade taxes discussed in Section 2, the argument would have to be recast in a setting where trade rather than consumption is the alternative tax base (see Besley and Persson (2011, ch. 2) for such a model).

[8] To see this, observe that this expression can be written as:

$$\Lambda_2\omega\left[\alpha_2 - 1\right] t^*_{L,2} L^*\left(\Lambda_2\omega(1 - t^*_{L,2})\right) +$$
$$\Lambda_2\omega \int_0^{t^*_{L,2}} \left[L^*\left(\Lambda_2\omega(1 - t^*_{L,2})\right) - L^*\left(\Lambda_2\omega(1 - t)\right)\right] dt$$

where the first term is positive and the second term is negative if there is any labor supply response to taxation. To a first order approximation this is

$$\Lambda_2\omega\left[\left[\alpha_2 - 1\right] t^*_{L,2} L^*\left(\Lambda_2\omega\right) - \left(t^*_{L,2}\right)^2 \alpha_2 L^{*\prime}\left(\Lambda_2\omega\right)\right]$$

Endogenous economic differences In this section, we make the level of fiscal capacity endogenous to other aspects of government state building. The general modeling follows the analysis in Besley and Persson (2011).

Let wages be given by $\omega_s^J = \Lambda_s \omega(\pi_s)$, where scalar π_s represents endogenous government investment in the productive side of the state and where $\omega(\pi_s)$ is an increasing function. Besley and Persson (2011, ch. 3) show that one can microfound such a formulation in settings where π_s represents the capacity to carry out legal support to the private sector in the form of contract enforcement or, alternatively, protection of property rights. In this interpretation, which we will maintain in the present subsection, π_s thus captures the legal capacity of the government: its courts, its supply of educated judges, or its registers for credit or property. An alternative interpretation would be to think of π_s as government infrastructure that raised the productivity in the private sector. We could also let π_s be a vector of productive capacities, rather than a scalar.

In analogy with fiscal capacity, we assume that legal capacity in period 2 can be augmented by investment in period 1. That investment has cost $\mathcal{L}(\pi_2, \pi_1) = \mathcal{L}(\pi_2 - \pi_1)$. We assume that legal-capacity investments have no fixed costs, for simplicity, and that $\mathcal{L}$ is a convex function with $\frac{\partial \mathcal{L}(0)}{\partial \pi} = 0$. As a consequence, the total investment costs for the period-1 government are now given by

$$m_s = \begin{cases} \mathcal{F}(\boldsymbol{\tau}_2, \boldsymbol{\tau}_1) + \mathcal{L}(\pi_2, \pi_1) & \text{if } s = 1 \\ 0 & \text{if } s = 2 \,. \end{cases}$$

What happens to the investment in fiscal capacity in the specialized model that we just studied, when we replace exogenous wages $\omega_s^J = \Lambda_s \omega$ with endogenous wages $\omega_s^J = \Lambda_s \omega(\pi_s)$? The marginal investment conditions in (9) are not affected, because neither $\frac{\partial Z_{k,2}}{\partial \tau_{k,2}} = -\frac{\partial e_{k,2}}{\partial \tau_{k,2}} > 0$ nor $\frac{\partial q_{k,2}}{\partial \tau_{k,2}} = -\frac{\partial c}{\partial \tau_{k,2}} < 0$ depend on legal-capacity investments π_2. However, the condition for incurring the fixed costs of introduction of the income tax now becomes:

$$\begin{aligned} \Lambda_s \omega(\pi_2) \int_0^{t^*_{L,2}} \left[\alpha_2 L^* \left(\Lambda_2 \omega(\pi_2)(1 - t^*_{L,2})\right) - L^* \left(\Lambda_2 \omega(\pi_2)(1-t)\right]\right] dt \qquad (11) \\ + q\left(t^*_{L,2}, \tau^*_{L,2}\right) - \left[\alpha_2 - 1\right] t^*_{L,2} e^*\left(t^*_{L,2}, \tau^*_{L,2}\right) \geq \alpha_1 [\mathcal{F}^L\left(\tau^*_{L,2}\right) + f^L] \end{aligned}$$

Only the first term from (10) is affected with higher legal capacity increasing wages. There are good reasons to expect that this key expression will be

increasing in Λ_2 and $\omega(\pi_2)$. For example in the case of a constant elasticity of labor supply, η, the first expression in (11) becomes:

$$[\Lambda_s \omega(\pi_2)]^{1+\eta} \int_0^{t^*_{L,2}} \left[\alpha_2(1-t^*_{L,2})^\eta - (1-t)^\eta\right] dt$$

which is increasing in π_2.Thus, a country with higher legal capacity and endogenously higher income is more likely to have an income tax than one with low legal capacity.

Of course, this raises the question what drives the investments in legal capacity in the model. Maximizing the investment objective (7) with regard to π_2, under the assumptions of the specialized model, we obtain the first-order condition

$$[1 + (\alpha_2 - 1)t^*_{L,2} L^*_2 \Lambda_2] \frac{\partial \omega}{\partial \pi_2} - \alpha_1 \frac{\partial \mathcal{L}(\pi_2 - \pi_1)}{\partial \pi_2} = 0 \tag{12}$$

after using Roy's identity. Since the two terms in the first bracket, the net benefit of legal capacity, are both non-negative and since $\frac{\partial \mathcal{L}(0)}{\partial \pi_2} = 0$, there are always positive investments in legal capacity. Moreover, a higher level of fiscal capacity in the income tax $\tau_{L,2}$ raises the equilibrium tax rate $t^*_{L,2}$. This way, a higher value of $\tau_{L,2}$ raises the net benefit of investing in legal capacity, by raising the private marginal surplus from higher wages as well as boosting the fiscal benefits of the income tax through a higher tax base.

This result and the earlier result, that a higher π_2 makes (11) more likely to hold, make the investment in legal capacity and the investment necessary to introduce the income tax *complementary* decisions. This is a close relative to the complementarity discussed in Besley and Persson (2009, 2011). Thus, the endogenous growth of income triggered by investments in the productive side of the state makes it more likely that a country at some point in time will incur the fixed costs necessary to put an income tax in place.

As discussed at length in this earlier work, measures of fiscal capacity – like a high share if total tax income collected by the income tax – and measures of legal capacity are strongly positively correlated across countries in the data, and both of these capacities indeed have a strong positive correlation with income.

This point in illustrated in Figure 7 which plots the share of taxes in GDP in 2000 against the ICRG measure of property rights protection. Countries that raise more in taxes (have more fiscal capacity) tend also to enforce property rights better (have more legal capacity).

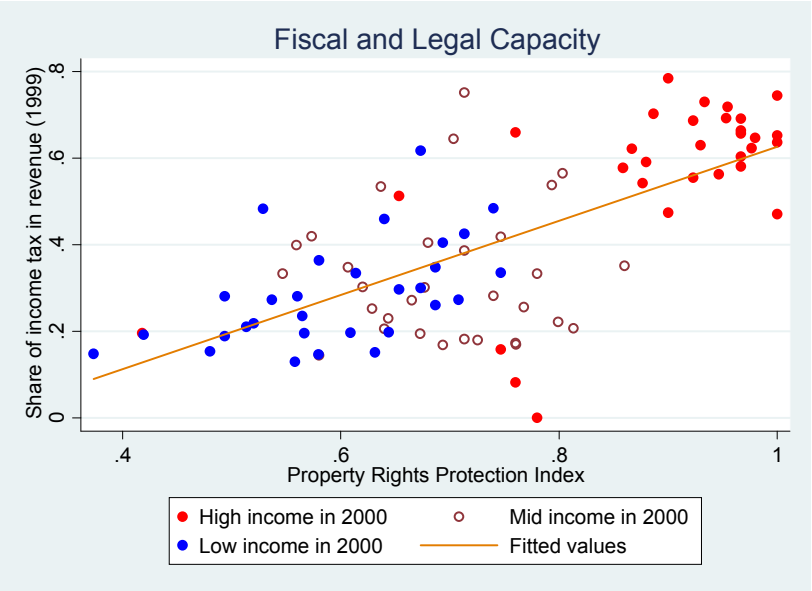

Figure 7: Share of income tax in revenue and protection of property rights

Structural Change Development is about a lot more than raising income per capita. The process of rising incomes is typically associated with deep structural change towards a more urban and non-agriculturally based economy . Part of that change will be conducive to extracting taxation, including greater use of formal sector employment in firms as opposed to self-employment, as stressed by Kleven, Kreiner and Saez (2009), and greater use of formal financial transactions, as emphasized by Gordon and Li (2009). Both types of change make transactions more visible to tax authorities and enable them to obtain corroborating evidence from cross-reported transactions. Moreover, they form part of transformation of economic activity, where larger economic units take advantage of scale economies in production. To the extent that this id reflected in higher wages, the arguments presented above apply and we would expect fiscal capacity to increase.

The typical discussion of development and taxation couches structural change as an exogenous feature of economic development with causality running from economic development to fiscal capacity. This can be captured in our model either by allowing the function $c\left(e_{k,s}, \tau_{k,s}\right)$ to depend on the sector of the economy in which an individual is operating. Suppose we ex-

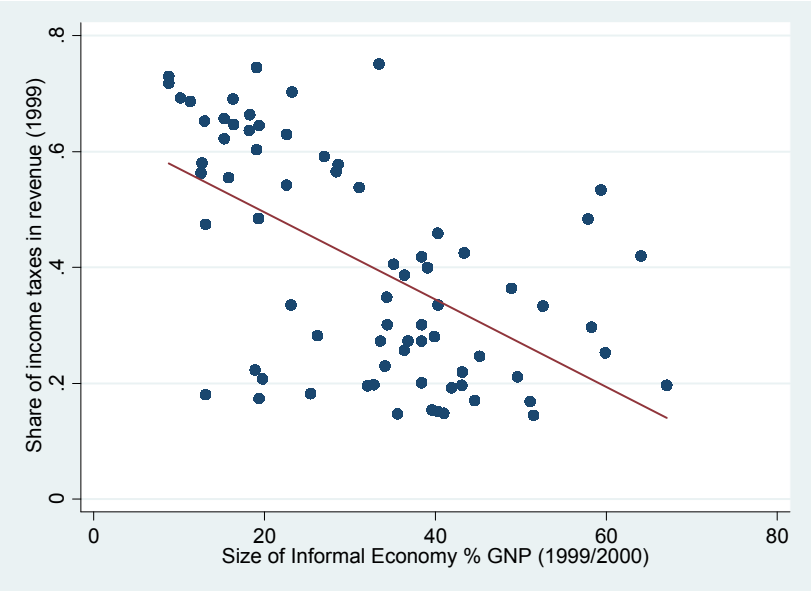

Figure 8: Share of income taxes and informal economy

ogenously assign individuals to the formal and informal sectors denoted by $\delta \in \{f, n\}$ where f stands for "formal" and n for "informal" with evasion functions $c\left(e_{k,s}, \tau_{k,s}, \delta\right)$. We may then reasonably suppose that

$$-\frac{c_{\tau e}\left(e_{k,s}, \tau_{k,s}, f\right)}{c_{ee}\left(e_{k,s}, \tau_{k,s}, f\right)} > -\frac{c_{\tau e}\left(e_{k,s}, \tau_{k,s}, n\right)}{c_{ee}\left(e_{k,s}, \tau_{k,s}, n\right)}$$

so the marginal effect of an investment in fiscal capacity would be more effective in deterring evasion for those in the formal sector. Under this circumstance, an increase in formality would boost the marginal revenues that can be generated from fiscal capacity investments, all else equal. This is consistent with the observation that countries with smaller informal sectors also raise more taxes. This is illustrated in Figure 8 which plots a measure of the size of of the informal economy in 1999/2000 from the World Bank against the share of income taxes in total tax revenue in 1999 from Baunsgaard and Keen (2005). The downward sloping relationship is extremely clear.

Less attention has been devoted to the possibility that the size of the informal sector and the structural development of the economy evolves endogenously with the development of fiscal capacity, as in the discussion of

legal capacity above. However, we may also take one further step and think of legal capacity as affecting the returns to being formal. It is very hard for an individual to simultaneously be largely invisible to the tax system while taking full advantage from the benefits in the legal system. This creates a further complementarity between legal and fiscal capacity of the state. A state which invests in the infrastructure to support formal financial intermediation will overcome some of the barriers to formality and enhance the ability to raise more taxes. A good example of this has been the efforts to build credit and land registries in the process of development to increase property rights and contract enforcement. Such registries clearly bring the patterns of ownership and credit contracts into the daylight for tax authorities. To study these issues explicitly, we would have to extend the model with an endogenous decision to choose the sector δ based on costs and benefits. While a higher cost of tax evasion is a cost of choosing the formal sector, there may be benefits in the form of a better trading environment.[9]

4.2 The Role of Politics

No account of the development process is complete without bringing in the political forces that shape policy selection. A widely held view is that the failure of states to build strong institution might reflect weak motives to do so, given the nature of the political institutions. In this section, we explore the implications of bringing into the analysis a government which operates under institutional constraints and faces the possibility of political turnover. The framework that we use is based on Besley and Persson (2010, 2011). As we shall see, this adds new issues to the analysis of fiscal capacity building and allows us to uncover important additional forces which can explain high or low investments.

Cohesive institutions Suppose that the government in power acts on behalf of a specific group in the spirit of a citizen-candidate approach to politics – see Besley and Coate (1997) and Osborne and Slivinski (1996). We assume no agency problem within the incumbent group; whoever in the group holds power, she cares about the average welfare of its members.

[9] Also germane to this discussion are the increasing efforts by may governments to link certain transfer benefits, such as social security, to paying taxes and working in the formal sector.

We model how political institutions constrain the incumbent's allocation of transfers in a very simple way. Specifically, this constraint requires the incumbent group in period s, called I_s, to give (at least) a fixed share θ to all non-incumbent groups J for any unit of transfers awarded to its own group. That is to say, we impose the restriction

$$r_s^J \geq \theta r_s^I, \text{ for } J \neq I \ .$$

We let $\theta \in [0,1]$ represent the "cohesiveness" of institutions; the closer θ is to 1, the more cohesive are political institutions.

This is an extremely simple, tractable but reduced-form way of looking at politics. We will interpret a higher value of θ in one of two broad ways. One real-world counterpart might be minority protection by constitutional checks and balances on the executive due to some separation of powers. In practice, we expect democracies to impose greater constraints on the executive than autocracies. An alternative real-world counterpart might be stronger political representation of the interests of losers in policy decisions through proportional representation elections or parliamentary democracy. The literature on the policy effects of constitutional rules suggests that both of these institutional arrangements make policymakers to internalize the preferences of a larger share of the population – see, e.g., Persson and Tabellini (2000), Persson, Roland and Tabellini (2000), or Aghion, Alesina, and Trebbi (2004).

Using this way of representing political institutions, we can solve for transfers allocated to the incumbent group and all the groups in opposition $J = O$. In the model of Section 3, these are

$$\begin{aligned} r_s^I &= \beta^I\left(\xi^I, \theta\right)\left[B\left(\mathbf{t}_s, \boldsymbol{\tau}_s\right) + R_s - g_s - m_s\right] \text{ and} \\ r_s^O &= \beta^O\left(\xi^I, \sigma\right)\left[B\left(\mathbf{t}_s, \boldsymbol{\tau}_s\right) + R_s - g_s - m_s\right] \end{aligned}$$

respectively, where

$$\beta^I\left(\xi^I, \theta\right) = \frac{1}{\theta + (1-\theta)\xi^I} \text{ and } \beta^O\left(\xi^I, \sigma\right) = \frac{\theta}{\theta + (1-\theta)\xi^I} \qquad (13)$$

For $\theta = 1$, there is equal division of any residual tax revenue as transfers. Otherwise, the incumbent group receives a higher share of transfer spending.

We maintain the simplifying assumption that the utility function for public goods is linear, but allow the valuation of public goods to differ across groups. The shadow value of public revenue now compares the incumbent's

value of transfers $\beta^I\left(\xi^I,\theta\right)$ to spending on public goods α_s^I. As in the general model, we have two cases. If $\alpha_s^I > \beta^I\left(\xi^I,\theta\right)$ then all spending will be allocated to public goods, i.e., $\lambda_s^I = \alpha_s^I$ .In the other case, the marginal value of public funds is $\lambda_s^I = \beta^I\left(\xi^I,\theta\right)$.

Suppose now that a single group is in power in period 1 as well as period 2, i.e. there is a natural elite and no political turnover for sure. In this case, the preferences of the elite determines policy and investment in fiscal capacity. For simplicity, we assume away any fixed costs in investment (or alternatively $\tau_{k,1} > 0$ for all k so that the fixed costs have already been incurred). Then, we get the following first-order conditions for investment in fiscal capacity:

$$\begin{aligned} \lambda_2^I \frac{\partial B\left(\mathbf{t}_2^*,\boldsymbol{\tau}_2\right)}{\partial \tau_{k,2}} + \frac{\partial Q\left(\mathbf{t}_2^*,\boldsymbol{\tau}_2\right)}{\partial \tau_{k,2}} - \lambda_1^I \frac{\partial \mathcal{F}\left(\boldsymbol{\tau}_1,\boldsymbol{\tau}_2\right)}{\partial \tau_{k,2}} &\leqslant 0 \qquad (14) \\ \text{c.s.} \tau_{k,2} &\geqslant \tau_{k,1} \ . \end{aligned}$$

The analysis requires only a modest modification of the benchmark model, where we recognize that the driving force behind the decision to build fiscal capacity is now the preference of the elite, rather than society as a whole, for tax revenue. Clearly, an elite that values public goods a lot is more likely to spend on public goods than one that does not. Spending on public goods rather than transfers is more likely as institutions become more cohesive, $\theta \to 1$ and the ability of an incumbent to extract transfers diminishes. However, an elite can also be motivated to build capacity to collect tax revenue as a means of increasing transfers for itself, when $\lambda_s^I = \beta^I\left(\xi^I,\theta\right)$ because the elite faces few checks and balances on its power to pursue group interests (i.e., θ is low which makes $\beta^I\left(\xi^I,\theta\right)$ high).

Political turnover The model becomes more interesting when there is political turnover, i.e., the identity of the incumbent group may shift over time. To zoom in on this issues, we specialize the model to the case of only two groups where each of those comprise half the population, $\xi^J = 1/2$. Let $\gamma \in [0,1]$ be the probability that the incumbent group is replaced between the two time periods. Clearly, γ is a natural measure of political instability. This new feature adds new and important dimensions to the analysis of policy and fiscal capacity.

Let the period-s payoff of being either the incumbent or the opposition, $J = I_s, O_s$, be:

$$W^J\left(\boldsymbol{\tau}_s, R_s - m_s\right) = V_s^J\left(\mathbf{t}_s^*\left(\lambda_s^{I_s},\boldsymbol{\tau}_s\right),\boldsymbol{\tau}_s, g_s^*\left(\lambda_s^{I_s},\boldsymbol{\tau}_s\right),\omega_s^J,\beta^J(\theta)\, b_s\left(\lambda_s^{I_s},\boldsymbol{\tau}_s\right)\right) \ ,$$

where

$$b_s\left(\lambda_s^{I_s},\boldsymbol{\tau}_s\right)=\left[B\left(\mathbf{t}_s^*\left(\lambda_s^{I_s},\boldsymbol{\tau}_s\right),\boldsymbol{\tau}_s\right)+R_s-m_s-g_s^*\left(\lambda_s^{I_s},\boldsymbol{\tau}_s\right)\right]$$

is the total budget available for transfers, and $\beta^I(\theta)=\beta^I\left(\frac{1}{2},\theta\right)$ and $\beta^O(\theta)=\beta^O\left(\frac{1}{2},\theta\right)$ are the shares of transfers going to the incumbent and opposition groups. Now the level of fiscal capacity will be chosen to maximize

$$W^I\left(\boldsymbol{\tau}_1,R_1-\mathcal{F}\left(\boldsymbol{\tau}_1,\boldsymbol{\tau}_2\right)\right)+(1-\gamma)W^I\left(\boldsymbol{\tau}_2,R_2\right)+\gamma W^O\left(\boldsymbol{\tau}_2,R_2\right). \tag{15}$$

The effect of political turnover follows from the fact that γ enters this expected payoff.

The optimization of the incumbent over the vector of fiscal capacity yields:

$$\begin{aligned}(1-\gamma)\frac{\partial W^I\left(\boldsymbol{\tau}_2,R_2\right)}{\partial\tau_{k,2}}+\gamma\frac{\partial W^O\left(\boldsymbol{\tau}_2,R_2\right)}{\partial\tau_{k,2}}-\lambda_1^{I_1}\frac{\partial\mathcal{F}\left(\boldsymbol{\tau}_1,\boldsymbol{\tau}_2\right)}{\partial\tau_{k,2}} &\leqslant 0 \qquad (16)\\ \text{c.s.}\tau_{k,2} &\geqslant \tau_{k,1}\ .\end{aligned}$$

which, of course, just says that marginal costs and benefits are equated (at an interior solution). The third marginal cost term in (16) is by now familiar. However, some additional considerations go into computing the marginal benefit represented by the first and second term.

After some algebra, one can rewrite (16) as:

$$\begin{aligned}[\lambda_2^I+\gamma(\lambda_2^O-\lambda_2^I)]\frac{\partial B\left(\mathbf{t}_2^*,\boldsymbol{\tau}_2\right)}{\partial\tau_{k,2}}+\Delta_2^O+\frac{\partial Q\left(\mathbf{t}_2^*,\boldsymbol{\tau}_2\right)}{\partial\tau_{k,2}}-\lambda_1^I\frac{\partial\mathcal{F}\left(\boldsymbol{\tau}_1,\boldsymbol{\tau}_2\right)}{\partial\tau_{k,2}} &\leqslant 0 \qquad (17)\\ \text{c.s.}\tau_{k,2} &\geqslant \tau_{k,1}\ ,\end{aligned}$$

where

$$\Delta_2^O\equiv\gamma\frac{\partial V_2^O\left(\mathbf{t}_2^*\left(\lambda_2^{I_2},\boldsymbol{\tau}_2\right),\boldsymbol{\tau}_2,g_2^*\left(\lambda_2^{I_2},\boldsymbol{\tau}_2\right),\omega_2^J,\beta^J(\theta)\,b_s\left(\lambda_s^{I_s},\boldsymbol{\tau}_s\right)\right)}{\partial\mathbf{t}_2^*\left(\boldsymbol{\tau}_2\right)}\cdot\frac{\partial\mathbf{t}_2^*\left(\lambda_2^{I_2},\boldsymbol{\tau}_2\right)}{\partial\tau_{k,2}} \tag{18}$$

and

$$\lambda_2^O=\begin{cases}\alpha_2^{I_1} & \text{if } \alpha_2^{I_1}\geq\beta^I(\theta)\\ \beta^O(\theta) & \text{otherwise}\ .\end{cases}$$

The third and fourth terms in (17) are the same as in earlier cases , capturing the utility costs of greater compliance and the marginal costs of investment in

fiscal capacity. As before, the first term represents the value of extra revenue. However, the weight on this is now more complicated since the value of public revenue to the current incumbent is different when a marginal future dollar is spent by the incumbent than by herself, especially when the spending is on transfers rather than public goods. Unless there is agreement in the valuation of public goods $\alpha_2^{I_1} = \alpha_2^{O_1}$ and/or institutions are fully cohesive $\theta = 1$, we would expect $\lambda_2^O < \lambda_2^I$, so this effect will tend to diminish the incentive to invest in fiscal capacity, and more so the higher is the probability of turnover γ.

The second term Δ_2^O is entirely new. It represents an effect familiar from analyses of strategic policy making in dynamic models, which began with Alesina and Tabellini (1990) and Persson and Svensson (1989). The fact that the current incumbent and opposition may differ in their views about optimal period-2 taxes, means that the period-1 incumbent should structure investments in fiscal capacity to influence those decisions. For example, she may overinvest (underinvest) in the income tax if she likes the income tax more (less) than the opposition, so as to encourage (discourage) the opposition in using the income tax in the future, and the more so the higher the likelihood that the opposition takes over.

The size of this effect and whether it is positive or negative cannot be determined without going into details. A specific example that may lead to underinvestments is the case of a period-1 high-wage incumbent, who might be unlikely to invest heavily in income-tax compliance if she anticipates being replaced by a period-2 low-wage incumbent (see Subsection 4.3 for more details).

On balance, we may therefore expect higher political turnover to diminish investments in fiscal capacity, especially if there are few checks and balances so that θ is high (σ low) so that transfers are shared quite unequally.

Three types of state Following Besley and Persson (2011), the political model of the previous section allows us to think about three types of fiscal state that can emerge depending on the combination of political institutions and political turnover. For simplicity, and to focus on a specific set of issues, we will work through the case where $\alpha_s^{I_1} = \alpha_s^{O_1} = \alpha_s$ and $\omega_s^I = \omega_s^O$, so the valuations of public goods as well as earnings opportunities are identical across the two groups.

A common-interest state As long as α_2 is high enough relative to the value of transfers, we have:

$$\lambda_2^I = \lambda_2^O = \lambda_2 = \alpha_2 > \beta^I(\theta) \ . \tag{19}$$

In this case, all incremental tax revenue is spent on public goods and there is agreement about the future value of public funds. We will refer to this as a case of common interests, as both groups agree that the state should be for a common purpose, either because public goods are valuable (so that α_2 is high), or political institutions are very cohesive (so that $\beta^I(\theta)$ is low). In this case, we have a common-interest state, where the level of investment is driven entirely by the motive to invest in tax revenue to provide public goods. Moreover, both groups agree on the level and structure of taxation. The Euler equations for investing in fiscal capacity become identical to the benchmark model in Section 3, namely:

$$\begin{aligned} \lambda_2 \frac{\partial B(\mathbf{t}_2^*, \boldsymbol{\tau}_2)}{\partial \tau_{k,2}} + \frac{\partial Q(\mathbf{t}_2^*, \boldsymbol{\tau}_2)}{\partial \tau_{k,2}} - \lambda_1 \frac{\partial \mathcal{F}(\boldsymbol{\tau}_1, \boldsymbol{\tau}_2)}{\partial \tau_{k,2}} &\leqslant 0 \\ \text{c.s. } \tau_{k,2} &\geqslant \tau_{k,1} \ . \end{aligned}$$

Political institutions do not affect these decisions since the two groups agree on policy, and the state is run with a common purpose, no matter who is in charge. Although somewhat fanciful, the nearest real-world example might be what happens in a state of war, or a common external threat where common interests are paramount. We return to this point in Subsection 4.4 on the value of public spending below.

A redistributive state Now consider what happens when

$$\alpha_2 > \beta^I(\theta) \ . \tag{20}$$

In this case, the marginal dollar is spent on transfers, i.e. $\lambda_2^I = \beta^I(\theta)$. Moreover, the value of public funds to the opposition is $\beta^O(\theta)$. Now each group values public revenues differently and the period one incumbent cares about whether his group will remain in power to reap the rewards from investing in fiscal capacity which will accrue to the incumbent. The expected value of public revenues in period 2 to the period-1 incumbent is now:

$$\lambda_2^{I_1} = (1-\gamma)\beta^I(\theta) + \gamma\beta^O(\theta)$$

which is decreasing in γ for all $\theta < 1$. Indeed, this value is maximized at 2,when $\theta = \gamma = 0$. This is the case, where an incumbent faces no threat of removal and no checks and balances. The desire to build a revenue base is then based on the desire to redistribute resources towards the incumbent group.

Besley and Persson (2011) refer to the case when a strong sectional motive to redistributive is the driving force for state building as a redistributive state. Such states thrive on low turnover and low cohesion. In the limiting case of $\lambda_2^I = 2$, the Euler equations are:

$$\begin{aligned} 2\frac{\partial B\left(\mathbf{t}_2^*, \boldsymbol{\tau}_2\right)}{\partial \tau_{k,2}} + \frac{\partial Q\left(\mathbf{t}_2^*, \boldsymbol{\tau}_2\right)}{\partial \tau_{k,2}} - 2\frac{\partial \mathcal{F}\left(\boldsymbol{\tau}_1, \boldsymbol{\tau}_2\right)}{\partial \tau_{k,2}} &\leqslant 0 \\ \text{c.s. } \tau_{k,2} &\geqslant \tau_{k,1} \ . \end{aligned}$$

Since the incumbent is guaranteed to remain in power, there is no strategic effect in this case.

A weak state A weak state combines non-cohesive institutions so that (20) holds with high political instability. To illustrate this, consider what happens if an incumbent expects to lose power for sure and his successor faces no meaningful executive constraints, i.e. $\gamma = 1$ and $\theta = 0$. Then, the expected value of public revenues created by investments in fiscal capacity is zero! The future incumbent, i.e., the current opposition is the residual claimant on all revenue created by fiscal-capacity investments. In this special case, the fiscal-capacity Euler equations are:

$$\begin{aligned} \Delta_2^O + \frac{\partial Q\left(\mathbf{t}_2^*, \boldsymbol{\tau}_2\right)}{\partial \tau_{k,2}} - \lambda_1 \frac{\partial \mathcal{F}\left(\boldsymbol{\tau}_1, \boldsymbol{\tau}_2\right)}{\partial \tau_{k,2}} &\leqslant 0 \\ \text{c.s. } \tau_{k,2} &\geqslant \tau_{k,1} \ . \end{aligned}$$

Since the second and the third terms are both negative, the only potential argument for building fiscal capacity would be to influence strategically the decisions over taxation of a future incumbent, according to the first term. However, this term is negative too: because $\lambda_2^I > \lambda_2^O = 0$, the future incumbent (the current opposition) wants (much) higher taxation than the current incumbent. Hence, the strategic motive makes the current incumbent not want to invest at all, perhaps even destroy fiscal capacity if that is feasible option.

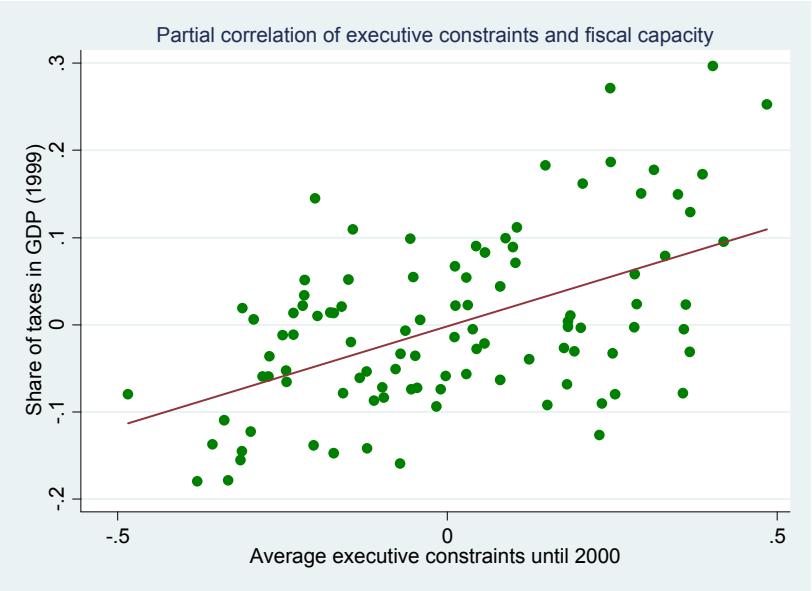

Figure 9: Share of tax revenue and executive constraints

While we have illustrated this mechanism for an extreme case, the logic is much more general. Political instability and little political cohesion (few checks and balances) generally mean that the incentives to invest in fiscal capacity are very slim, so we expect tax compliance and hence tax revenues to stay weak under these conditions.

One bottom line of the discussion in this section is that we should expect countries that have operated on more cohesive institutions in the past to have a higher stock of fiscal capacity today. Besley and Persson (2011, chs. 2 and 3) show that this is indeed the case, when fiscal capacity is measured in different ways and cohesive political institutions are measured by executive constraints in the Polity IV data set. Political instability is harder to measure in a convincing way, but there seems to be some evidence that more stability is correlated with higher fiscal capacity.Figure 9 illustrates the relationship between current fiscal capacity and past cohesive political institutions using a partial correlation plot. As a measure of cohesiveness, we use the history of the strength of a country's executive constraints from 1800, or its year of creation, up to 2000. The data come from the Polity IV

data base, specifically the variable *executive constraints* measuring various checks and balances on the executive. Following the theory outlined above, the underlying regression controls for the value of public spending, through measures of ethnic homogeneity and (past) external wars, and the degree of political instability, through measures of openness and competition in the selection of the executive. We see a very clear upward slope in the regression line, consistent with the argument in this section – countries with a history of more cohesive institutions appear to have built more fiscal capacity.

4.3 Social Structure and Politics

The two-group model with common valuations of public goods and identical wages has served well to illustrate some key points. But clearly, it misses a lot in terms of social structure, which may affect the struggle for power. Often, the political struggle has different values or an unequal distribution of resources at its heart.

Group size heterogeneity and elite rule Consider now the possibility that the two groups in the specialized model have different size but face the same institutions, as represented by θ, when in office. Observe that $\beta^I\left(\xi^I,\theta\right)$, as defined in (13), is larger for the majority group than the minority group, meaning that transfer behavior becomes more cohesive when larger groups are in office, as their value of extracting a dollar in transfers is much lower than for a small group. A lower value of $\beta^I\left(\xi^I,\theta\right)$ means that the condition

$$\alpha_s^I > \beta^I\left(\xi^I,\theta\right)$$

for all spending to be on public goods is more easily to fulfil. Thus, there is a greater chance the state pursues a policy in the common interest when large groups hold power. On this account, majority rule is more likely to stimulate buildup of fiscal capacity than minority rule. Indeed, if a country is governed by a small elite, it seems rather unlikely that a common-interest state will emerge – instead the state will become redistributive or weak.

The same basic effect will emerge when a group leader rules on behalf of a small elite rather than on behalf of the group as a whole. When such narrow elites alternate in power, it will be difficult to create common interests in the use of public resources. Therefore, the value of political reform that raises θ towards 1 can be particularly strong in such a country. Similarly,

measures which reduce the agency problem between elites and rank and file group members could also push a country towards a common-interest state.

Income inequality The discussion in Subsection 4.2, abstracted from heterogeneity in earnings. To home in on this, we now focus exclusively on income taxation and assume away all other forms of heterogeneity, e.g., in group size or the preferences for public spending. Using standard logic from Romer (1975), Roberts (1977), and Meltzer and Richards (1981), we would expect a low-income group to prefer a higher rate of income taxation than the high-income group, due to the redistributive effect of income taxation whether it is spent on public goods or transfers. We might also expect these policy preferences to translate into different incentives to invest in fiscal capacity to increase income taxation.[10]

These mechanisms are most simply illustrated in the case of a common-interest state where (19) holds. Suppose we specialize the model to two groups, $J = P, R$, where P stands for "poor" and R for "rich" with $\omega^R > \omega^P$. We have dropped the time subscripts, i.e., we assume that the rich and the poor each have the same wage rates periods 1 and 2. In the case with constant elasticity of labor supply, the income tax preferred by group J (assuming an interior solution) becomes:

$$\frac{t_{L,s}^{*J}}{1 - t_{L,s}^{*J}} = \frac{\left(\lambda_s - \nu^J\right) + (1 - \kappa)\,\varepsilon}{\kappa\eta} \tag{21}$$

where $\nu^J = \omega^J L^J / \sum \xi_K \omega^K L^K$ is the ratio of group J's labor income to average labor income. For the rich to want a positive income tax, the value of public spending as represented by λ_s has to be great enough. Clearly, we have

$$t_{L,s}^{*P} > t_{L,s}^{*R}$$

in general. We can now say something concrete about the strategic effect in equation (18) provided we assume, as the discussion following equation (5)

[10] Cárdenas and Tuzemen (2010) use a similar model, allowing for income inequality between two groups, called Elites and Citizens. When the (richer) Elites are in power, in the presence of political instability, both income and political inequality lead to lower investment in state capacity. Conversely, if the (poorer) Citizens rule, high political and income inequality results in higher state capacity.

suggest, that

$$\frac{dt^{*I_s}_{L,s}}{d\tau_{L,s}} > 0 \text{ for } I_s \in \{P, R\} \ .$$

This says that an incumbent of any type would wish to implement a higher rate of income taxation if there is greater investment in the fiscal capacity to charge an income tax. Recall that this effect arises because greater fiscal capacity in the form of income-tax enforcement raises the marginal yield from any given statutory income tax rate. The strategic effects become:

$$\Delta_2^P > 0 > \Delta_2^R \ .$$

To see why, take the case of a rich incumbent. If the poor group takes over in the future, then it will tax too much from the viewpoint of the rich, so a rich group contemplating being in future opposition would gain an strategic advantage from lowering fiscal capacity. In the same way a poor incumbent contemplating being in future opposition would gain a strategic advantage by pushing investment in income tax capacity further. These incentives are larger the higher is income inequality and the larger is political instability. The logic is the same as the one that makes a rich group want to impose a larger debt on a poor successor, and a poor group to impose a smaller debt on a rich successor in Persson and Svensson (1989).

Thus, perhaps unsurprisingly, inequality creates a conflict of interest over investing in fiscal capacity which mirrors the conflict of interest over the tax base itself. However, the patterns of political control also matter to whether income tax capacity gets built. If the rich are securely in power, they will invest in fiscal capacity to support public spending. However, if they fear losing power, they will invest less as this will encourage the poor to use income taxation more intensively in future making the rich pay for an even larger share of public spending. If the poor are securely in power, this should lead to a strong investment in income tax capacity. To the extent that transitions to more democratic rule leads to lower income citizens being in the ascendancy, we should observe a tendency to build income tax capacity. This would be spurred on even further if the poor are more fearful of a reversion to elite rule. Generally, the poor's strategic incentive is to overinvest.

While we have applied this argument to income tax capacity, the same argument applies to any tax base which generates a strong conflict of interest between groups. We have made the argument in the case of a common-interest state, where there is agreement over the disbursement of public re-

sources. But the basic logic could equally well be applied to a redistributive or weak state.

The bottom line from this discussion is that we may expect income inequality to play an important role in the development of fiscal capacity. Given that a high level of income inequality particularly curtails the investment incentives for a rich incumbent, this conclusion is strengthened if we are willing to assume that economic power and political power tend to go hand in hand. Cárdenas (2010) considers the question empirically, using cross-sectional data for 100+ countries, and finds that political and (especially) economic inequality appears to be associated with lower incentives to invest in state capacity. In fact, he uses income inequality to explain Latin America's generally underdeveloped fiscal capacity.

Polarization In the political models above, we have assumed that there is a *common* way of valuing of public goods across the two groups. However, this need not be the case. Alesina, Baqir and Easterly (1999), e.g., have forcefully argued that ethnic conflicts may lead to polarized preferences that diminish society's spending on public goods.[11]. Differences in valuation may reflect e.g., ethnic, linguistic, or religious cleavages in society. We now briefly consider the implications of such divergent views, which we think about in two different ways. First, we consider what happens when groups differ in their value of public goods in a way that is not affected by whether or not they are incumbents. Second, we consider the possibility that differences arise according to whether a group is an incumbent, since an important dimensions of policy choice may be the type of public goods that are chosen.

To illustrate the first case, we will suppose that $\alpha_2^J \in \{\alpha_L, \alpha_H\}$ with $\alpha_H > \alpha_L$. For simplicity, we focus on the common-interest case where all public spending is allocated to public goods. Now it is clear that the marginal value of public spending depends on which group is in office. Any group for whom $\alpha_2^J = \alpha_H$ has a higher value of future public funds $\lambda_2^I = \alpha_H$ than the low-valuation group, and will therefore invest more in fiscal capacity of all types, everything else equal. For such groups, securely holding power will encourage investing. One interpretation of such heterogeneity in values may be that certain groups have stronger social capital and hence can provide public goods on its own, e.g. trough ethnic or familial networks. Then, arranging the public goods provision through the state will be of lesser

[11] See Esteban and Ray (1994) for a discussion of how to measure polarization.

interest. For example, authors such as Esping-Andersen (1999) and, more recently, Alesina and Giuliano (2010) have argued that countries with strong family ties invest less in welfare state.

To illustrate the second case, where the decision rights of being in power affects the mix of public goods when in office, we suppose that $\alpha_2^I = \alpha_H > \alpha_L = \alpha_2^O$.[12] In this case, $\alpha_H - \alpha_L$ becomes a natural measure of the polarization in preferences. The expected value of future public revenues to an incumbent becomes

$$\lambda_2^I = \left[(1-\gamma)\,\alpha_H + \gamma\alpha_L\right] \ .$$

It follows from the expressions above that more polarization and higher political instability both reduce the incentive to invest in fiscal capacity of all types to boost future revenues. As shown in Figure 10, the partial correlation (holding constant the same factor as those discussed under Figure 9) between ethnic heterogeneity and different measures of fiscal capacity is indeed negative.

4.4 The Value of Public Spending

Our approach gives the value of spending on collectively valuable goods a central place among the motives to build fiscal capacity. Formally, parameter α_s^J affects the value of public revenues in the eyes of group J. In this section, we discuss some factors that go into determining this value. Of course, in the standard interpretation, these are just fixed preference parameters. But there are strong reasons to think that they depend on factors which can be shaped by history as well as policy.

Common-interest spending and war finance As discussed in the introduction, war has played a central role in the history of public finance. In terms of the model, external threats can be an important determinant of the structure of preferences $\{\alpha_2^J\}_J$. The threat of war may also act like a common-interest shock that moves a society close to a common-interest state, or from the status of a weak to a redistributive state (at least during a period where the threat is felt). In our approach, the mechanism behind this is to raise the value of public revenues and make it incentive compatible to

[12] A more involved case would explicitly introduce different types of public goods, with different groups having a preference bias towards certain types, as in Alesina and Tabellini (1990).

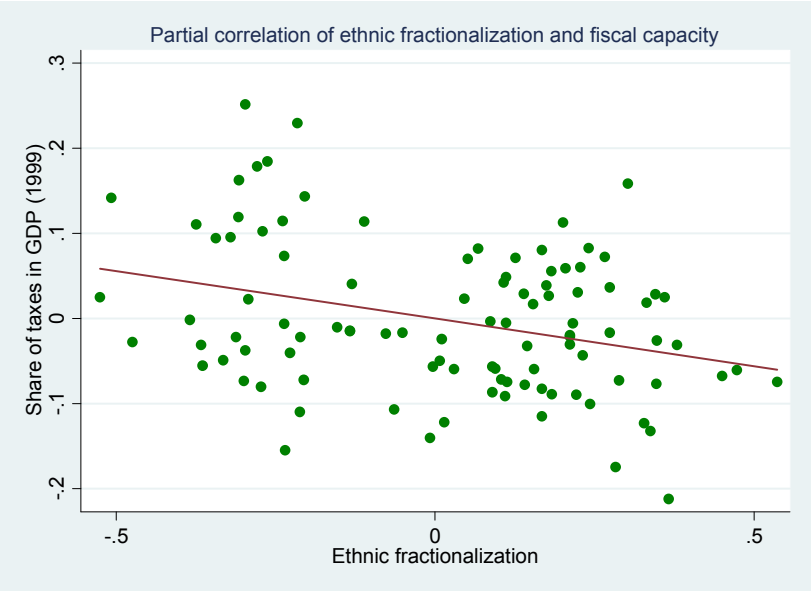

Figure 10: Share of taxes and ethnic fractionalization

spend these revenues on public goods rather than redistribution. This allows our framework to capture the arguments made by Hintze (1906), Tilly (1985, 1990) and others. Dincecco and Prado (2010) use pre-modern war causalities to explain fiscal capacity today (measured as direct taxes as a share of total taxes), and also relate GDP per capita to fiscal capacity. Gennaioli and Voth (2011) ....

War may have other effects which are more non-standard to the extent that war actually shapes social preferences. One interpretation may be that it diminishes polarization, as citizens forge a clearer sense of national identity – see Shayo (2009) on the endogenous formation of national identity. This might translate a transitory shock to a permanent effect. War may have lasting effects in a dynamic model where fiscal capacity investments are long-lived. The fact that a country built a strong tax system during a past war may raise its long-term tax take to the extent that such investments are permanent. This could be true, for example, in countries that introduced direct deduction of income taxes at source as a means to help finance their war expenditures.

One way to look at the link between wars and fiscal capacity is to look

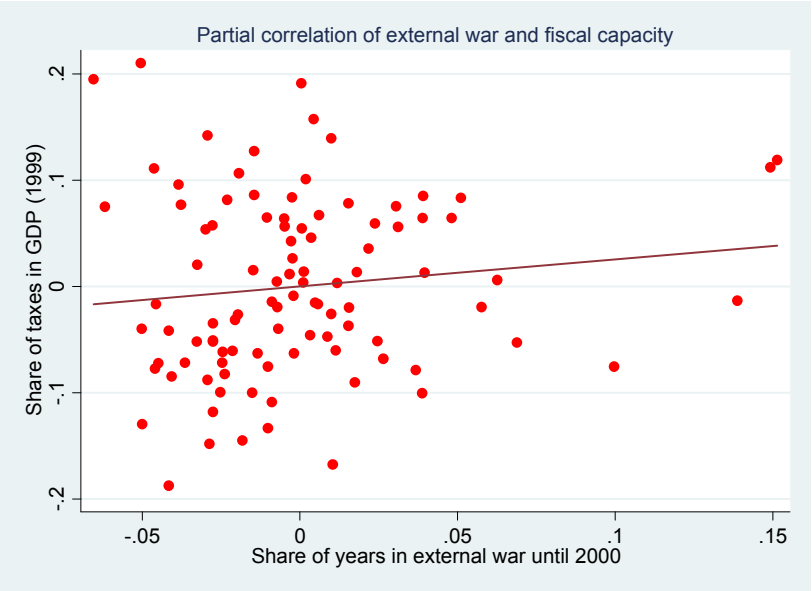

Figure 11: Share of taxes in GDP and external war

at the partial correlation (again holding constant the same factors an in the regression underlying Figure 9), between the years in external war from the Correlates of War data base and the share of taxes in GDP. This is done in Figure 11 which shows that there is an upward sloping relationship.

An important aspect of income tax compliance is direct withholding of taxes from wage packets. So its introduction is an interesting discrete investment in income tax capacity. Figure 12, illustrates the introduction of withhold over time, comparing countries who participated in the second world war with non-participants. The significant increase in the proportion of countries with direct withholding among the war participants is striking when compared to the non-perceptible effect among the non-participants. Although this is certainly casual empiricism, it is consistent with the arguments in this section.

Identifying public projects We could also see $\{\alpha_2^J\}_J$ as reflecting the ability of governments to identify good projects. An important line of development research in recent years has been instrumental in using Randomized Controlled Trials (RCTs) to identify the value of public interventions. These

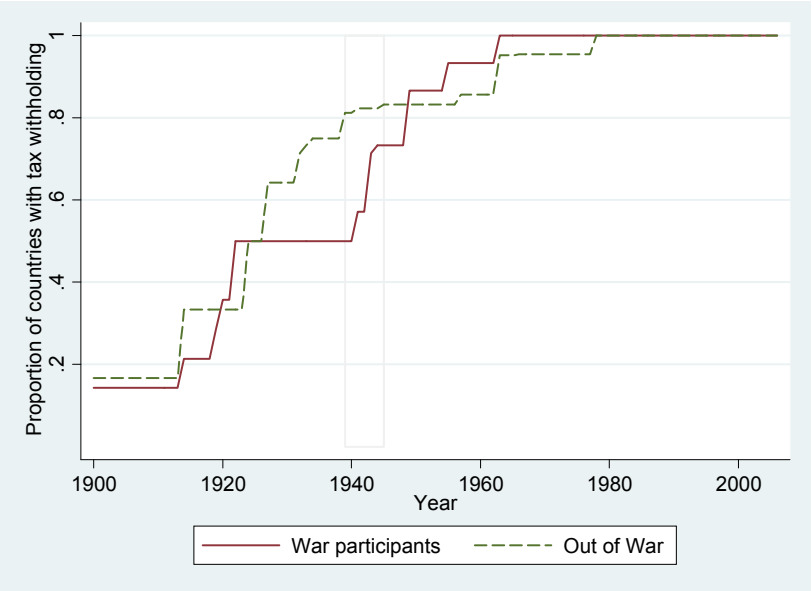

Figure 12: Introduction of tax withholding and war

can be thought of as trying to find ways of better allocating resources to public goods by identifying high benefit interventions. (See Duflo et al, 2007 for a discussion of the methodology.)

In our framework, we can represent an RCT as a particular form of experiment to evaluate project effectiveness. To model this, suppose that there is a continuum of possible public projects indexed by $p \in [0,1]$ where some have high returns and other low returns. Preferences for public goods are now:

$$\int_0^1 \alpha(p)\, h(g(p))$$

where $g(p)$ is spending on projects of type p. In the absence of discriminating information, we assume that the expected return on projects is the same, such that $\alpha(p) = \overline{\alpha}$. In this case, spending will be identical on all projects. For the sake of illustration, let us suppose that utility of public goods is quadratic, i.e., $h(g) = g - \frac{1}{2}g^2$

Suppose now that RCTs have been conducted on a subset of projects, which we assign to the interval $[0, \iota]$, to establish which have high and low returns. For simplicity, suppose all projects are equally likely to be high

return, α_H or low return α_L and that

$$\frac{\alpha_H + \alpha_L}{2} = \overline{\alpha} \ .$$

Given the outcomes of the trials and a given level of public spending, g_s, the government chooses three numbers – g_H, g_L, and $\overline{g}$ – to maximize:

$$\iota \frac{[\alpha_H h(g_H) + \alpha_L h(g_L)]}{2} + (1-\iota)\,\overline{\alpha} h(\overline{g})$$

subject to

$$\frac{\iota}{2}(g_H + g_L) + (1-\iota)\,\overline{g} = g_s.$$

This will lead to governments spending more on projects that have value α_H and less on those with value α_L. Denote the solution by $H(g_s;\iota)$. Solving this for the quadratic case, the marginal value of public goods spending is

$$H_g(g_s;\iota) = \frac{1-g_s}{\left(\frac{\iota}{2}\left(\frac{1}{\alpha_H}+\frac{1}{\alpha_L}\right)+\frac{1-\iota}{\overline{\alpha}}\right)} \ ,$$

an expression which is increasing in ι, the fraction of spending in which the government is informed about returns. In words, better information about worthwhile projects raises the value of public spending. Moreover, this information effect is larger the greater is the difference between high and low returns, $\alpha_H - \alpha_L$.

This illustrates how public interventions found through randomized-control trials – provided they could be scaled up to achieve large aggregate returns – might assist the creation of common-interest states. Arguably, the argument may also illustrate why Western welfare states have gradually become the engine of state development during times of peace. Creating effective public health-care systems seems like an especially important example. Such systems persist essentially because the returns are perceived as common-interest spending with high returns.

One could develop a related argument regarding the improvement of cost efficiency in the delivery of public spending. In that case, there could be a role for using knowledge about best practice to enhance the value of public spending. This could include innovations in the mode of delivery or lower cost forms of delivery, such as making better use of information and communication technologies. Our modeling approach would links such efficiency enhancement to the scale of demand for public goods at the expense of transfer payments.

Corruption Our model assumes that all resources that are spent on public projects finds their way into actual spending on public goods. But in many countries, this is a poor assumption due to high levels of corruption. Many studies, following the pioneering work by Reinikka and Svensson (2008), have shown the value of interventions which reduce corruption and increase the effective flow of spending benefiting the end users.

This argument is especially poignant when fiscal capacity is endogenous. Suppose then that only a fraction ξ of the intended spending on public goods actually finds its way into actual spending on the ground. If so, the value of public goods is

$$\alpha_s^J H\left(\left(1-\xi_s\right) g_s\right) \ .$$

In terms of accounting, a share of the spending, $\xi_s g_s$, ends up in the hands of citizens who earn corruption rents. Indeed, if $\xi_s g_s$ is a pure transfer, then corruption is also pure transfer. In practice, corruption in this or other forms creates constituencies in favor of maintaining the status quo. In terms of our approach, if the corruption rents flow disproportionately to ruling groups, this can affect the decisions to build fiscal capacity.

To understand the implications for public finance, we ask how the parameter ξ_s affects incentives to build fiscal capacity. Two broad effects need to be understood. First, we have an effect on the marginal value of spending on public goods. This depends on how

$$\left(1-\xi_s\right) H_g\left(\left(1-\xi_s\right) g_s\right)$$

depends on ξ_s. As long as the elasticity $-H_{gg} g\left(1-\xi\right)/H_g$ falls short of unity, greater corruption reduces the marginal value of spending on public goods.

Second, we have an effect comes from the distribution of the rents from corruption $g_s \xi_s$. If these accrue exclusively to the incumbent group, this will enhance the value of holding power – in effect, there is a blur between spending spending on transfers and on public goods since:

$$r_s^I = \beta^I\left(\xi^I, \theta\right)\left[B\left(\mathbf{t}_s, \boldsymbol{\tau}_s\right) + R_s - g_s - m_s\right] + g_s \xi_s$$

With low political turnover γ, this will tend to enhance motives for building fiscal capacity as in the case of a redistributive state above but this effect will be weakened by turnover as in the case of the redistributive state. Moreover, even as $\theta \to 1$, a redistributive motive for building fiscal capacity remains

due to extra-budget transfers accruing to incumbents through corruption. To the extent that corruption rents are widely held, i.e. are not distributed towards incumbent status, these motives will be weakened.

In summary, the first effect via the marginal value of public goods likely cuts the value of public funds and thus reduces the motives for investing in fiscal capacity. The second effect, via corruption rents, may go the other way at least when incumbents groups capture a large share of the rents from corruption. .

Summary The discussion in this section ties together the taxation and spending side of the state. A requirement for building a state run on common-interest grounds is that public revenues are spent on goods that are valued by a wide group of citizens. In history, war has arguably been an important source of such common interests and provides a key motive for creating fiscal capacity. Our framework suggests that states which lack common interests will have fiscally weak states, all else equal. One way to foster such interests might be to improve project evaluation and to identify which public interventions work in practice. This may not only improve the use for a given budget, but it can also foster endogenous increases in fiscal capacity. As we have seen, combatting corruption in public spending is also linked to the motives for building an effective tax system.

4.5 Non-Tax Revenues

Our model framework allows for the possibility that states have non-tax revenue, called R_s in the form of aid or natural resources. These incentives are made plain in the first-order conditions for fiscal capacity (8). The conditions show that non-tax income matters for investments in the state through changing the marginal value of tax revenue, as represented by λ_1 and λ_2.

Aid and development finance Anticipated period 2 aid, embodied in R_2 reduce the incentive to invest, whenever marginal spending is allocated to public goods. However, current non-tax income, R_1 reduces costs of investing in the short term, when marginal spending is on public goods, thus boosting the incentives to invest. When the transfer motive for investing in the state is dominant, we would expect aid and resources to go into transfers leading to no effect on incentives to build indigenous fiscal capacity. This observation

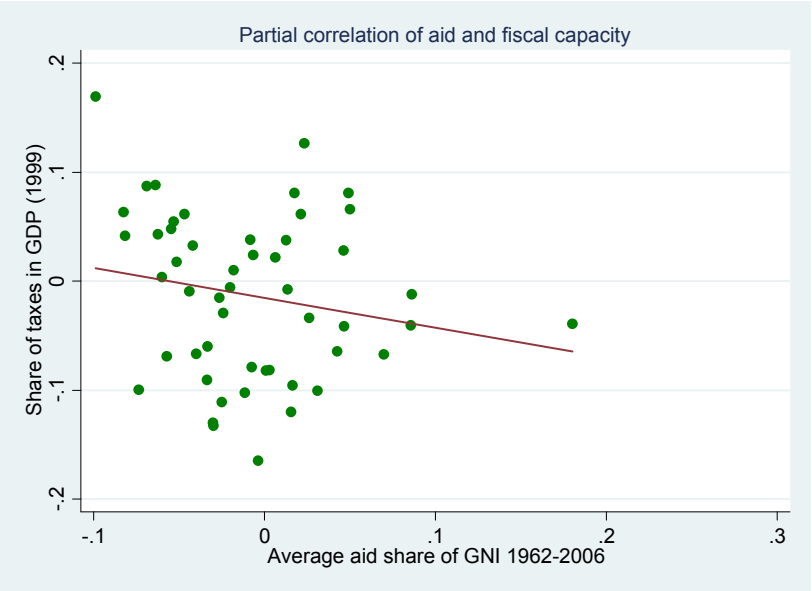

Figure 13: Share of taxes in GDP and aid

shows why political institutions may matter, as we have already discussed, since these govern the likelihood that the common-interest, rather than the redistributive, motive is dominant.

This discussion justifies the standard focus of development finance on lending to government rather than handing out cash grants. The former promotes the incentives to build an effective tax system. When public goods are valuable, a period-1 grant or loan should increase investment in fiscal capacity. And forcing repayment of the loan, thereby increasing λ_2, further reinforces the investment effect. But the incentives would be reversed in a Samaritan's dilemma, where a period-1 failure to invest in fiscal capacity elicits more aid to be paid in period 2. This dilemma seems relevant for some aid-dependent countries, where part of the gain from building indigenous fiscal capacity would be taxed away in the form of lower aid.

Figure 13 looks at the relationship between fiscal capacity, measured by the total tax take, and aid receipts as a share of gross national income. The graph shows that the partial correlation is negative, in line with what we would expect from the framework presented here.

Resource revenues The model also gives insights into why natural resource discoveries can stifle the efforts to build fiscal capacity. A government that discovers oil in period 1 with anticipated revenues in period 2 will reduce their investment in fiscal capacity. Of course, such resource revenues may be beneficial but may necessitate a catch-up period of fiscal capacity building and leave country vulnerable to negative commodity-price shocks.

Some data supports the proposition that fiscal capacity building is related to resource dependence. Jensen (2011) presents econometric evidence, using panel data with country-specific price indexes constructed for natural gas and oil and weighted by respective shares in total national energy production. He finds that a 1 percent increase in the share of natural resource rents in total government income is associated with a 1.4 percent decrease in the fiscal capacity of a country.

Informal taxation The previous section discussed the role of corruption on the spending side of the state and touched upon the revenues generated by corruption. But corruption may also work as a direct non-tax revenue-raising device for governments or government bureaucrats. Like explicit taxation, such informal taxation through corruption imposes static and dynamic distortions on the business of the private sector. Here, we briefly bring such considerations into the approach.

Suppose that there are now two kinds of taxation on activity k in period s, the formal tax rate $t_{k,s}$ studied above and informal taxation at rate $T_{k,s}$. Unlike formal taxation, we suppose that returns to corruption accrue directly as transfers to the ruling group, rather than being funneled through the public budget and subject to any checks and balances in place to constrain government spending. Moreover, we suppose that the governing group has some "informal fiscal capacity" and that non-compliance with corruption is impossible. This may be extreme, but will serve us well to make a few important points. It is clear that we could extend the treatment and make informal and formal fiscal capacity more alike.

The individual budget constraint is now:

$$x_{0,s}^{J}+\sum_{n=1}^{N}p_{n,s}\left(1+t_{n,s}+T_{n,s}\right)x_{n,s}^{J}\leq\omega_{s}^{J}\left(1-t_{L,s}-T_{L,s}\right)L_{s}^{J}+r_{s}^{J}+\sum_{k=1}^{L}\left[t_{k,s}e_{k,s}-c\left(e_{k,s},\tau_{k,s}\right)\right]\ .$$

and the earnings from informal taxation are

$$B^I(\mathbf{T}) = \sum_{n=1}^{N} T_{n,s} p_{n,s} x_{n,s} + \sum_{J=1}^{\mathcal{J}} \xi^J T_{L,s} \omega_s^J L_s^J.$$

The existence of such informal taxation affects optimal formal tax rates as there are both formal and informal tax rates on each base.

An increase in $T_{k,s}$ has a static effect in that it cuts available formal tax revenue by reducing goods demand or labor supply. So there is a negative externality for formal taxation. If the motive for informal taxation is purely redistributive, as here, it should also reduce resources available to spend on public goods. There are no checks and balances on raising such revenues except any informal controls that may exist within a group. Incentives for informal taxation are particularly high when the revenues accrue to a small subset, an "elite", within the ruling group. In addition to this static effect, however, informal taxation through corruption can also have a dynamic effects. Specifically, it may undermine the incentives to invest in the formal tax base, since the latter shrinks in response to informal taxation. The lower tax base therefore diminishes investments in fiscal capacity, as did a lower level of development in Section 4.1.

Unlike corruption on the spending side, we would thus expect higher corruption on the revenues side to be associated with less tax collection, everything else equal. This is confirmed in Figure 14, which plots the partial correlation between fiscal capacity (measured by total tax take) and corruption, measured by a perceptions index from Transparency International. Countries with a higher share of taxes in GDP are also the least corrupt.

4.6 Compliance

So far, we have basically left the technology for evading taxes and for increasing compliance as a black box. In this section, we will glean a little on the door of this black box and indicate how one may enrich the analysis. We will begin with a simple model of the forces that may shape the costs of non-compliance, and then extend it in a few ways to motivate policy interventions to increase compliance.

A simple micro-foundation for the costs of non-compliance The simplest micro-foundation for the evasion cost function $c(\tau, e)$, which plays

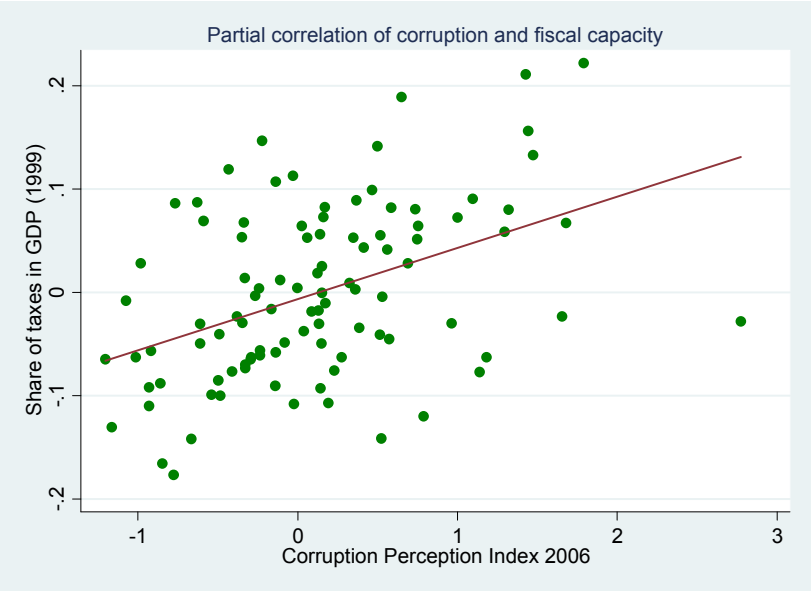

Figure 14: Share of taxes in GDP and corruption

a crucial role for tax compliance, is a variant of the classic analysis of detection and punishment. Let $\phi(e)$ be a non-pecuniary punishment for non-compliance with the tax code, increasing and convex in the amount of evasion e and let $\upsilon(\tau)$ be the probability of detection, increasing in τ.[13] Then

$$c(e,\tau) = \upsilon(\tau)\,\phi(e).$$

This is the classic Allingham and Sandmo (1972) model of evasion, except that we have supposed that punishments are non-pecuniary. To the extent that $\phi(e)$ is pecuniary, it adds directly to tax revenue and would have to be added to the government budget constraint. However, this would be a fairly minor difference with little effect on the main insights and we therefore stick with the non-pecuniary punishment case.

The other important part of the compliance technology is $\upsilon(\tau)$ – factors shaping the probability to be caught and face a sanction. A raft of measures based on technological improvements in record keeping and competence among tax authorities belong in here. It is questionable whether

[13]It would be straightforward to allow $\upsilon(\tau)$ depends on e so larger transgressions are more likely to be detected.

low-income countries generally use best practice procedures, so there might be scope for technology transfer. (Cite some examples).

The function $\upsilon(\tau)$ also depends on the production structure, as we discussed in Section 4.1, with some kinds of economic activities intrinsically easier to monitor than others depending the degree of formality, the need for transparent record keeping, and the use of the formal financial system.

Social norms and tax morale The model can be used to crudely consider the role of social norms in affecting tax compliance. Suppose that shame or stigma from noncompliance in a particular tax base depends on the average amount of non-compliance in the population as a whole, which we denote by $\bar{e}$. Thus

$$c(e, \tau; \bar{e}) = \upsilon(\tau)\, \phi(e; \bar{e}) \ ,$$

with $\phi_{\bar{e}}(e; \bar{e}) < 0$ i.e., an increasing amount of non-compliance in the population as a whole lowers the stigma/shame from cheating. In this simple case, the evasion decisions, corresponding to (1) in Section 3 will form a Nash equilibrium where:

$$t_{k,s} = \upsilon(\tau_{k,s})\, \phi_e\left(e^*_{k,s}; e^*_{k,s}\right) \text{ for } k = 1, ..., N, L \text{ if } \tau_{k,s} > 0 \ .$$

With $\phi_{e\bar{e}} < 0$, we get the possibility of multiple Pareto-ranked tax-evasion equilibria, since the reaction functions for evasion slope upwards.

This opens the door for tax culture to affect compliance. Countries with a strong culture of compliance may find it much cheaper to achieve a similar level of fiscal capacity compared to one where the norm is unfavorable. Such issues have been discussed by political scientists, e.g., Torgler (2007), Levi (1998) and Rothstein (2000).

Obviously, the simple model considered here could be modified in different directions. For instance, there could be spillover effects between different tax bases, so that common cheating on some tax base spreads by contagion and erodes compliance with other taxes. Also, the relevant reference group for the social norm espoused by some particular individual may be more local the entire set of tax payers. Local reference groups of this sort might help explain local pockets with widespread tax evasion, like the favelas at the outskirts of large Brazilian cities in which whole communities function largely outside the formal sector.

If tax morale is important, then interventions that increase the stigma from non-compliance may be an important form of intervention to improve

compliance. It may even make sense to increase the visibility of compliers and to associate compliance with social approval (Chetty (2009) and Chetty, et al (2009)). But the real and fundamental question her – about which we know very little, theoretically or empirically – is how legal and administrative interventions interact with social norms – see, however, Benabou and Tirole (2011) for a recent and very interesting analysis.

Our discussion here has been speculative and sketchy. But the issue of tax morale is certainly important and it is plausible that different tax cultures in, say, Sweden and Greece contributes to the large differences in their tax take. The idea of tax morale also goes to the heart of debates about state legitimacy, a concept we have not dealt with at all. However, the interactions between social norms of compliance, state legitimacy, fiscal capacity, and institutions is an interesting and important topic for further research.

Incentives for tax inspectors In many countries, a major problem in collecting tax revenues is the weak motives for tax inspectors. These could reflect either low incentives to detect tax evasion or a willingness to take bribes from non-compliers if caught. Our simple model allows us to think about both issues.

Suppose that detection of evasion requires that inspectors put in effort χ. Such effort increases the chances of being catching an evader, but is privately costly to the tax inspector. Denote the probability that an evader is caught by $\upsilon(\tau, \chi)$ with $\upsilon_\chi(\tau, \chi) > 0$. For any given tax base and level of fiscal capacity, let equilibrium evasion be

$$e^*(t, \tau; \chi) = \arg\max_e \{et - \upsilon(\tau, \chi)\phi(e)\} \ .$$

It is easy to see that $e^*(t, \tau; \chi)$ is decreasing in χ. Let $q(t, \tau, \chi)$ now be the private profit per capita from non-compliance when tax inspectors put in effort χ.

An important question, on which much tax administration has tripped up, is what motivates inspectors to put in such costly monitoring. A traditional view is that this is taken care by some kind of pro-social motivation, i.e., inspectors are intrinsically honest. But as governments have learned to their cost, this cannot be taken for granted.

Assuming that inspectors have to be compensated for their disutility of labor in a competitive labor market, the socially optimal level of tax revenue

raising effort is:

$$\chi^{*}\left(t_{k,s},\tau_{k,s}\right)=\arg\max_{\chi}\left\{q\left(t_{k,s},\tau_{k,s},\chi\right)+\lambda_{s}\left[t_{k,s}e^{*}\left(t_{k,s},\tau_{k,s};\chi\right)-\chi\right]\right\}. \quad (22)$$

where λ_s, as above is the marginal value of public revenues. The maximand includes two terms – the private non-compliance profits and the value of tax revenues net of the cost of effort. Higher effort χ will reduce the first term and increase the second term and the balance between the two will define the optimum.

The main question is how the government can implement such an optimal effort level. If χ is not observed, there is a potential moral-hazard problem for inspectors – see Mookherjee and Png (1995) and Besley and McLaren (1993) for studies along these lines. If the tax inspector were offered a fixed wage and is not strongly intrinsically motivated, he would set $\chi = 0$. In this case, there would no point in employing inspectors at all. In this framework, we can think of changes in fiscal capacity as corresponding to alternative ways of organizing the tax-collection service to avoid this outcome.

One regime would be to focus on recruiting tax inspectors who set $\chi = \chi^{*}\left(t_{k,s},\tau_{k,s}\right)$ by establishing some kind of rigorous recruiting and training regime. Such merit-based professionalization of the bureaucracy is certainly a feature of fiscal history.

Another possibility would be to contemplate tax farming, a popular solution in historic times where tax inspectors are sold a franchise to collect taxes on a particular tax base, in exchange for becoming a residual claimants. In this case, we would expect:

$$\hat{\chi}\left(t_{k,s},\tau_{k,s}\right)=\arg\max\left\{t_{k,s}e^{*}\left(t_{k,s},\tau_{k,s};\chi\right)-\chi\right\}$$

Comparing this to the expression in (22), we see that tax farming would never be optimal in our framework, for reasons that make sense given the history of tax farming. Specifically, tax farming would vest too much effort in extracting taxes, as tax farmers would fail to internalize the utility costs they impose on the public. In practice, tax farmers would have tended to use sometime brutal methods of collecting taxes, ignoring most of the costs to the populations from whom they are collecting.

Another option would be to pay tax inspectors efficiency wages, as discussed in Besley and McLaren (1993). To see how this might work, assume inspectors are themselves subject to inspection in a hierarchical structure.

Suppose that inspectors are asked to put in effort χ and that the probability a tax inspector is monitored and caught is $\xi(\tau)$. Finally, assume that if inspectors are caught, they are fired without being paid. Now, an inspector will put in effort at a wage of $\tilde{w}$ if:

$$\tilde{w} - \chi \geq (1 - \xi(\tau))\,\tilde{w}\ .$$

Solving this inequality, says that the wage needed to elicit effort χ is an increasing function :

$$\tilde{w} = \frac{\chi}{\xi(\tau)} > \chi.$$

Compared to a benchmark model with observable and contractible effort, getting effort is more expensive so for any $\xi(\tau) < 1$, the level of non-compliance will be higher. However, compared to a world which relies entirely on public spiritedness, or a world where $\chi = 0$, this could be a worthwhile proposition.

Corrupt tax inspectors Now consider how the possibility of corruption affects these arguments. Suppose for the moment that the level of effort put into detection is fixed. After detection, however, a bribe of b can be paid by an evader to the inspector, which exempts the evader from suffering the punishment $\phi(e)$. Assume that the inspector and the evader engage in Nash bargaining so that the bribe paid is:

$$b^* = \arg\max\{b(te - b + \phi(e))\} = \frac{te + \phi(e)}{2}.$$

In this case, higher penalties for non-compliance are partly transferred to tax inspectors, since they give the ability to tax inspectors to extort money from non-complying tax payers.

Somewhat paradoxically, bribery can motivate inspectors to put in greater detection effort since their payoff is:

$$\upsilon(\tau, \chi)\left[\frac{te + \phi(e)}{2}\right] - \chi.$$

Moreover this effort is sensitive to tax rates with greater taxes actually motivating tax inspectors to put in greater effort. This suggests the possibility that efforts to reduce bribery in a world where there is great deal of unobserved effort need not necessarily increase tax compliance. This is not to say that bribery should be condoned but that this is a second best world

where we need to consider the full set of incentives. Note also that if some component of fiscal capacity is independent of the incentive scheme for the inspectors' own efforts (such as income tax withholding), then higher independent capacity raises equilibrium effort by complementing the inspector's own efforts.

Exploiting local information How far should local information be harnessed in improving tax compliance? Focusing on the formal inspection process underestimates the scope for schemes, which fall under the heading of "cross reporting". This has become very important in the development literature on peer monitoring in micro-finance but has received less attention in the taxation literature.

The main idea exploits something which is well known in mechanism design theory is that once more than one person is informed about something then a variety of means can be used to illicit that information (see Maskin (1999) and Moore and Repullo (1988), among others). In the case of taxation, the obvious counterpart to this is when there are two parties to a transaction.

The following canonical model illustrates the idea. Suppose that evasion activity e is observed by two parties – whom we can call a purchaser (denoted by a subscript p) and a vendor (denoted by a subscript v). Suppose that the vendor is asked first to declare e_v and then the purchaser either agrees or disagrees. If there is disagreement, the government audits the transaction and the honest party is given a small reward and the dishonest party has to pay $\phi(e)$.

In the unique sub-game perfect equilibrium of this game, there is full compliance as long as $\phi(e) > te$. In other words, it is as if there is complete and costless auditing of transactions – the gamble in the traditional Allingham and Sandmo (1972) model goes away. This simple "mechanism" is simple illustration of the potential power of cross-reporting. However, it only works under two key assumptions. First, that there is no scope for collusion between the vendor and purchaser. Second, both parties to a given transaction can be observed. The latter is true when there are formal contracts of employment or purchase, where a receipt or record of the transaction is kept.

The evidence on informal taxation in Olken and Singhal (2011) suggest that traditional societies have evolved ways of mutually raising revenues using local information and enforcement. In modern economies, firms have taken on this role as argued by Kleven, Kreiner and Saez (2009). The ev-

idence from a clever field experiment in cooperation with the Chilean tax administration reported in Pomeranz (2011), suggests that cross-reporting in the value-added chain indeed helps enforce payments of the value added tax.

5 Conclusion

A key question in public finance and development is to understand how a state moves from collecting a low level of public revenue of around 10% of national income towards collecting around 40%. In the process, tax bases are typically shifting from trade taxes and excises towards labor income and other broad bases, such as value added.

To study this process is fundamentally a challenge of appreciating incentives and constraints. Incentives are shaped by political institutions, existing power structures, and societal demands that the state perform certain functions. Constraints are imposed by a society's economic environment, social cleavages, and political interests. Over time, these constraints can be shifted and governments play a key role for such shifts. Governments might invest to improve the working of the economy and the efficiency of public goods provision. They may also try to create a sense of national identity and propose reforms to political institutions. Analyzing such issues requires a dynamic framework and our chapter has sketched one. We believe that the factors highlighted in this framework provide substance to Schumpeter's insights about the centrality of taxation to understanding state development, namely:

> "The fiscal history of a people is above all an essential part of its general history. An enormous influence on the fate of nations emanates from the economic bleeding which the needs of the state necessitates, and from the use to which the results are put." (Joseph Schumpeter, *The Crisis of the Tax State*, 1918)

If developing states are to be able to support their citizens at a level now taken for granted by citizens in developed countries, this requires a series of investments, making the state more effective and responsive. Uncovering the preconditions for such investments to take place is a central task for research on public finance and development.

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