

# State Capacity, Reciprocity and the Social Contract\*

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## Abstract

This paper explores the role of civic culture in expanding fiscal capacity by developing a model based on reciprocal obligations; citizens pay their taxes and the state provides public goods. Civic culture evolves over time according to the relative payoff of civic-minded and materialist citizens. A strong civic culture manifests itself as high tax revenues sustained by high levels of voluntary tax compliance and provision of public goods. This captures the idea of government as a reciprocal social contract between the state and its citizens. The paper highlights the role of political institutions and common interests in the emergence civic culture.

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# 1 Introduction

One of the most striking features of twentieth century economic history was the increase in the capacity of states to raise significant revenues as a share of national income. At the turn of the century, very few advanced countries raised in excess of 10% of GDP in the form of tax revenues. Yet, by the last quarter of the century a tax take of around 40% was not uncommon. This expansion in revenues has enabled governments around the world to expand the scope of their activities from a predominant concern with national defence and infrastructure to high levels of public funding for health care, education, pensions and income transfers.

But this change in the nature of government is of much greater significance than is suggested by data on public revenues and spending alone. Raising substantial tax revenues requires transformative economic, political and social changes which was emphasized in Schumpeter (1918), a foundational essay in the history of fiscal sociology, when he notes that:

“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.”

In short, the power to tax is at the heart of creating an effective state.

This paper develops a model to illustrate the role of civic culture in building an effective fiscal state. Tax compliance is affected by the civic-mindedness of citizens and by the composition of government spending, i.e. public goods versus transfers. The latter is affected by the value of public goods and the cohesiveness of political institutions. Civic culture evolves over time reflecting the relative payoffs of civic-minded and materialistic citizens. The paper gives conditions under which this leads to an increase in fiscal capacity. Despite the specific modelling assumptions, the ideas developed in the paper are of wide applicability in understanding the historical emergence of effective states.

The approach taken here differs from the typical starting point for economic studies of government policy which assume that governments are endowed with sufficient power to tax, regulate and enforce laws. The main focus is then on how policy measures are deployed in theory and practice.<sup>1</sup>

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<sup>1</sup>See, for example, the classic texts such as Atkinson and Stiglitz (1980) on taxation and public spending, or Laffont and Tirole (1993) on regulation.

Only recently has there been a systematic investigation of how state capacities are acquired in the first place, feeding off an increased recognition that differences in state effectiveness across the world and over time are strikingly large.<sup>2</sup> At one end of the spectrum, are the highly functional states of Scandinavian countries many of which combine functioning market economies with social provision of a range of goods and services. At the other end of the spectrum are so-called “fragile” states, many of which are located in Africa and the Middle-East, and struggle to maintain law and order and to deliver even the most basic services to their citizens.

The framework developed here is able to isolate a range of factors which determine fiscal capacity. It highlights, in particular, the complementarity between the strength of institutions and a quasi-voluntary tax compliance as emphasized in Levi (1988). This emphasizes that institutional and cultural explanations of the emergence of a strong fiscal state are complements. The model also generates a range of novel insights into the factors which shape how civic culture develops in the long run.

The remainder of the paper is organized as follows. The next section discusses areas of related research along with some suggestive evidence from the World Values Survey. Section three develops the core model. Section four studies optimal policy and cultural dynamics and section five develops implications of different ways of creating stronger common interests between citizens and elites. Section six explores some additional issues while section seven concludes. Proofs and some technical details are in the Appendix.

## 2 Background

**State Effectiveness, Reciprocity and Social Order** The state is the central institution for maintaining social order in large and complex societies. This paper is related to long-standing debates about how to build an effective state that can tax, spend and regulate markets. This links a wide range of literature in political philosophy and the social sciences.

There are two broad views of the origins of effective states. The first is often associated with Hobbes (1651) and regards the *sine qua non* of state effectiveness to be the projection of coercive power. This sees the problem of state effectiveness as building organizational structures which allow the state to extend its reach and coerce citizens into complying with its diktats. This

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<sup>2</sup>See Besley and Persson (2011) for an outline of some of the main ideas.

means creating a system of formal enforcement of legal rules and payment of taxes. Doing so requires purposeful investment by state actors of the kind modeled in Besley and Persson (2009, 2011) who consider the power to tax (fiscal capacity) and the power to enforce property rights and regulate a market economy (legal capacity). They propose a model in which policy-makers weigh up the costs and benefits of investing in state capacities. Incentives to do so depend on how far state power is used to pursue common interests which is facilitated by having more cohesive institutions. Their approach rhymes well with that taken in, for example, Acemoglu and Robinson (2012) and North and Weingast (1989) who both see constraints on state power as essential to establishing effective government.<sup>3</sup>

The second view emphasizes the state as a social contract and has its origins in a range of influential thinkers. For example, Locke (1690) and Rousseau (1762) argue that civil and political rights constitute a form of exchange where a citizen accepts obligations in return for benevolent government. If a government fails to deliver such policies, then citizens can legitimately withdraw their cooperation and/or actively seek leadership change.<sup>4</sup> A crucial feature of these theories is that they extend the idea of reciprocity in small-scale societies to apply to state-citizen relations.<sup>5</sup> The contractarian view gives a central role to reciprocal obligation in establishing an effective state and lies at the heart of Levi (1988)'s influential historical analysis of the power to tax. She argues that curtailing state predation has historically played a role in encouraging what she calls "quasi-voluntary" compliance with the state.

A number of economists have explored a contractarian approach to government. For example, Buchanan (1975) argues that rules should be designed so as to constrain government intervention to those things which com-

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<sup>3</sup>They also see benefits from the extension of power beyond the initial elite, the king for North and Weingast (1989), the nobles and landed aristocrats for Acemoglu and Robinson (2012).

<sup>4</sup>They did however draw somewhat different conclusions from their approaches with Locke believing in limited, representative government while Rousseau believed in direct government by the people. They also recognize coercion as essential although they don't give it primacy of place the way that Hobbes did.

<sup>5</sup>Page 5 of Lessnoff (1986) suggests that the model of a contract in social contract theory is one of "reciprocal, conditional promises and obligations." He also stresses the central role of voluntarism in political obligation and makes a distinction between what he calls "trust-based" theories and contract-based theories where only the latter stresses reciprocal obligation.

mand universal assent following the ideas of Wicksell (1896). This requires procedural and constitutional rules which are self-enforcing, an issue that is explored in Weingast (1997, 2005) in a repeated game setting. Kotlikoff et al. (1988) explore how a social contract can be sustained when there is a commitment problem between overlapping generations of citizens. Binmore (1994, 1998) explores a social contract in a world of repeated interactions sustaining cooperation and Acemoglu (2005) uses a similar approach to characterize when a “consensually strong state” will emerge. In many of these approaches, reciprocity between citizens and the state is a feature of equilibrium play.

This paper takes an approach based on what Sobel (2005) calls *intrinsic reciprocity* where the forces that shape reciprocal behavior are internalized in preferences.<sup>6</sup> There is significant evidence to underpin this view, mainly from lab experiments. For example, Fehr and Fischbacher (2003), Fehr and Gächter (2000) and Dohmen et al (2009) suggest that reciprocity comes in two main forms: *positive reciprocity* where one agent who takes an action to benefit another agent encourages a beneficial act in return and *negative reciprocity* when one agent is willing to use a costly punishment when another agent transgresses. Social contract models of the state leverage these ideas to explore state-citizen relations, particularly citizens obligations to obey the law and to comply with taxes and empirical studies linking tax compliance to the delivery of public services such as Fjeldstad and Semboja (2000) and Levi and Sacks (2009). Slivinski and Sussman (2019) emphasise a combination of perceptions of fairness and use of local information in tax compliance in medieval Paris. Weigel (2018) finds evidence for the relevance of concerns about legitimacy in a field experiment which links tax compliance and perceptions of legitimacy. Feld and Frey (2007) emphasize that compliance will be higher when the government is perceived to be fair which has parallels with the wider psychological literature on legitimacy and compliance (for example Tyler, 2006).

Notions of reciprocity run deep in human societies and have been studied by economists and anthropologists in many different settings.<sup>7</sup> Trivers (1971) argues that it has a biological basis shaped by species cooperating to resist predators and to raise their offspring. Bowles and Gintis (2004, 2011)

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<sup>6</sup>See also Kolm (2008) who identifies different forms of reciprocity and explores their implications. He also discusses forces driving the cultural evolution of reciprocity.

<sup>7</sup>See, for example, Popkin (1979) and Scott (1976) for discussion of the role of reciprocity in village economies and Oliver (2019) for a discussion of its policy implications.

also take a biological view of reciprocity, emphasizing the fitness advantages that it brings to groups. Reciprocity can also emerge from cultural evolution along the lines of Boyd and Richerson (1985) and Cavalli-Sforza and Feldman (1981). Such ideas have been incorporated into economic settings, for example by Bisin and Verdier (2001) and Tabellini (2008). Here, we adopt an indirect evolutionary process applied to preferences following Güth and Yaari (1992) where norms, customs and values are internalized in preferences. This has been applied by Sethi and Somanathan (2001), Dekel et al. (2012) and Alger and Weibull (2013) among others.

The ideas in this paper are also linked to a tradition in political science that sees the emergence of a strong civic culture as the bedrock of successful polities. This idea has a long heritage beginning with Montesquieu (1748). In a more contemporary incarnation, American political scientists such as Lipset (1960) and Almond and Verba (1963) emphasized the importance of values underpinning the successful operation of government institutions. Such ideas also lie behind Putnam (1988)'s account of a functional democracy supported by social capital. Besley and Persson (2018) develop a model where there is coevolution between the values that support democracy and institutions. The paper is also linked to a range of contributions in economics which explain economic success and failure in terms of cultural factors (see, for example, Algan and Cahuc, 2013, Collier 2017, Guiso et al. 2006 for overviews of different aspects). Finally, there is an emerging literature that links norms, values and politics such as Lindbeck et al. (1999) and Besley and Persson (2019a,b).

**Fiscal Capacity and Tax Compliance** It is well-known that the tax take in GDP varies both cross-sectionally and over time. Figure 1, which is taken from Besley and Persson (2013), gives an overview of these trends, looking at the historical picture *over time* during the last 100 years based on a sample of 18 countries using data from Mitchell (2007).<sup>8</sup> It shows that taxation has increased over time from around a 10% share in national income to around 25%. The figure also illustrates the increasing importance of income taxation which only made up about 5% of revenues in 1900 but

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<sup>8</sup>The countries in the 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. The sample is selected, as we are reasonably confident that the data are comparable across countries and time in Mitchell (2007).

increased to around 50% by the end of the last century. These increases in income taxation are particularly striking during the two world wars.<sup>9</sup>

Figure 1 about here

Three dimensions – the economic, political and social – are invoked to explain the observed increase in taxation as a share of GDP.

On the economic side, demand-based factors include waging war as emphasized, for example, by Tilly (1990) as well as increases in the demand for (income elastic) public services. On the supply side, structural change in the economy mean that governments can more easily collect tax revenue. Thus, formal employment contracts allow cross-reporting on tax liabilities to the government (see Kleven et al. (2016) and Jensen (2019)). Increased use of VAT and income taxation both make use of the firm as a nexus of compliance.

When it comes to politics, state centralization and constraints on power are important as emphasized in Besley and Persson (2009, 2011), Besley et al. (2013) and Dincecco, (2011, 2015) and Stasavage (2003, 2011). Increasing use of elections has fuelled growth in demand for social insurance and publicly-funded health care and education.

Among social factors, Schumpeter (1918) emphasized taxation as an expression of obligation. And Levi (1988) argues that building state capacity is made feasible by creating quasi-voluntary compliance. This is related to the idea that the legitimacy of the state is increasing alongside greater trust in state institutions.<sup>10</sup>

These factors are reflected in economic models of tax compliance. Following Allingham and Sandmo (1972), the canonical approach focuses on the threat of material sanctions as the primary driver of tax-compliance decisions. It predicts that better detection and monitoring, coupled with higher fines,

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<sup>9</sup>Using data on the same 18 countries used to construct Figure 1, Besley et al. (2013) show (using five year averages at the country level for the 20th century) that there is a robust correlation between participating in external wars and having strong constraints on the executive as measured in the PolityIV data. These correlations remain even when country fixed-effects are included in the regression and when income per capita is used as a control.

<sup>10</sup>Levi et al. (2007) posit that legitimacy it has roots in two key complementary elements: trustworthiness of government and procedural justice. Braithwaite and Levi, (1998) discusses a range of perspectives on building trust in government and its link to government effectiveness.

are the key elements in building fiscal capacity. Besley and Persson (2009, 2014) and Besley et al (2013) model fiscal capacity building as investing in better monitoring and compliance.

The importance of these elements of tax compliance notwithstanding, it is now widely accepted that it is incomplete and a wider set of considerations underpin decisions to pay taxes. Collectively these approaches, invoke the term “tax morale” to capture a range of reasons for paying taxes (see, for example, Torgler (2007) and Luttmer and Singhal (2014) for discussion). The model developed is directly related to this literature; tax morale evolves endogenously over time.

### **Evidence from the World Values Survey /European Values Survey**

Some clues on the determinants of voluntary tax compliance can be found in attitudinal data. For example, both the World Values Survey and European Values Survey contains a question to its respondents as follows: "Is it justifiable to cheat on your taxes if you have a chance?" with the responses coded on a 10 point scale. It has been asked 103 countries with six survey waves of the World Values Survey countries and one wave of the European Values Survey with answers available from around 335,000 individual respondents in repeated cross-sections. Across the sample, around 58% of the population think that cheating is never justifiable. Although we focus on within-country variation, it is worth noting that there are large differences across countries

For convenience of interpretation, we reverse this ten point scale so that the highest value denotes believing that cheating on taxes is *never* justified, i.e. a positive attitude towards compliance. We denote the variable of interest by  $a_{icw}$  for respondent  $i$  in country  $c$  in survey wave  $w$ . The data can be described by running a regression of the following form:

$$a_{icw} = \alpha_c + \alpha_w + \beta x_{icw} + \varepsilon_{icw} \tag{1}$$

where  $\{\alpha_c, \alpha_w\}$  are country and wave dummies,  $x_{icw}$  are individual characteristics for which we include age (in three bands), gender (as dummy variable) education (in three bands) and income (in ten bands). These correlations therefore exploit only within-country variation in responses. The standard errors are clustered at the country level.

Table 1 about here



The results from (1) are in Table 1. In column (1), the Table shows that having a positive attitude towards compliance is related to individual characteristics; it is decreasing in income, increasing in education and age and less prevalent among men.

More directly related to the ideas that follow, attitudes towards justifiable cheating can be correlated with an individual’s subjectively reported confidence in government based on a question where the respondent is asked “I am going to name a number of organizations. For each one, could you tell me how much confidence you have in them: is it a great deal of confidence, quite a lot of confidence, not very much confidence or none at all?”. We use the answers as applied to the government in the capital city and code the answer as equal to one if the answer is “not very much” or “none at all”, i.e. if there is low confidence. When this is included as a right-hand side variable along with the other regressors in column (2) of Table 1, there is a negative and significant correlation between confidence in government and having a positive attitude towards tax compliance.

To check that it is lack of confidence in government that matters rather than trust in general, the answer on justifiable cheating can also be related to the standard trust question which is asked in the survey: “Generally speaking, would you say that most people can be trusted or that you can’t be too careful in dealing with people?” where the answer is coded as one if the respondent says that “you cannot be too careful”.<sup>11</sup> Table 1, column (3) shows that lack of trust in general is not significantly correlated with believing that cheating on taxes is justifiable. This emphasizes that the answer to this question is related to lack of confidence in government rather than lack of trust in general.<sup>12</sup>

Although this serves only to offer further motivation for the model that follows, the results from the World Values Survey are quite consistent and link attitudes to tax compliance with confidence in government.<sup>13</sup>

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<sup>11</sup>Cook et al. (2005) emphasize the need to separate trust in general from confidence in government.

<sup>12</sup>This is true in spite of the fact that low confidence in government and low trust in people are strongly positively correlated with each other.

<sup>13</sup>Besley and Mueller (2019) extend these results to other attitudinal data and find similar results.

### 3 The Core Model

The core model gives a role to intrinsic reciprocity in fostering tax compliance. It partitions the citizens into an elite, with decision-making power over transfers and a public good, and citizens who pay taxes to fund these expenditures. Civic-minded citizens receive positive or negative utility from tax compliance depending on whether the state spends on the public good or transfers. This allows government policy choices to feedback onto fiscal capacity.

**Basics** Time is infinite and indexed by  $s = 1, 2, \dots$  and at each date a continuum of citizens of size one is alive. We view each time period as a generation with a fresh set of agents being born each period.<sup>14</sup> All citizens have the same level of private income,  $w$ , generated from labor earnings.

There are three groups of citizens denoted by  $\omega \in \{E, M, V\}$ . A fraction  $e < 1$  of the population is a part of group  $E$ , a governing *Elite* which chooses policy. The non-elite citizens are partitioned into two groups where  $M$  stands for “*Materialist*”, and  $V$  for “*civic-minded*” or “*Virtuous*”. At date  $s$ , a fraction  $\mu_s$  of non-elite citizens is civic-minded. We assume that  $\mu_s \in [\underline{\mu}, \bar{\mu}]$  where  $\underline{\mu}$  is an irreducible fraction of materialists who are not open to socialization and  $\bar{\mu}$  is an irreducible fraction of civic-minded citizens. The possibility  $\underline{\mu} > 0$  and  $\bar{\mu} < 1$  allows for a society to remain partially materialist or civic-minded and  $\bar{\mu} - \underline{\mu}$  can be thought of as the amount of cultural leverage in a society.

The utility function of all citizens is linear in public and private goods, i.e.  $\alpha G + y$ , where  $G$  is expenditure on a tax-financed public good and  $y$  is private consumption. The value of the public good is identical for all citizens and stochastic. Each period it is drawn afresh from the interval  $[1, A]$  with the cumulative distribution function of  $\alpha$  being  $F(\alpha)$ . One way of thinking about  $\alpha$  is capturing a fluctuating external threat of war which necessitates investment in defensive capabilities. Since  $\alpha > 1$ , the non-elite always prefer that tax revenue is spent on the public good rather than adding to private consumption.

Taxes are levied on the incomes of the non-elite.<sup>15</sup> Taxpayers must decide

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<sup>14</sup>To motivate the socialization process, we could also have some economically inactive children alive in each period who become next period’s taxpayers.

<sup>15</sup>This is convenient since the compliance decisions of the elite can be ignored. However, this could be added to the model, albeit at the cost of increased complexity.

what proportion of their income to hide from the tax authorities which we denote by  $n \in [0, 1]$  where  $n$  stands for “non-compliance”.

**Policy and Institutions** We focus for now on a single period of policy-making dropping any reference to date  $s$ . Policy is determined by the elite and comprises four elements: a tax rate on income,  $t$ , spending on the public good,  $G$ , a level of transfer per capita to the non-elite,  $b$ , and a level of transfer per capita to the elite  $B$ .

Following Besley and Persson (2011), suppose that institutions constrain the government to spend  $\sigma \in [0, 1]$  on transfers for the non-elite for every unit of transfer spending on the elite. If  $\sigma = 0$ , then the elite can consume all of public revenues as transfers with impunity and whereas with  $\sigma = 1$ , the elite is compelled to share resources equally with the non-elite. As  $\sigma$  increases, institutions are therefore more cohesive and, as show below, the state is more likely to spend on the public good.

Substituting  $b = \sigma B$ , the government budget constraint can be written as:

$$B = \theta(\sigma) [T - G]$$

where  $T$  is taxation per capita and  $\theta(\sigma) = [e + (1 - e)\sigma]^{-1} \in [1, \frac{1}{e}]$  is the effective “price” of the public good to the elite given that it must forego a transfer to provide them. Note also that  $e\theta(\sigma) < 1$  and  $\sigma\theta(\sigma) \leq 1$ . Moreover,  $\theta(1) = 1$  for all  $e \in [0, 1]$ . Note also that  $b = \sigma B \leq B$ , i.e. the transfer to the non-elite is lower than for the elite whenever  $\sigma < 1$ .

If  $\theta(\sigma) < 1$ , there is a conflict of interest between elites and non-elites. Specifically, there can be range of  $\alpha \in [1, A]$  where the elites prefer spending on transfers rather than on the public good. However, the fact that  $\theta(\sigma)$  is decreasing in  $\sigma$  implies a larger range of  $\alpha$  for which the elite prefer spending on the public good to transfers as  $\sigma$  increases. This logic implies that more cohesive institutions encourage the elite to spend on the public good as in Besley and Persson (2009, 2011).

**Tax Compliance** Non-compliance with taxation may be costly if an individual is caught and fined for not paying taxes. We capture this by positing a non-compliance cost  $\tau wC(n)$ , measured in units of private consumption,

where  $C(\cdot)$  has the following quadratic form:<sup>16</sup>

$$C(n) = \begin{cases} \frac{n^2}{2} & \text{if } n > 0 \\ 0 & \text{otherwise.} \end{cases}$$

The parameter  $\tau$  indexes detection effort by government and parallels the strategic investments in coercion of the kind studied in Besley and Persson (2009, 2011).

Preferences of the taxpaying citizens depend on their tax non-compliance decision,  $n$ , and are given by:

$$\alpha G + b + w [1 - (1 - n) [t - \lambda [G - eB]] - \tau C(n)]. \quad (2)$$

where  $\lambda = 0$  for materialists and  $\lambda = \Lambda > 0$  for civic-minded citizens. The final term in (2) is utility from earning net of taxes and non-compliance costs. The term  $n\Lambda [G - eB]$  links tax-compliance compliance decisions to the pattern of government spending for civic-minded citizens. If  $G > eB$ , then it is “as if” non-compliance is based on a lower tax rate and vice versa if  $eB > G$ . Civic-minded citizens are like motivated agents in the sense of Besley and Ghatak (2005); they comply with taxes if their preferences as tax-paying agents are aligned with the principal (in this context the government).<sup>17</sup> This injects an element of intrinsic reciprocity since tax compliance is higher when then public good is provided and lower when the elite chooses to spend on a transfer to itself.

For  $\lambda \in \{0, \Lambda\}$ , the optimal (non-)compliance decision is given by:

$$\begin{aligned} n^* &= \arg \min_{n \in [0,1]} \{(1 - n) [t - \lambda [G - eB]] + \tau C(n)\} \\ &= \frac{t - \lambda [G - eB]}{\tau} \end{aligned} \quad (3)$$

assuming an interior solution. Hence non-compliance is increasing in  $t$  and

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<sup>16</sup>For simplicity, we assume that none of the compliance costs that are imposed on citizens are appropriable as public revenues.

<sup>17</sup>Key to the formulation is that compliance creates a *private* benefit or cost for civic-minded citizens.

$B$  and decreasing in  $G$  and  $\tau$ .<sup>18</sup> Let

$$v\left(\frac{t - \lambda[G - eB]}{\tau}\right) = \tau \left[ \left(\frac{t - \lambda[G - eB]}{\tau}\right) - \frac{1}{2} \left(\frac{t - \lambda[G - eB]}{\tau}\right)^2 \right]. \quad (4)$$

It determines the loss in utility from taxation given an optimally chosen level of non-compliance.

To focus on an interior solution for non-compliance as well as an optimal tax rate between zero and one, we assume throughout that

$$\tau < 2 \text{ and } \min\{2 - \tau, 1\} > \Lambda w. \quad (5)$$

This holds if the reciprocal motive is not too strong and coercive power (affecting the material cost of non-compliance) is sufficiently limited.<sup>19</sup>

**Fiscal Capacity** Fiscal capacity is defined as the *maximum* tax revenue that a government can raise given the civic culture represented by  $\mu$  and the coercive power of government given by  $\tau$ . Tax revenue per capita, given a tax rate of  $t$  and an expenditure mix  $(G, B)$ , is given by:

$$T(t, G - eB, \mu, \tau) = t(1 - e)w \left[ \frac{\tau - t + \mu\Lambda[G - eB]}{\tau} \right] \quad (6)$$

where, for notational convenience, we have suppressed dependence on  $e$ . The revenue-maximizing tax rate is given by:

$$\hat{t}(G - eB, \mu, \tau) = \arg \max_{t \geq 0} \{T(t, G - eB, \mu, \tau)\} = \frac{1}{2} [\tau + \mu\Lambda(G - eB)]. \quad (7)$$

Dependence of the tax rate in (7) on the expenditure mix reflects the fact that this affects tax compliance. The revenue-maximizing tax rate is increasing in the proportion of civic-minded citizens if  $G > eB$  and decreasing otherwise.

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<sup>18</sup>It is easy to check that

$$\hat{f}(m) = \min\{\max\{m, 0\}, 1\}$$

is the level of evasion in general and hence at an interior solution  $\hat{f}(m) = m$ .

<sup>19</sup>See Appendix B for details.

It is also higher when the government has more enforcement capacity, i.e.  $\tau$  is higher.<sup>20</sup>

Plugging (7) into (6), fiscal capacity is:

$$T(\hat{t}(G - eB, \mu, \tau), G - eB, \mu, \tau) = \frac{(1 - e)w}{4\tau} [\tau + \mu\Lambda(G - eB)]^2. \quad (8)$$

This is increasing and convex in  $G - eB$ . It is also increasing in  $\tau$  but can be increasing or decreasing in  $\mu$  depending on the sign of  $G - eB$ .

The model suggests a difference between *de jure* and *de facto* fiscal capacity. The former depends on legal enforcement capacity represented by  $\tau$  which affects the material non-compliance cost. This is all that matters for fiscal capacity if  $\mu = 0$ , i.e. all citizens are materialists. In general a higher value of  $\tau$  enables the state to extract greater tax revenues by reducing non-compliance. The actual level of compliance can depend on government spending policy if  $\mu > 0$ . We can think of this as representing higher or lower “tax morale” in the language of that literature.

## 4 Analysis

The model is studied in two steps. First, we study the elite’s optimal policy recognizing the dependence of tax revenues on civic culture given in (8). We then reintroduce the time dimension and study the dynamics of civic culture driven by the relative payoffs of the materialists and civic-minded citizens.

### 4.1 Optimal Policy

Given a realization of  $\alpha$ , the elite choose policies constrained by institutions,  $\sigma$ , civic culture,  $\mu$ , and enforcement capacity,  $\tau$ .<sup>21</sup> Recognizing that  $b = \sigma B$ , the elite’s optimal policy,  $(G, B)$ , maximizes:

$$\alpha G + B \quad (9)$$

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<sup>20</sup>Appendix B shows that the parameter restriction in (5) is sufficient for an interior solution for in the non-compliance decisions by both kinds of citizens, i.e. materialist and civic-minded and for the optimal tax rate.

<sup>21</sup>This abstracts away from the possibility that elites set policy to influence  $\mu_s$  strategically which raises an interesting set of issues which are left for future work.

subject to

$$[T(\hat{t}(G - eB, \mu, \tau), G - eB, \mu, \tau) - G] \theta(\sigma) = B. \quad (10)$$

For any given expenditure mix, the elite will choose the revenue maximizing tax rate (7). Moreover, we show in Proposition 1 below that the constraint set is convex so that the elite will choose a corner solution where either  $G$  or  $B$  is zero.

Two key magnitudes are the maximal and minimal tax revenues that can be raised from the non-elite citizens which are given by:

**Lemma 1:** *The maximum and minimum tax revenues,  $\{T_H(\mu, \tau), T_L(\mu, \tau, \sigma)\}$  are characterized as follows:*

(i) *if all spending is on the public good, then*

$$T_H(\mu, \tau) = \tau \xi_H(\mu)$$

*where  $\xi_H(\mu)$  is increasing and,*

(ii) *if all spending is on transfers, then*

$$T_L(\mu, \tau, \sigma) = \tau \xi_L(\mu, \sigma)$$

*where  $\xi_L(\mu, \sigma)$  is a decreasing function of  $\mu$  and an increasing function of  $\sigma$ . Moreover,  $\theta(\sigma) \xi_L(\mu, \sigma)$  is decreasing in  $\sigma$ .*

This says that taxation is proportional to  $\tau$  which holds as a consequence of the quadratic specification of compliance costs. More substantively, the result says that when  $\mu$  increases, then civic-minded citizens increase or reduce compliance depending on the mix of public spending. This implies a lower tax revenue when the state is spending on transfers and a higher tax revenue when it is spending on the public good. Since the transfers to the elite is decreasing in  $\sigma$ , all else equal, the level of taxation that can be raised with transfer spending is increasing in  $\sigma$ .

To explore the implications for tax rates, define

$$t_H(\mu, \tau) = \frac{\tau}{2} [1 + \mu \Lambda \xi_H(\mu)] \quad (11)$$

and

$$t_L(\mu, \tau, \sigma) = \frac{\tau}{2} [1 - \mu \Lambda e \theta(\sigma) \xi_L(\mu, \sigma)] \quad (12)$$

as the tax rates when all spending is on the public good (11) or transfers (12). Together these imply that:

$$t_H(\mu, \tau) > \frac{\tau}{2} > t_L(\mu, \tau, \sigma). \quad (13)$$

The significance of this inequality is that  $\tau/2$  is the tax rate that would prevail if all citizens were materialists. Hence, the effect of having civic-minded citizens is to increase the revenue-maximizing tax rate when  $G > 0$  and depress it when  $B > 0$ . The rate of taxation is higher in an economy that spends all of its revenues on the public good since civic-minded citizens comply more with taxes in this case.

The model captures the kind of tax morale argument which is invoked to understand why Scandinavian countries are able to obtain high levels of tax compliance even at high marginal rates of taxation. This is because their governments also provide public goods and citizens respond to that by reciprocally paying more tax.<sup>22</sup> The model explains the logic of the argument developed in Levi (1988) which forges an explicit link between compliance and government provision of public goods through history.

We now have the following result describing the conditions under which different levels of public spending are chosen:

**Proposition 1** *Optimal public expenditures depend on the realization of  $\alpha$  given  $\{\sigma, \mu, \tau\}$  as follows:*

1. If  $1 \geq \theta(\sigma) \frac{\xi_L(\mu, \sigma)}{\xi_H(\mu)}$ , then for  $\alpha \in [1, A]$ ,  $\tau\xi_H(\mu)$  is spent on the public good with no transfer spending.
2. If  $A > \theta(\sigma) \frac{\xi_L(\mu, \sigma)}{\xi_H(\mu)} > 1$  then then:
  - (a) for  $\alpha \geq \theta(\sigma) \frac{\xi_L(\mu, \sigma)}{\xi_H(\mu)}$ , then  $\tau\xi_H(\mu)$  is spent on the public good with no transfer spending.
  - (b) for  $\alpha < \theta(\sigma) \frac{\xi_L(\mu, \sigma)}{\xi_H(\mu)}$ , then  $\theta(\sigma)\tau\xi_L(\mu, \sigma)$  is spent on transfers with no spending on the public good.
3. If  $A < \theta(\sigma) \frac{\xi_L(\mu, \sigma)}{\xi_H(\mu)}$  then for  $\alpha \in [1, A]$ , then  $\theta(\sigma)\tau\xi_L(\mu, \sigma)$  is spent on transfers with no spending on the public good.

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<sup>22</sup>For an interesting discussion along these lines, see Kleven (2014).



The logic of the result comes from two features of the model. Tax revenue raised is convex in  $G - eB$  while the payoff function of the elites is linear in the public good,  $G$ , and the transfer,  $B$ .<sup>23</sup> Hence, the solution will be for the elite to spend *either* on the public good *or* on transfers. This is governed by a cutoff value of  $\alpha$  equal to  $\theta(\sigma) \frac{\xi_L(\mu, \sigma)}{\xi_H(\mu)}$  with the public good being provided only if  $\alpha$  exceeds this cutoff. A key ratio is therefore  $\frac{\xi_L(\mu, \sigma)}{\xi_H(\mu)}$ , i.e. taxes raised when the government spends on transfers compared to those raised when spending is on the public good. It is straightforward to see from (8) that this ratio is equal to one if  $\mu = 0$ . Moreover, from Lemma 1, we know that it is less than one for  $\mu > 0$ . This increases the range of  $\alpha$  for which it is optimal for the elite to spend on the public good. This illustrates how a stronger civic culture allows citizens to exercise de facto control over how the government behaves above and beyond constraints imposed by institutions as represented by  $\sigma$ . A strong civic culture increases the likelihood of spending on the public good.

Proposition 1 illustrates three possibilities.

In the first case, there is spending on the public good even if  $\alpha = 1$ . This corresponds to what Besley and Persson (2011) refer to as a common interest state where the elite follows the policy preferences of the non-elite citizens for  $\alpha \in [1, A]$ . This requires a combination of  $\sigma < 1$  and  $\mu > 0$  since  $\theta(\sigma) > 1$  whenever  $\sigma < 1$ .

In the second case, the mix of public spending depends upon the realization of  $\alpha$ . For high  $\alpha$  realizations, spending is on the public good while, for low realizations, it is on transfers. The probability of transfers in this case is therefore:

$$\rho(\sigma, \mu) = F\left(\frac{\theta(\sigma) \xi_L(\mu, \sigma)}{\xi_H(\mu)}\right) \in [0, 1], \quad (14)$$

which, using Lemma 1, is decreasing in  $\mu$  and  $\sigma$ .

The third case is where tax revenue is spent on transfers regardless of the realization of  $\alpha$ . This corresponds to what Besley and Persson (2011) call a redistributive state. It is most likely to occur when  $\sigma$  is close to zero and  $e$  is small which make it costly for the elite to spend on the public good. It is also facilitated by  $\mu$  being low since there is smaller cost to the elite in terms of foregone revenue when the civic culture is weak.

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<sup>23</sup>Introducing curvature into the utility function would be straightforward but the insights are less clean.

## 4.2 The Dynamics of Civic Culture

We now make  $\mu_s$  endogenous by applying an evolutionary model of the type studied in Sandholm (2010) and Sethi and Somanathan (2001) where the payoff difference between being a civic-minded and materialist citizen affects the composition of the population. We will show that this converges to a steady state with either  $\mu = \bar{\mu}$  or  $\mu = \underline{\mu}$ . Although we are not specific about the micro-foundations, we have in mind a socialization process between parents and children along with some non-assortative matching as spelled out in Besley and Persson (2019a). But peer-to-peer influence could also be important as citizens are influenced over their life-cycle.

**Timing** The timing of events in the dynamic model is as follows:

1. There is an initial level of civic-culture  $\mu_s$ .
2. Nature determines the value of the public good  $\alpha_s$ .
3. The elite choose policies:  $\{G_s, B_s, t_s\}$ .
4. Citizens choose their compliance decisions  $n_s$  which determines the level of tax revenues.
5. Payoffs are realized.
6. The next generation of citizens is socialized which determines  $\mu_{s+1}$ .

We now describe the exact evolutionary model that we use.

**An Evolutionary Dynamic** Sandholm (2010) emphasizes two elements of an evolutionary dynamic that we use: (i) agents do not continually change their types but do so only sporadically (inertia) and (ii) agents condition these switches on current behavior and opportunities (myopia). Let  $U^J(\mu_s, \sigma)$  be the expected utility of being a type  $J \in \{M, V\}$  when there is a fraction  $\mu_s$  of civic minded types in the population in the population at date  $s$ . An evolutionary dynamic is based on a revision protocol. Formally, this is a continuous function  $\varsigma_{IJ}(U^V(\mu_s, \sigma), U^M(\mu_s, \sigma), \mu_s) \in [0, 1]$  which specifies a conditional switch rate from type  $I$  to  $J$  given the payoffs and proportion of

types in the population. Sandholm (2010) suggests a general class of mean dynamics which yield:

$$\mu_{s+1} - \mu_s = (1 - \mu_s) \varsigma_{MV_s} - \mu_s \varsigma_{VM_s} \quad (15)$$

where

$$\varsigma_{IJ_s} > 0 \iff \bar{\Delta}(\mu_s, \sigma) \equiv U^I(\mu_s, \sigma) - U^J(\mu_s, \sigma) > 0.$$

This class of dynamics is convenient since they depend only on comparisons of the payoff of one type with the potential payoff from being the other type.<sup>24</sup> The essential ingredient which drives the results is that the type with the highest expected payoff will replicate faster.

**Cultural Fitness** To understand the dynamics of civic culture, we need to explore how the fraction of civic minded types affects this expected utility difference between civic-minded and materialist citizens denoted by  $\bar{\Delta}(\mu, \sigma)$ . For any realization of  $\alpha$  and optimal values of spending  $(\hat{G}, \hat{B})$  from Proposition 1, the utility of a non-elite citizen is:

$$\alpha \hat{G} + \sigma \hat{B} + w \left[ 1 - v \left( \frac{\hat{t}(\hat{G} - e\hat{B}, \mu, \tau) - \lambda [\hat{G} - e\hat{B}]}{\tau} \right) \right].$$

Using Proposition 1, the expected utility *difference* between being a civic-minded and materialist citizen is given by:

$$\begin{aligned} \bar{\Delta}(\mu, \sigma) = & \rho(\sigma, \mu) w \left[ v \left( \frac{t_L(\mu, \tau, \sigma)}{\tau} \right) - v \left( \frac{t_L(\mu, \tau, \sigma)}{\tau} + \Lambda e\theta(\sigma) \xi_L(\mu, \sigma) \right) \right] \\ & + (1 - \rho(\sigma, \mu)) w \left[ v \left( \frac{t_H(\mu, \tau)}{\tau} \right) - v \left( \frac{t_H(\mu, \tau)}{\tau} - \Lambda \xi_H(\mu, \sigma) \right) \right] \end{aligned} \quad (16)$$

We will refer to (16) as the *cultural fitness advantage/disadvantage* of civic-minded citizens. It has two parts, the first referring to the case when there

<sup>24</sup>The specification in (15) includes the replicator dynamic as a special case when

$$\begin{aligned} \varsigma_{MV_s} &= \mu_s \max \{ [U^V(\mu_s, \sigma) - U^M(\mu_s, \sigma)], 0 \} \\ &\text{and} \\ \varsigma_{VM_s} &= (1 - \mu_s) \max \{ [U^M(\mu_s, \sigma) - U^V(\mu_s, \sigma)], 0 \}. \end{aligned}$$

is spending on transfers and the second to that where there is spending on the public good.

The following property of (16) is useful in what follows:

**Lemma 2:** *The cultural fitness advantage of civic-minded citizens,  $\bar{\Delta}(\mu, \sigma)$ , is increasing in  $\mu$  and  $\sigma$ .*

Both of these properties make intuitive sense. As either  $\mu$  or  $\sigma$  increases, then the set of realizations of  $\alpha$  for which the public good is provided also increases. This, in turn, increases the utility of civic-minded citizens relative to materialists as they have higher (lower) payoffs when the public good (transfers) are provided by government.

Lemma 2 implies that there is a complementarity between  $\mu_s$  and  $\mu_{s+1} - \mu_s$ ; having more (fewer) civic-minded citizens increases (decreases) the cultural fitness advantage of civic-minded citizens.<sup>25</sup>

**Steady-States** Since, from Lemma 1,  $\Delta(\mu, \sigma)$  is increasing in  $\mu$ , any reasonable notion of stability implies that any interior steady-state will be unstable and hence that only  $\mu = \bar{\mu}$  or  $\mu = \underline{\mu}$  are possible long-run outcomes.<sup>26</sup> This observation is reflected in:

**Proposition 2** *Steady state civic cultures are as follows:*

1. *If  $\bar{\Delta}(\underline{\mu}, \sigma) > 0$  then, for all  $\mu_0 \in [\underline{\mu}, \bar{\mu}]$ , the steady state is  $\mu = \bar{\mu}$ .*
2. *If  $\bar{\Delta}(\bar{\mu}, \sigma) < 0$  then, for all  $\mu_0 \in [\underline{\mu}, \bar{\mu}]$ , the steady state is  $\mu = \underline{\mu}$ .*
3. *If  $\bar{\Delta}(\bar{\mu}, \sigma) > 0 > \bar{\Delta}(\underline{\mu}, \sigma)$ , there exists a critical value of  $\hat{\mu}(\sigma) \in [\underline{\mu}, \bar{\mu}]$  which is decreasing in  $\sigma$  such that the steady state is  $\mu = \bar{\mu}$  if and only if  $\mu_0 \geq \hat{\mu}(\sigma)$ .*

There are three cases. In case 1 then, even with  $\mu = \underline{\mu}$ , the probability of spending on the public good is high enough to create a cultural fitness advantage for civic-minded citizens. A maximally strong civic culture then evolves for all  $\mu_0$  since  $\bar{\Delta}(\underline{\mu}, \sigma) > 0$  implies that  $\bar{\Delta}(\mu, \sigma) > 0$  for all  $\mu \geq \underline{\mu}$ . Thus

<sup>25</sup>Note this comes even without there being a direct externality in tax compliance decisions between citizens where cheating by one citizen begets cheating by another. This could, of course, be added to the model as an additional source of complementarity.

<sup>26</sup>Specifically, we consider small deviations around the steady  $\mu \pm \nu$  for  $\nu > 0$ .

the dynamic complementarity ensures that the cultural fitness advantage of civic-minded citizens increases over time. The flip-side is true in the second case where civic-minded citizens have a cultural fitness disadvantage with  $\bar{\mu}$ . This means that the range of  $\alpha$  realizations for which there is spending on the public good is likely to be narrow. The third case illustrates the possibility of a cultural “tipping point” where there is a critical value of  $\mu_0 \in [\underline{\mu}, \bar{\mu}]$  above which  $\Delta(\mu, \sigma) > 0$  and below which  $\Delta(\mu, \sigma) < 0$ . The starting point then affects which steady state occurs. The model’s dynamic complementarity implies hysteresis where societies that begin with a strong civic culture build on it whereas those with a weak civic culture lose it. Even if we suppose that every society begins with only materialists, i.e.  $\mu_0 = \underline{\mu} = 0$ , Proposition 2 emphasizes that a civic culture can still emerge in this case if  $\sigma$  is large enough.

The third case in Proposition 2 emphasizes that the starting point,  $\mu_0$ , can play a role in determining the long-run outcome. For many countries which began life following a period of colonialism, this could be an inheritance from their colonial history. Civic culture could also be influenced by migration of citizens from locations where a civic culture has already been developed. The initial civic culture could also be inherited from prior experience of government in small-scale societies. Some forms of community-based government may have encouraged a civic culture creating an initial endowment which is influential when a central state is formed so that  $\mu_0 > \underline{\mu}$ .<sup>27</sup> Proposition 2 emphasizes that inherited cultures need not however be sustainable in the long-run depending on the cohesiveness of institutions and the strength of common interests.

## 5 Core Implications

This section draws out three implications of the framework for the evolution of civic culture and state capacity. The first shows how institutional cohesiveness and civic culture are complements. The second shows how the structure of common interests shapes how civic culture, and hence fiscal capacity, evolves. This provides a link to debates about the relationship between civic-culture and national emergencies such as the threat of an external war. Finally, the model is extended to allow citizens to have a say

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<sup>27</sup>This argument is elaborated in section 6 below.

in choosing which elites hold office, forging a link between the dynamics of state capacity, civic culture and extension of the franchise.

## 5.1 Cohesiveness of Institutions

The fact that  $\bar{\Delta}(\mu, \sigma)$  is increasing in  $\sigma$  (Lemma 2) encapsulates the idea that, when the government is more constrained not to use the state for transfer purposes, this enhances the cultural fitness of civic-minded citizens. This generates a natural complementarity between institutional cohesiveness and civic culture which we now bring out.

Consider two different values of cohesiveness represented by  $\sigma \in \{\sigma_L, \sigma_H\}$  where  $\sigma_L < \sigma_H$ . This could be the same polity at two different dates, as in England before and after the Glorious Revolution in 1688, or two different polities that differ in the form of institutions for constraining power such as Argentina and the USA in 1910.<sup>28</sup>

To create a stark implication of institutional differences for the development of civic culture, suppose that for  $\mu_0 \in [0, 1]$ , we have:

$$\bar{\Delta}(\mu_0, \sigma_H) > 0 > \bar{\Delta}(\mu_0, \sigma_L).^{29} \quad (17)$$

If (17) holds, then Proposition 2 yields:

**Proposition 3** *Suppose that (17) holds at  $\mu_0$ , then a polity with  $\sigma_H$  converges to  $\mu = \bar{\mu}$  and a polity with  $\sigma_L$  converges to  $\mu = \underline{\mu}$ .*

This result illustrates the complementarity between institutions and civic-culture in the model. A combination of weak institutions (low  $\sigma$ ) and a weak initial civic culture (low  $\mu$ ) can together undermine the prospects for fiscal capacity and civic-culture to grow.

The result can be used to think about what happens in a country following an institutional reform which enhances constraints on executive power. The framework suggests that direct benefits in the form of more public good provision may be accompanied by indirect benefits if the incentive to build civic culture is also enhanced. We can think of this as a kind of institutional

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<sup>28</sup>According to the Madison data project <https://www.rug.nl/ggdc/historicaldevelopment/maddison/releases/madison-project-database-2018> the ratio of US and Argentinian GDP per capita in 1910 was about 1.13. According to the executive constraints variable (xconst) in the PolityIV data from <https://www.systemicpeace.org/inscrdata.html> the the USA is coded with xconst equal to 7 (the highest possible score) while Argentina is coded with xconst equal to 4.

reform “multiplier” on fiscal capacity due to the dynamics of civic culture. In her historical account, Levi (1988) emphasizes the fact that increasing quasi-voluntary compliance was enhanced by institutional reforms which meant that governments became more constrained in ways that increased provision of public goods.

Proposition 3 emphasizes that reforms may only be effective if they are sufficiently large to take a polity above a tipping point of the form implicit in (17). Small reforms are more likely to have an impact when  $\mu_0$ , the value at the point of reform, is close to  $\hat{\mu}(\sigma)$  as defined in Proposition 2. This insight could be important if the analysis were extended to consider purposive institutional reform of the kind studied in Acemoglu and Robinson (2006).

## 5.2 Strength of Common Interests

The distribution of  $\alpha$  represents the extent of common interests between the elites and non-elites since high  $\alpha$  will tend to give them the same objectives for government as emphasized by Besley and Persson (2009). We can, therefore, think of the distribution of  $\alpha$  as a measure of common interests which may differ across countries and over time. The ebb and flow of external threats to a country is a case in point and has been emphasized as a driver of fiscal capacity by historical sociologists such as Hintze (1906) and Tilly (1990). Here we discuss how this can influence civic culture.<sup>30</sup>

To illustrate the consequences of this, let  $\kappa$  index the distribution of  $\alpha$ , i.e.  $F(\alpha : \kappa)$  with  $F_\kappa(\alpha : \kappa) < 0$ , so that an increase in  $\kappa$  yields a first-order stochastic dominating shift in the demand for the public good. Variation in  $\kappa$  can capture differences in exposure to an external threat. Since the probability of transfer spending  $\rho(\sigma, \mu, \kappa) = F\left(\frac{\theta(\sigma)\xi_L(\mu, \sigma)}{\xi_H(\mu)}, \kappa\right)$  now depends on  $\kappa$ , we now also index the cultural fitness advantage by  $\kappa$ . Formally,  $\bar{\Delta}(\mu, \sigma, \kappa)$  is increasing in  $\kappa$  since  $\rho(\sigma, \mu, \kappa)$  is decreasing in  $\kappa$ . This implies that there is a stronger incentive to develop a civic culture if  $\kappa$  increases since, all else equal, it is more likely that the public good is provided (cf Proposition 1).

Consider two values of  $\kappa \in \{\kappa_l, \kappa_h\}$  with  $\kappa_h > \kappa_l$  such that for the initial condition  $\mu_0 \in [0, 1]$ , we have

$$\bar{\Delta}(\mu_0, \sigma, \kappa_h) > 0 > \bar{\Delta}(\mu_0, \sigma, \kappa_l). \quad (18)$$

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<sup>30</sup>See Bauer et al. (2016) for a discussion of the cultural legacy of warfare.

If this holds then whether a polity has strong or weak common interests as measured by  $\kappa$ , has an impact on state capacity and the strength of the civic culture. The following result parallels Proposition 3:

**Proposition 4** *Suppose that (18) holds at  $\mu_0$ , then a polity with  $\kappa_h$  converges to  $\mu = \bar{\mu}$  and a polity with  $\kappa_l$  converges to  $\mu = \underline{\mu}$ .*

This result offers an interesting twist on the Hintze-Tilly hypothesis on the importance of war in the development of a fiscal state adding an additional dimension in the form of civic culture. The model shows that a higher external threat will enhance fiscal capacity depending on  $\{\mu_0, \sigma, \kappa\}$ . A country with an initially weak civic culture may not move to a path where fiscal capacity expands even though the war threat increases if  $\bar{\Delta}(\mu_0, \sigma, \kappa_h) < 0$  which is likely to be the case if the initial civic culture and/or institutions are weak. This provides a possible explanation for the claim that the Hintze-Tilly hypothesis has little predictive power in some contexts. For example, this argued by Centeno (1997) for the Latin American context where he argues that external war threat was not an engine of state development.

A positive shock to  $\kappa$  could also reflect investments by government which increase bureaucratic efficiency or reduce corruption; these would increase the effective provision of the public good for a given outlay. Our observation that this can affect civic culture squares with the observation in Levi and Sacks (2009) that having a competent bureaucracy can increase quasi-voluntary compliance.

### 5.3 Representative Institutions and Selection of Elites

We have supposed so far that policy is always controlled by an homogenous entrenched elite. We now allow the possibility that there are competing elites with heterogeneous preferences for the public good. This will allow us to think about what happens when non-elites have a greater say in who governs them.

**Heterogeneous Elites** To fix ideas, suppose that the value of the public good among non-elite citizens is always  $A > 1$ . The stochastic draws of the value of the public good therefore apply only to the elites and affect their policy choices. Their valuation is drawn from a distribution  $F(\alpha : \kappa)$  where  $\alpha \in [1, A]$  and an increase in  $\kappa$  induces first-order stochastic dominance.



To capture heterogeneity in elite preferences very simply, assume that there are two groups within the elite denoted by  $l$  and  $h$ , with type  $h$  elites closer in their preference for the public good to the non-elite citizens captured by  $\kappa_h > \kappa_l$ . Let  $\gamma \in [0, 1]$  be the probability that the elite is of type  $h$  and assume that elites compete for power with each elite group represented by a “citizen-candidate” who faithfully represents the interest of their group when in power.<sup>31</sup> Finally, let  $e_J$  be the fraction of the elite population of type  $J \in \{l, h\}$  with  $e = e_h + e_l$ . A further state variable will now be the group-identity of the elite in power at date  $s$ . That elite group’s representative will choose policy based on their group’s realization of  $\alpha$ .

**Modified Timing** The timing of the model is now modified to include the determination of the elite’s type and becomes:

1. There is an initial level of civic-culture  $\mu_s$ .
2. The type of the new elite is determined for period  $s$  with  $\gamma$  being the probability that the elite is of type  $h$ .
3. Nature determines the value of the public good,  $\alpha_s$ .
4. The elite choose policies:  $\{G_s, B_s, t_s\}$ .
5. Citizens choose their compliance decisions  $n_s$  which determines the level of tax revenues.
6. Payoffs are realized.
7. The next generation of citizens are socialized which determines  $\mu_{s+1}$ .

The timing suppose that the realization of  $\alpha_s$  occurs *after* the elite has been chosen.

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<sup>31</sup>See Osborne and Slivinsky (1996) and Besley and Coate (1997) for models based on this idea.

**Public Good Provision** Using the analysis in Proposition 1, the probability of transfer spending when the probability that the elite is of type  $h$  is  $\gamma$  is given by

$$\rho(\mu, \sigma, \gamma) = \gamma F\left(\frac{\theta(\sigma)\xi_L(\mu, \sigma)}{\xi_H(\mu)} : \kappa_h\right) + (1 - \gamma) F\left(\frac{\theta(\sigma)\xi_L(\mu, \sigma)}{\xi_H(\mu)} : \kappa_l\right) \quad (19)$$

The transfer regime is less likely if the polity is represented by a type  $h$  elite group member, if the civic culture is stronger and if institutions are more cohesive.

**Choice of Elites** We now discuss how  $\gamma$  can be determined endogenously using a very simple model. Note first that if there was no randomness and the non-elite citizens could choose which group to have in power before the realization of  $\alpha_s$ , they would unanimously prefer a type  $h$  elite member and we would  $\gamma = 1$ . We can think of  $\gamma$  as therefore indexing how far the non-elite citizen's preferences are represented in the selection process which could reflect franchise extension as modeled by, for example, Acemoglu and Robinson (2000) and Lizzeri and Persico (2004).

To be specific, suppose that in each period, there is a contest for power between a representative of the  $h$  and  $l$  elites and that the group with more support wins. Moreover, suppose that there is a pro- $h$  "shock"  $\chi \in [-e, e]$  with symmetric distribution function  $K(\cdot)$ . This shock can be thought of as representing non-economic factors such as the relative charisma or persuasiveness of the candidate put up by each group. So even a group  $h$  elite member may favour the group  $l$  member and vice versa.

Let  $\phi \in [0, 1]$  index how much influence non-elite citizens have in choosing who holds power. They will always support the group  $h$  candidate. Assuming that the group with highest level of support holds office, then the group  $h$  will hold power if  $e_h + \phi[1 - e] + \chi \geq e_l$ . Then

$$\gamma = K(e_h - e_l + \phi(1 - e))$$

is the probability that a type  $h$  elite member controls policy. This is increasing in  $\phi$  so that greater representation of the views of non-elites in the selection process increases the chance of a type  $h$  elite group member controlling policy. Moreover,  $\hat{\phi}$  such that  $\gamma = 1$  for all  $\phi \geq \hat{\phi}$  as long as  $e < 1/3$ . If  $\phi$  and  $e_h$  are small then group  $l$  elites will tend to dominate policy making with  $\gamma$  close to zero.

**Implications** The cultural fitness advantage of civic-minded citizens will now be a function of  $\gamma$  through (19) since the selection process of the elite group affects the probability that expenditure will be on the public good rather than transfers. We capture this by writing this as  $\bar{\Delta}(\mu, \sigma, \gamma)$  which is an increasing function of  $\gamma$ .

Now consider two values of  $\gamma \in \{\gamma_l, \gamma_h\}$  where  $\gamma_h > \gamma_l$  to represent varying levels of non-elite representation in the political process either in different polities or following a reform within a polity. Suppose that for  $\mu_0 \in [0, 1]$  we have:

$$\bar{\Delta}(\mu_0, \sigma, \gamma_h) > 0 > \bar{\Delta}(\mu_0, \sigma, \gamma_l). \quad (20)$$

This is implied by (18) if  $\gamma_h$  and  $\gamma_l$  are far enough apart. We now have a parallel result to Propositions 3 and 4:

**Proposition 5** *Suppose that (20) holds at  $\mu_0$ , then a polity with  $\gamma_h$  converges to  $\mu = \bar{\mu}$  and a polity with  $\gamma_l$  converges to  $\mu = \underline{\mu}$ .*

This result shows how a democratic reform towards greater participation in political selection can change the direction of civic culture and fiscal capacity. However, as in the case of reforms to cohesiveness, this is more likely with non-marginal reforms and is more likely when close to  $\hat{\mu}(\sigma)$  as defined in Proposition 2. Thus the impact of a reform can be heterogeneous according to context.

## 6 Further Insights

This section explores some additional implications of the model. We first discuss what happens when different civic traditions from heterogeneous communities are merged together. Second, we discuss aid dependence and natural resources. Third, we discuss some alternative ways of thinking about socialization and cultural transmission.

**Bottom-up State Building** Reciprocity is most often invoked as a feature of small-scale societies and local communities. Moreover, modern states were often built from the ground up by merging heterogeneous communities. The USA merged together states with cultural origins and the UK is a forged from a variety of countries with their own political traditions and institutions. This consideration opens up the possibility that strong local cultures could

help in building a centralized state. Moreover, the framework developed in this paper is useful in thinking about this process.

Suppose therefore that there are two different communities indexed by  $J \in \{1, 2\}$  with each comprising an elite group and a set of non-elite citizens. Let the communities be identical except for the quality of institutions that regulate how public resources, i.e. there is  $\sigma_J$  for  $J \in \{1, 2\}$  and suppose that these differences are exogenously given. At any date  $s > 0$  let  $\mu_s^J$  represent the civic culture in community  $J$  and suppose that  $\mu_0^J = \underline{\mu} = 0$ , i.e. both communities begin with purely materialistic cultures. If institutions in the two communities differ such that  $\bar{\Delta}(0, \sigma_1) > 0 > \bar{\Delta}(0, \sigma_2)$ , then Proposition 3 implies that the civic cultures will diverge and, after a period of time,  $\mu_s^1 > \mu_s^2 = 0$ , i.e. the community with more cohesive institutions will develop a stronger civic culture.

Now consider what would happen if the two communities were to merge and decision-making over taxes and public spending across the two communities were unified as a result. To study the merged polity, assume that the aggregate civic culture has  $\mu_s = \varphi \mu_s^1$  where  $\varphi \in [0, 1]$  is the population share of community 1. For institutions, suppose that  $\sigma = \beta \sigma_1 + (1 - \beta) \sigma_2$  where  $\beta = 1$  is the optimistic case where the most cohesive institutions are adopted centrally while  $\beta = 0$  is the opposite case.

The merger creates the possibility of positive and negative externalities between the communities which affect the subsequent evolution of civic culture. A sufficient statistic for this is the sign of  $\bar{\Delta}(\varphi \mu_{1s}, \beta \sigma_1 + (1 - \beta) \sigma_2)$  which is the cultural fitness advantage of the civic-minded citizens in the merged polity. A successful merger in fiscal capacity terms, can then be defined as a case where

$$\bar{\Delta}(\varphi \mu_{1s}, \beta \sigma_1 + (1 - \beta) \sigma_2) > 0,$$

so that the merged community now has an incentive to build a strong civic culture and community 1 creates a positive externality for community 2. This is more likely if  $\beta$  is close to one. An unsuccessful merger would be characterized by

$$0 > \bar{\Delta}(\varphi \mu_{1s}, \beta \sigma_1 + (1 - \beta) \sigma_2).$$

Now community 2 inflicts a negative externality on community 1 shows civic culture erodes over time.

These considerations illustrate the risk associated with merging civic cultures from different countries to form nation states. Moreover, there is

evidence that artificial mergers of ethnic groups into contrived nation states has more often than not result in lower levels of public good provision as argued, for example, by Alesina et al. (1999) and study in terms of pre-colonial institutions by Papaioannou and Michalopoulos (2013).

**Natural Resources and/or Aid-dependence** The model focuses on tax revenues from incomes. But a feature of many low-income countries and weakly institutionalized polities is high dependence on natural resource royalties and aid flows to fund the government. Moreover, there is now a sizeable literature emphasizing the economic and political disadvantages of natural resource dependence (for example, Sachs and Warner, 2001, and Ross, 2015)

We now show natural resources can affect fiscal capacity via its impact on civic culture. To do so, let non-tax revenues per capita be denoted by  $R$ . This implies that tax revenues on income are comparatively less important and the critical ratio of  $\alpha$  (from Proposition 1) which determines whether spending is on the public good or transfers is modified to:

$$\alpha \gtrless \theta(\sigma) \left[ \frac{R + \tau \xi_L(\mu, \sigma)}{R + \tau \xi_H(\mu)} \right]. \quad (21)$$

The right hand side of (21) is increasing in  $R$  implying that greater natural resource revenue increase the range of  $\alpha$  for which the state spends on transfers for any given value of  $\mu$ . This weakens the influence of civic culture on government spending behavior since income tax compliance is relatively less important.

The probability that a government will spend on transfers is now given by:

$$\rho(\mu, \sigma, R) = F \left( \theta(\sigma) \left[ \frac{R + \tau \xi_L(\mu, \sigma)}{R + \tau \xi_H(\mu)} \right] \right) \quad (22)$$

which is also increasing in  $R$ . This in turn affects the cultural fitness advantage of civic-minded citizens. Specifically this now depends on  $R$ , and hence is denoted by  $\bar{\Delta}(\mu, \sigma, R)$ , which is decreasing in  $R$ . This is because with a higher probability of transfer spending, there is a smaller fitness advantage to civic-minded citizens.

To illustrate the implication of natural resources for the emergence of civic culture, suppose that two polities differ only in respect of their levels of non-tax revenues from natural resources  $R \in \{R_L, R_H\}$  where  $R_H > R_L$  for which that:

$$\bar{\Delta}(\mu_0, \sigma, R_L) > 0 > \bar{\Delta}(\mu_0, \sigma, R_H), \quad (23)$$

for  $\mu_0 \in [0, 1]$ . Now, using the logic of Proposition 3, a polity with low natural resources,  $R_L$ , converges to  $\mu = 1$  while a polity with high natural resources,  $R_H$ , converges to  $\mu = 0$ .

This argument adds a new twist to the literature on the resource curse showing how natural resources can have an impact on civic culture. This weakness of civic culture presents particular challenges for countries with dwindling natural resources or where aid is being cut back. Even if this increases the incentive to spend on public goods, if they lack a strong social contract based on reciprocal obligation, raising tax revenue may be a challenge.

**The Nature of Cultural Transmission** The approach taken here supposes that it is utility rather than material payoffs that drive cultural transmission. This contrasts with a more standard economic view where the only observable fitness signal comes from material payoffs, i.e. the consumption that each type enjoys which is given by:

$$\hat{Y}(x) = 1 - t \left( 1 - \hat{f} \left( \frac{t-x}{\tau} \right) \right) - \tau C \left( \hat{f} \left( \frac{t-x}{\tau} \right) \right) \quad (24)$$

where  $x = 0$  for materialists and  $x = \Lambda [G - eB]$  for civic-minded citizens. The fact that  $\hat{Y}(x)$  is maximized at  $x = 0$  reflects the fact that civic-minded citizens always have lower material payoffs and hence:

$$\bar{\Delta}(\mu, \sigma) = \rho(\mu, \sigma) \hat{Y}(\Lambda \tau \xi_H(\mu)) + (1 - \rho(\mu, \sigma)) \hat{Y}(-e\theta(\sigma) \Lambda \tau \xi_L(\mu, \sigma)) - \hat{Y}(0) < 0.$$

This is true since civic-minded citizens only receive a utility benefit from paying more taxes if they have higher non-material payoffs. Cultural evolution based on material payoffs would imply that no civic culture would emerge. This observation could be used to motivate an upper bound on  $\mu$  if some of the non-elite citizens always care only about money or if there is diminishing marginal utility of private consumption.

As an alternative source of intrinsic motivation, Besley and Persson (2019a) explore the emergence of environmentalism using an approach based on Benabou and Tirole (2006) where agents use their consumption decisions to signal to others and earn social esteem from pro-social behavior. The approach in this paper emphasises that what creates esteem can vary, i.e. whether paying taxes is deemed to be “pro-social” could depend on whether the state it is providing the public good.

The model of cultural evolution used here makes socialization depend on expected utilities conditional on  $\mu_s$ . This differs from strategic forward-looking socialization as in Bisin and Verdier (2001). However, as Besley and Persson (2019a,b) show, with a few stronger assumptions, the current approach can include forward looking socialization without any material change in the results.<sup>32</sup>

## 7 Concluding Comments

This paper has explored the interplay between civic culture, effective governance and state capacity. The proposed framework captures the role of civic culture in encouraging voluntary compliance. Intrinsic reciprocity between the state and its citizens evolves based on the relative payoffs of materialists and civic-minded citizens. The analysis models an evolving social contract where tax compliance is linked to the provision of a public good.

The framework has two important complementarities which affect the dynamic path that a polity takes. First, a society with a strong (weak) civic culture encourages provision of public goods which increases (decreases) the payoff of civic-minded citizens relative to materialists. Thus weak or strong civic-cultures are mutually reinforcing. This feature of the model can generate multiple steady states leading to hysteresis with eventual outcome depending on the initial conditions. The second complementarity comes from cohesive institutions constraining government and therefore favoring civic-minded citizens over materialists. Governments who lack constraints will tend to disappoint their civic-minded citizens leading to an erosion in civic culture over time. Making elites more accountable to their citizens can also foster the emergence of a stronger civic culture.

There are many potential avenues for future development. Exploring more dimensions of state capacity such as laws and regulations would be interesting. A direct role for “due process” in generating compliance and civic culture is important in this context as would be the process by which government policy is made. A greater role for heterogeneity and polarization is also important. There are many potential applications of cultural change to politics. For example, Besley and Persson (2019b) try to explain the rise

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<sup>32</sup>The essentials of the analysis are preserved as long as the the evolutionary model is governed by a difference equation which has a root in the unit interval.

of identity politics in terms of the cultural fitness advantage to citizens with nationalistic rather than cosmopolitan views.

The model of elite selection above assumed that the elite were exogenously partitioned into groups with high and low public spending priorities so that some were closer to what non-elite citizens wanted. But the size of these groups could be made endogenous by considering the relative payoffs of the different kinds of elites. When the political elite comes to power in elections, they have an incentive to develop norms and values which make them faithful servants of non-elite citizens as long as they gain an electoral advantage from doing so. Greater prestige from holding power might then help to nurture an elite who had a stronger ethic of public service.

We have abstracted away from efforts by government to affect culture strategically. If the government is strategic, and especially if it can commit, it could take into account how policy changes  $\mu_{s+1}$ .<sup>33</sup> The body of evidence that educated individuals are more likely to engage in civic activities such as volunteering (see, for example, Dee, 2004, and Milligan et al. 2004) which opens up the possibility that governments spending resources on civic education in order to change  $\mu_{s+1}$  directly.

The paper has also taken political institutions as given. But it would be interesting to explore institutional and cultural dynamics jointly. Besley and Persson (2018) build on the strategic approach of Acemoglu and Robinson (2006) and argue that democratization and democratic values are complements. There is much more to do to explore the coevolution of culture and political institutions.<sup>34</sup>

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<sup>33</sup>See Besley and Persson (2019a) for discussion of how policy commitment and forward looking government action could influence the trajectory of environmental values.

<sup>34</sup>See, for example, Acemoglu and Robinson (2018) and Bisin and Verdier (2017).



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## A Proofs

**Proof of Lemma 1:** Let

$$T_H = \frac{(1-e)w}{4\tau} [\tau + \mu\Lambda T_H]^2$$

and

$$T_L = \frac{(1-e)w}{4\tau} [\tau - \theta(\sigma) e\mu\Lambda T_L]^2$$

Now let  $\tau Z_H = T_H$  and  $\tau Z_L = T_L$ . Then we have that

$$Z_H = \frac{(1-e)w}{4} [1 + \mu\Lambda Z_H]^2$$

and

$$Z_L = \frac{(1-e)w}{4} [1 - \theta(\sigma) e\mu\Lambda Z_L]^2$$

This is a common quadratic with form

$$\hat{X}(A, b) = A [1 + b\hat{X}(A, b)]^2.$$

Choosing the lowest root, we have that:

$$\begin{aligned} \frac{T_H}{\tau} &= \hat{X}\left(\frac{(1-e)w}{4}, \mu\Lambda\right) \\ &= -\frac{2}{(1-e)w(\Lambda\mu)^2} \left[ \sqrt{1 - (1-e)w\Lambda\mu} + \frac{(1-e)w\Lambda\mu}{2} - 1 \right] = \xi_H(\mu) \end{aligned}$$

$$\begin{aligned} \frac{T_L}{\tau} &= \hat{X}\left(\frac{(1-e)w}{4}, -\mu\Lambda e\theta(\sigma)\right) \\ &= \frac{2}{(1-e)w(\theta(\sigma)e\Lambda\mu)^2} \left[ -\sqrt{1 + \theta(\sigma)e(1-e)w\Lambda\mu} + 1 + \frac{\theta(\sigma)e(1-e)w\Lambda\mu}{2} \right] = \xi_L(\mu, \sigma). \end{aligned}$$

for  $\Lambda\mu \neq 0$ . It is straightforward to verify that for  $\mu > 0$ , then  $\xi_H(\mu)$  is increasing in  $\mu$  and  $\xi_L(\mu, \sigma)$  is increasing in  $\sigma$  and decreasing in  $\mu$ . Moreover:

$$\frac{\partial\theta(\sigma)\xi_L(\mu, \sigma)}{\partial\sigma} = \frac{\theta_\sigma(\sigma)\xi_L(\mu, \sigma)}{1 + \frac{(1-e)w}{2} [1 - \mu\Lambda e\theta(\sigma)\xi_L(\mu, \sigma)] e\theta(\sigma)\mu\Lambda} < 0.$$

**Proof of Proposition 1:** Define

$$T = \frac{(1-e)w}{4\tau} [\tau + \mu\Lambda(G - eB)]^2$$

$$\hat{B}(G) = \left[ T \left( t, \lambda \left[ G - e\hat{B}(G) \right], \mu, \tau \right) - G \right] \theta(\sigma)$$

and note that

$$\hat{B}'(G) = \frac{[\Gamma(G - eB) - 1] \theta(\sigma)}{[1 + \theta(\sigma) e\Gamma(G - eB)]}$$

where  $\Gamma(G - eB) = \left[ \frac{1-e}{2\tau} w\Lambda\mu \right] (\tau + \mu\Lambda[G - eB]) > 0$ . Moreover,

$$1 - e\hat{B}'(G) = \frac{1 - e\theta(\sigma)}{[1 + \theta(\sigma) e\Gamma(G - eB)]}.$$

Then, using this, note that:

$$\hat{B}''(G) = \theta(\sigma) \frac{[1 + \theta(\sigma) e]^2}{[1 + \theta(\sigma) e\Gamma(G - eB)]^3} \Gamma'(G - eB) > 0.$$

Substituting (10) into (9), the choice of  $G$  maximizes the following convex function:

$$\alpha G + \hat{B}(G)$$

and hence yields a corner solution at either  $G = 0$  or  $G = T_H(\mu, \tau)$ . Hence we can now compare  $\alpha T_H(\mu, \tau)$  and  $\theta(\sigma) T_L(\mu, \tau, \sigma)$  which yields the three cases in the Proposition. ■

**Proof of Lemma 2:** Begin from (16) and (14). Now first consider the effect of a change in  $\mu$ . Note that  $\rho(\sigma, \mu)$  is decreasing in  $\mu$  and

$$\delta_L(\mu, \sigma) = w \left[ v \left( \frac{t_L(\mu, \tau, \sigma)}{\tau} \right) - v \left( \frac{t_L(\mu, \tau, \sigma)}{\tau} + \Lambda e\theta(\sigma) \xi_L(\mu, \sigma) \right) \right] < 0$$

and

$$\delta_H(\mu) = w \left[ v \left( \frac{t_H(\mu, \tau)}{\tau} \right) - v \left( \frac{t_H(\mu, \tau)}{\tau} - \Lambda \xi_H(\mu) \right) \right] > 0$$

since  $v(\cdot)$  is an increasing function. Then note that

$$\begin{aligned} \frac{\partial \delta_H(\mu)}{\partial \mu} &= \tau w \left[ \left( 1 - \frac{t_H(\mu, \tau)}{\tau} \right) - \left( 1 - \frac{t_H(\mu, \tau)}{\tau} - \Lambda \xi_H(\mu) \right) \right] \frac{\partial t_H(\mu, \tau)}{\partial \mu} \\ &\quad + \tau w \left( 1 - \frac{t_H(\mu, \tau)}{\tau} - \Lambda \xi_H(\mu) \right) \frac{\partial \xi_H(\mu)}{\partial \mu} \end{aligned}$$

$$\begin{aligned} \frac{\partial \delta_L(\mu, \sigma)}{\partial \mu} &= \tau w \left[ \left( 1 - \frac{t_L(\mu, \tau, \sigma)}{\tau} \right) - \left( 1 - \frac{t_L(\mu, \tau, \sigma)}{\tau} + \Lambda e \theta(\sigma) \xi_L(\mu, \sigma) \right) \right] \frac{\partial t_L(\mu, \tau, \sigma)}{\partial \mu} \\ &\quad - \tau w \left( 1 - \frac{t_L(\mu, \tau, \sigma)}{\tau} + \Lambda e \theta(\sigma) \xi_L(\mu, \sigma) \right) \frac{\partial \xi_L(\mu, \sigma)}{\partial \mu} \end{aligned}$$

which are both positive. Together these imply that  $\bar{\Delta}(\mu, \sigma)$  is increasing in  $\mu$ .

How about dependence on  $\sigma$ ? First note that  $\rho(\sigma, \mu)$  is decreasing in  $\sigma$ . Then

$$\begin{aligned} \bar{\Delta}_\sigma(\mu, \sigma) &= \rho_\sigma(\sigma, \mu) w [\delta_L(\mu, \sigma) - \delta_H(\mu)] + \\ &\quad - \rho(\sigma, \mu) w \frac{\partial \delta_L(\mu, \sigma)}{\partial \sigma} > 0, \end{aligned}$$

since

$$\begin{aligned} \frac{\partial \delta_L(\mu, \sigma)}{\partial \sigma} &= \tau w \left[ \left( 1 - \frac{t_L(\mu, \tau, \sigma)}{\tau} \right) - \left( 1 - \frac{t_L(\mu, \tau, \sigma)}{\tau} + \Lambda e \theta(\sigma) \xi_L(\mu, \sigma) \right) \right] \frac{\partial t_L(\mu, \tau, \sigma)}{\partial \sigma} \\ &\quad - \tau w \left( 1 - \frac{t_L(\mu, \tau, \sigma)}{\tau} + \Lambda e \theta(\sigma) \xi_L(\mu, \sigma) \right) \frac{\partial \xi_L(\mu, \sigma)}{\partial \sigma}. \end{aligned}$$

which is negative since  $\frac{\partial \xi_L(\mu, \sigma)}{\partial \sigma} > 0$  and  $\frac{\partial t_L(\mu, \tau, \sigma)}{\partial \sigma} > 0$  from (12). ■

**Proof of Proposition 2:** To prove this, we start from

$$\mu_{s+1} - \mu_s = (1 - \mu_s) \varsigma_{VM} - \mu_s \varsigma_{MV}. \quad (25)$$

Note that if  $\bar{\Delta}(\mu, \sigma) > 0$  for all  $\mu \in [0, 1]$  then  $\varsigma_{VM} > 0$  and  $\varsigma_{MV} \leq 0$  and (25) is positive so  $\mu$  converges to one globally. The opposite is true if  $\bar{\Delta}(\mu, \sigma) < 0$  for all  $\mu \in [0, 1]$ . Now consider the case where there exists  $\hat{\mu}(\sigma)$  such that  $\bar{\Delta}(\hat{\mu}(\sigma), \sigma) = 0$ . Then from Lemma 1 since  $\bar{\Delta}(\mu, \sigma)$  is globally increasing for  $\mu \in [0, 1]$ , then at  $\bar{\Delta}(\hat{\mu}(\sigma), \sigma) = 0$ , we must have  $\mu_{s+1} - \mu_s \geq 0$  for all  $1 \geq \mu \geq \hat{\mu}$ , while  $\mu_{s+1} - \mu_s < 0$  for all  $0 \leq \mu < \hat{\mu}$ . The interior steady state is therefore unstable. Moreover since  $\bar{\Delta}(\mu, \sigma)$  is globally increasing implies that if  $\bar{\Delta}(1, \sigma) \geq 0 \geq \bar{\Delta}(0, \sigma)$ . Hence

$$\mu_{s+1} - 1 + \nu = (1 - \nu) \varsigma_{VM} - \nu \varsigma_{MV} > 0$$

$$\mu_{t+1} - \nu = \nu \varsigma_{VM} - (1 - \nu) \varsigma_{MV} < 0$$

for small enough  $\nu > 0$ . This implies that the steady states at  $\mu = 0$  and  $\mu = 1$  are stable. ■

**Proofs of Propositions 3, 4, & 5** The argument is essentially identical for all three Propositions. Hence, we give the proof only for Proposition 3. Since (17) holds, then from (15), then for  $\mu = \mu_0$ , if  $\sigma = \sigma_H$ , then  $\mu_1 > \mu_0$  and since  $\bar{\Delta}$  is increasing in  $\mu$ , then  $\mu_{s+1} > \mu_s$  for all  $s > 1$ . A similar argument holds in reverse for  $\mu = \mu_0$  and  $\sigma = \sigma_L$  which implies that  $\mu_{s+1} - \mu_s < 1$  for all  $s > 0$ . ■

## B Conditions for an interior solution

For compliance to be at an interior solution, we require that

$$0 < \frac{t - \Lambda\mu(G - eB)}{\tau} < 1 \quad (26)$$

for all  $\mu \in [0, 1]$ . For the tax rate to be interior, we need

$$0 < \frac{1}{2} [\tau + \mu\Lambda(G - eB)] < 1. \quad (27)$$

Note that for (26), we require that

$$t \left[ \frac{1 - \Lambda w}{\tau} \right] > 0 \quad (28)$$

and

$$t \left[ \frac{1 + \Lambda w e \mu}{\tau} \right] < 1. \quad (29)$$

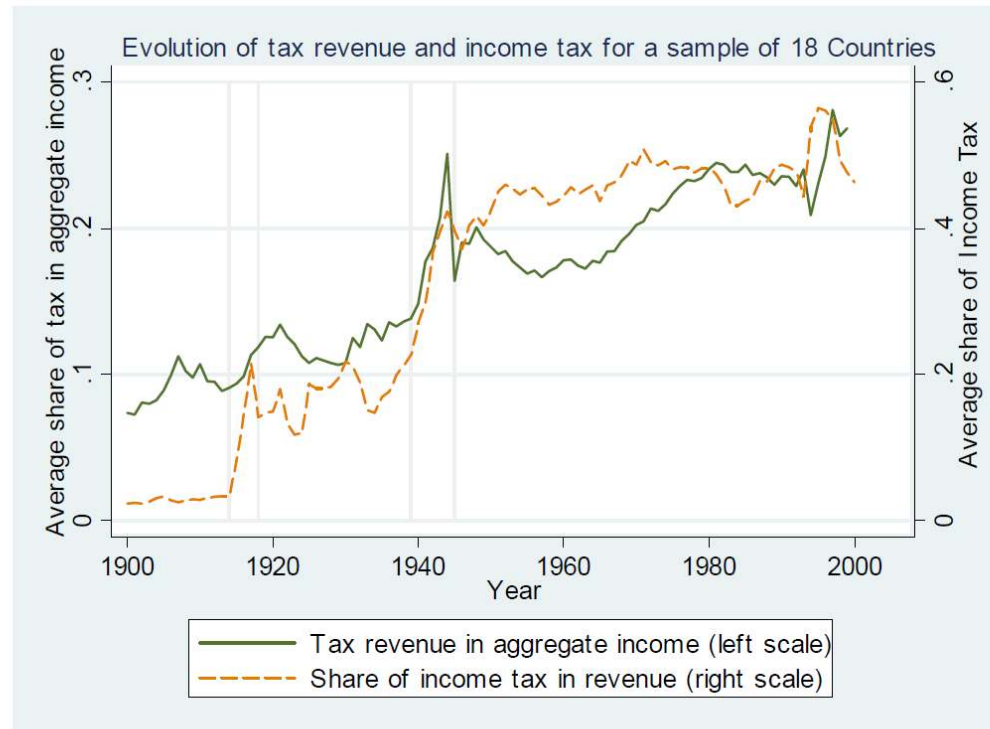
The first condition holds for all  $t \in [0, 1]$  if  $\Lambda w < 1$  which is implied by (5). For the second condition, we require that this holds when  $t = \frac{1}{2} [\tau - \mu e \Lambda w t]$ . Substituting this into (29) yields

$$\frac{\tau}{2 \left[ 1 + \frac{\Lambda w e \mu}{2} \right]} \left[ \frac{1 + \Lambda w e \mu}{\tau} \right] < 1.$$

So finally we need to check that

$$\frac{\tau}{2 \left[ 1 - \frac{\Lambda w}{2} \right]} < 1$$

or  $2 - \tau > \Lambda w$  which is also implied by (5).



## Taxes and share of income tax over time

Countries in time series 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 1: Taxes and the Share of Income Tax Over Time

Low confidence in government	-	-0.177 (0.029)	-
Low trust in people	-	-	0.009 (0.022)
Male	-0.212 (0.018)	-0.210 (0.018)	-0.212 (0.018)
Age 30-49	0.222 (0.021)	0.220 (0.021)	0.222 (0.021)
Age 50+	0.571 (0.043)	0.564 (0.043)	0.572 (0.043)
Education: Middle	0.042 (0.026)	0.046 (0.026)	0.042 (0.026)
Education: Upper	0.097 (0.032)	0.101 (0.033)	0.098 (0.031)
Income 2	-0.017 (0.055)	-0.014 (0.029)	-0.017 (0.055)
Income 3	-0.034 (0.054)	-0.032 (0.054)	-0.034 (0.053)
Income 4	-0.087 (0.056)	-0.087 (0.057)	-0.087 (0.056)
Income 5	-0.043 (0.056)	-0.041 (0.057)	-0.043 (0.056)
Income 6	-0.141 (0.056)	-0.141 (0.057)	-0.141 (0.056)
Income 7	-0.161 (0.057)	-0.160 (0.057)	-0.161 (0.057)
Income 8	-0.158 (0.069)	-0.157 (0.069)	-0.158 (0.069)
Income 9	-0.194 (0.063)	-0.191 (0.062)	-0.193 (0.063)
Income 10	-0.234 (0.081)	-0.236 (0.080)	-0.233 (0.081)
Number of Observations	303229	303229	303229

Notes: The dependent variable is based on question “Is it justifiable to cheat on your taxes if you have a chance?” from the World Values Survey and European Values Survey (various waves) with the scale reversed so that the highest score is associated with cheating not being justified. All specifications include wave and country dummies with standard errors clustered at the country level. The data cover 104 countries. Standard errors adjusted for clustering at the country level. For income: Here is a scale of incomes. We would like to know in what group your household is, counting all wages, salaries, pensions and other incomes that come in. Just give the letter of the group your household falls into, before taxes and other deductions. For confidence: I am going to name a number of organizations. For each one, could you tell me how much confidence you have in them: is it a great deal of confidence, quite a lot of confidence, not very much confidence or none at all? Use answers on “government in capital”. Coded 1 if answer is “Not very much” or “None at all”. Generalized Trust: Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people? Coded 1 if “You cannot be too careful”

Table 1: Determinants of Attitudes Towards Tax Compliance