Elite Politics and Inequality: The Development of Fiscal Capacity in Authoritarian Regimes

by

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John Ahlquist

Dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the Department of Political Science in the Graduate School of Duke University 2015
ABSTRACT

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Abstract

The ability to raise revenue is one of the most fundamental requirements for statehood. Without revenues, states are unable to perform even the most basic tasks. In this dissertation I aim to answer the question: When do authoritarian elites invest in fiscal capacity? First, I develop a theoretical argument using computational modeling techniques. I contend that inequality increases the costs associated with higher fiscal capacity due to a possible regime change in the future. On the other hand, elite demand for government spending can raise the incentives for autocrats to increase the tax capacity of the state. Complementarity between elite-owned capital and government investment can lead to a demand for higher taxation. Based on their personal utility associated with government spending, elites weigh the current benefit of higher tax capacity with possible future costs.

I then test the overarching theoretical argument across two different datasets. First, I empirically investigate the question on a sample of over 90 authoritarian regimes from 1980 to 2006. Estimating a number of different models and including a variety of controls, I find that inequality has a strong negative long term effect on fiscal capacity. On the other hand, more industrial countries have higher levels of capacity. In the second empirical chapter, I investigate the theoretical argument on newly collected data on tax revenue and administrative spending in local Prussian counties in the 19th century. Again, I find that local inequality has strong negative effects, while more industrial areas are associated with higher levels of fiscal capacity.
Dedicated to my parents, Gisela and Leo
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List of Abbreviations and Symbols

Symbols

\[ \pi \quad \text{Probability of Regime Change to Democracy} \]
\[ \phi \quad \text{Fiscal Capacity of the State} \]
\[ \tau \quad \text{Tax Rate} \]
\[ Y \quad \text{Total Income in Society} \]
\[ N \quad \text{Size of the Group/Society} \]
\[ \tau \quad \text{Tax Rate} \]
\[ \alpha \quad \text{Benefit from Public Spending Parameter} \]
\[ y \quad \text{Individual Pre-Tax Income} \]
\[ PS \quad \text{Share of Revenue Used for Public Service Spending} \]
\[ R \quad \text{Revenue as Share of Total Income} \]
\[ Rep \quad \text{Share of Revenue Used for Repression} \]
\[ d \quad \text{Share of Personal Income Declared for Taxation} \]
\[ \delta \quad \text{Discount Factor of Future Time Periods} \]
\[ gini \quad \text{Inequality in Society, Measured as Gini Coefficient} \]
\[ c \quad \text{Subscript for Citizen} \]
\[ e \quad \text{Subscript for Elite Member} \]
\[ i \quad \text{Subscript for any Individual in Society} \]
\[ I \quad \text{Individual Post-Tax Income} \]
\[ Paudit \quad \text{Probability of Audit by the State} \]
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<td>Conformity Parameter</td>
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Introduction

Why do some countries tax more than others? What is the effect of inequality on redistribution and regime change? Does democratization lead to more redistribution? And, how can the wealthy minorities limit their tax burden in democratic polities? These questions have motivated scholars of politics and economics going back to Plato and Aristotle. The way in which politics, public finance, and development influence each other has sparked many debates. Yet, when thinking about these questions, scholars and the general public presuppose the ability of states to collect taxes and raise revenues. A country’s level of taxation and tax rates are seen as a simple problem of bargaining and policy choice. Contrary to these discussions, in many countries around the world governments are severely limited when it comes to making choices about tax policy.

Raising revenue via taxation requires high levels of administrative and enforcement capacity. Low capacity can make otherwise preferred tax policies impossible to enforce, forcing governments to alter their policy choices. Consider Figure 1.1, which plots an approximate level of tax evasion as percent of total tax revenue around the world. Based on estimates of the size of the shadow economy and total tax revenue
Figure 1.1: The map shows the variation in estimated tax evasion around the world. Data is averaged for the years 2000-2007. Missing observations are plotted in dark gray, while level of tax evasion increases with darker shades of red. As one can see, the level of estimated tax evasion varies greatly across the world, and within continents.

as a percentage of GDP, the map shows differences in the ability of states to raise revenue via taxation.\footnote{Data is averaged for the years 2000-2007 to increase the sample size. Data on the size of the informal economy comes from Schneider, Buehn and Montenegro (2010), whereas data on total levels of taxation is based on World Bank data (2014). To get a simple approximation, I estimate the share of tax evasion as percentage of tax revenue by multiplying the size of the informal economy in US $ with the overall average tax revenue as percent of GDP (i.e. average tax take). The resulting value is the approximate lost tax revenue from the shadow economy, which is then divided by total tax revenue to get an estimation of tax revenue lost due to tax evasion as a percentage of total tax revenue.} Darker shades of red in the map indicate higher levels of estimated tax evasion. Significant tax evasion implies difficulties of the state to enforce its chosen tax policies. As the map in Figure 1.1 shows, the level of estimated tax evasion, or the ability of states to enforce tax laws, varies greatly across the world and also within continents.

Where the fiscal capacity of states is limited, governments are forced to raise revenue using taxes that are easy to enforce. Through its effect on the tax tools available to the state, low tax capacity limits the maximum amount of revenue that can be taxed. At the same time low capacity also increases the marginal cost as-
associated with each collected tax Dollar. For example, consider a state with very low capacity. Here, the enforcement of the income tax, the most administratively demanding tax tool, is nearly impossible. Instead, the state has to rely on taxes that are easily enforceable. Trade taxes, are generally seen as the easiest to enforce, since tax collection happens via monitoring of border crossings and ports of entry (Walker, 1970; Aidt and Jensen, 2009; Besley and Persson, 2014). On the other hand, while the enforcement of trade taxes requires little capacity, tariffs and customs are highly inefficient from an economic perspective and associated with high marginal costs. Levying trade taxes became even more costly as trade liberalization increased around the world (Baunsgaard and Keen, 2010). As I discuss in more detail in Chapter 3, given the high cost associated with trade taxation and its low enforcement costs, the ratio of trade tax revenue to total tax revenue can be used as an inverse proxy of fiscal capacity. Figure 1.2 shows the variation in trade tax revenue as percentage of total tax revenue around the world.² The map shows nicely the large differences in levels of trade tax revenue, even at a time period of high trade liberalization. Moreover, one can easily see that the two maps of tax evasion and trade taxation correspond quite nicely with each other.

Given this variation in the level of tax evasion and tax capacity around the world, the question arises what can explain differences in the ability of states to raise revenue via taxation? One of the first answers that comes to mind is the level of development or a country’s income. According to one of the most famous discovered empirical relationships in the social sciences, Wagner’s law (1883), more developed states ought to have higher levels of taxation. Similarly, the idea goes, as states become more developed, they are better able to raise taxes and develop capacity (Aidt and Jensen, 2009). The left plot in Figure 1.3 shows the relationship of logged GDP per capita

2 Data comes from Wilson, Cobham and Goodall (2014) and is again averaged over the period from 2000-2007.
Figure 1.2: The map shows the variation in the ratio of trade tax revenue to total tax revenue (excluding resource revenue) around the world. Again, data is averaged for the years 2000-2007. Missing observations are plotted in dark gray, while the level of trade tax revenue increases in darker shades of red. As one can see, this inverse measure of fiscal capacity corresponds nicely with the level of tax evasion that is plotted in Figure 1.1 above.

(income) and total taxation as percent of GDP. The right plot shows the association of logged GDP per capita with trade taxation as percent of total tax revenue. The first plot displays the fact that the level of development is certainly related to the overall level of taxation, however, quite a few cases do not fit the story. Income does not explain all of the variation. Secondly, as seen on the right plot, richer countries also have higher levels of fiscal capacity (lower levels of trade taxation). Yet again, the relationship between capacity and income is not conclusive. Together, both plots show that income has only limited explanatory power when it comes to total levels of taxation and the level of fiscal capacity.

The capacity of the state to enforce fiscal policies constrains the tools of taxation available to politicians. In reaction to limited fiscal capacity of the state, politicians adjust their strategies and demands. Fiscal capacity therefore directly influences de

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3 Data on GDP per capita is taken from the World Development Indicators (World Bank, 2014), while data on tax revenues comes from Wilson, Cobham and Goodall (2014). Total tax revenue is all tax revenue including social security payments, except for revenues from natural resources. To increase coverage, data are averaged over the time period 2000-2007.
Figure 1.3: The left plot shows the relationship between total tax revenue as percentage of GDP and logged GDP per capita. While a positive relationship exists in the data, income does not explain all of the variation. The right plot shows how trade tax revenue as the share of total tax revenue relates to the level of development. Again, income seems to explain part of the variation in fiscal capacity (low trade tax share), but not all of it.

As the capacity to tax varies greatly across the world, it has remained largely unexplained by political scientists and economists. Our limited knowledge about capacity investment is even more troubling, since unlike public policy, capacity can not be changed immediately. Rather, fiscal capacity is sticky and constant in the short term. Increasing the ability to tax takes long term investments by governments and states (Besley and Persson, 2011). Fiscal capacity constrains public policy making of
autocratic and democratic governments alike. Even more so, raising fiscal capacity is more complicated in settings where the most wealthy have incentives to undermine the strengthening of the state. This is likely the case in highly unequal and new democracies. As I argue below, the fiscal capacity investments in autocracies can therefore constrain taxation in subsequent regimes, even democracies. The path dependency of tax capacity leads to the long run influence of authoritarian politics into subsequent democratic regimes – an *authoritarian legacy*. Before we can fully understand distributive conflicts and their resolutions in democracies, we first have to learn whether and why previous regimes did or did not develop the capacity to tax. The study of fiscal capacity development in autocracies is therefore important to understand in light of authoritarian politics, but also because of its consequences for economic development, regime change, and politics in subsequent democracies.

This dissertation is concerned with fiscal capacity development in non-democratic regimes. Specifically, I aim to answer the question: When do authoritarian elites invest in the capacity of the state to tax? As I lay out in the following in more detail, the focus of this dissertation on autocratic politics is crucial for several reasons.

1.1 Classifying Political Regimes

How to distinguish regime types and define democracy has been a long standing debate in political science, both from an empirical and philosophical perspective (e.g. Aristotle, 2014; Bollen, 1990; Schmitter and Karl, 1991; Alvarez et al., 1996; Dahl, 2000; Cheibub, Gandhi and Vreeland, 2010; Marshall, Jaggers and Gurr, 2009; Boix, Miller and Rosato, 2013). In this dissertation, I define authoritarian regimes as those governments that are not democratic, i.e. the excluded category. Moreover, I use the terms autocratic, dictatorial, and authoritarian interchangeably. To create a clear delineation between democracy and autocracy, it is therefore easier to provide a clear characterization of democracy. The most fundamental definition of democracy
implies that political power lies with the people. Within political science definitions have varied widely, ranging from Dahl’s (1971; 2000) extension of the concept to polyarchy, to more minimalistic definitions (Cheibub, Gandhi and Vreeland, 2010). Bollen (1990, 12) vaguely defines democracy as “the extent to which the political power of the elite is minimized and that of the nonelite is maximized.” In his definition, however, Bollen (1990) argues for a latent and continuous concept of democracy. Instead, Alvarez et al. (1996) pursue a more minimalistic definition of democracy. Based on Dahl (1971) and Schumpeter (1942), Alvarez et al. (1996, 4) define democracy as “a regime in which some governmental offices are filled as a consequence of contested elections.” Inherent in this definition is the idea that elections must be contested (i.e. uncertainty exists about their outcome) and that the loser will accept defeat.

In part because of the need to classify countries into one of two regimes, I follow Alvarez et al. (1996), Cheibub, Gandhi and Vreeland (2010), and Boix, Miller and Rosato (2013) in the notion that democracy ought to be defined procedurally and in a minimalist perspective, as opposed to a continuous or ordinal scale (e.g. Marshall, Jaggers and Gurr, 2009). Understanding democracy as a binary concept with a minimalist definition is conceptually attractive and advantageous from a scientific standpoint. As Svolik (2012, 23) writes: “Before anything else, regimes are either democracies or dictatorships.” In this light, I rely on Boix et al’s (2013) minimalist definition. Political systems are defined as democracy when the executive is either directly or indirectly elected, the legislature is elected in free and fair elections, and a majority of adult males has the right to vote (Boix, Miller and Rosato, 2013). Anything falling outside of this definition is considered an autocracy. To select the sample of authoritarian regimes in Chapter 3 and Figure 1.4, I therefore use the data on regime types by Boix, Miller and Rosato (2013).

Figure 1.4 shows the same relationships and data as Figure 1.3 above, only this
Figure 1.4: The left plot shows the relationship between total tax revenue as percentage of GDP and logged GDP per capita, now sorting countries into democracies (orange) and authoritarian regimes (purple). The right plot displays the association of revenue from trade taxation as the percentage of tax revenue with logged GDP per capita. Again democracies are plotted in orange, while autocracies are shown in purple. While income explains part of the variation in the data, for both variables, the relationship with income is much weaker for autocratic countries.

It easily becomes clear that the relationship between income and taxation is largely driven by the democratic countries. As the left plot now shows, while the level of development is certainly related to overall taxation, this is mostly true for democracies (orange observations). The relationship is virtually non-existent for authoritarian countries (purple observations). Similarly, the association between fiscal capacity (low trade taxation) and income is strong for democracies, but again

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4 Again, data on GDP per capita is taken from the World Development Indicators (World Bank, 2014), while data on tax revenues comes from Wilson, Cobham and Goodall (2014). Total tax revenue is all tax revenue including social security payments, except for revenues from natural resources. Regime type classification is based on Boix, Miller and Rosato (2013) and the data are averaged over the time period 2000–2007.
much weaker for dictatorships. The variation in total taxation and fiscal capacity that can not be explained by the level of development is very stark in authoritarian regimes. As I elude to below, this is particularly important, since low fiscal capacity under authoritarian rule can have long lasting consequences for countries and their citizens.

1.2 Politics of Authoritarian Public Finance

The vast majority of societies in the history of the world have been ruled by authoritarian leaders. Only since 1991 has democracy been the most prevalent political system in the world and even in 2007, 46 percent of the world population was living in non-democratic regimes. Moreover, non-democratic government is, in essence, the original regime type. Most modern states were once under authoritarian rule, and as I argue below, these authoritarian politics can have long lasting effects.

While Figure 1.2 gave an indication of the existing variation in fiscal capacity across the world, a common notion is that within authoritarian regimes little variation exists when it comes to public finance. Rather, the prevailing view is that exclusive institutions or non-democratic governance is generally associated with little government spending and taxation (Acemoglu and Robinson, 2001; Boix, 2003; Bueno De Mesquita et al., 2005; Acemoglu and Robinson, 2006). In turn, if autocrats have little interest in utilizing taxation, it follows that they have little incentives to develop the fiscal capacity of the state. Yet, a look at the data proves otherwise.

The left plot in Figure 1.5 shows the empirical densities for total tax revenue as a percentage of GDP by regime type. The right plot on the other hand, shows the density for the share of total tax revenue that is derived from trade taxation. For both plots the data is averaged for the years 2000 to 2007 to increase data

\[5\] See Mulligan, Gil and Sala-i Martin (2004) and personal calculation based on population data by the World Bank (World Bank, 2014) and regime type coded by Boix, Miller and Rosato (2013).
coverage. Democracies are plotted in orange and the densities for authoritarian regimes are colored purple. The left plot clearly shows that on average democracies have higher levels of taxation. On the other hand, the variation within regime type is larger for autocracies. In fact, the sample variance for democracies with regards to total tax revenue as percentage of GDP is 45.12, while that for autocracies is 52.4. This exemplifies the large empirical variation that exists when it comes to public finance in autocracies. Yet, whereas a number of theories can explain differences in fiscal policies within democracies (e.g. Esping-Andersen, 1990; Boix, 1998; Shugart, 1999; Persson and Tabellini, 2003; Iversen and Soskice, 2006; Ganghof, 2006b; Iversen and Stephens, 2008; Beramendi, 2012), we know very little about what explains the differences in taxation within autocracies.

The right plot in Figure 1.5 displays the same density plots by regime type for the share of total tax revenue that is raised via trade taxation. Again democracies are depicted in orange, autocracies in purple. As explained in more detail in Chapter 3, the share of trade taxes in total tax revenue is a preferred inverse measure of fiscal capacity. As shown in the plot, on average democracies have higher levels of fiscal capacity. This ought to be expected, especially given that democracies are richer on average. Again one can see, however, that the densities between democracies and authoritarian regimes overlap. Consequently, many autocracies have high levels of capacity, similar to other democracies. On the other hand, many authoritarian regimes rely heavily on trade taxation, in other words, lack fiscal capacity. Again, much of this variation is unexplained and the question remains where these differences in fiscal capacity within authoritarian regimes originate?

Whereas Figure 1.5 shows the amount of variation that exists within authoritar-

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6 The data on tax revenues is again taken from Wilson, Cobham and Goodall (2014). The sample only includes those countries with constant regime type over the period 2000-2007. Total tax revenue refers to all revenue from taxation plus social security, but excluding any revenues from taxes on natural resources. Countries are classified as democratic and non-democratic based on (Boix, Miller and Rosato, 2013).
ian regime when it comes to fiscal capacity and taxation, much research has instead focussed on differences between the two regime types. One of the most prominent arguments about the origins of fiscal capacity has been the idea that it goes hand in hand with increases in representation or democratization. In short, the argument goes, rulers trade the ability to tax for higher levels of political representation of their subjects (e.g. North and Weingast, 1989; Timmons, 2005; Moore, 2008; Aïdt and Jensen, 2009; Timmons, 2010; Karaman and Pamuk, 2013). As Mick Moore writes: “[...] the dependence of governments on tax revenue encourages bargaining with tax payers and an exchange of (quasi-) voluntary compliance over tax payments
for institutionalised influence over public policy” (Moore, 2008, 35). Yet, as the density plots indicate, autocratic regimes exhibit large differences in terms of their fiscal capacity, often just as high as democracies. Moreover, one can think of several examples where the development of fiscal capacity came about prior to increases in representation. For example, South Korea strengthened the fiscal state long before democratization occurred. Similarly, as I describe in detail in Chapter 4, the development of Prussia into a prolific revenue making machine preceded regime change in Germany. Since this argument builds on political representation as one driving factor of the development of the fiscal state, it can not be used to explain differences in taxation and spending within authoritarian regimes.

A common explanation for differences in economic and fiscal policies between authoritarian regimes is the level of institutionalization (Escribà-Folch, 2009; Gehlbach and Keefer, 2011; Jensen, Malesky and Weymouth, 2013; Boix and Svolik, 2013). While this research offers insights into authoritarian politics and policies, the authors rarely discuss how and when fiscal capacity is developed. In the following dissertation, I aim to provide an explanation for fiscal capacity development that is more fundamentally related to countries’ economic characteristic and initial conditions.

1.3 Path Dependency of Fiscal Capacity

Democracy as defined by Aristotle (2014) in Politics is “the form of government [...] when the free, who are also poor and the majority, govern, and an oligarchy [is] when the rich and the noble govern, they being at the same time few in number.” Intrinsic in this definition is the idea that once states move towards democracy and expand the franchise, political power will move from the few (and often wealthy) to the general (and poorer) population. Implied in the definition of political power is that it can be used to change economic and fiscal policies. Thus, democratization ought to be associated with legislation that is more preferential to the masses.
The very general idea of how policies in democracies follow the will of voters was formalized by Downs (1957). Since the median voter becomes decisive for political majorities, policies should follow his will. Based on this theoretical argument, Romer (1975) and Meltzer and Richard (1981) developed models on how taxation and redistribution should respond to changing levels of inequality in democracies. Rational citizens ought to vote for more taxation and redistribution as the difference between their income and the mean income rises (Meltzer and Richard, 1981). From these models, one of the most famous and common sensical theoretical predictions in political science followed: as inequality rises, redistribution ought to increase in democracies. Yet, despite the simplicity of the argument and its theoretical attractiveness, the empirical evidence in its favor is rather weak. In fact, empirically higher inequality is not associated with more redistribution and taxation in democracies (e.g. Milanovic, 2000; Moene and Wallerstein, 2003; Iversen and Soskice, 2006; Elis, 2011; Lupu and Pontusson, 2011).

Moreover, in part based on the Meltzer-Richard model, Downs’ (1957) median voter model, and Moore’s (1966) seminal work, Boix (2003) and Acemoglu and Robinson (2006) developed economic models of regime change. In essence, the idea here is that as inequality rises, mass citizens pressure for more advantageous economic policies and redistribution. Yet, the only way for autocrats to credibly commit to better policies for the poor is through institutional change, or democratization. The fight for redistribution and higher levels of government spending is the driving factor in the Acemoglu and Robinson (2006) and Boix (2003) models of regime change. Once democratization occurs, taxation and spending should therefore increase under the newly elected democratic government. Again, this expectation is already implicit in Aristotle’s definition of democracy given above. As the franchise is expanded and the general masses become eligible to vote, the decisive voter becomes poorer. If democracies represent the will of the masses, we ought to expect policies in
their favor, i.e. higher taxation and redistribution. Yet, again, this neat theoretical prediction is not borne out in the data.

Figure 1.6 shows a simple plot of the tax revenues as percent of GDP before and after regime changes to democracy in the post 1980 era. The local piecewise smoother before and after regime transitions (green) is almost the same, which implies that democratization is not clearly associated with any changes in level of taxation. Overall, the plot shows that very little difference exists in total taxation levels before and after regime changes. If the distributive models of regime change were correct (Acemoglu and Robinson, 2006; Boix, 2003), we would expect a significant difference in pre- and post regime change taxation. Instead, the finding in the plot is in line with extensive research that finds little evidence of a positive effect of democratization on redistribution and taxation and challenges the power of these theoretical models (Ansell and Samuels, 2010; Elis, 2011; Ahlquist and Wibbels, 2012; Haggard and Kaufmann, 2012).

From this general notion of democracy as a political system that gives power to the masses, two clear theoretical predictions arise: 1) redistribution increases with higher inequality in democracies, and 2) all else equal democratization leads to higher taxation and redistribution. Yet, as we know, both predictions are not borne out in empirical reality. This leads to some of the most curious disconnects between these parsimonious theoretical models and empirical results in political science.

One reason for this divide between theory and empirics may lay in the omission of fiscal capacity when it comes to the study of taxation and redistribution. As outlined above, current research on these topics generally presupposes the ability of states to raise revenue. Scholars conclude that low tax revenue is due to a lack of political will. A possible lack of fiscal capacity is a different explanation for the missing empirical support for the redistributive models of regime change. Transitions to democracy create increased pressure for redistribution, yet many young democracies are actually
Figure 1.6: The plot shows how tax revenue as percentage of GDP changes before and after a regime change to democracy. The data is for all democratizations in the post 1980 era. As one can see, there is no significant effect of regime change on total tax revenue.

unable to tax the rich due to a lack of fiscal capacity. Therefore, omitting tax capacity in our analyses, political scientists miss a large part of the picture.

As I argue in this dissertation, fiscal capacity can not be changed easily. This is even more so the case once a transition to democracy occurs and inequality is high. In this case, the most wealthy citizens in society (those most important for generating revenue) have strong incentives to fight the strengthening of the state. In young democracies, the level of tax capacity is constant and dependent on investments in previous, often autocratic, regimes. While a demand for higher taxation and higher fiscal capacity exists, this can only be achieved in the long run. Only slowly can new democracies raise the fiscal capacity of the state.

Figure 1.7 shows some indicative evidence in favor of this argument. The plot shows the share of trade tax revenue to total tax revenue on the y-axis, an inverse
Figure 1.7: The plot shows the relationship between fiscal capacity (proxied by trade taxation) and regime age for both democracies and autocracies. The relationship between regime age and trade tax revenue is negative for democracies, i.e. older democracies have higher levels of capacity. However, this relationship is not nearly as clear for authoritarian regimes.

proxy of fiscal capacity, while the x-axis plots regime age in years. As democratic regimes mature and become older, their fiscal capacity increases (i.e. reliance on trade taxes is lower). Indicating a slow development of capacity in democracies. On the other hand, this simple relationship is not visible for authoritarian states, where fiscal capacity seems more stable.

Indeed, the distributional models of regime change may be correct after all, if one takes the level of fiscal capacity, or lack thereof, in new democracies into account. Low capacity would constrain newly elected governments from pursuing the fiscal policies they prefer. The lack of ability to enact the laws and policies for which they were elected could also explain part of the “disillusionment with democracy as a political system” in young democracies Svolik (2013, 685).
In this context, capacity investment in autocracies can be seen as one mechanism by which autocratic elites can influence politics in future regimes. This is similar to other recent research on how authoritarian elites may control future democratic politics through institutional design or other means (Acemoglu, Ticchi and Vindigni, 2011; Ardanaz and Scartascini, 2013; Albertus and Menaldo, 2013). To understand the consequences of capacity on regime change and policies in subsequent democracies we first ought to understand when and where capacity is developed.

1.4 The Argument

In this dissertation, I aim to answer the question of when authoritarian elites develop the fiscal capacity of the state. I tackle this problem from the perspective of a rational actor, who is guided in his actions by his economic self interest. It is therefore paramount to understand the circumstances under which autocratic elites benefit form increasing the capacity of the state and under which circumstances the costs of capacity investments are particularly high.

One of the most common arguments to motivate increases in fiscal capacity is the idea that the need for revenues is caused by an external threat, i.e. the need for military spending (Tilly, 1990; Dincecco, 2011; Besley and Persson, 2011; Gennaioli and Voth, 2014). The argument of external war as a driving factor of state development, however, was developed with the particular historical experience of Europe in mind and its applicability is less clear outside of the European context (Herbst, 2000; Kurtz, 2013). Instead, I argue that the basis of a county’s economy (e.g. capital vs. labor intensive) can motivate autocratic elites to invest in fiscal capacity and raise taxes. On the other hand, inequality increases the costs associated with fiscal capacity, as it raises the equilibrium level of redistribution, should it come to a transition to democracy. In the following, I shortly outline the overarching argument of the dissertation.
1.4.1 The Benefits of Fiscal Capacity Investment

Fiscal capacity investments lower the costs associated with taxation and increase the maximum level of revenue that is available to the state. With increasing capacity, the marginal cost of taxation declines. It is straightforward that motivations to increase the fiscal capacity in the authoritarian regime must come from a demand for taxation by the autocratic elites. In other words, the cost of increasing fiscal capacity must be smaller than the benefit the autocratic elite derives from higher levels of taxation and government spending.

What can motivate autocratic elites to demand government spending and higher taxation? I argue that depending on the type of capital elites own, they can benefit from higher government spending on public services, such as education or infrastructure spending. Building on endogenous growth models (e.g. Barro, 1990; Barro and Sala-i Martin, 1992; Cashin, 1995), the idea is that government spending can directly influence the production function for economic elites, i.e., government spending can increase the return to private investment. I contend, however, that the effect of public spending on the growth in private capital for the elite depends on the type of capital they own and the economic activity they are engaged in. For example, elites with strong investments in manufacturing and the industrial sector require high skilled labor. Investment in public education would therefore lead to a positive effect of government education spending on their private returns on capital. On the other hand, for landed elites who require mostly unskilled labor, the multiplier effect would be almost zero.

Moreover, elites prefer government spending and taxation over private investment for a number of reasons. First, taxation and utilizing the state can serve as a commitment mechanism and prevent free riding. Second, especially in regards to education, the state likely exhibits economies of scale. Third, by using taxation, as
opposed to private spending, part of the revenue used to pay for these goods comes from outside the elite.

The type of capital owned by the elite and the economic activity they are engaged in can thus create a demand for government spending. As the demand for higher taxation increases, investments in fiscal capacity become more and more beneficial to authoritarian elites. The argument builds on the factor endowment literature (Engerman and Sokoloff, 2002; Galor, Moav and Vollrath, 2009), in that country characteristics affect the type of investments elites undertake. Where elites invest in capital intensive industries, require skilled labor, and infrastructure spending, I expect higher investment in fiscal capacity.

1.4.2 Economic Inequality - Shadow of Regime Change

The second part of the main argument is about the costs associated with fiscal capacity. Specifically, I argue that economic inequality can prevent or delay investments in fiscal capacity. In any authoritarian regime the possibility of democratization exists. While the probability of a transition varies across regimes, it is seldom truly zero. Building on Meltzer and Richard (1981), I assume that once a country transitions to democracy, pressure for redistribution in the new regime is increasing in inequality. Therefore, all else equal, the costs for authoritarian elites associated with regime change increase with higher inequality. As outlined above, one necessary condition for redistribution and taxation is high fiscal capacity. If the state is unable to enforce taxation, high income and wealth taxation will be impossible.

Once a country transitions to democracy, raising fiscal capacity becomes even more difficult. In young democracies with low capacity, the wealthiest taxpayers have a strong incentive to undermine capacity building to prevent future increases in taxation. Voluntary compliance will be extremely low. At least in the short and mediate term, the newly elected democratic government has to work with the fiscal
capacity it inherits, which limits the policy choices in regards to taxation. Low fiscal capacity can therefore protect former authoritarian elites from high taxation and redistribution in democracy.

Through its positive effect on the marginal costs of taxation and limiting the maximum level of revenue, low fiscal capacity reduces the equilibrium tax rate in democracy, all else equal. Any increase in fiscal capacity under the authoritarian regime raises the future level of taxation in democracy, all else equal. As the cost of democratization increases (i.e. inequality rises), this factor becomes more important to the autocratic elite. Thus, in societies with higher levels of inequality elites have incentives to keep the fiscal capacity at low levels to insulate themselves from possible future redistribution.

To summarize, based on their personal utility associated with government spending, elites weigh the current benefit of higher tax capacity with possible future costs. I expect higher levels of fiscal capacity in countries with more industrial and capital intensive economies. On the other hand, elites in societies with high economic inequality are interested in keeping fiscal capacity low.

1.5 Plan of the Dissertation

This dissertation adds to existing research on regime change, fiscal capacity development, and fiscal policy differences in authoritarian regimes. I first develop a novel theoretical argument about how the interplay of economic demand for government spending and distributive threats influence capacity development. In the latter two essays of this dissertation, I then investigate the general theoretical argument in two very different settings. First, I use cross-national time-series data of post-world-war II autocracies. I rely on a new dataset on trade and total tax revenues that covers a larger number of countries and years than what has been available to date (Wilson, Cobham and Goodall, 2014). The goal in this essay is to establish the empirical re-
relationship across a large number of cases over space and time. In a second empirical chapter, I utilize newly collected data on revenues, administrative costs, inequality, and the economic structure of Prussian counties in the 19th century. The geographic variation of fiscal capacity across Prussia during a time of profound fiscal innovation allows me to control for several competing hypotheses, such as the threat of war and the political system. In addition, I make use of instrumental variables to show that inequality has a robust negative effect on fiscal capacity, while higher rates of industrialization have a positive effect.

In the first essay of this dissertation (Chapter 2), I develop a general theoretical model of fiscal capacity development in authoritarian regimes. The argument is developed as a computational model of citizen and elite interaction. The basic setup is similar to the models by Acemoglu and Robinson (2006) and Boix (2003), with a political and economic elite deciding over tax rates and government spending. In contrast to previous models of regime change, the elites also determine the levels of fiscal capacity. The autocratic elite decides on levels of fiscal capacity and how much tax revenue to raise. The raised revenue can be spent on public service provision, which can increase private returns to capital, as well as repression. Increases in government repression, in turn, decreases the probability of regime change. The model allows us to understand how authoritarian elites make the tradeoff between utilizing repression to prevent any future regime change or low levels of capacity to curb redistribution in the future. In addition to the government decision making, the theoretical model gives insights at a second level. All agents in the computational model, i.e. citizens and the autocratic elite alike, are also private actors: i.e. taxpayers. All private actors decide on their level of tax compliance based on the private benefit to government spending and the level of fiscal capacity. To my knowledge, this is one of the first theoretical models that considers the interactive effect between the political process of fiscal capacity building and individual level decision making.
on tax compliance.

The theoretical model nicely shows the interplay of tax evasion, capacity investments, and distributive conflicts. I find that when inequality is high, autocrats have incentives to curb investments in the revenue raising capacity. They do so in anticipation of higher redistribution in a possible subsequent democratic regime. Low levels of capacity in turn increase the level of tax evasion. However, as the personal benefit to government spending increases, this can outweigh the costs associated with a possible regime change. Investments in the revenue raising capacity of the state can become optimal. At constant levels of inequality, when the benefits to government spending increases, it becomes optimal to raise fiscal capacity and utilize repression to avoid democratization. As the state’s capacity to enforce taxation increases tax evasion by citizens decreases. Similarly, higher personal benefit to government spending also increases tax compliance.

The second essay in this dissertation (Chapter 3) is a first investigation of the broader theoretical argument at a cross-national level. I empirically test whether higher inequality is associated with lower level of fiscal capacity investment, while an industrial economic basis should lead to higher fiscal capacity. To do so, I assemble data on tax revenues, inequality, and economic characteristics in over 90 authoritarian regimes from 1980 to 2007. To my knowledge, this is the first systematic empirical investigation of what determines the development of fiscal capacity in authoritarian regimes using such detailed data. Moreover, I create a novel measure of fiscal capacity: the inverse of the ratio of trade tax revenue to total tax revenue. I use newly available data on tax revenues by the International Center for Tax and Development (Wilson, Cobham and Goodall, 2014). The assembled data set is one of the most complete samples when it comes to cross-national research on taxation in comparative political economy. An additional contribution of the empirical investigation is the incorporation of two levels of uncertainty in the data. Combining the
results from 10,000 estimated models, I account for uncertainty associated with the inequality data, as well as the imputations of missing observations. Both kinds of uncertainty are often ignored by scholars estimating quantitative models on political economic outcomes around the world. I find robust evidence that inequality is associated with lower fiscal capacity investment in the long run, while countries with more industrial economies have higher levels of capacity.

The final essay (Chapter 4) is a further investigation of the relationship between inequality, elite capital ownership, and fiscal capacity development in a different empirical setting. In an effort to test the argument at a time of profound fiscal innovation, I make use of newly collected data on tax revenues, administrative spending, and economic characteristics from 19th century Prussia. During the time period studied in this paper, the second half of the 19th century, Prussia developed one of the most prolific fiscal states in the world. I utilize detailed subnational data, collected from Prussian census publications, and create a cross-sectional dataset of over 300 Prussian counties. The research design of utilizing subnational data allows me to control for the two most important competing hypotheses in the literature: 1) the threat of war; 2) changes in political representation. Both the threat of war and the political system are constant across the geography and can therefore not explain variation in the development of fiscal capacity across Prussia. I find strong evidence that counties with high inequality had lower levels of fiscal capacity, whereas more industrial counties developed higher levels of capacity. As an additional robustness check, I estimate an overidentified instrumental variable model to instrument for both inequality and industrial propensity.
2

Raising Robin Hood: The Political Economy of Tax Capacity Investments in Authoritarian Regimes

2.1 Introduction

Fiscal capacity is one of the most important characteristics of states. It determines whether the state has the administrative power to collect and enforce broad based taxes, such as progressive income taxes. For example, in countries with low capacity the bureaucracy is weak and the tax administration is unable to ensure the enforcement of tax laws. In addition, the structure of taxation is often unnecessarily complicated and inefficient. Both lead to less revenue for the state and low compliance. When tax capacity is low, governments have to rely on voluntary compliance and revenue sources that are easy to access, such as customs, tariffs, and fees. In this case, the ability to raise revenues and the functioning of the state are limited. Fiscal capacity is of such importance because it precedes and impacts almost any policy choice made by governments. Implementation of many government programs are only possible if the state is capable of raising revenue. Yet, in a large number
of countries around the world, this is not the case and as a result policy choices are effectively limited.

Autocratic governments are often believed to prefer low levels of taxes and thus ought to have an interest in low fiscal capacity. Yet, empirically large differences in the level of government spending can be observed within autocracies. Furthermore, a large variation in fiscal capacity can be observed around the world, not only between regime types, but also within autocratic and democratic regimes.

I argue that increasing the fiscal capacity of the state becomes warranted for government leaders who prefer higher government spending. However, the decision to increase fiscal capacity is not always optimal for political elites. When authoritarian elites increase the tax capacity of the state, they are building the tool that can be used for redistribution in case of a loss of power. Thus the question arises: Under what circumstances do authoritarian elites have an interest to strengthen the ability of the state to raise revenue?

In this paper, I develop a theoretical model showing that inequality in authoritarian regimes can repress the development of fiscal capacity. However, this negative effect is moderated by the benefit of government spending to autocratic elites. I argue that in some cases government spending complements investments made by capital owners and can thus have a direct positive effect on elite income. If the capital owned by the autocratic elite is complimentary to human capital increases or other types of government spending, raising the level of spending increases the profit associated with owning physical capital. Depending on the level of inequality and the economic structure, it can be in the interest of the autocratic elite to increase the revenue raising capacity of the state, increase taxation, and raise government spending. Yet, if inequality rises, the costs associated with increasing fiscal capacity in case of possible regime change become too high.

The computational model I develop below investigates the relationship between
inequality, public spending, and the development of fiscal capacity in authoritarian regimes. In the agent based model, autocratic elites can utilize tax capacity to raise revenue for public service investments, as well as to lower the probability of a regime change using repression. Furthermore, all individual members of society are modeled to choose a level of tax compliance, influenced by their personal benefit to government spending and the probability of the state detecting tax evaders. The model interacts the elite’s decision on taxation, spending, and fiscal capacity with individual decision-making about tax evasion. It allows me to develop hypotheses on how inequality and the propensity for public spending by elites affect the development of fiscal capacity, the level of taxation, as well as spending on public services and repression in autocracies. Moreover, the model gives insight on how these variables interact with the personal decision of tax compliance.

In the next section, I will briefly discuss some of the existing literature on government spending and taxation under authoritarian governments, as well as research on fiscal capacity. I then introduce the actors and structure of the agent based model and explain the simulation strategy to find equilibria. In Section 2.4, I show the results from the model and summarize the empirical implications. The last section concludes and discusses avenues of future research.

2.2 Fiscal Capacity, Taxation and Authoritarian Regimes

Many models in political science imply that democratization is associated with more redistribution and government spending (Acemoglu and Robinson, 2006; Boix, 2003; Bueno De Mesquita et al., 2005). One of the underlying assumptions of these theories is that wealthy authoritarian elites generally oppose taxation and government spending. Yet, empirically we don’t find this to be true.\(^1\) Figure 2.1 a) shows an

\(^1\) For differing results, see for example: Lake and Baum (2001); Brown and Hunter (2004); Lindert (2004); Mulligan, Gil and Sala-i Martin (2004); Ross (2004); Avelino, Brown and Hunter (2005);
inverse estimate of fiscal capacity (trade taxes as share of tax revenue) in relation to logged GDP per capita for countries around the world. Figure 2.1 b) shows the relationship between tax effort (tax revenue as percent of GDP) and logged GDP per capita for the same observations. Countries are marked as democracies (D) or authoritarian regimes (A).\(^2\) The left plot shows that across regime type, fiscal capacity is associated with income, yet neither GDP nor regime type can fully explain the variation. Note that trade taxes are an inverse proxy of fiscal capacity. The relationship between income and fiscal capacity is clearly weaker for authoritarian regimes. Figure 2.1 b) on the right shows that high variation exists in the levels of taxation within authoritarian regimes.

Despite the general theoretical notion that authoritarian elites oppose taxation, we see that autocratic countries differ extensively when it comes to fiscal capacity (Figure 2.1) and government spending. Yet, we know little about why some autocracies utilize taxation and government spending, while others never develop the ability to raise revenue. The argument developed in this paper aims at explaining differences in government spending across authoritarian regimes, as well as investments in fiscal capacity that have long lasting effects on a country’s development.

Previous research has strongly emphasized the link between war making, state building, and the expansion of revenue raising capabilities (Tilly, 1990; Moore, 2008; Besley and Persson, 2009, 2011; Dincecco and Prado, 2012; Karaman and Pamuk, 2013). Others have pointed to the development of tax states and revenue production in relation to increased representation and democratization (North and Weingast, 1989; Moore, 2008; Dincecco, 2011; Karaman and Pamuk, 2013). I contend that nei-

\(^2\) The plots are based on data by Boix, Miller and Rosato (2013) for regime type and the International Centre for Tax and Development (ICTD) for tax revenue (Wilson, Cobham and Goodall, 2014). To maximize the number of observations, I use all available data from 2000 to 2007 and take the average value for tax revenues and gdp for each country. Only countries without an occurring regime change during this period are plotted.
Figure 2.1: The left plot shows the observed relationships between an inverse measure of fiscal capacity (trade tax revenue as share of total tax revenue) and logged GDP per capita. The right plot shows the relationship between total tax revenue and logged GDP per capita. Both figures also show the relationship with regime type, as autocracies are plotted in red and with the letter A, while democracies are in blue and depicted as the letter D. As is easily visible, neither income nor regime type fully explain the variation in fiscal capacity nor total tax revenue.

ther representation, nor war making can solely explain when authoritarian leaders invest in fiscal capacity. One can observe states with high fiscal capacity with no democratic history (such as Singapore). At the same time, in many of the high-growth Asian developmental states, increases in fiscal capacity preceded democratization and further developments of political freedom (Wade, 1993). I propose an argument below that explains investments in fiscal capacity based on inequality and the economic characteristics of countries.

This paper builds on two growing strands in the literature. The first is how authoritarian institutions and policies have long term effects, including on future democratic politics (See for example: Wright, 2008; Escribà-Folch, 2009; Gehlbach
and Keefer, 2011; Jensen, Malesky and Weymouth, 2013; Albertus and Menaldo, 2011; Svolik, 2012; Boix and Svolik, 2013). The second strand is concerned with how the prospect of politics under future democratic regimes influence authoritarian politics (Acemoglu, 2005; Acemoglu, Ticchi and Vindigni, 2011; Besley and Persson, 2011). I attempt to connect these literatures by developing an argument for the circumstances under which authoritarian leaders have incentives to strengthen state development, i.e. invest in fiscal capacity. I contend that the propensity to invest is driven by current characteristics of the authoritarian elite, inequality, and a cost benefit analysis by forward looking elites. Furthermore, I explicitly connect the issue of tax compliance with the development of fiscal capacity, regime change, and inequality.

The first and most fundamental task of states is to raise revenue. Without the means to finance, the state is unable to fulfill even its basic and defining tasks: e.g., to “(successfully) claim[s] the monopoly of the legitimate use of physical force within a given territory” (Weber, 1919). When investigating policy differences between countries, political scientists often assume that states are capable of making policy decisions and presuppose the ability of states to fund these undertakings. Yet, even modern states often lack the capacity to raise sufficient levels of revenue to undertake basic functions, let alone redistribute income. The inability to raise revenue is especially prevalent in many poor countries, often with high levels of inequality.

Fiscal capacity determines whether the state has the administrative power to enforce the chosen fiscal policies. Again, when tax capacity is low, governments are forced to rely on revenue sources that are easier to access, such as customs, tariffs, and fees. The available ability of governments to raise revenue directly influences the structure of taxation and limits the amount of revenue that can be raised. Only when the fiscal capacity of the state is sufficiently high can broad based and progressive taxation be enforced. On the other hand, when the level of fiscal capacity is low, the
state must rely on taxes with narrow bases, as well as trade and consumption taxes, which are often regressive.

Fiscal capacity investments, or the lack thereof, have long term consequences for future politics. It constrains and impacts policies immediately, but it also influences policy creation in future regimes. This is especially true in cases of regime change from authoritarian to democratic regimes. When new governments come into power, they are constrained by the capacity they inherit. Even after a transition to democracy, policies are shaped by fiscal capacity investments under prior regimes. This effect is amplified by the fact that increasing fiscal capacity ought to be harder in democracies when redistributive pressures are high. When the state’s fiscal capacity is weak, voluntary compliance by tax payers is more important. Thus, fiscal capacity can be raised more easily when wealthy tax payers have a vested interest in strengthening the state and raising revenue. On the other hand, when pressure for redistribution is high and fiscal capacity is low, wealthy tax payers have a strong interest in opposing and actively hampering increases in the capacity of the state. This is to be expected in young democracies where wealthy elites oppose the strengthening the state.

As mentioned above, a disconnect exists between famous theoretical predictions in political economy and empirical reality. First, there is little evidence that pre-tax inequality and redistribution go hand in hand, as famously hypothesized by Meltzer and Richard (1981). Secondly, transitions to democracy are not generally associated with increases in redistribution. In order to make sense of redistributive outcomes in autocracies and democracies alike we first have to understand the development, or lack thereof, of fiscal capacity. As Besley and Persson (2011, 12 f.) explain: “... today’s ability to levy an income tax is constrained by the existing fiscal capacity of the state, e.g., the administrative capacity to monitor and enforce tax payments and the institutions necessary to implement income-tax withholding by firm.” Only
when the fiscal capacity of the state is sufficiently high can redistribution be achieved. If the state is unable to enforce its chosen tax policies, income redistribution is an impossible goal.

Autocratic leaders are usually modeled as wanting to curb redistribution and public spending (Acemoglu and Robinson, 2006; Boix, 2003; Bueno De Mesquita et al., 2005). An aversion to spending that ought to go hand in hand with reluctance to make investments in fiscal capacity. Secondly, if authoritarian elites are forward looking and fear the loss of power, the incentive to keep the revenue raising capacity low is even stronger. This is the case because higher fiscal capacity lowers the cost of and increases the ability for redistribution. For those who gained access to power, high capacity makes it easier to raise the revenue necessary for redistribution. Thus we should expect a strong refusal from authoritarian elites to establish tax capacity when inequality is high. In contrast to this bleak theoretical view, we know of non-democratic states which undertook investments in fiscal capacity and strengthened the state. Many countries that are highly developed and democratic today were built on foundations of tax capacity that started prior to transitions to democracy. Consider the more recent development in South Korea, which reformed the fiscal system, bureaucracy, and increased investment in public services, long before the transition to democracy (Wade, 1993; Doner, Ritchie and Slater, 2005). South Korea is one example where low inequality was associated with state development. At the same time state investments in public goods such as education increased (Wade, 1993). Korea is only a singular example, but as Figure 2.1 shows, high variance exists across and within regime types when it comes to fiscal capacity and governments spending.

One of the most fundamental consequences of low fiscal capacity is the inability to enforce tax policies and thus high levels of tax evasion. Yet, much research on tax evasion or compliance has very little to say about the interplay of capacity building
and tax evasion (Andreoni, Erard and Feinstein, 1998). In part, this is likely due
to the focus on high income democracies, in particular the United States. Other
research has centered on the question how states can increase tax morale by raising
trust in the state or fellow citizens (Uslaner, 2007; Hug and Spörri, 2011; Luttmer
and Singhal, 2014).

In general, however, this research has started with the assumption that states, or
elites in power, have an interest in enforcing the laws of taxation. Instead, I argue
that this is not always the case. As I explain in more detail below, authoritarian
elites may have an interest in keeping the state incapable of enforcing taxation for
two reasons: 1) to gain the ability to avoid taxation today; and 2) to constrain the
state’s future ability to redistribute. Elites may want to keep the capacity low, which
means tax evasion becomes prevalent. On the other hand, capacity is necessary to
enforce compliance, if elites prefer government spending. In fact, capacity is crucial
to enforce their own compliance make free riding less likely. I argue that building
tax capacity can be used as an enforcement mechanism between the elites.

One prominent finding on tax evasion is that a higher belief about the compliance
of others has a negative effect on evasion (e.g. Del Carpio, 2013). Del Carpio (2013)
also shows with a sophisticated experiment that reminding citizens of the rules and
enforcement increases compliance. Yet, we know very little how these mechanisms
interacts with capacity development. Specifically, capacity can increase individual
compliance through enforcement. This ought to have an interactive effect with peer
pressure, as the effect on individual behavior should reinforce itself. In addition, it is
unclear how the benefit to government spending can affect the individual’s decision
to pay taxes. In the following model, I build on work by Pellizzari and Rizzi (2013) to
understand how the elite decision making about fiscal capacity investments influences
and is influenced by the individual choice to comply with the state’s taxation.
2.3 Formal Model

The theoretical argument in this paper builds on work by Bourguignon and Verdier (2000) but combines parts of both Acemoglu and Robinson (2006) as well as models developed by Besley and Persson (2011). In addition, it contains aspects of a recently published agent based model by Pellizzari and Rizzi (2013) on tax evasion and public expenditure. The theoretical idea has similarities to work by Besley and Persson (2011). Here, I focus on autocratic governments and how the interaction between inequality and the benefit of public spending affect fiscal capacity investments. Moreover, I add the interplay of government policy making and individual decisions about tax evasion.

Bourguignon and Verdier (2000) argue that elite driven democratization is possible when it is profitable for elites to continuously invest in education for the poor. Education then leads to enfranchisement in their model. Different political and economic outcomes are possible, depending largely on the positive externalities to education for the oligarchy and the equilibrium level of redistribution once the franchise is increased. The main point of the Bourguignon and Verdier (2000) model is that the positive externalities of public education for the elite can outweigh the costs of democratization. As Bourguignon and Verdier (2000, 313) state themselves, “members of the oligarchy would like more poor to be educated to benefit from the educational externality, but at the same time they know that, by doing so, they increase the probability of a revolutionary switch to democracy”. It is questionable whether education ought to be automatically associated with democratization, however, in a distributive framework education may in fact decrease redistributive pressures. In this paper, I model how the provision of public services (such as education) can directly increase elite incomes. Depending on the level of inequality, the personal payoff associated with government spending for the elite can outweigh the
costs associated with increasing the future redistributive capacity of the state. Fiscal capacity determines how capable and effective the state is at raising revenue. As the demand for government spending by the autocratic elite increases, raising the fiscal capacity becomes necessary. At the same time, higher revenue raising capacity of the state enables more repression to avoid democratization. On the other hand, this increases the ability of the state to engage in redistribution, should the poor ever come to power.

Similar to the Bourguignon and Verdier (2000) model and the selectorate theory (Bueno De Mesquita et al., 2005) I assume that public goods investment can increase income and economic growth. Consider the example of education spending, which is often assumed to increase the income of the newly educated individuals and have a positive effect on the societal income via externalities. Yet in contrast to these models, I contend that government spending can complement investments made by elites and can thus have a direct positive effect on the return to capital. If the capital owned by the autocratic elite is complimentary to human capital increases or other types of government spending, raising the level of spending increases the profit of owning the physical capital for the elite. The size of this positive effect is conditional on the type of capital owned by the elite. Depending on the level of inequality and the economic structure, it can be in the interest of the autocratic elite to increase the revenue raising capacity of the state, increase taxation, and raise government spending. Fiscal capacity and individual benefits to government spending on the other hand also influence decisions by all members of society on their level of tax evasion. As individuals personally benefit form government spending they are more likely to comply with tax laws. Similarly, as the like state enforcement rises (i.e. high fiscal capacity), citizens are more likely to comply.
2.3.1 Set up of the Game

The game starts with a society comprised of (poor) citizens (denoted by subscript $c$ in the following) and an autocratic elite (denoted by subscript $e$). In this hypothetical society, the elite is in power and decides the level of taxation as well as fiscal capacity. All revenue collected by the government can be invested in public service provision (such as education, infrastructure, etc) or repression. The autocratic elite is assumed to own the productive capital and can benefit directly from government investment. For example, the building of a new road or public education of workers directly increases the profits for a factory owner. The model is set up as an agent based model which is designed as a repeated game, where agents have infinite time horizons. In each period, there is a possibility for the poor to gain access to power in a transition to democracy. Once a regime change occurs, the median voter sets the tax rate and is able to use the capacity of the state to redistribute income. Most importantly, the policy choice of the poor median voter is influenced by the level of fiscal capacity, which is path dependent upon the capacity investments made in the previous regime. Once the poor take power, I assume the game ends and democracy remains the regime type, i.e., democracy is modeled as an absorbing state.

The agent based model can be separated into two processes. In “the political game” the autocratic elite decides on a level of fiscal capacity and a linear tax rate. The collected revenue can be spent on government investment in public services or repression. In this part of the game, citizens are not strategic actors, except for the median voter’s decision on taxation/redistribution after a possible transition to democracy. The expected equilibrium tax rate under democracy influences the elite’s decision on fiscal capacity investments. The probability of regime transition (denoted $\pi$) is not based on strategic decisions by the citizens, but a function of the level of inequality and the level of repression chosen by the autocratic elite. Repres-
sion spending by autocratic elites decreases the probability of a regime transition, but is subject to diminishing returns. Thus, the autocratic elite in the model has two options to decrease possible future costs of regime transitions. First, they can keep fiscal capacity at low levels to constrain redistribution. Secondly, holding fiscal capacity constant the elite can utilize tax revenue to finance repression and lower the probability of a regime transition. The model results will give insight into the trade off between spending on repression and curbing fiscal capacity investments.

The second process of the agent based model, “the evasion game” includes all citizens and elite members as individual strategic actors. Here, agents decide how much of their income to declare for taxation and ergo by how much to evade taxes. Their decision in this stage is influenced by the level of fiscal capacity, the tax rate, the expected behavior of others, and their personal benefit to government spending. Modeling individual tax compliance in addition to the elite group decision on capacity, taxation, and spending levels gives insights on how elites can utilize the state to overcome the collective action problem when it comes to investments in public goods. Further, it shows how individual compliance is influenced by tax capacity, the threat of enforcement and group compliance.

**Modeling Fiscal Capacity**

Recent formal models involving fiscal capacity Besley and Persson (e.g. 2011), often denote tax capacity as a parameter that constrains the maximum level of taxation. I deviate from this strategy to make the model more realistic. Fiscal capacity (denoted $\phi$) enters both the cost of taxation and the probability of catching tax evaders. By influencing the cost of taxation, fiscal capacity changes the value of utilizing taxation.

All else equal, I assume that government revenue rises with increasing fiscal capacity. This is due to two reasons: lower efficiency costs associated with taxation and lower levels of tax evasion. Assume a tax rate $\tau$, the costs associated with this
tax rate is modeled as $\frac{1}{\phi} \tau^2$, where $\phi$ is the capacity of the state to raise taxes and ranges from 1 to 2. As $\phi$ increases, the cost associated with taxation decreases. The amount of tax revenue a state can collect, is defined as the rate of taxation times all taxable income minus the cost of taxation. Thus, as fiscal capacity increases (larger $\phi$), the cost of taxation decreases and, all else equal, collected tax revenue rises. More formally, the available revenue to the state with total taxable income $Y$, tax rate $\tau$, and fiscal capacity $\phi$ would be:

$$\text{Revenue} = (\tau - \frac{1}{\phi} \tau^2)Y$$ (2.1)

Thus, all else equal revenue goes up with higher rates, but as $\phi$ decreases, the cost of taxation rises and revenues become smaller. In addition, the level of fiscal capacity also determines the probability of an audit for all agents in the agent based model. The higher $\phi$, the higher is the probability of tax evasion being detected.

When capacity is modeled to only determine the maximum level of attainable revenue, costs associated with raising revenue are ignored. For example, even at low levels of revenue the costs associated with taxation decrease with capacity. Low government revenues as a policy choice are not necessarily associated with low capacity, if revenues are to be raised efficiently. Similarly, even when fiscal capacity is low, governments can generally raise revenues, however it becomes prohibitively more expensive to do so. Yet, the higher the demand for revenue, the more important fiscal capacity becomes.

When modeling fiscal capacity this form, it has several characteristics that are closely related to the real world:

- Low fiscal capacity constrains the kind of taxes governments can employ. Taxes that necessitate little capacity (e.g. tariffs or customs) are often highly distortionary on the economy and thus increase the economic costs associated with
taxation. These costs increase with the level of taxation.

- Direct and broad based taxes, on the other hand, are some of the most efficient revenue sources, but they demand high levels of fiscal capacity for enforcement. As fiscal capacity increases, the amount of revenue that can be collected rises and taxation becomes less costly.

- Fiscal capacity determines the probability of tax evasion being detected. As capacity increases, it becomes more likely that evaders are caught.

A lack of high fiscal capacity is much more than a simple constraint on the maximum level of revenue and has more differentiated consequences. Clements, Gupta and Inchauste (2004, 12), for example, describe the effects of low fiscal capacity in developing countries as creating, “formidable challenges in implementing efficient tax systems owing to (1) large informal sectors; (2) lack of reliable data that allow for effective monitoring and analysis; (3) ineffective tax administrations; and (4) powerful high-income groups that preclude the introduction of more equitable taxes.”

As exemplified by the above quote, lower fiscal capacity ought to be associated with lower levels of government enforcement, all else equal. Thus, tax evasion becomes more likely. The model explained in detail below allows us to directly study the interplay between investments in fiscal capacity, taxation, public service provision, and tax evasion. The interaction between tax evasion and fiscal capacity is important, because increasing capacity can aid the autocratic elites to overcome the collective action problems that are associated with investment in public services. Each individual elite member might prefer higher spending on infrastructure or education to increase profits, but private investment is problematic as it allows others to free ride. Thus each individual would like everybody else to foot the bill. The only way to achieve higher spending is to utilize the state. Yet with low capacity, evasion is more likely and tax collection is costly. One possibility is to increase the capacity
of the state and enforce the chosen policies. The state’s ability to collect revenue can thus function as a policing mechanism for the group’s decision on spending and taxation.

In the following section I explain the exact setup of the agent based model more clearly. I will do so by first explaining both sub games, the “political” and “evasion” game in isolation. The last part of this section explains how both games are combined to find the interactive equilibria.

2.3.2 The Political Game

In the political stage of the game, the members of the autocratic elite determine whether they want to engage in taxation and public spending via a coordinated effort through the government. If the autocratic elite decides to utilize the state for tax collection and public service investments, it has to set a level of fiscal capacity and a level of taxation. All tax revenue collected by the state is exhausted every period and thus split into public service provision or repression. In addition, I follow common models in political economy and only allow for a linear tax on all income (Meltzer and Richard, 1981; Boix, 2003; Acemoglu and Robinson, 2006).

The payoff to the elite (or post-tax income) in the model is determined by their own pre-tax income, the individual benefit to government spending, as well as costs to a possible future democratization. The benefit to public service provision is a concave function of government spending influenced by the parameter $\alpha_e$, which represents the propensity of the elite for public spending. As $\alpha_e$ increases, higher government spending becomes more beneficial to the individual elite member. In theory this can be due to any intrinsic preferences for government spending, or as I argue here, because the individual economically benefits from government spending, e.g., through higher returns on the capital owned. More specifically, depending on what kind of capital each individual elite member owns, government spending can raise her income
significantly. For example, consider a country in which the autocratic elite engages in the production of goods that require an increase in skilled labor. The return to capital invested by autocratic elites will greatly increase with government spending on education. Similarly, in countries with large manufacturing sectors, the owners of capital are likely to benefit from infrastructure spending. On the other hand, economic elites in countries with large agricultural sectors, and exporters of raw materials are less likely to benefit from government spending.\textsuperscript{3}

Increasing benefits for individuals associated with government spending are denoted by a higher $\alpha_e$ in the model. Each individual elite member is associated with a specific $\alpha_e$, which determines her benefit to public spending. Similarly, citizens benefit from public service provision, given their own $\alpha_c$ parameter. For simplicity’s sake, I model all elite members as having the same income but different $\alpha_e$ values. The autocratic elite thus has to make a decision on taxation, fiscal capacity and public spending while differing on one dimension (propensity for public service spending). To model the elite as a unitary actor, I assume that the median voter model applies for the group decision making process, i.e. the elite member with the median $\alpha_e$ value is decisive.

It is important to emphasize the different parameters that influence the distribution of income between and within the groups. First, initial individual incomes are homogenous within the groups, i.e. $y_e$ and $y_c$ are the same for all individuals. Initial income inequality is based on differences between the groups’ incomes and the different group sizes. Both parameters are varied across the simulations. The second parameter that is different between the groups is the benefit of government spending: $\alpha$. Different members of the elite benefit more or less from government spending, at the same time citizens are also characterized by different $\alpha$ values. Based on the

\textsuperscript{3} Similar to the general Cobb-Douglas production function I assume that the benefit to public spending is equal to: $(PS)^{\alpha_e}$, where $0 \leq \alpha \leq 1$. 

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effect of $\alpha$ and government spending decisions of the elite, the post-tax income of elites and citizens varies within and between the groups.

Heterogeneity in the $\alpha$ parameter allows for an understanding how personal benefit to government spending affects elite decision making on fiscal capacity, spending levels, as well as individual tax compliance, one of the primary interest of this paper. The post-tax income of elites is affected by their different $\alpha$ values. In addition, differences in income between citizens and the elite, as well as different group sizes also influences the elite decision making process. Holding income constant within groups avoid a conflation of the income effect, i.e. that elite’s with more capital benefit more from spending. In addition, it is not straightforward to model the elite’s decision making process when preferences change based on differences on two dimensions (e.g. McKelvey, 1976).  

Mathematically the utility of individual elite members is modeled as the following:

\[
\text{utility elite} = y_e(1 - (d_e \tau)) \{(PS)R(\tau, \phi, \sum_{i=1}^{N} y_i d_i, Y)\}^{\alpha_e}
\]

\[
+ \sum_{t=1}^{\infty} \delta^t \left[ (1 - \pi(\text{Rep, gini})) \{y_e^t(1 - (d_e \tau)) \{(PS)R(\tau, \phi, \sum_{i=1}^{N} y_i d_i, Y)\}^{\alpha_e} \} \right] 
\]

\[
+ \sum_{t=1}^{\infty} \delta^t \left[ \pi(\text{Rep, gini}) \{y_e^t(1 - (d_{e, \text{dem}} \tau_e)) \} \right] 
\]

The first line of the utility function is the pay-off (or post-tax income) to the autocratic elite in the current period, $\tau$ is the tax rate set by the elite, $\pi$ is the probability of regime transition, $PS$ is share of revenue spent on public services, and $R$ denotes tax revenue as a share of total income.  

Future research could seek to understand the interaction between elite income and government spending propensity. Secondly, future extensions of the model could also investigate the consequences of a possibility for the elite to split, motivated by differences in income or $\alpha_e$.

Government revenue in the authoritarian regime is measured as the share of total income and multiplied by 100. Thus values are possible in the range from 0 to 100. This is done to ensure
tax applied to all incomes in society. Revenue ($R$) is a function of the tax rate, fiscal capacity, and each individual’s declared income, $y_i d_i$. Elite pre-tax income is denoted $y_e$, $d$ is the share of income declared for taxation, which is taxed at rate $\tau$. All government revenue is invested in either public service provision or repression (denoted $Rep$). Thus $Rep = (1 - PS)R$.

As explained above, $\phi$ denotes the fiscal capacity of the state and determines the attainable level of revenue at any given tax rate. For the autocratic elite, $\phi$ is endogenous. With increasing fiscal capacity, $\phi$, the cost associated with taxation decreases, while the maximum level of government revenue increases. Government revenue as share of total income is equal to $R = (\tau - \frac{\tau^2}{\phi}) \frac{100 \sum_{i=1}^{N} y_i d_i}{Y}$. Fiscal capacity affecting the cost of taxation through the nominator, means that as $\phi$ increases, the cost associated with raising taxes decreases. Therefore, all else equal, when capacity is higher, the government collects more revenue at any given rate.

The second and third line of equation 2.2 show the payoff for future time periods, including a possibility that a transition to democracy occurs with probability $\pi$. The probability of a transition to democracy is a function of the level of repression ($Rep$) and inequality, as measured by the Gini coefficient.\(^6\) Line 2 in equation 2.2 comparability of results. To model inequality, holding population shares constant, either the elite or citizen income has to vary. As I am mainly interested in elite decision making, I vary citizen’s income in the simulation. This changes total income in society. To avoid any results being driven by the income effect I model revenue as the share of average income. The results are similar and effects are only strengthened if revenue is not modeled as share of average income.

\(^6\) Mathematically the probability of transition is modeled as: $\pi = 0.5 + \frac{Gini}{10} - \left(\frac{Rep}{100}\right)^{\frac{1}{2}}$. $Rep$ is the share of total income spend on repression and is normalized to be between 0 and 1. The square root function is used to make repression spending subject to diminishing returns. The idea behind this equation is that each autocracy is subject to a baseline probability of regime change (here 0.5). Repression can decrease the probability of regime change, however at increasing levels of repression spending the effect of each additional Dollar decreases. In addition, as argued by Boix (2003) and Acemoglu and Robinson (2006), inequality raises the demand for regime change. The probability of regime change increases linearly in inequality, but the effect is relatively small, i.e. an increase of 0.1 in the gini coefficient leads to an increase of 0.01 in $\pi$. The simulation results are similar when inequality does not matter for the probability of regime change and $\pi = 0.5 - \left(\frac{Rep}{100}\right)^{\frac{1}{2}}$. However, in that case the negative effect of inequality on fiscal capacity development is weakened. Changing the numerical values should not affect the functional relationships presented in the results.
shows, with probability \((1 - \pi)\), the payoff in future periods is equal to the payoff in the current period under authoritarian government. However, with probability \(\pi\), the payoff is equal to the elite’s pre-tax income, minus the tax levied by the poor majority in democracy, \(\tau_c\) (line 3). The tax rate is applied to the share of declared income by the elite under democracy, \(d_{e,dem}\). \(\tau_c\) is the equilibrium tax rate set by the citizens under democracy, where all revenue is used to redistribute to the poor. \(\tau_c\) in equation 2.2 is equal to the equilibrium level of taxation under democracy.\(^7\) It is important to note that government spending at time \(t\) in the model only affects income at time \(t\) and has no continuing effect on incomes.

\(\delta\) in equation 2.2 is a weight associated with payoffs in future time periods, i.e. the discount factor with which the elite values pay-offs in the future. If \(\delta\) approaches 1, pay-offs in future periods receive the same weight as the current period, while if \(\delta = 0\), elite members only care about the current period. The \(\delta\) parameter essentially describes the difference between an autocrat comparable to Mancur Olsen’s famous roving bandit \((\delta = 0)\) and a stationary bandit with long time horizons (in the extreme \(\delta = 1\)) (Olson, 1993). High levels of insecurity generate short time horizons (small \(\delta\)) for autocrats or politicians in general. This has been seen as inhibiting economic and political development in many African countries (Bates, 2008). \(\delta\) here is exogenous but allows the study of how shorter or longer time horizons can affect the decision making process of elites. By design the scope of the theoretical argument is limited to regimes where the elite’s time horizon is not zero. In cases where authoritarian elites do not value the future at all, the theory laid out in this paper does not make sense for two reasons: 1) there is no fear of future redistribution, i.e. no cost to capacity investments; and 2) elites would not care about future benefits of government investment. One of the scope conditions of the theoretical argument is

\(^7\) In contrast to Acemoglu and Robinson (2001) redistribution under democracy is modeled as a lump sum transfer only to the poor, not the former elite members.
therefore that, at least to some degree, elites care about the future.

Since actions are modeled with an infinite time horizon, payoffs can be summarized using an infinite sum and geometric series. The utility of the elite can thus be simplified to:

\[
\text{utility elite} = y_e(1 - (d_e \tau))\{(PS)R(\tau, \phi, \sum_{i=1}^{N} y_i d_i Y)\}^{\alpha_e}
\]

\[
+ \frac{(1 - \pi(Rep, gini))\{y_e(1 - (d_e \tau))\{(PS)R(\tau, \phi, \sum_{i=1}^{N} y_i d_i Y)\}^{\alpha_e}\}}{(1 - \delta)}
\]

\[
+ \frac{\pi(Rep, gini)\{y_e(1 - (d_{e, dem} \tau_e))\}}{(1 - \delta)}
\]

To summarize, the elites choose a level of fiscal capacity and taxation, as well as how to spend government revenue. They maximize their utility function with respect to tax rate, capacity, and public service expenditure as a share of revenue. I assume that investments in capacity are costless for the elite and are immediate, i.e. the elite sets a level of fiscal capacity. The ability to raise taxes efficiently has three implications for the elite: the cost of government spending, the level of tax evasion (as explained in the next section), and, all else equal, the costs associated with democracy in the future.

Should democratization occur, the tax rate is set by the median voter in society. In order to simplify, I assume that all poor citizens have the same income. Since the poor make up the majority of the population, the median voter under democracy comes from within this group. The equilibrium tax rate is therefore chosen by one of the poor agents.

The following function represents the utility of the poor median voter under
utility citizens = $y_c(1 - \tau_c) + \frac{\sum_{i=1}^{N} y_i d_i, dem(\tau_c - \frac{1}{\phi} \tau_c^2)}{N_c} + \frac{\sum_{i=1}^{N} y_i d_i, dem(\tau_c - \frac{1}{\phi} \tau_c^2)}{(1 - \delta)}$  

\[ (2.4) \]

Again, $y$ denotes the individual income, where the subscript indicates the individual’s income group (i.e., {c}itizen or {e}lite) or any individual (denoted $i$) in society. As noted above, initial incomes of both groups, $y_c$ and $y_e$, are internally homogenous, but differ from each other. All inequality in the model is based on the income difference between the two group. $\tau_c$ is the tax rate chosen by the citizens, and $\phi$ is the fiscal capacity of the state. Recall that $\phi$ is a parameter chosen by the elite under autocracy and is thus exogenous. $N_c$ stands for the number of citizens in society. $\sum_{i=1}^{N} y_i d_i, dem(\tau_c - \frac{1}{\phi} \tau_c^2)$ is the total amount of revenue collected by the state, which is divided by the number of citizens to find the amount of income redistributed to every poor individual. The total revenue is determined by total income and evasion ($\sum_{i=1}^{N} y_i d_i, dem$), as well as the equilibrium tax rate ($\tau_c$) and deadweight losses ($\frac{1}{\phi} \tau_c^2$).

As above, an infinite time horizon is assumed, however since democracy is an absorbing state, the $\delta$ parameter does not effect the equilibrium tax rate under democracy. The utility function for the poor is similar to the utility function of the median voter under democracy as modeled by Acemoglu and Robinson (2006). However, in my model fiscal capacity is dependent on the decision by the elite in previous time periods, while the cost of taxation in Acemoglu and Robinson (2006) is exogenous.

Given a threat of transition to democracy, maximizing tax capacity is generally not the equilibrium strategy for autocratic elites, even if there are no direct costs associated with investments in capacity. The elite has to account for the possibility of redistribution in the future. Recall that fiscal capacity is path dependent upon its
level under the previous autocratic regime. Thus, the optimal value of $\phi$ chosen by the autocratic elite directly influences the level of taxation and redistribution chosen by the median voter under democracy.

To figure out the equilibrium strategy of the autocratic elite, the first step is to understand how policy decisions by the elite would affect democratic politics in the future. Thus, one has to understand the equilibrium level of taxation in a potential democratic regime for any distribution of income in society, as well as any level of fiscal capacity. Once the policy decision of the median voter in democracy is clear, one can figure out the best response of the autocratic elite. To find the median voter’s preferred policy under democracy, I take the derivative of equation 2.4 with respect to $\tau_c$ and solving for the tax rate.

$$\tau_c^* = \frac{\phi}{2} \left(1 - \frac{N_c y_c}{\phi \sum_{i=1}^{N_c} y_i d_{i,dem}}\right)$$

(2.5)

I assume that citizens do not evade taxes in democracy, more importantly wealthy former elite members do. The assumption is based on the fact that citizens benefit from redistribution in democracy but former elites pay the majority of the taxes. The assumed amount of evasion by former elite members under democracy is explained below in section 2.3.4. If we ignore tax evasion for the moment, Figure 2.2 shows the effect of rising elite income share and fiscal capacity on the equilibrium tax rate under democracy.\(^8\)

As one can see in Figure 2.2, the equilibrium tax rate under democracy is increasing with higher fiscal capacity (i.e. as the cost of taxation decreases) and increasing

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\(^8\) The society is simulated with 1000 agents, of which 951 are citizens and 49 belong to the elite. The income of elites is held constant at 1000, the individual income of citizens ranges from 9 to 206 to create more or less inequality. Changing inequality can be done by changing the size of the each group in the population and holding total income constant or by changing group member income. As I am mainly interested in the effect of income inequality and to limit the number of parameters in the model I create inequality by varying the individual income of citizens across societies. The only effect of changing the group size here would come via inequality.
in inequality. Similarly the effect of fiscal capacity on the equilibrium tax rate increases with higher levels of inequality. This is due to the fact that when inequality increases, citizens demand more taxation and the higher the level of taxation, the more pronounced is the effect of fiscal capacity. It should be noted, that the final equilibrium effect of fiscal capacity on the tax rate under democracy is likely stronger than pictured here, as it also includes an indirect effect via tax evasion that is omitted in Figure 2.2. Nevertheless, the plot gives the intuition on how levels of inequality and fiscal capacity influence taxation under democracy.

Now, when setting the level of taxation, public spending, repression, and fiscal capacity under autocracy, the autocratic elite takes the best response function of the median voter into account. Given a level of inequality, the elite can see how any decision to increase fiscal capacity would affect taxation under a future democratic regime. To find the equilibrium behavior by the autocratic elite the solution to $\tau_c^*$ in Equation 2.5 is inserted for $\tau_c$ in the utility function of the autocratic elite member.
The utility function of the elite is then maximized with respect to $\tau$, $\phi$, and $PS$ to find the equilibrium level of fiscal capacity, taxation, and spending shares for repression and public services.

Before turning to the simulation, a second level of the computational model has to be explained. While the political game is about the macro level decision making of political elites, the second part of the model, the “evasion game” is about how private actors react to the macro level policy decisions. The next subsection will explain how individuals react to decisions about tax rates, capacity, and spending levels and whether they evade taxes.

2.3.3 The Evasion Game

In this model, every individual agent in society has to pay taxes. Commonly formal models do not treat tax payers as agents and assume 100 per cent compliance. In the context of fiscal capacity, however, this assumption is less realistic. One of the most fundamental problems associated with low fiscal capacity is that the state is unable to enforce the laws of taxation. For example, unable to audit citizen’s incomes, a weak state is incapable of efficiently enforcing an income tax. It is clear that when the fiscal capacity of the state is weak, citizens have fewer incentives to follow the laws of the state. The public and macro level decision about fiscal capacity investment and individual decisions about tax evasion are clearly related and ought to be studied together. All else equal, the political decision to increase fiscal capacity raises government revenue and spending, which can benefit individual taxpayers. On the other hand, higher capacity raise individual tax payments as it makes tax evasion more dangerous.

Individual agents react to the decisions about fiscal capacity, taxation, and spending made by the political elite. Based on the political game, each individual agent in society has to decide whether or not to evade taxes and if so by how much. More
precisely, each agent maximizes her utility with respect to \( 0 \leq d_i \leq 1 \), the share of income she declares for taxation. The individual decision is based on the believed behavior of others as well as the government’s decision about fiscal capacity, tax rates, and the share of spending on repression and public services, respectively. Fiscal capacity impacts the individual’s decision on tax evasion in two ways: 1) indirectly, via the cost of taxation and the personal benefit to government spending; 2) directly, as it effects the probability of getting caught. When combining the two games in the next section, it will become clear that the government takes the decisions about tax evasion into account when setting the tax rate, fiscal capacity, and spending levels.

In its simplest form, the utility function of individual elites under authoritarianism is similar to the utility function for the median elite member in the political game. That of citizens is analogous, but the payoff for democracy includes the benefit of redistribution.

\[
\text{utility elite} = I_i \{ (PS) \hat{R}_i \}^{\alpha_i} + \frac{(1 - \pi(Rep, gini)) \{ I_i \{ (PS) \hat{R}_i \}^{\alpha_i} \}}{(1 - \delta)} + \frac{\pi(Rep, gini) \{ y_i d_{e, dem} (1 - \tau_e) \}}{(1 - \delta)} \tag{2.6}
\]

\[
\text{utility citizen} = I_i \{ (PS) \hat{R}_i \}^{\alpha_i} + \frac{(1 - \pi(Rep, gini)) \{ I_i \{ (PS) \hat{R}_i \}^{\alpha_i} \}}{(1 - \delta)} + \frac{\pi(Rep, gini) \{ y_i (1 - \tau_e) + \frac{R_{dem}}{N_c} \}}{(1 - \delta)} \tag{2.7}
\]

Let \( I_i \) here denote the individual’s income after taxation and \( \hat{R} \) the individual’s estimate of government revenue. Post-tax income \( I_i \) can be separated into two parts,
depending on whether the individual is successful at evading taxes (not audited) or is caught cheating (audited). Equation 2.8 shows the post-tax income if the individual successfully evades taxes, which is equal to her pre-tax income minus the taxes paid on the share of income she declared. Equation 2.9 shows her income should the agent get caught cheating. This is equal to the pre-tax income minus the taxes paid on the declared share of income, minus a penalty on the non-declared share of income.

\[ I_{i, \text{no audit}} = y_i (1 - (d_i \tau)) \]  
\[ I_{i, \text{audit}} = y_i \{(1 - \tau) - \text{(penalty)}(1 - d_i \tau)\} \]  
\[ I_i = p_{\text{audit}} \{y_i[(1 - \tau) - \text{(penalty)}(1 - d_i \tau)]\} + (1 - p_{\text{audit}})\{y_i(1 - (d_i \tau))\} \]  

Both parts, i.e. equations 2.8 and 2.9, can be combined to the estimated post-tax income taking into account the probability of being audited, as shown in equation 2.10. The probability of being audited is a direct function of fiscal capacity.\(^9\) I assume that all individuals know the current level of fiscal capacity and the probability of getting audited. Thus, the individual’s decision about what share of income to declare for taxation (\(I_i\) in equations 2.6 and 2.7) is replaced with equation 2.10.\(^11\) In the utility function for citizens, \(R_{\text{dem}}\) denotes the revenue under taxation in democracy.\(^12\)

A second necessary complication is that the individual does not know the true value of government revenue, which depends on her own, as well everybody else’s
decision on the share of income to declare. Thus government revenue in equations 2.6

\(^9\) The penalty is three times the tax rate applied to the undeclared income. Future extensions of the model may explore the effect of different values for the penalty.

\(^10\) The exact function of the probability of audit is \(p_{\text{audit}} = (\frac{\phi - \frac{1}{2}}{2})^2\). The function is increasing in \(\phi\) but subject to diminishing returns and given the possible values of fiscal capacity ranges from 0 to 0.125.

\(^11\) The model of tax evasion is similar to the model recently developed by Pellizzari and Rizzi (2013), however several differences exist and Pellizzari and Rizzi (2013) do not model the interaction of tax evasion with the endogenous development of fiscal capacity.

\(^12\) For simplicity I assume that citizens and elite members estimate the elite members share of declared income in democracy to be equal to the share of declared income under authoritarian government by the elite member with the lowest evaluation of public goods \(\alpha_i\), denoted as \(d_{e, \text{dem}}\).
and 2.7 has to be replaced with the individual’s estimation (denoted \( \hat{R} \)). Following Pellizzari and Rizzi (2013) and Cowell and Gordon (1988) the estimated revenue is again part of two functions. The first part is some knowledge about the true level of revenue coming from the previous iteration of the game, whereas the second component of the function is a calculation of the revenue if all other agents would behave like the individual herself. The two parts of the equation are combined using the “conformity parameter” (Pellizzari and Rizzi, 2013, 4) \( \gamma \), where \( 0 \leq \gamma \leq 1 \). As \( \gamma \) goes towards 1, the agent increasingly believes everybody behaves like herself. Conversely, as \( \gamma \) approaches 0, she believes the level of declaration by all other agents is the same as in previous iterations of the game. The full estimating equation for the revenue for each individual agent is thus the following (recall that all revenue in the model is denoted as share of total income):

\[
\hat{R}_i = \gamma \left\{ \frac{N \hat{y} d_i (\tau - \frac{1}{2} \tau^2)}{Y} \right\} + (1 - \gamma) \{ R_{-1} \} \tag{2.11}
\]

To summarize, agents do not have full knowledge of the compliance or evasion behavior of all other agents. Yet, based on the \( \gamma \) parameter each agent makes an educated guess about the behavior of all other agents, either based on behavior in the previous round or based on her own utility maximization.

In the first part of the estimated revenue, each agent takes her personal decision about the share of income to declare and applies it to the average income in society. She then uses this assumption to calculate total collected revenue, again represented as a share of total income. The second part of the estimation is the revenue as share of total income from the previous round. To find each individual’s equilibrium decision about how much of her income to declare for taxation, equation 2.11 is inserted into equations 2.6 and 2.7 instead of \( \hat{R}_i \). For each individual member of society, the function is maximized with respect to \( d_i \) to find the agent’s best response to the
Based on this design, what are the most important factors influencing the decision to evade? First, individuals who value government spending more, have an interest in complying with tax laws. Yet, this is also influenced by the government's decision about what share of revenue to spend on public service provision. Increasing with the individual's benefit of public service provision \( \alpha_i \) and the share of revenue that is used for public service provision \( (PS) \), higher levels of declared income become optimal. This effect is also increasing with \( \gamma \) as each individual agent assumes that others behave like herself, i.e. the individual behavior becomes more important for the estimated level of total revenue. Second, depending on the share of revenue used for repression \( (1 - PS) \), the share of income declared affects the probability of transition to democracy \( (\pi) \) and thus has positive (negative) effects on the utility for elite members (citizens). The most important factor is, however, the chosen level of fiscal capacity. With higher capacity the probability of an audit increases and thus tax evasion becomes riskier and the higher the incentive to declare all income. In addition, higher efficiency of revenue collection makes spending more beneficial to individuals.

2.3.4 Combining both Games – Simulation

Up until this point, both the “political” and “evasion” game have been discussed as two independent parts. However, to truly understand how the decisions of autocratic elites about taxes, fiscal capacity, and spending levels interact with the individual's decision to evade taxes, both parts of the model have to be combined. The idea is currently I assume that individual elite members do not know the exact level of tax compliance for all other members of society when making their personal decision about evading taxes. In contrast, to simplify the model, I assume that when deciding on the governments policy elite members have full knowledge of all individual's compliance decisions. More realistically would be for the governing elite to have beliefs about compliance levels as in the evasion game. However, I do not believe that this would change any of the results significantly.
that individual agents react to the governments decision about fiscal capacity and spending levels. On the other hand, the autocratic elite when making decisions about fiscal policies anticipates the reaction by individual taxpayers.

To combine the two games into one computational model, I iteratively find the equilibria for each of the games with starting values based on the previous iteration. Specifically, given a starting value for the tax rate, fiscal capacity, and spending shares I find all agents’ share of declared income. The share of declared income depends on the individual’s $\alpha_i$ and the appropriate utility function for citizens or elite members (equations 2.6 and 2.7).\textsuperscript{14} Based on the vector of income shares declared by all individual actors, the autocratic government is then modeled to decide on a level of fiscal capacity, taxation, and spending levels. These two processes are iterated until an equilibrium stage is found. For example, for a given set of parameters finding the equilibria for all actions would be as follows:

1. Starting values: $\tau = 0.5$, $\phi = 2$, and, $PS = 0.9$, maximize individual utility functions to find share of declared income ($d_i$) for all members of society.

2. Based on all $d_i$ values from 1), maximize elite utility function to find $\tau$, $\phi$, and, $PS$.

3. Based on $\tau$, $\phi$, and, $PS$ from 2), maximize individual utility functions to find share of declared income ($d_i$) for all members of society.

4. ...

The maximization of the individual, private utility functions and the political decision are iterated until changes from one iteration to the next are miniscule.\textsuperscript{15}

\textsuperscript{14} Across all simulations the starting values in the first iteration are the following: $\tau = 0.5$, $\phi = 2$, and, $PS = 0.9$. The starting values should not affect any of the results, however the values chosen increase the likelihood of convergence for the maximization algorithms.

\textsuperscript{15} To determine equilibria I iterate both processes alternatively until the change in both the equi-
I focus on the effect of how much elite members benefit from public spending and inequality on the development of fiscal capacity, taxation, and government spending in autocracies, as well as their interplay with individual tax compliance. To do so, I find the equilibrium behavior in societies with varying levels of inequality and changes in the benefit of public services expenditure ($\alpha_i$). I estimate the equilibrium solutions for all societies based on all combinations of parameters in Table 2.1. For each individual elite agent, $\alpha_e$ is drawn from a normal Gaussian distribution with the mean ranging from 0.35 to 0.75, as shown in Table 2.1. The standard deviation in each draw is 0.05. The $\alpha_c$ parameters for citizens are drawn from a normal Gaussian distribution with the mean being 0.1 larger than the mean of the elite parameter. Here, the standard deviation is 0.1. Citizen’s alpha values are larger on average. The idea is that the poor generally benefit more from public education and other government investments than the elite.

The computational model is run in Python for all parameter combinations shown in Table 2.1. In the next section, I present the results of the agent based model, specifically the effects of inequality and the elite’s benefit from public service provision. Income inequality in the simulation is based on the citizen’s income share, ranging from 0.15 to 0.8. These values were chosen such that the minimum and maximum gini coefficient of simulated societies is similar to the minimum and maximum market gini in the most recent inequality data by Solt (2009), i.e. the gini coefficient ranges from 0.151 to 0.801. As explained above, inequality can be varied via population or income shares. As I want to limit the parameters that vary across societies I focus on changing group income and hold population shares constant. Given the current design of the model, population size should only have an effect

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16 The mean for $\alpha_e$ ranges from 0.3 to 0.65 in jumps of 0.025, for simulations with $\gamma$ and $\delta$ unequal to 0.5.
via inequality and can thus be held constant.\textsuperscript{17} In addition, I only vary the citizen’s income and hold elite income constant. This is done, so that the elite’s decision on capacity, taxation, and spending is not caused by higher/lower personal incomes but is generated via inequality or the $\alpha$ parameter.

Table 2.1: Parameters for Simulation

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citizen Population</td>
<td>951</td>
</tr>
<tr>
<td>Elite Population</td>
<td>49</td>
</tr>
<tr>
<td>Total Population</td>
<td>1,000</td>
</tr>
<tr>
<td>Elite Individual Income</td>
<td>1000</td>
</tr>
<tr>
<td>Citizen Income Share</td>
<td>0.1, 0.15, 0.2, ..., 0.7, 0.75, 0.8</td>
</tr>
<tr>
<td>Citizen Individual Income</td>
<td>9.1, 12.9, ..., 154.6, 206.01</td>
</tr>
<tr>
<td>Society Total Income</td>
<td>57647.1, 61250.0, ..., 196000.0, 245000.0</td>
</tr>
<tr>
<td>Mean $\alpha_e$</td>
<td>0.30, 0.325, 0.35, ..., 0.625, 0.65</td>
</tr>
<tr>
<td>Mean $\alpha_c$</td>
<td>0.35, 0.375, 0.40, ..., 0.675, 0.7</td>
</tr>
<tr>
<td>Penalty</td>
<td>3</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>0.4, 0.5, 0.6</td>
</tr>
<tr>
<td>$\delta$</td>
<td>0.3, 0.5, 0.7</td>
</tr>
</tbody>
</table>

To reiterate, the equilibria are found by sequentially running the maximization algorithm for the “evasion” and “political game”. First, I find a solution to the evasion problem for each individual agent, given the state’s policy on taxation, capacity, and repression. Based on the declared income of all members of society, the autocratic government (median elite member) then chooses the preferred tax and spending policy, as well as a level of fiscal capacity. This process is iterated until actors do not change their behavior anymore, i.e. an equilibrium is reached.\textsuperscript{18}

\textsuperscript{17} Future extensions could investigate the effect of group sizes on the elite’s collective action problem of raising revenue, however this would necessitate a different model design.

\textsuperscript{18} Recall that the process is iterated until both the change in the elite’s chosen tax policy and the median elite member’s tax declaration level from one iteration to the next are less than 0.01 %. In general it took between 8 and 10 full iterations for an equilibrium to be reached. The functions were maximized using the \texttt{scipy.optimize.minimize_scalar} function (single variable optimization in the “evasion game”) and the \texttt{scipy.optimize.fmin_slsqp} algorithm (multivariate optimization in the “political game”). The following boundaries were set for the maximization problems: $0 \leq d_i \leq 1$, $0 \leq \tau \leq 1$, $0 \leq PS \leq 1$, and $1 \leq \phi \leq 2$. 55
2.4 Equilibrium Strategies and Empirical Implications

In this section, I first summarize the effect of inequality and the elite’s benefit from government spending on the equilibrium outcomes of fiscal capacity and spending decisions. I then develop some hypotheses to be tested in further empirical research.

As a first cut, Table 2.2 shows the results from simple OLS regressions with several variables of interest as dependent variables. The independent variables in all models are societal inequality, the median elite member’s propensity for government spending ($\alpha_{e,Med}$), as well as the $\delta$ (discount factor) and $\gamma$ (conformity) parameters.

<table>
<thead>
<tr>
<th></th>
<th>Fiscal Capacity</th>
<th>Public Service Spending</th>
<th>Revenue as Share of Total Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intercept)</td>
<td>-0.82</td>
<td>-26.18</td>
<td>-40.24</td>
</tr>
<tr>
<td></td>
<td>(0.06)</td>
<td>(0.64)</td>
<td>(0.96)</td>
</tr>
<tr>
<td>Gini</td>
<td>-0.29</td>
<td>-4.05</td>
<td>-4.01</td>
</tr>
<tr>
<td></td>
<td>(0.03)</td>
<td>(0.28)</td>
<td>(0.43)</td>
</tr>
<tr>
<td>Median Elite Alpha</td>
<td>2.91</td>
<td>48.59</td>
<td>65.79</td>
</tr>
<tr>
<td></td>
<td>(0.06)</td>
<td>(0.64)</td>
<td>(0.96)</td>
</tr>
<tr>
<td>$\delta$</td>
<td>0.12</td>
<td>1.95</td>
<td>2.93</td>
</tr>
<tr>
<td></td>
<td>(0.04)</td>
<td>(0.49)</td>
<td>(0.73)</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2.17</td>
<td>40.33</td>
<td>58.32</td>
</tr>
<tr>
<td></td>
<td>(0.09)</td>
<td>(0.98)</td>
<td>(1.48)</td>
</tr>
<tr>
<td>$N$</td>
<td>1054</td>
<td>1054</td>
<td>1054</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.75</td>
<td>0.88</td>
<td>0.86</td>
</tr>
</tbody>
</table>

Standard errors in parentheses

While the OLS regression model does not give a full representation of the simulation results, it shows some initial relationships.\(^{19}\) As one can see, inequality has a clear negative effect on investments in fiscal capacity, the amount invested in public services, and total revenue. As inequality increases, elites lower their investment in fiscal capacity. Moreover, total revenue is lower and public service spending declines.

\(^{19}\) The OLS regression is based on all simulations where an equilibrium was found. Out of 1064 different parameter combinations the model converged in 1054 simulations. For 10 parameter combinations when $\gamma = 0.6$ the simulation does not converge and results are thus dropped. However, this should not affect the general relationships.
when inequality is rising. Note that public service spending is measured as share of total income, not the share of revenue devoted to government investment.

In contrast to inequality, when the median elite member’s benefit from government spending increases, fiscal capacity is raised and more revenue is collected. A higher value of payoffs in future time periods for the elite (i.e. higher $\delta$), has positive effects on investments in capacity and spending. Similarly, increasing $\gamma$ is also positively associated with capacity and spending levels. This means, the stronger the belief of agents that other individuals behave like themselves in regard to tax evasion, the more investment in capacity and spending is observed. I will now consider each variable of interest separately and in more detail. To make the results easier to interpret, the plots and regressions in the next sections are based on simulations with $\gamma = 0.5$ and $\delta = 0.5$. In Section 2.4.3 I show how the individual behavior of agents in regards to tax evasion is affected by government policies and consider the effect of changing $\gamma$. The effects of varying the discount factor ($\delta$) are described in Section 2.4.4.

2.4.1 Fiscal Capacity

The main question to be answered by the theoretical model is how fiscal capacity investments in autocracies are affected by inequality and the benefit of government spending on the elite’s private investment. Table 2.2 already shows the positive effect of $\alpha_{e,Med}$ on capacity investments and the negative effect of inequality. However, the OLS regression results are unable to recover any non-linearities in the relationship.

Figure 2.4.1 shows the relationship between fiscal capacity, inequality, and $\alpha_{e,Med}$. The plot is based on the simulation results for all societies when $\delta = \gamma = 0.5$ and is lowess smoothed. One can easily see that inequality has a negative effect on fiscal capacity development. Yet, the relationship is not linear, in fact, there is an interactive effect with the median elite member’s benefit from government spending.
When the benefit of government spending is very small, there is little incentive to invest in fiscal capacity. Consequently, at low levels of $\alpha_{e, Med}$, fiscal capacity investment is always small and the effect of inequality is minimal. As $\alpha_{e, Med}$ increases, the effect of inequality becomes larger, i.e. the difference in fiscal capacity between high and low levels of inequality is largest at medium levels of $\alpha_{e, Med}$. On the other hand, once the benefit associated with government spending becomes very large, inequality has small effects on fiscal capacity.

Inequality affects the cost of a possible transition to democracy for the autocratic elite. Thus, all else equal, inequality raises the costs associated with higher fiscal capacity. While higher a higher elite benefit from public spending raises the demand for fiscal capacity, the effect is smaller at high levels of inequality. Once the benefit of government spending becomes large enough, fiscal capacity is raised to the maximum level. Here it becomes optimal for the elites to raise higher levels of revenue, utilizing maximum capacity. This inflection point, the $\alpha_{e, med}$ value at which fiscal capacity is set to the maximum level, increases in inequality. At the same time, however, when fiscal capacity is increased and inequality is high, elites revert to spending more money on repression to decrease the probability of a regime transition (shown below).

Table 2.3 shows how inequality and fiscal capacity are related to the equilibrium tax rate under democracy. Note that the resulting policies under democracy are a direct consequence of inequality and the policy choices of the authoritarian elites in the previous regime. On the other hand, as discussed above, the choices in the authoritarian regime were made in expectation of a possible future democratization.

Should it come to a transition to democracy, based on the choice of the median voter (poor), higher inequality increases demands for redistribution. Yet, low fiscal capacity constrains the level of taxation, as it leads to higher costs and a lower maximum level of revenue. Table 2.3 shows the results from a simple OLS regression.
Figure 2.3: The level of inequality has a negative effect on fiscal capacity investments up until a point in $\alpha_{e,Med}$, at which fiscal capacity is raised to the maximum. The value at which $\alpha_{e,Med}$ leads to maximum levels of fiscal capacity is increasing in inequality. Both $\delta$ and $\gamma$ are held constant at 0.5.

with the equilibrium tax rate under democracy being the dependent variable while fiscal capacity, inequality, and their interaction are used as independent variables. As one can see, the coefficient for inequality here is actually negative, yet this is due to the positive interaction. Holding fiscal capacity constant, the overall effect of inequality is positive. In addition, fiscal capacity also has a strong positive effect, indicating that as capacity increases tax rates are higher. Most importantly, however, the coefficient on the interaction of inequality and capacity is large and positive. This means, as capacity increases, the effect of inequality on the equilibrium tax rate in democracy is positive. In other words, if fiscal capacity is high, more inequality leads to more taxation.

What are the take away points from the results so far? First, as the benefit to government spending increases, elites raise the fiscal capacity of the state. This
is especially true at intermediate levels of inequality. Second, inequality inhibits the development of fiscal capacity. Again, the effect of inequality is strongest at intermediate levels of the benefit of government spending to elites ($\alpha_{e,Med}$).

Concerning democratic politics, two predictions can be made. Inequality increases pressure for taxation, however, this effect is conditional on existing fiscal capacity. Where fiscal capacity is low, the effect of inequality on taxation will be minimal. This means, that predictions based on the Meltzer and Richard (1981) model, i.e. that democracies with higher inequality ought to have higher levels of taxation, are conditional on the level of fiscal capacity and only apply to high capacity states.

### 2.4.2 Taxation, Public Spending and Repression

While inequality clearly influences the decision to invest in fiscal capacity, what are the predictions of the theoretical model when it comes to government spending and taxation? A first important observation is that changes in the level of taxation (i.e. the linear tax rate) chosen by the political elite are less pronounced than changes in actual revenue or the fiscal capacity.
Figure 2.4.2 shows the difference between the maximum and minimum levels of revenue and tax rates across societies at constant levels of $\alpha_{e,Med}$. The x-axis plots all simulated levels of the median elite’s benefit from public spending. The vertical lines plot the discrepancy in the maximum and minimum rate or revenue level at a given $\alpha_{e,Med}$. These differences at constant $\alpha_{e,Med}$ levels stem from changes in inequality. The important take away here is twofold: 1) As $\alpha_{e,Med}$ increases and autocratic elites demand higher spending levels, this is primarily accomplished via higher levels of efficiency (i.e. capacity) and not higher tax rates. 2) Differences in inequality affect revenue, but again, the main effect comes from changing fiscal capacity, not rates.

Figure 2.4: This plot shows how the level of revenue as a share of total income and the tax rate chosen by the elite varies across different societies. The median elite member’s benefit from spending ($\alpha_{e,Med}$) is plotted along the x-axis. The vertical lines show the difference between the maximum and minimum level of revenue or tax rate at a given $\alpha_{e,Med}$ value. As one can see, the difference is more pronounced for revenue (red) than for tax rates (green). This is due to the effect of fiscal capacity on the levels of collected revenue. Both $\delta$ and $\gamma$ are held constant at 0.5.
This result is important for empirical investigations of fiscal policies. It suggests that tax rates are not necessarily an appropriate measure of true tax effort by governments. Instead, researchers ought to focus on revenue in interaction with capacity to understand whether governments truly attempt to raise revenue in the long term.

The relationship of government revenue as share of total income with inequality and median elite propensity for government spending is almost equivalent to that of fiscal capacity. Revenue increases with fiscal capacity and capacity is used to raise more revenue, i.e. changes in fiscal capacity are driven by demands for revenue. In addition, total revenue and fiscal capacity are correlated with each other at 0.99. It is noteworthy that the relationship between revenue and propensity for public spending is driven by three factors: 1) the increase in fiscal capacity and thus efficiency in revenue collection; 2) the indirect effect of increasing capacity on lowering tax evasion; and 3) the direct effect of the increasing individual benefit to public spending on declaration levels (i.e. tax evasion).

It is important to note, what this high correlation between revenue and capacity means for studying fiscal capacity in real world settings. As I argue elsewhere, revenue is an imperfect measure of fiscal capacity, because it conflates the choice not to raise taxes with the inability to do so. The high correlation between capacity and revenue here indicates otherwise. Yet, this is due to abstraction in the model. Here, autocratic elites start out with a blank slate and set capacity the level that is optimal considering inequality and demand for revenue. On the other hand, in the real world a country may have higher capacity than necessary for the preferred level of revenue or increases in capacity may be impossible under certain regimes (especially in democracies). Thus, the correlation between capacity and revenue is likely much lower in the real world setting.

Figure 2.5 shows the relationships between fiscal capacity, inequality, and repression levels. The left plots shows the effects of capacity and societal inequality on the
Figure 2.5: The two plots show the effect of inequality and fiscal capacity on the share of the budget used for repression (left) and repression spending as the share of total income (right). It is noteworthy that inequality has a positive effect on the share of the budget devoted to repression. This effect is stronger for the share of the budget and at high levels of fiscal capacity. Both $\delta$ and $\gamma$ are held constant at 0.5.

The relationship between inequality, capacity, and repression spending as a share
of total income is more straightforward and linear. Spending increases with higher levels of capacity, which is due to the higher revenue levels in general and the rising share used for repression. Secondly, inequality has only a small effect on actual spending levels, but the effect is increasing with capacity.

The share of the budget devoted to public service spending is equal to one minus the share spent on repression. Thus the relationship between the share of the budget spent on public services, inequality, and capacity is opposite to that between the share of repression spending, inequality, and capacity. The relationship is shown in Figure A in the Appendix.

More interesting is the association between inequality, fiscal capacity, the propensity for public service spending, and actual spending on public services as a percentage of total income. The left plot in Figure 2.6 shows the association between fiscal capacity, inequality, and public service spending. The right plot shows the effect of median elite $\alpha$ and inequality on spending. The relationship between capacity and public service spending is clearly positive. Capacity investment is driven by the demand for government spending on public services, which explains the clear positive relationship. As capacity increases, the association between spending and capacity becomes weaker. This is due to the diminishing effect of capacity on total revenue.

On the other hand, the effect of the elite’s benefit from public service spending on actual spending levels is clearly positive and almost linear. The effect is slightly increasing in $\alpha_{Med,e}$. Not surprising the model shows a direct effect from benefit to demand for public spending. It is noteworthy that at high levels of capacity, as well as at constant levels of median elite $\alpha_{e,Med}$, the effect of inequality on public service spending is negative. This is due to the fact that repression becomes more important at high levels of fiscal capacity and the marginal benefit of public service spending decreases.
(a) Public Service Spending with Fiscal Capacity

Figure 2.6: The left plot shows the effect of inequality and fiscal capacity on public service spending as share of total income. The plot on the right shows the relationship of public service spending with inequality and $\alpha_{e,Med}$. Note that the x-axis (inequality) is flipped between the left and right plot. Both $\delta$ and $\gamma$ are held constant at 0.5.

2.4.3 Conformity & Explaining Evasion

Table 2.4 shows a simple OLS regression with the mean level of declared income as the dependent variable. The model includes the mean level of $\alpha$ in society, fiscal capacity, and the conformity parameter $\gamma$ as independent variables. As expected, both fiscal capacity and the demand for public spending have positive effects on the share of income that is declared. With increasing fiscal capacity the probability of an audit increases, which leads to higher levels of compliance. Secondly, at higher levels of capacity the cost of taxation is lower and a higher share of taxed income ends up as revenue for the state. The increased efficiency of taxation raises the personal benefit and thus also leads to lower tax evasion.

Recall that as $\gamma$ increases, each individual agent, when making the evasion deci-
Table 2.4: Explaining Evasion

<table>
<thead>
<tr>
<th></th>
<th>Declared Income Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intercept)</td>
<td>-0.48</td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
</tr>
<tr>
<td>Fiscal Capacity</td>
<td>0.46</td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
</tr>
<tr>
<td>Mean (\alpha)</td>
<td>0.41</td>
</tr>
<tr>
<td></td>
<td>(0.02)</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>0.12</td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
</tr>
<tr>
<td>(N)</td>
<td>693</td>
</tr>
<tr>
<td>(R^2)</td>
<td>0.98</td>
</tr>
<tr>
<td>adj. (R^2)</td>
<td>0.98</td>
</tr>
</tbody>
</table>

Standard errors in parentheses

sion, increasingly believes that others behave like herself. With higher \(\gamma\), the share of income declared also increases. This is not surprising and resembles findings by Pellizzari and Rizzi (2013). However, what is interesting is that higher conformity by the agent also seems to increase the benefit of fiscal capacity for the elite. As can be seen in Figure 2.4.3, as \(\gamma\) increases, fiscal capacity becomes more effective as the share of declared income grows. This leads to a higher increase in fiscal capacity at higher levels of \(\gamma\), all else equal. For low levels of \(\gamma\) (red), fiscal capacity is never increased to the maximum level. At higher levels of \(\gamma\), capacity is increased to the maximum at an earlier stage. Thus with a higher conformity parameter, the authoritarian elite is more likely to invest in fiscal capacity.

The results in regards to the conformity parameter give insight to an interesting phenomenon. It indicates that fiscal capacity investment is especially beneficial in countries where trust between citizens is already high and a culture of high tax morale exists. The relationship is in line with recent research that tax compliance increases when tax payers are aware of the compliance of those around them (Del
2.4.3

Figure 2.7: The plot shows how the mean share of declared income varies by the level of fiscal capacity. As fiscal capacity increases, individuals declare a larger share of their income for taxation. However, the effect of fiscal capacity on declaration seems to decrease for smaller $\gamma$. Fiscal capacity then becomes a less powerful tool for the autocratic elite. When $\gamma = 0.4$ (red) fiscal capacity is never increased to the maximum level, whereas when $\gamma = 0.6$ fiscal capacity is increased at a faster rate by the authoritarian elite.

Carpio, 2013) and a peer effect (Luttmer and Singhal, 2014). Tax compliance and high fiscal capacity may thus interact positively in lowering tax evasion in countries around the world. The implication is that a virtuous cycle can occur in which states increase fiscal capacity, while also working to increase compliance via peer effects and morale building.

2.4.4 Valuing the Future

The $\delta$ parameter measures how strongly actors in the model value current vs. future income. As $\delta$ increases to one, payoffs in future periods are valued the same as current period payoffs. If $\delta$ goes to zero, agents only care about the present. Somewhat unexpectedly, a higher $\delta$ parameter in the model is associated with higher investments
in fiscal capacity. Figure 2.8 shows the relationship between inequality, median elite \( \alpha \), and fiscal capacity for the simulations with \( \delta = 0.3 \) (left) and \( \delta = 0.7 \) (right). As one can see, when \( \delta \) is higher, investments in fiscal capacity begin at lower levels of the elite’s propensity for public services. This is surprising as a higher \( \delta \) also increases future costs of possible democratization. The most likely reason for this finding is that increasing the value of future periods increases individual declarations and thus (similar to a higher \( \gamma \) parameter) increases the benefit to increasing capacity.

\[ \text{Gini} \]
\[ \text{Median Elite Alpha} \]
\[ \text{Fiscal Capacity} \]

(a) Fiscal Capacity, \( \delta = 0.3 \)  
(b) Fiscal Capacity, \( \delta = 0.7 \)

**Figure 2.8:** The two plots show the effect of inequality and \( \alpha_{e,Med} \) on fiscal capacity for two different levels of \( \delta \). At a higher \( \delta \) (right), investments in fiscal capacity begin at lower levels of \( \alpha_{e,Med} \).

2.5 Discussion

The threat of democratization and redistribution can inhibit fiscal capacity investment in authoritarian regimes. On the other hand, when elite members benefit greatly from government spending, the benefit of increasing capacity can outweigh possible future costs. The results from the computational model were described in
detail in the previous sections. Several important take aways and trade-offs result from the model, which can be used to formulate predictions for empirical research.

First, the model shows clearly how inequality and a possible future regime change can lead to low investments in fiscal capacity. As inequality rises, the costs associated with higher fiscal capacity in case of democratization go up. As a consequence, elites keep fiscal capacity low when inequality is high. We ought to expect a negative relationship between inequality and fiscal capacity in the real world. Second, as the benefit of government spending to elites increases, their demand for higher taxation and fiscal capacity also rises. With increasing benefit to government spending, we should therefore observe higher levels of fiscal capacity.

In turn, fiscal capacity is highly correlated with actual revenue collection in the model. The relationship between revenue and inequality is expected to be negative, as inequality leads to less capacity investment and as a consequence lower levels of revenue. On the other hand, higher benefit of government spending creates demand for taxation, increases in capacity, finally leads to more revenue.

In addition, the computational model lends some insights into the trade-off between keeping fiscal capacity at low levels to constrain future democratic politics and investing in repression to avoid democratization. First, all else equal, as inequality increases, the share of government spending used for repression rises. Interestingly, this effect increases with higher levels of fiscal capacity. At low levels of capacity, repression is less important, even at higher inequality. This is due to the limited costs associated with democratization at low levels of capacity. Yet, as elites invest in capacity, regime change becomes comparatively more expensive and thus the share of revenue used for repression increases. Based on these results, one ought to expect more repression in states with higher levels of fiscal capacity, especially when inequality is high. Where both the benefit to government spending and inequality are high, elites are likely to increase the capacity of the state but at the same time
utilize revenue to finance repression. Moreover, those authoritarian states with high levels of taxation and spending on public services, are where one ought to expect high levels of repression, when inequality is high.

Last, the model’s results have important implications for the relationship between fiscal capacity and tax evasion. Fiscal capacity investment seems to be most effective where governments can create a culture of tax compliance or high tax morale. Thus, evasion ought to be lowest in those states where capacity is high but citizen see the benefit of government spending and believe compliance of others is high.
2.6 Conclusion

Fiscal capacity is of immense importance to countries and their governments. It determines whether states can raise sufficient levels of revenue to fulfill their basic functions and provide public goods and services to their citizens. It affects the efficiency of government revenue production as well as spending, and has implications for economic development. Yet, the level of tax capacity varies immensely around the world. Many countries, democracies and authoritarian regimes alike, have highly efficient systems of revenue collection. Other countries are unable to collect much revenue aside from the simplest forms of taxation, such as customs and tariffs.

In this paper, I develop a theoretical model assessing when authoritarian elites have incentives to increase the fiscal capacity of the state. The computational model interacts the autocratic government’s decision on fiscal capacity, taxation, and spending levels with the individuals’ decisions about tax evasion. To my knowledge, this is one of the first attempts to model both the macro-level decision making about fiscal capacity investments and individual decisions about tax compliance.

I argue that fiscal capacity is constant in the short run and that changes in its levels are much less complicated under authoritarian regimes. This is the case because investments in tax capacity are more likely to be successfully implemented when they are in the interest of the most wealthy in society. In contrast, increases of tax capacity are much harder to accomplish when the economic elite is fighting them, as is likely in newly democratic regimes with high levels of inequality. The level of fiscal capacity in young democracies is thus dependent on investments under previous autocratic regimes. Forward looking autocratic elites ought to take this into account when determining the optimal level of fiscal capacity under authoritarianism. Autocrats have to weigh increases in the efficiency in revenue collection under the current regime with the possibility of increasing the capacity for redistribution in a
future democracy.

Based on the computational model, I find that when inequality is high, autocrats have incentives to curb investments in the revenue raising capacity. They do so in anticipation of higher redistribution in a possible subsequent democratic regime. Low levels of capacity in turn increase the level of tax evasion. However, as the personal benefit to government spending increases, this can outweigh the costs associated with a possible regime change and investments in the revenue raising capacity of the state can become optimal. Similarly, as the personal benefit to government spending increases, tax evasion decreases. An additional insight of the model is that one should observe higher levels of repression in states with both high levels of fiscal capacity and high levels of inequality.

While the autocratic elite is modeled as a single actor, the results also give insights about the effect of conflict within the political elite. If intra-elite conflict and inequality is high, a coup or change in the autocratic leadership ought to have similar effects as societal inequality in the current model. Future extensions could include the possibility of a split in the elite and elite driven democratization based on a coalition of elite members and citizens. Understanding the determinants of fiscal capacity investments has important implications for authoritarian economic policies and economic development in its own right. In addition, I believe it can aid in our understanding of one of the big puzzles in political economy. Many models have clear expectations that a regime change from autocracy to democracy should lead to increases in redistribution and taxation (Acemoglu and Robinson, 2001; Boix, 2003; Acemoglu and Robinson, 2006), yet this is not borne out in the data (Elis, 2011). If fiscal capacity in democracies in the short term is endogenous to developments and characteristics under authoritarian regimes, as I argue, then immediate effects of regime change on redistribution are not necessarily expected. Instead, low levels of fiscal capacity would limit taxation and redistribution in those young democracies.
with high inequality. In short, a better understanding of the development of fiscal capacity under authoritarian regimes will have large implications for autocratic and democratic politics alike. This possible long term effect on democratic politics will be further investigated in future work.
3.1 Introduction

Fiscal capacity enables states to effectively raise taxes and revenue. Without this ability governments have to rely on revenues from natural resource extraction and taxes that are easily enforceable. Low tax capacity limits the kinds of taxes and maximum level of revenue states are able to raise. It thus impacts the ability for states to undertake even the most basic tasks, let alone providing publics goods and/or redistributing income. In spite of the importance of fiscal capacity for states’ functioning, the level of capacity varies extensively across the world. The inability of many poor countries to raise taxes is a detriment to development, as was noted by Kaldor (1963) in 1963. Despite a strong effort to overcome these issues, the weakness in tax capacity is an ongoing problem in many countries around the world (Bird and Zolt, 2004; Fjeldstadt and Moore, 2008; Bird and Zolt, 2008).

The capacity to tax is developed in the long term and precedes immediate policy choices. Whereas democratic governments generally ought to have an interest in
strengthening the state and its institutions, autocrats may have strategic incentives to undermine the capacity of the state (Acemoglu, Ticchi and Vindigni, 2011). Moreover, while a large debate exists on differences in taxation between regime types (e.g. Lake and Baum, 2001; Brown and Hunter, 2004; Lindert, 2004; Mulligan, Gil and Sala-i Martin, 2004; Ross, 2004; Avelino, Brown and Hunter, 2005; Timmons, 2005, 2010; Elis, 2011; Acemoglu et al., 2013), we have very little systematic knowledge about what explains differences in taxation and fiscal policy within authoritarian regimes. In this paper, I investigate the question of “when do authoritarian elites pursue the development of fiscal capacity?”

Some of the most prominent theoretical models in political economy lead us to expect that political elites in authoritarian regimes prefer low levels of taxation and generally oppose government spending (Acemoglu and Robinson, 2006; Boix, 2003; Bueno De Mesquita et al., 2005). Following this notion authoritarian leaders have few incentives to develop tax capacity. In contrast to these theoretical predictions, many authoritarian governments do however raise significant levels of revenue via taxation. Furthermore, in many cases the development of fiscal capacity and expansion of revenue collection preceded the turn to democracy. Much of the innovation in fiscal policies in Prussia, often a prime example when it comes to the development of taxation, happened at a time with very little political representation of the masses. More recently, South Korea strengthened and reformed the fiscal system while under authoritarian rule. Similarly, one can think of other high capacity states that remained authoritarian, such as Singapore. Many authoritarian countries have tax to GDP ratios of over 20 percent, levels commonly experienced in democracies. On the other hand, some authoritarian countries, such as Pakistan, the Philippines, or Ethiopia, have tax to GDP ratios of around ten percent. The variation in fiscal policies with autocracies is exemplified by the fact that while the mean tax to GDP ratio in 2000 was about 15 percent, the standard deviation was 6.6.
In spite of these vast differences within authoritarian regimes, there is comparatively little political science research that aims to systematically explain them. Moreover, the decision of authoritarian elites whether or not to raise fiscal capacity has far reaching consequences for states and their citizens, even in subsequent democratic regimes. In young democracies fiscal capacity is determined by investments in prior regimes, thus learning when autocrats invest in tax capacity is paramount to further our understanding of politics in young democracies. In this paper, I therefore investigate the circumstances under which authoritarian elites have incentives to raise the fiscal capacity of the state and engage in efficient taxation and government spending and when they avoid doing so.

I first outline a theoretical argument explaining the development of fiscal capacity in authoritarian regimes. Building on some of the predominant theoretical models in political economy (Bourguignon and Verdier, 2000; Boix, 2003; Acemoglu and Robinson, 2006; Besley and Persson, 2011; Acemoglu, Ticchi and Vindigni, 2011), I contend that the threat of future regime change and possible associated redistribution influences decisions of autocratic elites. As inequality rises, the costs associated with a possible regime change increase. One way for autocrats to minimize these possible redistributive costs is to keep fiscal capacity at low levels. Low capacity constrains future redistribution should they ever lose power. Higher fiscal capacity increases the maximum attainable level of revenue and lowers the costs associated with revenue production. Hence, while higher efficiency in revenue collection is generally preferable, this must not be true for autocratic elites. In fact, when inequality is high, they prefer low levels of capacity to lower the costs associated with a possible loss of power. On the other hand, when authoritarian leaders prefer higher levels of government spending under the current regime, they have incentives to lower the costs associated with taxation and thus, to invest in fiscal capacity. In this case, autocrats must weigh the benefit of raising taxes more efficiently in the present, with
increasing the possibility of redistribution in the future. I argue that the structure of the economy shapes the returns to public investment for the autocratic elite, while inequality determines the threat associated with redistribution.

After outlining the theoretical argument, I empirically investigate the question on a sample of more than 90 authoritarian regimes from 1980 to 2006. To my knowledge, this is the first systematic empirical investigation of what determines the development of fiscal capacity in authoritarian regimes using cross-sectional time-series data. To do so, I utilize newly available data on tax revenues around the world provided by the International Center for Tax and Development (Wilson, Cobham and Goodall, 2014). This results in one of the most complete samples when it comes to cross-national research on taxation in comparative political economy. Moreover, these new data distinguish between resource and non-resource revenue, which is particularly important when investigating fiscal capacity. I estimate a number of cross-sectional models that give suggestive evidence in favor of the argument. In Section 3.5.1 I then follow two different estimation strategies to uncover long term effects on fiscal capacity. Across both models I find robust evidence that inequality is associated with less fiscal capacity, while more industrial authoritarian regimes exhibit higher levels of fiscal capacity. An additional contribution of the empirical investigation is that, as a robustness check, the time-series cross-sectional models are also replicated incorporating two levels of uncertainty in the data. Combining the results from 10,000 estimated models, I account for uncertainty associated with the inequality data, as well as the imputations of missing observations. Both kinds of uncertainty are often ignored by scholars estimating quantitative models on political economic outcomes around the world. The findings are robust, even accounting for these uncertainties in the data.
3.2 Inequality, Autocratic Elites, & Fiscal Capacity

In this section I present the theoretical argument about when authoritarian governments increase government spending and the capacity of the state to raise taxes. Two factors determine which authoritarian governments make investments in fiscal capacity and which do not: All else equal, inequality raises the cost of regime change to authoritarian elites (Boix, 2003; Acemoglu and Robinson, 2006). Keeping fiscal capacity at low levels is therefore one way for autocrats to constrain any future redistribution, when inequality is high. In contrast, when authoritarian elites own capital that is complimented by government spending, increasing taxation and tax capacity has a direct positive effect on their personal income. In this case, the development of fiscal capacity becomes warranted to raise revenue more efficiently.

3.2.1 Fiscal Capacity Development

The first and most fundamental task of states is to raise revenue. Before states can engage in war making and state building, they have to be able to raise a minimum amount of revenue, be it through trade, natural resource collection, or some form of taxation. Fiscal capacity constrains the policy choices of governments through limiting the level of attainable revenue. The available capacity directly influences the structure of taxation and limits the amount of revenue that can be raised. Only when the fiscal capacity of the state is sufficiently high can broad based and progressive taxation be enforced. On the other hand, when the level of fiscal capacity is low, the state must rely on taxes with narrow bases, as well as trade and consumption taxes, which are often regressive and limit in the amount of revenue that can be raised.

Low fiscal capacity has a clear limiting effect on the amount of money states can raise via taxation. Where tax revenues are low, government services, such as infrastructure spending, public goods, and public education, are limited. Fiscal
capacity is of such importance because it precedes any other fiscal policy choice made by governments. Yet, in a large number of countries around the world, the capacity to raise revenue is low and as a result policy choices are effectively limited.

Given how important fiscal capacity is for countries’ fiscal and social policies, it is crucial for political scientists to understand when tax capacity is developed and when elites have an interest in a weak fiscal state. Previous research has emphasized the link between war making, state building, and the expansion of revenue raising capabilities (Tilly, 1990; Moore, 2008; Besley and Persson, 2009, 2011; Dincecco and Prado, 2012). Besley and Persson (2011) develop an elaborate formal theoretical model with numerous extensions. They show that the development of state capacity is more likely in more politically inclusive states and when rival groups agree on a common need for government spending, e.g. war. In contrast to Besley and Persson (2011) I focus here on a particular type of regime (i.e. autocracies) and domestic reasons to invest in fiscal capacity. Moreover, Besley and Persson (2011) lack a true empirical investigation of their model.

To a large degree the focus on war marking as state making was driven by the experience in Europe prior to the 20th century (Tilly, 1990). In many other cases, for example Latin America or Africa, it is not clear how strongly the threat of war can explain variation in capacity investments across states (Kurtz, 2013). Moreover, recent scholarship has also questioned war as the sole driver of state development in Europe (Abramson, 2012).

A second predominant argument in the literature links changes in fiscal policy with increasing democratic representation or the development of political institutions (e.g. North and Weingast, 1989; Lizzeri and Persico, 2004; Moore, 2008; Dincecco, 2011; Karaman and Pamuk, 2013; Beramendi and Queralt, 2014). Yet, in many of the historical cases in Europe, it is unclear whether increased representation truly precedes the development of fiscal capacity and higher government spending, espe-
cially since capacity investments are likely to occur prior to significant changes in
revenue levels. Moreover, in many cases it is not quite clear whether the discussed
processes are actual cases of “democratization” or changes in the composition of
political elites, which affects their economic interests. Most importantly for this
paper, in many cases the development of fiscal capacity takes place under authori-
tarian regimes without any democratic history (for example, Singapore). In many
of the high-growth Asian developmental states, increases in fiscal capacity preceded
democratization and further developments of political freedom (Wade, 1993).

3.2.2 Fiscal Policy in Authoritarian Regimes

Much work in political science and economics assumes that autocratic governments
prefer low levels of taxation and oppose government spending (e.g. Acemoglu and
Robinson, 2006; Boix, 2003; Bueno De Mesquita et al., 2005). Moreover, based on
the median voter theorem (Downs, 1957) and the Meltzer and Richard (1981) model,
the most prominent models of regime change lead us to expect, all else equal, that 1)
levels of taxation and redistribution are higher in democracies than in authoritarian
regimes, and 2) taxation and redistribution increase after a regime change to democ-

tacy (Acemoglu and Robinson, 2001; Boix, 2003; Acemoglu and Robinson, 2006).1

An additional implication of the Meltzer and Richard (1981) model is that in democ-

racies redistribution should be higher where market inequality is higher. As I show
here and is documented by a vast literature, neither of these theoretical predictions
are borne out in empirical reality (For differing result on regime type, transitions
and redistribution, see e.g. Lake and Baum, 2001; Brown and Hunter, 2004; Lindert,
2004; Mulligan, Gil and Sala-i Martin, 2004; Ross, 2004; Avelino, Brown and Hunter,
2005; Timmons, 2005, 2010; Elis, 2011; Ahlquist and Wibbels, 2012; Acemoglu et al.,

1 Similarly, McGuire and Olson (1996) argued that the level of taxation in a majoritarian democ-

racy should generally be lower than taxation in autocratic regimes.
First, a general and dominant expectation is that autocrats have few incentives to raise taxes and provide public goods. Yet, there is considerable variation in the amount and efficiency of taxation in non-democratic states. As I have shown above, the relationship between total taxation and per capita income (known as Wagner’s law (1883)) is much stronger for democracies. Moreover, a large variation exists within authoritarian regimes when it comes to tax revenues as the share of GDP, ranging from under ten percent to more than 30 percent. This is exemplified in Figure 3.1. The plot shows a simple density plot for the data on total tax revenue as a percentage of GDP in authoritarian regimes in the year 2000. The data is taken from Wilson, Cobham and Goodall (2014) and includes all tax revenue, including social security contributions, but excludes any revenue from natural resources. Whereas the mean level of taxation in autocracies is around 10% of GDP, the plot clearly shows the variation across cases. Consider the three exemplary cases, excluding resource taxes, the Democratic Republic of Congo raised only slightly more than one percent of GDP in taxation in the year 2000. Belarus on the other hand raised more than 35 percent of GDP in taxation, while Zambia raised close to 16 percent of GDP. The difference between Zambia and Belarus is similar to that between the two democracies of Chile and Canada. The plots exemplifies the large differences in taxation within authoritarian regimes.

Figure 3.1 clearly shows that authoritarian regimes differ when it comes to their fiscal policies. A second predominant expectation in political economy is that regime change leads to higher levels of redistribution (Acemoglu and Robinson, 2001; Boix, 2003; Acemoglu and Robinson, 2006). Yet, again, the empirical support for redistributive models of regime change is rather weak (e.g. Ansell and Samuels, 2010; Ahlquist and Wibbels, 2012; Haggard and Kaufmann, 2012). This is also exemplified in Figure 3.2, which shows how total levels of taxation vary in the year before and
after regime changes to democracy. Based on the A & R and Boix model one ought to see increases in taxation after regime changes, this, however, does not appear in the data.

What can explain the lack evidence in regard to redistributive theories of regime change? And, why do some authoritarian regimes develop tax capacity while others do not? This paper seeks to make a number of contributions. First, I aim to provide a theoretical argument explaining the variation in total taxation and fiscal capacity across authoritarian regimes that is shown in Figure 3.1. Secondly, the short run stability of fiscal capacity and path dependency makes investments under authoritarian governments even more consequential for authoritarian elites. I argue that low fiscal capacity can be used by authoritarian elites to constrain future redistributions. The paper provides a possible explanation for fiscal capacity development that is
Figure 3.2: The plot shows the distribution of observations for total tax revenue as the percentage of GDP just before and after regime changes. Based on redistributive models of regime change, one would expect an increase in taxation after the regime transition. This effect is not visible in the data.

consistent with the median voter and the Meltzer and Richard (1981) models and the null finding in regards to regime change and its effect on taxation. Namely, if inequality inhibits the development of fiscal capacity in autocracies, it will negatively affect taxation and redistribution in subsequent regimes.

In a similar vein, a number of scholars have examined the ability of authoritarian elites to constrain redistribution in future regimes via institutional design (e.g Ardanaz and Scartascini, 2013; Albertus and Menaldo, 2013). Acemoglu, Ticchi and Vindigni (2011) develop a theoretical model showing that inefficient states may persist as a mechanism to protect autocratic elites from future redistribution. Albertus and Menaldo (2013) argue that they do so by influencing the constitutions of nascent democracies. As I argue here, the ability of authoritarian leaders to limit fiscal capacity and thus constrain taxation and redistribution in future democratic regimes
could offer another potential explanation for these mixed findings. However, it is important that we first understand the determinants of capacity investments under authoritarian regimes.

3.2.3 A Theory of Fiscal Capacity Development

Consider a society comprised of citizens and an autocratic elite, similar to the Acemoglu and Robinson (2006) model. The autocratic elite can utilize taxation to finance government spending and maximize their own post-tax income. Most importantly, the level of fiscal capacity of the state is endogenous. The autocratic elite can decide to develop fiscal capacity or not. I argue that the decision to invest is driven by two factors: the level of inequality and the elite’s demand for government spending. Depending on the structure of the economy, higher government spending can increase the elite’s post-tax income. When government investment is complementary to the capital owned by the elite, higher taxes can increase their post-tax income. As the desired equilibrium level of government spending increases, higher levels of capacity become necessary for two reasons: 1) to increase the maximum level of revenue attainable, 2) to decrease the cost associated with taxation at any given level. Thus as the preferred level of taxation increases, the contemporaneous costs associated with low capacity become more important to authoritarian elites.

As inequality increases, future costs associated with high capacity rise. For any authoritarian regime, a positive probability exists that regime change will occur. Under democracy, the citizens gain access to power and set a level of taxation and redistribution. As in Boix (2003) and Acemoglu and Robinson (2006), all else equal, the demand for redistribution and taxation under democracy increases with higher inequality.\footnote{The assumptions are in large part based on the median voter model going back to Romer (1975) and Meltzer and Richard (1981), which were at least in part based on Black (1948) and Downs (1957).} I argue that fiscal capacity in the newly democratic system is depen-
dent upon earlier levels of fiscal capacity investments and is thus determined by the
decision making of the autocratic elite.

The path dependency of fiscal capacity introduces a powerful trade off for auto-
ocratic elites between raising the efficiency of tax collection for their own economic
benefit and enabling more redistribution in the future, should they lose power. Once
the state is provided with the ability to raise revenue efficiently, this power can be
used against the autocratic elite in case of a regime change or loss of power. As laid
out above, when a transition to democracy occurs, the equilibrium level of redistri-
bution is influenced by contemporaneous levels of fiscal capacity. With high levels of
inequality, the autocratic elite has to fear that the power of the state will be used to
engage in redistribution should it come to a regime transition. On the other hand,
when inequality and the threat of democratization are low, all else equal, the risk
and cost associated with increasing tax capacity are lower.

An important assumption within this argument is that the fiscal capacity levels
developed under authoritarian regimes have long term effects on fiscal policies in
subsequent regimes. This is for two reasons. First, fiscal capacity is constant in
the short term and requires long term investments by states (Besley and Persson,
2011). For example, bureaucrats need to be selected and trained and this is only
possible if the supply of educated, potential employees is high enough. Second, an
accountability structure within the bureaucracy has to be developed. A certain level
of compliance and trust in the institution of tax collection must be in place (Levi,
1989). Importantly, I contend that it is harder to increase fiscal capacity in highly
unequal and young democracies. The reason is that when capacity is very low, tax
evasion is easier and associated with lower risks. When the most wealthy have an
interest in raising the capacity of the state and prefer government spending, it is likely
that their level of tax compliance will be comparatively high. On the other hand,
consider a young democracy with high redistributive pressures. Here, the wealthy
elites have little incentive to voluntarily comply with tax laws and may actively fight any increases in capacity.

The ability of the state to raise taxes and redistribute in young democracies is thus partially determined by the decisions of autocratic leaders in previous regimes. All else equal, low fiscal capacity leads to lower levels of de facto revenue from taxation and thus redistribution. Consider a democratic regime with an elected left party government, which has a preference for tax revenue of level $R$. This preferred level of taxation $R$, however, can only be realized under high levels of fiscal capacity. There are at least three reasons for why low fiscal capacity constrains redistribution. First, low levels of capacity limit the fiscal instruments available to governments. The most broad-based sources of revenue require high levels of capacity. When the state is weak, governments must rely on revenue sources with narrow tax bases and often, high distortionary effects. Secondly, low levels of capacity increase the cost associated with taxation, which will induce political leaders to set lower levels of taxation/redistribution than they would otherwise prefer (Gould and Baker, 2002). More specifically, the marginal cost associated with every dollar of collected revenue increases with lower fiscal capacity. This decreases the benefit of taxation and increases opposition (Becker, 1985; Becker and Mulligan, 2003). Third, low fiscal capacity has a negative effect on the realized level of revenue, holding policy choices constant. In countries with little tax capacity, the state is much less able to enforce the tax policies chosen by the political elite. The level of tax evasion is higher and the gap between realized revenue and de jure tax policy increases.\(^3\)

Thus, by making a decision about whether or not to invest in the fiscal capacity of the state, authoritarian elites more or less constrain redistribution in future democratic regimes. When inequality is high, all else equal, autocrats prefer low levels of

\(^3\) These effects are amplified by the fact that the most redistributive forms of taxation, i.e. income and capital taxation are especially hard to enforce and demand high levels of capacity to be successful.
fiscal capacity to guard themselves against future redistribution.

On the other hand, as I have shown above, considerable variation exists when it comes to taxation within authoritarian regimes. I contend that raising fiscal capacity can be in the interest of the autocratic elite when the benefit of government spending is high enough. When it is in the interest of autocratic elites to increase government spending and taxation, raising the fiscal capacity of the state can be preferred. Decreasing the cost of taxation today, can outweigh any possible future costs of redistribution. I argue that the autocratic elite can benefit economically from government spending, depending on the characteristics of the economy and the type of capital they own. When capital is conducive to investments in public goods and services, such as education or infrastructure spending, the autocratic elite is interested in utilizing tax revenue to undertake these investments. As the preferred level of government spending of the elite increases, the costs associated with low levels of fiscal capacity become more pronounced. Thus the contemporaneous gains from investments in capacity can outweigh possible future costs.

For example, when autocratic elites are large landowners and are mainly engaged in the production of agricultural goods and raw exports, elites gain little from government investments in public services such as health, education, and infrastructure. In these sectors, workers are largely exchangeable and there is little motivation for elites to improve their skills or health. On the other hand, in countries with few natural resources, where autocratic elites pursue economic activities that are capital intensive and require skilled labor, government investments in health and education have a positive effect on the return to private investment for the autocratic elites. As the return to manufacturing and other capital intensive economic activities increases for autocratic elites, utilizing government spending becomes more beneficial. Similarly, manufacturing industries are likely to require more investments in infrastructure, such as electricity grids. At the same time both manufacturing as well as
agricultural or natural resource dependent economies require investment in transportation infrastructure, such as ports, roads, and airports. However, compared to education, public health, or electricity grids, these costs are rather small and less frequent.

Depending on the economic activities authoritarian elites are engaged in, government spending can directly increase their income and serve as a multiplier to their own private investments. First, externalities associated with efficient public service provision increase the income of all members of society, e.g., investments in public education have wealth effects through externalities. For example, Bourguignon and Verdier (2000) argue that the externalities associated with education can lead to oligarchic elites sponsoring the education of the poor and can even outweigh the costs associated with democratization.4 When increases in educational levels of individuals exhibit positive externalities, investments in human capital can be especially beneficial for economic growth (Lucas Jr., 1988). And indeed, education has been shown to be one of the most robust determinants of economic development (Barro, 2001; Barro and Sala-i Martin, 2004; Sala-i Martin, Doppelhofer and Miller, 2004).

Keeping the example of education, under standard assumptions, if workers are paid their marginal product, productivity gains do not necessarily increase the return to capital. Yet more realistically, the gains of increasing productivity are more distributed in favor of capital owners. For example, the massive gains in workforce productivity in the US during the 20th century were reaped mostly by capital owners, not workers (Goldin and Katz, 1998). This distributional disadvantage is likely to be even stronger in highly unequal and undemocratic settings. However, if workers gain higher wages in association with higher productivity, as long as the productivity gains also increase the return to capital, government investment remains beneficial.

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4 Education of the poor is automatically associated with enfranchisement in their model. Thus education provided to the poor increases the share of political elites (Bourguignon and Verdier, 2000).
to the elite. Depending on the distribution of gains from productivity, increased
government investment could therefore reduce income inequality. This is in line with
the theoretical argument made by Galor and Moav (2006), who state that the in-
creased complimentarily of physical and human capital led to the expansion of public
education and the weakening of class structures in Europe after industrialization. In-
herent in their argument and here as well, is that the elite is concerned with their
absolute income levels and does not oppose relative gains by the poor citizenry. The
argument rests on the idea that the elite does not oppose lower inequality in its own
right, instead they worry about a possibility of regime change and redistribution,
which would results in lower absolute incomes.

Barro (1990) shows formally how government spending can aid a country’s eco-
nomic growth via effects on the production function. Similarly, it can have a positive
effect on the production functions of individuals. As Barro (1990, 121) points out,
the productivity effect of public service provision can differ across countries for rea-
sons that include “geography, the share of agricultural production, urban density,
and so on.” Similarly, following endogenous growth models, scholars have worked to
understand how specific kinds of government spending can increase economic growth
and positively affect production functions (Romer, 1989; Barro, 1990, 1991; Easterly
and Rebelo, 1993). I argue that depending on the kind of capital owned by the
autocratic elite, government spending can enhance their private incomes by working
as a multiplier in the production function.

The economic characteristics of countries will affect the kind of production elites
are engaged in and how much economic elites benefit from government spending.
Where natural resources are abundant and land is suitable to the production of
cash crops, elites own capital that requires comparatively little investment. For
example, the owners of mining operations and natural resource extraction do not
benefit greatly from the provision of public education and are likely to oppose such
spending by the government. On the other hand, where elites pursue economic strategies that require higher levels of human capital (i.e. skilled labor), utilizing government spending to educate citizens is highly beneficial and complementary to elite private investments. The same is true for public health. Where workers are easily substitutable and abundant, individual workers’ health is less important to capital owners.

The use of tax revenue and government spending for these investments is valued over private investments for several reasons. First, these goods are likely to be similar to public goods in the sense that the private investment of one elite member can be utilized by others. Thus free riding could become an issue should they be privately financed (Olson, 1971). For example, if one factory owner privately educates his workers, nothing prevents other firms from poaching the newly educated - the classic free rider problem. Government spending can thus work similar to a commitment device for authoritarian elites. Secondly, the production of many of these goods are likely to exhibit economies of scale and thus the marginal cost of provision decreases when spending is a coordinated effort through the government. Furthermore, especially in regard to education, private credit constraints are likely to keep poor citizens from financing their own education (Bourguignon and Verdier, 2000; Galor and Moav, 2006). In contrast, the economies of scale and free riding problem are less significant when it comes to transportation infrastructure, making private financing easier. Investments in transportation, which can increase the return to capital across most trading economies, thus motivates less investment in capacity.

To summarize, when the personal benefit to public spending increases, authoritarian elites have incentives to raise revenue to invest in public services and infrastructure. Yet, as the demand for government spending increases, fiscal capacity becomes more important. As the level of spending preferred by the autocratic elite rises, the incentives to raise the tax capacity of the state increase. At the same time,
when inequality is high, the threat of redistribution in the future is large and possible costs associated with investments in fiscal capacity rise. From the theoretical argument, one can then derive the following hypotheses:

**Hypothesis 1a:** Fiscal capacity investments in authoritarian states decrease with increasing inequality.

**Hypothesis 1b:** Higher benefits of government spending to the autocratic elite warrant higher fiscal capacity in authoritarian states

### 3.3 Measuring Fiscal Capacity & Data

As explained above, fiscal capacity is the ability of states to efficiently raise revenue. It determines whether the state has the administrative power to collect and enforce broad-based taxes, such as progressive income taxes. When tax capacity is low, governments are forced to rely on revenue sources that are easier to access, such as customs, tariffs, and fees. However, no measure of true fiscal capacity exists, mainly because it is hard to empirically distinguish the ability to tax from tax effort. Here, I propose the use of the share of tax revenue that does not come from trade taxation as a measure fiscal capacity. The idea behind this measure is the following. The more countries have to rely on trade taxation for tax revenue, the lower is their fiscal capacity. Thus the share of trade tax revenue to total revenue is an inverse measure of fiscal capacity. As a positive measure of fiscal capacity, I therefore use one minus the share of trade tax revenue to total tax revenue. In this section, I shortly discuss this new measure of fiscal capacity and some evidence in favor of its validity.

A commonly used measure of capacity is total taxes raised as the percentage of GDP (e.g. Cheibub, 1998; Fauvelle-Aymar, 1999). However, using the ratio of total taxes to GDP as a measure of fiscal capacity is highly problematic as it conflates ca-
pacity and policy choices. While high levels of taxation necessitate high capacity, low levels of revenue could be caused by low capacity or the policy choice of governments.

A low tax to GDP ratio is a necessary but not sufficient condition for low fiscal capacity. Consider the case of Singapore, a country with high capacity but a tax to GDP ratio of 15.3% in 2000, which is quite low by international comparison. Similarly, government tax revenue as percentage of GDP in the United States in 2000 was 29.9%, compared to Gabon with 33.2% and Zimbabwe with 25%, two countries with low capacity. Trade taxes as the share of tax revenue, on the other hand, were 10.9% and 10.4% in Gabon and Zimbabwe respectively, while only 0.7% in the United States (All data from the World Bank (2014)).

However, the ability of the state to collect tax revenues should certainly impact the strategies governments employ in raising revenue. As Hendrix (2010) and others have pointed out, the ability to raise taxes depends fundamentally on the tax source. Generally, taxes on income, property, and capital gains demand high levels of administrative and fiscal capacity. Thus one might suggest the share of income taxes as an appropriate measure for fiscal capacity. However, while income taxes may require the highest level of capacity to be enforced, their use today is much more affected by political choices. Historically income taxes were the main source of broad-based taxation, however today value added taxes (VATs) and other consumption taxes are often used to raise the majority of revenue. Consequently, the share of income taxes in the tax mix declined, even where efficiency is high. Thus, while high revenue from income taxes can indicate high capacity, a low income tax share is not necessarily indicative of low capacity.\(^5\)

On the other hand, taxes on trade are usually regarded as the easiest taxes to collect, since countries can focus their tax collection on points of entry and exit. As

\(^5\) See for example Ganghof (2006\textit{b},\textit{a}) and Beramendi and Rueda (2007) for work on tax mixes and the income tax in OECD countries.
Fjeldstadt and Moore (2008, 243) write: “where effective ‘tax handles’ are relatively scarce, governments find it easier to raise revenue by concentrating their tax collector on customs posts at their border.” Similarly, traded goods are easier to assess than income. And while Baunsgaard and Keen (2010) find that trade liberalization has led to a decrease in trade taxation around the world, in many fiscally weak countries, the lower revenue has not been made up via other domestic tax sources. Rather, the share of trade taxes to total tax revenue stayed relatively constant. This points to the fact that states with low fiscal capacity were unable to increase revenue through taxation of other means. The inability to replace trade taxes in these cases, lends confidence to the validity of trade taxes as share of total tax revenue as an inverse measure of fiscal capacity.

In addition, using trade tax revenue as a proxy for fiscal capacity is preferable over the ratio of income tax revenue to total tax revenue, since it is more isolated from political choices. Both the ratio of income tax revenue to total tax revenue and total tax revenue as percentage of GDP are problematic measures of fiscal capacity. While high levels indicate high capacity, low scores on these measures could be governmental choice and do not necessarily reflect low capacity. On the other hand, there are comparatively fewer political reasons for governments to increase trade vs. other taxes, as they have narrow bases and are generally quite inefficient. I thus expect the revenue from trade taxes to be inversely related to fiscal capacity.

As a robustness check, I also estimate all empirical models with an alternative measure of fiscal capacity. As Morrison (2009) argues, high non-tax revenues decrease incentives for governments to build tax capacity and can thus serve as an indicator of low capacity. However, low non-tax revenues do not necessarily indicate high capacity. This is because non-tax revenues are often dependent on exogenous factors, such as natural resources or aid. I thus create an alternative, measure of fiscal capacity that is one minus the ratio of non-tax and trade tax revenue to total tax revenue.
A common measure of administrative capacity that is discussed by Hendrix (2010), is the International Country Risk Guides’ measure of bureaucratic quality. The variable ranges from 0 to 4, with increasing values indicating higher quality of bureaucracy, i.e. higher administrative capacity.\(^6\)

Figure 3.3 can lend some confidence to using trade tax revenue as share of total tax revenue as an inverse measure of fiscal capacity. The first plot (left) shows the expected positive correlation between the measure of fiscal capacity based on trade taxes and the bureaucratic quality measure. As one can see in the box plot, countries with high bureaucratic quality also exhibit high levels of fiscal capacity on the proposed measure. There are two particular outliers in the plot, Gambia and the Bahamas. Both countries are very small and rely highly on trade or tourism for revenue. Overall, the plot lends confidence to the proposed measure. The right plot shows the relationship between fiscal capacity and the share of revenue from taxes on income and profit (excluding resource taxes). One can clearly see the expected positive relationship, but for high levels of capacity the level of taxes on income and profit vary. This indicates the political choice in high capacity countries on whether to rely on income taxes or not. All data here are averaged for the years 2000–2005 and revenue data comes from the *International Center for Tax and Development* (Wilson, Cobham and Goodall, 2014).

\(^6\) This measure is created by the ICRG staff based on a subjective analysis of available information. The bureaucratic quality measure is an attempt to measure whether “the bureaucracy has the strength and expertise to govern without drastic changes in policy or interruptions in government services. In [...] low-risk countries, the bureaucracy tends to be somewhat autonomous from political pressure and to have an established mechanism for recruitment and training”. (The PRS Group, 2012).
Figure 3.3: The left plot shows the relationship between the proposed measure of fiscal capacity and a measure of bureaucratic quality. Countries with high bureaucratic quality also exhibit high levels of fiscal capacity on the proposed measure. There are two particular outliers in the plot, Gambia and the Bahamas. Both countries are very small and rely highly on trade or tourism for revenue. Overall, the plot lends confidence to the proposed measure. The right plot shows the relationship between fiscal capacity and the share of revenue from taxes on income and profit (excluding resource taxes). One can clearly see the expected positive relationship, but for high levels of capacity the level of taxes on income and profit vary. This indicates the political choice in high capacity countries on whether to rely on income taxes or not. All data here are averaged for the years 2000–2005 and revenue data comes from the International Center for Tax and Development (Wilson, Cobham and Goodall, 2014).

3.3.1 Data

A large issue with investigating the outlined theoretical argument is the sparsity of data when it comes to government revenue for non-OECD countries. This is especially the case for authoritarian countries, where even less data are available. To overcome this issue, I use a newly created dataset on tax revenues around the world, the ICTD: Government Revenue Dataset. These data were collected by Wilson,
Cobham and Goodall (2014) at the International Centre for Tax and Development, who combined information from a number of different sources, including but not limited to the IMF Government Finance Statistics (GFS), the World Bank, CEPAL, OECD, and IMF Country Reports. The data are superior to other existing data sets for three particular reasons. First, the authors ensured the comparability of the revenue data before combining observations from different sources. Second, one of the main objectives of the dataset creation was to distinguish between resource revenue and non-resource revenue. This is especially important for this project, as fiscal capacity is fundamental to raising revenues from taxation, but not from natural resources. Prior datasets often entailed at least some part of the resource revenue within tax revenue figures (Wilson, Cobham and Goodall, 2014, 13f.). Third, this new dataset has, to my knowledge, the largest coverage across space and time to date.\footnote{In addition, I check the robustness of the results using data on on trade tax revenue and total tax revenue as share of GDP by Cage and Gadenne (2014) to create my preferred measure of fiscal capacity. However, this dataset is based on similar but more limited sources than the ICTD data.}

The sample of authoritarian country years is selected by relying on a new comprehensive dataset of regime type coded by Boix, Miller and Rosato (2013). Autocracies are defined as all regimes that are non-democratic.\footnote{Specifically, Boix, Miller and Rosato (2013, 9) define democracy as the following:

- “The executive is directly or indirectly elected in popular elections and is responsible either directly to voters or to a legislature.”
- “The legislature (or the executive if elected directly) is chosen in free and fair elections.”
- “A majority of adult men has the right to vote.”} General results include only the longest autocratic period for each country, to ensure that results are not driven by changes in intermittent democratic periods. As a robustness check I also estimated the standard models when all authoritarian periods for each country were included.

The main independent variables of interest are inequality and the benefit of government spending to the autocratic elite. To measure inequality, I rely on data from...
the *Standardized World Income Inequality Data* (SWIID) assembled by Solt (2009). Inequality measures are rarely comparable across space and time. For example, they may be based on different definitions of income or different units of analysis (e.g. gross vs. net income and household vs. individual level) (Solt, 2009, 233). Starting with the World Income Inequality Database (WIID) (UNU WIDER, 2008) as the basis, Solt combines data from a variety of sources but creates comparable measures of pre- and post-tax gini. In this paper, I use Solt’s data on market inequality.

Importantly, in addition to increasing the comparability of inequality measurements, Solt also provides uncertainty estimates for each inequality observation. However, these estimates are generally ignored in much of the research using the SWIID data and only mean estimates are used. An additional contribution of this paper is that I explicitly use all the information in the data provided by Solt, including the uncertainty around inequality estimates. Instead of only taking the mean estimate of inequality, the results presented in Section 4.5.2 below are based on all available observations and thus account for the uncertainty in the inequality data.

As I argue above, government spending is more profitable to the elite when investments in skill formation, health, and infrastructure have positive effects on the return to capital. To proxy for the propensity of elites to invest in government spending, I utilize a measure of industrial development that is widely available: manufacturing value added as a percentage of GDP. The idea is that the higher the manufacturing output, the more likely capital owned by the elites is conducive to public investment. This measure is taken from the World Bank (2014). Additionally, the time series

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9 The complete approach with which Solt created the SWIID data is described in detail in Solt (2009).

10 Solt (2009) has been cited over 320 times according to Google Scholar. A cursory look at recent articles citing Solt (2009) and published in top political science journals shows that the uncertainty around inequality estimates is usually not included in estimation or even discussed (Fox and Hoelscher, 2012; Ardanaz and Scartascini, 2013; Morgan and Kelly, 2013; Krieckhaus et al., 2014, e.g.).
cross-sectional models are also estimated using gross fixed capital formation as the proxy for the type of elite capital.

To account for confounding factors, I include several control variables in the empirical models. First and foremost, I include a measure of trade as the share of GDP. This is important as it likely affects trade tax revenue and is also correlated with the economic characteristics in a given country. Second, all models include the log of GDP per capita to account for the effect of economic development on the capacity of the state to raise taxes. As additional controls in the general models, I include a measure for the level of foreign aid provided as a share of gross national income (GNI). This is included, since external revenue can decrease the incentive of government leaders to raise revenue via taxation (Remmer, 2004). Another alternative source of income for governments that can serve as a substitute to tax revenue is the return to natural resource extraction, such as oil and gas. I therefore include a measure of the per capita value of oil and gas extracted in a given country per year. The data on aid is taken from the World Bank (2014), while data on oil and gas resources come from Ross (2011).

Additionally, models in section 4.5.2 I include a measure for the occurrence of external conflict. The conflict variable is taken from the Quality of Government dataset (Teorell et al., 2013) but originally stems from the *UCDP/PRIØ Armed Conflict Dataset* (Gleditsch et al., 2002). As explained above, one of the most common arguments about the development of state and fiscal capacity is that the threat of external war leads governments to make investments in the strength of the state (Tilly, 1990; Besley and Persson, 2008, 2011; Dincecco and Prado, 2012). Furthermore, war may affect inequality levels due to the destruction of assets. As an imperfect measure of this threat, I therefore add a control for the occurrence of external conflict. Lastly, governments can resort to repression to lower the threat of regime change when inequality is high, which may impact their decision to invest in fiscal capacity.
Further, increasing the capacity to raise revenue may be associated with higher ability to repress. In an attempt to control for repression, I include the political terror scale variable based on State Department data. These data are published by Gibney et al. (2014).

3.4 Evidence from Cross-Sectional Data

Before delving into the time-series cross-sectional data analysis, I here show some cross-sectional plots and regressions. The cross-sectional regressions can give a first sense of the relationship in the data. Moreover, the simple OLS model requires fewer assumptions about the data.

Figure 3.4 shows regression results from a simple cross-sectional regression of autocracies for 2004. The dependent variable here is the preferred measure of fiscal capacity, i.e. one minus the share of total tax revenue that comes from trade taxation. All independent variables are lagged by one year. To provide an initial idea about the relationship in the data, I do not impute missing values for the cross-sectional analysis. The results provide some initial support for the theoretical argument. Moreover, it is easier to detect potential influential cases in the cross-sectional data.\textsuperscript{11}

Due to missing data, the number of observations in the OLS regressions are very small and change from year to year. While the significance of results varies from year to year, not surprising given the small and changing samples, the overall results are very consistent.

The main independent variables of interest are inequality and the proxy for economic characteristics, here, manufacturing value added. As controls in this simple model I only include a measure of logged GDP per capita and the level of trade as share of GDP. The top plot shows the coefficient estimates and the 95% confidence

\textsuperscript{11} The regressions and plots in this section are based on the non-imputed dataset and do not include the uncertainty of the inequality data.
intervals (intercept not shown). As expected, income is associated with higher fiscal capacity, however the coefficient is not precisely estimated. Inequality is negatively, while value added in the manufacturing sector is positively associated with fiscal capacity. While both the 90% and 95% confidence intervals for inequality include zero, those for manufacturing value added do not. The coefficient associated with inequality is small, however, the estimated effect is substantial. The marginal effect of inequality, holding all else equal at the median value, is shown in the bottom, left plot of Figure 3.4. The marginal effect for changing values of manufacturing value added is shown in the bottom, right plot. As a first cut this shows some support for the argument made above, however the dynamic models below should give a better picture of the true relationship. Given that these plots only represent the regression results for one particular year, Table B.1 in the Appendix shows the same regression results for 1990, as well as all the years 2000 through 2005. As one can see, both variables of interest are generally in the expected direction and close to significance at conventional levels.

Table B.2 in the Appendix displays the results when additional controls for foreign aid and oil and gas extraction are added to the regressions. Across a majority of the models the coefficients of interest are generally in the expected direction, however not necessarily precisely estimated. Inequality is negatively associated with fiscal capacity, while manufacturing added value is consistently positively associated with fiscal capacity. It is important to note, that due to missing data the cross-sectional sample changes between the different years, thus consistent results, even if not statistically significant, provide additional confidence. As an additional robustness check, B.3 in the Appendix shows the results for equivalent models when the alternative measure of fiscal capacity is used (one minus the share of trade tax and resource revenue over total tax revenue). The results are essentially equivalent, showing a negative association with inequality and a positive association with manufacturing
Figure 3.4: The top plot shows coefficient estimates, 90% and 95% confidence intervals for the cross-sectional regression for the year 2004. The coefficients for both inequality and manufacturing value added are in the expected direction, yet only the coefficient for manufacturing value added is significant at the 5% level. The marginal effects are substantively meaningful and shown in the bottom left (inequality) and right most plot (manufacturing value added).
value added.

3.5 TSCS Modeling Approach

After taking a first look at the static, cross-sectional relationship over a range of years, I now estimate a number of different dynamic models. Based on the full data from 1980 to 2007, these estimations allow for a better understanding of the inherent relationships in the data. The sample of countries is listed in Table B.4 in the Appendix. The data available is an unbalanced time-series cross-sectional (tscs) sample, which are common in political science research, especially in comparative politics. As such, several choices have to be made in regard to the empirical strategy. Two issues complicate matters in this particular case. First, given the theoretical argument, I limit the sample to authoritarian country years. Secondly, as explained above, fiscal capacity develops in the long run and the investment process is happening slowly. Thus, given hypotheses 1) and 2) outlined above, the main quantities of interest are the long term effects of inequality and of manufacturing value added on fiscal capacity.

The stationary OLS model of the general form $Y_{i,t} = \alpha_0 1 + \beta X_{i,t} + \epsilon$ is not useful in this case, as it does not allow for dynamic or long run effects. Instead, I follow Bell and Jones (2014) and estimate a random effects model while separating between and within country effects for covariates of interest. The probably most commonly used model for tscs data in political science and economics is the standard fixed effects model. Given the research question and theoretical argument laid out above, however, the fixed effects model is inappropriate, since it only estimates within country effects. In the context of fiscal capacity development, I expect differences between countries to be important determinants of the dependent variable. Moreover, changes in inequality are relatively small within countries over time and measurement error is likely to be a larger problem for within country estimates.
Based originally on Mundlak (1978), Bell and Jones (2014) suggest the estimation of a hierarchical model with one additional term for each time-varying variable: its country specific mean. In particular, the standard multilevel random effects model is of the form:

\[ Y_{i,t} = \beta_{0,i} + \beta_1 X_{i,t} + \epsilon_{i,t}, \]  

(3.1)

where the country specific random effect can be modeled as a function of country level variables:

\[ \beta_{0,i} = \beta_0 + \beta_2 Z_i + u_i, \]  

(3.2)

Here \( Z_i \) is a vector of country specific variables (Gelman and Hill, 2008). Bell and Jones (2014) suggest adding the country level mean for time varying variables to the estimation of the country specific intercept (equation 3.2). Adding the country specific means and combining equations 3.1 and 3.2 results in the following specification:

\[ Y_{i,t} = \beta_0 + \beta_2 Z_i + \beta_3 \bar{x}_i + \beta_1 X_{i,t} + (u_i + \epsilon_{i,t}), \]  

(3.3)

In equation 3.3 \( \beta_3 \) can be substituted as the difference between the “within” and “between” effect of time-varying variables, i.e. \( \beta_3 \) can be replaced by \( \beta_4 - \beta_1 \). The resulting equation can then be rearranged to explicitly model the within and between effect of time-varying variables:

\[ Y_{i,t} = \beta_0 + \beta_2 Z_i + \beta_4 \bar{x}_i + \beta_1 (X_{i,t} - \bar{x}_i) + (u_i + \epsilon_{i,t}), \]  

(3.4)

In this final specification, \( \beta_4 \) is the coefficient on the effect caused by between country differences, while \( \beta_1 \) is the effect caused by within country differences. In addition, the residuals are assumed to be normally distributed:

\[ u_i \sim N(0, \sigma_u^2) \]

\[ \epsilon_{i,t} \sim N(0, \sigma_e^2) \]  

(3.5)
Specifically, I estimate the model shown in equation 3.4 as a Bayesian hierarchical model with country specific intercepts using WinBugs. All regression coefficients are estimated using diffuse Gaussian priors, while the variance hyper parameters have Gamma (0.1,0.1) priors (Gelman and Hill, 2008). To speed up convergence the data is scaled prior to estimation.

A common concern with large time-series cross-sectional data is the issue of missing observations, which generally cannot be expected to be missing at random. Even with carefully collected data as done by Wilson, Cobham and Goodall (2014) and Solt (2009), some observations remain missing across variables. It has been shown that list-wise deletion can lead to biased estimates and standard errors (Graham, 2009). This may be especially true when it comes to data from authoritarian regimes, where membership in international organizations may be correlated with data availability and important independent variables (Ross, 2006). One of the advantages of the Bayesian estimation is that missing observations can be imputed within the model and uncertainty from the imputation is inherently modeled.\textsuperscript{12}

To estimate the long term effect, all data are averaged over five year intervals between 1980 and 2007, resulting in 6 time periods, all time-varying variables are lagged by one period. The model is estimated via MCMC in WinBUGS. I run 3 chains with 260,000 iterations, while the first 90,000 iterations are discarded as burnin. In addition, only every 50th iteration is saved, resulting in 3400 final draws for each chain. I inspect convergence using Gelman-Rubin statistics (Gelman and Hill, 2008), as well as through visual inspection of traceplots and autocorrelation plots. Figure 3.5 a) shows one example of the densities for each of the three chains for one coefficient estimate (between country effect of GDP per capita). The plot on the right shows the autocorrelation for draws from the first chain of that particular

\textsuperscript{12} In an attempt to limit the missingness in the data frame prior to imputation, I restrict the sample to 1980 to 2007 and those observations included in Boix, Miller and Rosato (2013). I also include only those countries that have at least one observation on the measure of fiscal capacity.
estimate, while the bottom plot shows the trace of the MCMC draws. In general all models converged quickly.

3.5.1 TSCS Results

Based on the hierarchical Bayesian model, the results can be assessed using highest posterior density (HPD) intervals, which are comparable to confidence intervals in the frequentist setting. Note that the data is standardized prior to estimation to speed up convergence. The sample mean for each variable is therefore zero. Figure 3.6 shows the coefficient estimates as well as the 95% HPD interval (thin lines) and 90% HPD interval (thick lines). The main variables of interest are plotted in dark red.

Several results stand out from the estimated model. First, in general the between country effects are stronger for all independent variables. This is even more significant, since the model includes random intercepts for each of the countries, thus accounting for some of the differences between countries. Second, the strongest effects in magnitude are those for the between effect for manufacturing value added (Industrial Between) and the between effect for inequality (Gini Between). As expected, inequality has a negative effect, while manufacturing value added has a strong positive effect. For both variables of interest, the 95% HPD intervals of the between effects do not include zero. On the other hand, the within country effects are essentially indistinguishable from zero.

The between effects for trade and aid both have a negative association with fiscal capacity, which is in line with expectations. Aid may undermine the demand to create independent revenue sources. Since the measure of fiscal capacity is an inverse measure of trade taxation, a negative effect of trade volume on fiscal capacity is to be expected. However, for both variables the 90% and 95% HPD intervals include zero. Oil and gas resources have a slightly negative between country association, while the
Figure 3.5: The top left plot shows one example of the densities for each of the three chains for a coefficient estimate, here for the between country effect of GDP per capita. The plot on the right shows the autocorrelation for draws from the first chain of that particular estimate, while the bottom plot shows the trace of the MCMC draws. Convergence was also assessed using Gelman-Rubin statistics.
Figure 3.6: The plot shows the coefficient estimates and HPD intervals resulting from the Bayesian hierarchical model. For each variable two coefficients are estimated, the between and within country effect. As one can see, between country inequality has a negative association with fiscal capacity. The coefficient is negative and precisely estimated. The between effect of manufacturing value added, on the other hand, is strongly positive.

Within country coefficient is estimated to be positive. For both, however, uncertainty is large and the 90% HPD intervals include zero. Table B.5 in the Appendix shows the exact numerical values for the mean and median estimates for each variable, as well as the 90% and 95% HPD intervals.

Based on the fact that all variables are standardized it is hard to judge the real world impact that is associated with each of the coefficients. To illustrate the estimated effects, I create predicted values of fiscal capacity on the measure’s actual scale for two different scenarios. First, I plot the predicted value of fiscal capacity for the case of South Korea just prior to democratization. I then plot the same case, except that the country mean of inequality is changed from the original South Korean
value (36.06) to that of Cambodia (55.27). The effect of a change in the country mean of inequality from 36.06 to 55.27 on the predicted level of fiscal capacity is plotted on the left in Figure 3.7. The mean predicted level of fiscal capacity decreases from 0.95 to 0.86, a quite substantive effect.

The right plot shows the effect of a change in the country mean of manufacturing value added. Here, I use the sample values for Paraguay in 1995 and then change the country mean manufacturing value added from Paraguay’s value (14.92) to Uruguay’s country mean (26.32). Just based on the difference in manufacturing value added, the increase in predicted value of fiscal capacity is quite substantive, from 0.77 to 0.85. Again, the predicted values of fiscal capacity are plotted on the original scale. Most importantly, the differences in scenarios here are not extreme, much larger differences between countries are observed in the sample. Yet for both examples, the differences are substantively meaningful and important.

In addition to the model specification presented above, the Appendix includes the results for several robustness checks. First, Table B.6 shows the estimation results when missing values are not imputed. While the mean and median estimates are very similar, the HPD intervals are wider, not surprisingly, given the decrease in sample size. Alternatively, Table B.7 in the Appendix shows the results for the same model as above but with the data extended back to 1960. In the original model, the sample is restricted to 1980 because the share of missing data is so large in the period prior to 1980. Even though, the results are very much the same when the sample is extended back to 1960 as seen in Table B.7.

Additionally, the same model is estimated using a different measure of fiscal capacity. Table B.8 shows the results when I use the inverse of non-tax revenue plus trade tax revenue over total tax revenue as the measure of fiscal capacity. Again, the results are very similar. In fact, the coefficients for the between effects of both inequality and manufacturing value added are stronger and the 95% HPD intervals do
Figure 3.7: The left plot shows the predicted level of fiscal capacity when changing the country mean of inequality from the value of South Korea (36.06) to that of Cambodia (55.27). The right plot shows how fiscal capacity increases when one changes the observation of the country mean of manufacturing value added from that of Paraguay (14.92) to Uruguay’s country mean (26.32).

not cover zero. Moreover, the Appendix includes model results when the alternative data on tax revenue is used (Cage and Gadenne, 2014) (Table B.9), an alternative proxy for economic characteristics is used (gross capital formation – Table B.10), and when the sample restricted to non-African countries (Table B.11). Overall, the results are very similar across the different specifications, even if the coefficient estimates are not quite as precise.

Additional TSCS model: Bayesian Error Correction Model

The main parameters of interest in this empirical analysis are the long term effects of inequality and the benefit of the elite from government spending. To estimate long run effects in a time-series-cross-sectional setting, both De Boef and Keele (2008) and Beck and Katz (2011) suggest the use of general auto-distributed lag (ADL) or
error correction (ECM) models. The general ADL with lag length one (ADL (1,1,1)) is of the form:

\[ Y_{i,t} = \alpha_o + \alpha_1 Y_{i,t-k} + \beta_0 X_{i,t} + \beta_1 X_{i,t-1} + \epsilon_{i,t}, \]  

(3.6)

where \( Y_{i,t} \) is the lagged dependent variable and both \( X_{i} \) are independent variables and their one period lags. The lag length can be varied depending on the specific needs of the researcher. The models presented below are equivalent to autoregressive distributed lag models with one lag for each independent and the dependent variable.\(^{13}\) In the ADL model presented in equation 3.6, the coefficients \( \beta_0 \) and \( \beta_1 \) are the short term effects of the independent variables in periods \( t \) and \( t - 1 \) on the dependent variable in period \( t \). The effect of the independent variables in the long term, or the “long-run, dynamic, or total multiplier” (De Boef and Keele, 2008, 186) can be calculated as \( \frac{\beta_0 + \beta_1}{1 - \alpha_1} \).

As De Boef and Keele (2008) show, the ADL presented in equation 3.6, is equivalent to and can be rewritten as a general error correction model (ECM). To do so, subtract the lagged dependent variable from both sides. Then add and subtract \( \beta_0 X_{i,t-1} \) from the right hand side. The resulting error correction model can be seen in equation 3.7.

\[ \Delta Y_{i,t} = \alpha_o + (\alpha_1^*) Y_{i,t-1} + \beta_0^* \Delta X_{i,t} + \beta_1^* X_{i,t-1} + \epsilon_{i,t} \]  

(3.7)

As shown in the calculation to equation 3.7 and De Boef and Keele (2008), the ADL(1,1,1) and the ECM model in this form are mathematically equivalent. One of the advantages of the ECM over the autoregressive distributed lag model is the easy interpretability of coefficients. As shown in Equation 3.7, the coefficient on the lagged dependent variable can be interpreted as the error correction rate or speed of adjustment towards the new equilibrium. The coefficient on the differenced

\(^{13}\) Lag length was chosen based on AIC scores.
independent variables is the immediate short term effect of $X$ on $Y$. Based on the error correction model, the long run effect of an independent variable can be calculated by dividing the coefficient of the lag of that independent variable by the error correction rate i.e $\beta_{1, long} = \frac{\hat{\beta}_{1}^{*}}{\alpha_{1}}$. Neither the ADL nor the ECM give a direct standard error for the long run effect.

One of the advantages of estimating the ECM in a Bayesian setting is that the uncertainty associated with the long run effect is readily available through the draws from the MCMC. Furthermore, as noted above, missing observation can be imputed within the model. I therefore follow Ahlquist and Ansell (2014) and estimate a Bayesian error correction model with random country intercepts on yearly data from 1980 to 2007. Again, the model is estimated in WinBUGS with diffuse Normal priors on the coefficients and Gamma (0.1,0.1) variance hyperparameters. Convergence is assessed using visual inspection and Gelman-Rubin statistics.

The estimated coefficients are shown in Figure 3.8. For each variable three coefficients are plotted with uncertainty bands, the coefficient on the lagged observations, the coefficient on the differenced observations, and the long run effect. Again the main variables of interest are plotted in dark red.

As one can see the long run effects for both variables of interest are in the expected direction. Inequality has a strong negative long run effect on fiscal capacity, however, the 90% HPD interval slightly overlaps with zero. The long run effect of manufacturing value added is positive and quite precisely estimated. Both the 90% and 95% HPD intervals do not include zero. Overall, these results are in line with the findings presented above, showing a positive effect of manufacturing and a negative effect of inequality on fiscal capacity.

In addition, the long run effects of foreign aid and oil and gas resources are both estimated to be negative. This indicates that alternative revenue sources can have
negative effects on fiscal capacity. All short term effects estimated are very close to zero, in line with the idea that fiscal capacity investments take time and can not be changed immediately. Table B.12 in the Appendix presents the mean and median estimate as well as the 90% and 95% HPD intervals in numerical form. As with the Bayesian hierarchical model presented in section 3.5.1, several alternative model specifications were estimated and did not change the results substantively.\footnote{The alternative specification included changes to the sample, the alternative measure for fiscal capacity, alternative data for tax revenue, and an alternative proxy for elite benefit to government spending. The results are not presented here but are available upon request.}
3.6 Robustness Check: Missing Data & Uncertainty

In the models presented above, missing data was imputed within the Bayesian estimation and the associated uncertainty is included in the resulting estimates. In this section, I present additional results where I account for two types of uncertainty associated with the data. Cross-national inequality data suffers from several issues, one being that data are combined from different sources to increase coverage. Often the different observations are not quite comparable across time and space. Solt (2009) attempts to improve the data quality and comparability by combining and adjusting observations from different sources using multilevel modeling. As a consequence, however, the data provided by Solt (2009) is associated with uncertainty.

The uncertainty in the inequality data is often ignored by researchers, which could lead to false inference. The data by Solt (2009) includes an estimate of this uncertainty. He provides 100 values of inequality for each individual observation, which vary according to the underlying uncertainty in the data. For the results presented in this section, I explicitly account for this uncertainty and reestimate both the hierarchical model for within and between effects as well as the error correction model. To do so, I create 100 identical datasets, that only vary with respect to the inequality data, i.e. each dataset includes one of the 100 datasets provided by Solt (2009). As before, each of these datasets still suffers from missing data. The relative quickness of imputation via Gaussian copula methods (see Hollenbach et al. (2014) for details) allows me to impute each of these 100 datasets. For each imputed dataset, I save 100 imputations to account for the uncertainty associated with the imputation. The final results is a list of 10,000 data frames. These 10,000

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15 Essentially Gaussian copulas are used to represent the correlation between the variables and then impute the missing values. This strategy is based on current work with Nils Metternich, Shahryar Minhas, and Michael Ward (2014). For more details see Hoff (2007). The imputation was done using the sbgcop package in R. I impute each dataset 3000 times via MCMC methods using the Gaussian copula. Every sixth dataset of the last 600 imputations is saved, resulting in 100 imputations for each dataset.
datasets vary because of the uncertainty in the inequality data and the missing data imputations.

The results shown below are thus based on 10,000 model estimations, which are combined using Rubin’s rule (1987). The coefficients and standard errors therefore reflect the uncertainty in the inequality measure, as well as that associated with the imputation. The model estimates are combined using the mitools package in R. Additionally, in the models presented here I added several other control variables. I include the same set of controls as above, plus measures repression and the occurrence of external wars. Using the lme4 package in R, I estimate mixed effects models with country random intercepts.

![Coefficient Estimates](image)

**Figure 3.9:** The plot shows the coefficient estimates and confidence intervals resulting from estimating and combining 10,000 random effects models. Overall the results are very similar to the Bayesian estimation above, which did not account for the uncertainty in the inequality data. Most importantly, the between effect of inequality is negative and both the 90 and 95% confidence intervals do not include zero. Second, the coefficient for manufacturing value added is positive and again the 90 and 95% confidence intervals do not cover zero.
Figure 3.9 shows the coefficient estimates as well as the 90 and 95% confidence intervals for the random effects model with between and within country effects. Recall that these results are based on combining 10,000 estimated models to account for the uncertainty resulting from imputation and the inequality data. The results are quite similar to those of the Bayesian random effect model estimated via WinBUGS, the main variables of interest are plotted in dark red. Two results stand out. First, the between country effect of inequality is negative and both the 90 and 95% confidence intervals do not cover zero. Second, manufacturing value added has a positive effect on fiscal capacity, again the 95% confidence interval does not include zero. The between effect of income is large and precisely estimated, while foreign aid still has a negative effect, however, both the 95 and 90% CI cover zero. As in the model estimated above, the within effects are generally very close to zero and not precisely estimated. Repression seems to be associated with somewhat lower capacity but is not significant. Table B.13 in the Appendix displays the coefficient estimates, standard errors, as well as 90 and 95% confidence intervals.

It is important to note, that the coefficient estimates differ significantly from the results presented above, given that the data was not standardized here. However, the change in inequality from the country mean of Korea (36.06) to that of Cambodia (55.27) (same example as above), would be associated with a change in fiscal capacity of −0.097, almost exactly the same effect that was estimated in the Bayesian model above. Similarly, using the second example from above, and changing the manufacturing value added from Paraguay’s value (14.92) to Uruguay’s country mean (26.32) increases fiscal capacity by 0.087, again very similar to the result estimated above. Even when accounting for both sources of uncertainty in the data, and adding additional controls for war and repression, the results are robust and substantively showing a longterm positive association with manufacturing and negative association with inequality.
Lastly, I estimate the error correction model on the 10,000 datasets, also including the additional controls for war and repression. The results for all variables of interest are very similar to the Bayesian error correction model. The mean coefficient estimate for the long term effect of inequality is negative, while that for manufacturing value added is positive. Due to the added uncertainty, the 90 and 95% confidence intervals for both long term effects cover zero. Only the long term effect of logged GDP per capita is positive and significant at conventional levels.16

3.7 Conclusion

Fiscal capacity is of immense importance to countries and their governments. It determines whether states can raise sufficient levels of revenue to fulfill basic functions and provide public goods and services to its citizens. It affects the efficiency of government revenue production as well as spending, and has implications for economic development. Yet, the level of tax capacity varies immensely around the world. Many countries, democracies and authoritarian regimes alike, have highly efficient systems of revenue collection, while others are unable to collect much revenue aside from the simplest forms of taxation, such as customs and tariffs.

In this paper, I outline a theoretical argument for when authoritarian elites have incentives to increase the fiscal capacity of the state. I argue that when inequality is high, autocrats have incentives to curb investments in the revenue raising capacity. They do so in anticipation of higher redistribution in a possible subsequent democratic regime. I contend that fiscal capacity in young democracies is dependent on investments under previous autocratic regimes. The forward-looking autocratic elite takes this into account when determining the optimal level of fiscal capacity. Autocrats must weigh increases in the efficiency in revenue collection under the current regime with increasing the capacity for redistribution after a possible loss of power.

16 Results are not shown here, but are available upon request.
However, depending on the economic activity they are engaged in, public service provision can be of direct benefit to the autocratic elite. When the capital of the elite is complementary to government spending, the contemporaneous benefits of investments in capacity can outweigh the costs associated with a possible regime change. It is then that investments in the revenue raising capacity of the state become optimal.

I attempt to investigate the theoretical argument empirically on a sample of over 90 authoritarian countries and more than 25 years. I utilize data on trade tax and total tax revenue collected by Wilson, Cobham and Goodall (2014) to create a new measure of fiscal capacity: one minus the share of tax revenue that comes from trade taxation. First, I present some suggestive cross-sectional evidence in favor of the argument. In section 3.5.1 I present results from two different time-series cross-sectional model specifications. I show that inequality has negative effects on fiscal capacity in the long run. Furthermore, the manufacturing value added as a percent of GDP, proxying for the elite benefit from government spending, is consistently estimated to be positively associated with fiscal capacity. Thus when inequality is higher, authoritarian elites seem to avoid investments in the tax capacity of the state, as argued in the theoretical section. On the other hand, more industrial societies have higher levels of fiscal capacity. Moreover, as an added robustness check, the results are robust to estimating the models on 10,000 datasets to take into account the uncertainty from data imputation and the inequality data.

Understanding the determinants of fiscal capacity investments has important implications for authoritarian politics and economic development in its own right. In addition, however, I believe it can aid in our understanding of one of the big questions in political science. Many models in political economy have clear expectations that a regime change from autocracy to democracy should lead to increases in redistribution and taxation (Acemoglu and Robinson, 2001; Boix, 2003; Acemoglu and Robinson, 2006), yet this is not borne out in the data (Elis, 2011). Similarly, many
political scientists are still puzzled that one of the most beautiful theoretical models in political economics about the relationship between redistribution and inequality is not supported in the data (Meltzer and Richard, 1981). I believe that differences in fiscal capacity may help us understand why in many cases, redistribution is not related to inequality, even in democracies. If fiscal capacity is endogenous to developments and characteristics under authoritarian regimes, then immediate effects of regime change on redistribution are not necessarily expected. Instead, low levels of fiscal capacity can limit taxation and redistribution in those democracies with high inequality. In short, a better understanding of the development of fiscal capacity under authoritarian regimes will have large implications for autocratic and democratic politics alike. This possible long term effect on democratic politics will be investigated further in future work.
4

Autocracy, Inequality and Tax Capacity: Evidence from 19th Century Prussia

4.1 Introduction

When one finally concludes to undergo an operation \[i.e. \textit{introduction of a tax proportional to income}\] and then demands that it be made by a dull knife, I can only call him a fool. We all confess that we want an income tax, but we are not willing to grant the means whereby it can become an income tax. We are ready to have people pay according to their income, but we refuse to let anyone ascertain what the income is (as quoted in Seligman (1911, 238 f.)).

This statement by an old tax official, Kühne, was made during a debate over the introduction of the income tax in Prussia. It is exemplary of the trouble many developing and even developed countries continue to face today. The functioning of states and the execution of laws and policies is dependent upon the state’s ability to collect revenue. Yet, without fiscal capacity or the ability to assess citizen income, states are unable to raise large sums of money. While Kühne was concerned about
Prussia’s inability to assess the income of its citizens, many countries today continue to suffer from a failure to administer taxes fairly, inefficient tax administrations, and large informal sectors (Clements, Gupta and Inchauste, 2004). On the other hand, despite Kühne’s worry, Prussia turned out to become one of the most successful fiscal states of its time. Similarly, many modern states, democracies and autocracies alike, are highly capable of efficiently collecting taxes.

Based on social conflict models, predominant theoretical work in political economy leads to several hypotheses and assumptions related to this puzzle. First, political elites in authoritarian regimes ought to prefer low levels of taxation and oppose government spending (Acemoglu and Robinson, 2006; Boix, 2003; Bueno De Mesquita et al., 2005). Second, and relatedly, transitions to democracy should lead to increases in redistribution, as the median voter moves to the left in the income distribution (Acemoglu and Robinson, 2001; Boix, 2003; Acemoglu and Robinson, 2006). Yet, these theoretical expectations are not necessarily borne out in empirical reality. Tax revenues in many non-democracies rival those of democratic regimes, with many authoritarian countries having tax to GDP ratios of over 20 percent. On the other hand, some authoritarian countries have tax to GDP ratios of ten percent or even lower. Similarly, the empirical power of redistributive models of regime change have been repeatedly questioned (Ansell and Samuels, 2010; Elis, 2011; Ahlquist and Wibbels, 2012; Haggard and Kaufmann, 2012).

In spite of these large differences on fiscal policies, there is comparatively little research that aims to systematically explain differences in taxation, spending, and fiscal capacity within autocracies. Moreover, the decision of authoritarian elites on whether to raise the tax capacity has far reaching consequences for states and their citizens, even in subsequent democratic regimes. As I argue, in young democracies fiscal capacity is determined by investments in prior regimes. Thus, learning when autocrats invest in tax capacity is paramount to furthering our understanding of
politics in young democracies. In fact, while the empirical support for social conflict models of regime change may be weak, one reason might be our limited knowledge about when autocratic regimes develop fiscal capacity in the first place.

This paper is concerned with the origin of fiscal capacity development. Particularly, I ask the question: Under what circumstances do authoritarian elites invest in the capacity of the state to collect taxes? Much work in political science is concerned with the question of why some societies redistribute more than others (e.g. Lake and Baum, 2001; Brown and Hunter, 2004; Lindert, 2004; Mulligan, Gil and Sala-i Martin, 2004; Ross, 2004; Avelino, Brown and Hunter, 2005; Timmons, 2005, 2010; Elis, 2011; Acemoglu et al., 2013). Yet, our understanding of when states build the fiscal systems necessary for redistribution is much less developed. Fiscal capacity is a necessary condition for the implementation of redistributive and other fiscal policies. Therefore, for political economists to truly gain leverage on questions concerning different fiscal policies, we first need to understand what brings about variations in fiscal capacity.

I use the redistributive models of Boix (2003); Acemoglu and Robinson (2001, 2006) as a starting point to develop an argument about when authoritarian elites have an interest in developing the fiscal capacity of the state and when they have incentives to keep the state weak. I argue that the costs of a possible transition to democracy for autocratic elites increase with rising inequality. Keeping fiscal capacity at low levels is one way to constrain future redistribution.\(^1\) Thus, when inequality is high, elites are likely to prefer low levels of fiscal capacity. On the other hand, when authoritarian elites benefit from government spending, the demand for higher taxation under the current regime creates pressures to increase fiscal capacity.

\(^1\) This idea is similar to work by Acemoglu, Ticchi and Vindigni (2011); Albertus and Menaldo (2013); Ardanaz and Scartascini (2013), who argue that elites can influence institution building in their favor or may work to undermine bureaucratic capacity prior to democratization to avoid higher levels of redistribution.
I contend that when elite-owned capital is conducive to government spending, i.e. government investment raises the return to capital for elites, increasing fiscal capacity can become optimal.

In this paper, I investigate the theoretical argument using a novel set of observations: 19th century Prussian localities. To generate this dataset, I collected information on tax revenues and administrative spending in over 300 Prussian counties in 1903, which I combine with data on inequality and the local propensity for industrial development. These data are particularly well suited for investigating the theoretical argument for several reasons. First, over the time period covered, the Prussian state became one of the most prolific revenue machines in the world. At the same time, it experienced rapid economic change. The speed of industrialization, however, varied across the Prussian geography. Second, by analyzing subnational data I am able to essentially hold constant two competing hypotheses: one being that the threat of war motivates elites to invest in fiscal capacity, the other being that fiscal capacity increases are caused by democratization. Third, the amount of data available is incomparable to other regimes at this time and data quality is of the highest level (Becker et al., 2014). I leverage the variation in inequality and the speed of industrialization across the Prussian geography to investigate my theoretical argument. I show that inequality has a strong negative association with my measure of fiscal capacity and provide evidence that industrial areas had higher levels of tax capacity. To strengthen the results, I estimate instrumental variable models that largely confirm these findings.

The paper proceeds as follows. The first section gives a short overview of the extant literature and explains the theoretical argument in more detail. I then proceed to discuss the research design and the case of Prussia in particular. Section 4.4 describes the data and estimation strategy, which is followed by a description of the results and robustness checks. Lastly, I discuss implications and future research.
4.2 Existing Literature & Theoretical Argument

The ability to tax and raise revenue is one of the most important functions of the state. Without revenue governments are unable to undertake the most basic tasks. Even war making requires the ability to pay for weapons and soldiers. The ability to raise revenue precedes any policy decision made by politicians about spending on public goods or redistribution. Moreover, many countries even today still lack the administrative power to raise large amounts of revenue efficiently. The level of fiscal capacity directly influences the structure of taxation and limits the amount of revenue that states can raise.

Given the immense importance of fiscal capacity for countries’ fiscal and social policies, political scientists must understand the circumstances under which tax capacity is developed. Previous research has emphasized the link between war making, state building, and the expansion of revenue raising capabilities (Tilly, 1990; Moore, 2008; Besley and Persson, 2009, 2011; Dincecco and Prado, 2012). However, often the threat of external war is latent (i.e. unobserved) and in some cases exogenous to countries’ domestic conditions and politics. To a large degree this focus on war marking is driven by the experience of state building in Europe prior to the 20th century (Tilly, 1990). In contrast, Kurtz (2013) argues that for many cases in Latin America the absence or presence of a threat of war can not explain variation in capacity investments. Similarly, the nonexistence of territorial conflict between states can explain some of the lack of capacity development in African states (Herbst, 2000). It is unclear, however, whether it helps us understand the stark variation in capacity development within the African continent. Moreover, recent scholarship has questioned war as the sole driver of state development in Europe (Abramson, 2012). As Kurtz (2013) rightly points out, the theoretical underpinning for when the threat of war does or does not lead to government investments in state and tax capacity is
not exactly specified throughout the scholarly literature. In the argument outlined below, I seek to understand how domestic factors can drive authoritarian elites to invest in fiscal capacity. I then follow other recent work in political economy and utilize the richness of data available about historical Prussia (Ziblatt, 2008, 2009; Becker, Hornung and Wössmann, 2011a; Kopsidis and Wolf, 2012) to investigate the argument.

A second important argument in the literature links changes in fiscal policy to increasing democratic representation or the development of political institutions (North and Weingast, 1989; Moore, 2008; Dincecco, 2011; Karaman and Pamuk, 2013). Yet, in many of these historical cases it is unclear whether the discussed processes are actual cases of increasing representation or rather a change of political elites with different economic interests. Moreover, several states with high fiscal capacity lack any democratic history (such as Singapore). In many of the high-growth Asian developmental states, increases in fiscal capacity preceded democratization and further developments of political freedom (Wade, 1993). Consider, for example, the case of South Korea, which modernized the bureaucracy, strengthened tax administration, and reformed fiscal policies long before a regime change.

As I outline in the introduction, a dominant view in political economy is that autocrats have little interest in increasing government spending and/or taxation (Boix, 2003; Acemoglu and Robinson, 2001, 2006; Bueno De Mesquita et al., 2005). In many formal derivations, the rich political elite in authoritarian regimes prefers private consumption over government spending. Yet, contrary to these theoretical predictions, many authoritarian regimes have high levels of taxation and government spending. For example, Figure 4.1 shows the density of tax as the percentage of GDP for democracies and authoritarian regimes for 2007. One can see that while democracies collect higher taxes on average, a large variation exists within authoritarian regimes.²

² Data on tax as percentage of GDP is taken from the World Development Indicators provided by
A similar pattern can be observed when it comes to government spending or public goods provision, such as years of elementary school education. Moreover, many of the world’s most successful tax systems have their effective origin in authoritarian settings with limited representation and elite dominance. What drives authoritarian elites to expand taxation and invest in the capacity of the state to raise revenue? And, under what circumstances do the elites avoid strengthening the state?

![Figure 4.1](image)

**Figure 4.1:** This plot shows the density in tax as percentage of GDP for democratic and authoritarian regimes in 2007. While democracies have higher taxes on average, the figure clearly shows the large variation in taxation across dictatorships.

Several models developed in political economy lead to the expectation that transitions from authoritarian to democratic regimes ought to be associated with higher levels of taxation and redistribution (Boix, 2003; Acemoglu and Robinson, 2001, 2006). Yet, contrary to this clear theoretical expectation, the empirical results about the motivations behind regime transitions and the economic consequences thereof are

the World Bank (World Bank, 2014). Data on regime type is taken from Boix, Miller and Rosato (2013).
mixed. Following these findings, scholars have started to investigate the ability of former authoritarian elites to curb redistribution even after a regime change. For example, Ardanaz and Scartascini (2013) argue that in countries with higher inequality, legislative malapportionment slowed the use of the income tax after regime transitions to democracy. Similarly, Albertus and Menaldo (2011) show that autocratic elites influence the constitutions of “nascent democratic regimes” in order to inhibit increased redistribution in the new regime. Acemoglu, Ticchi and Vindigni (2011) develop a theoretical model showing how elites may prefer the “persistence of inefficient states” (i.e. low administrative capacity) as a mechanism to protect autocratic elites from future redistribution. Common to these theoretical and empirical papers is the notion that forward looking elites in authoritarian governments make decisions about strengthening state institutions and capacity based on future redistributive threats. In line with these arguments, I present a theory of elite investment in fiscal capacity. I then investigate the theoretical argument based on a specific case, Prussian local counties at a time of rapid economic change and fiscal development.

4.2.1 A Theory of Elite Capacity Investment

Fiscal capacity is a fundamental requirement for high revenue collection and therefore redistribution. Without fiscal capacity the state is unable to collect high levels of revenue. Instead, low capacity requires states to rely on revenue sources that are easy to access, such as customs and fees. Taxes that require little capacity are often inefficient, regressive, and limit the amount of revenue that can be collected. It is therefore important to understand when political leaders, and specifically autocratic

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3 For differing results, see for example: Lake and Baum (2001); Brown and Hunter (2004); Lindert (2004); Mulligan, Gil and Sala-i Martin (2004); Ross (2004); Avelino, Brown and Hunter (2005); Timmons (2005, 2010); Elis (2011); Acemoglu et al. (2013).

4 See also Acemoglu and Robinson (2008) on the continued de facto political power associated with former autocratic elites after a regime transition.
elites, increase the revenue raising power of the state. In particular, I contend that fiscal capacity development under authoritarian regimes is influenced by two main factors: 1) the threat of redistribution in the future; 2) the demand for revenue by authoritarian elites.

While an efficient bureaucracy and sufficient fiscal capacity is necessary for high taxation and government spending, it can also serve as a threat to political elites. Simply put, for any group holding power, strengthening the state’s fiscal capacity means developing the tools that can be used to tax away their wealth (and income) should they ever lose power. Importantly, in general this threat is not limited to democratization. When the state’s capacity is low, political power does not immediately translate into the ability to tax and redistribute. Consider, a state with high levels of inequality in which elites fear a loss of power that could result in high redistribution and taxation. Given that fiscal capacity is a necessary condition for high taxation, undermining fiscal capacity is one way for economic elites to safeguard themselves from future taxation.

On the other hand, low fiscal capacity constrains the revenue raising power of the current regime. Precisely for this reason, autocrats face a trade-off. When the elites prefer higher levels of government spending under the current regime, they have incentives to invest in fiscal capacity to lower the costs associated with taxation. In that case, autocrats must weigh the benefit of raising more revenue more efficiently, with increasing the possibility of redistribution later on. If the elite’s demand for higher revenue is strong enough, fiscal capacity investments become optimal.

Consider a fictional authoritarian society with two groups: the (poor) citizen; and the politically powerful (rich) elite. The set up is similar to that in Boix (2003) and Acemoglu and Robinson (2006). The authoritarian elite is faced with uncertainty about a possible regime change at some point in the future. For simplification, I assume that a change to a more democratic regime moves government policies
towards the preferences of the median voter (Downs, 1957). Building on famous models in political economy (Meltzer and Richard, 1981), I assume, the higher the level of inequality, the higher would be the equilibrium level of taxation should it come to a transition to democracy.\(^5\)

In the autocratic regime, the elite has the opportunity to invest in the fiscal capacity of the state to lower the cost associated with taxation and raise the maximum attainable level of revenue. Investments, however, are long term and improving fiscal capacity takes time (Besley and Persson, 2011). For example, bureaucrats need to be selected and trained, an accountability structure within the bureaucracy has to be developed, and an overall capable and reliable tax administration has to emerge. Moreover, quasi-voluntary compliance by tax payers requires a minimal level of trust into the tax collecting institutions (Levi, 1989).

In determining the optimal level of fiscal capacity, the autocratic elite has to take a possible loss of power into account. I argue that newly elected democratic politicians are constrained by the level of fiscal capacity developed in prior regimes. This is for two reasons. First, the long-term character of tax capacity investments. Second, it is harder to increase fiscal capacity in highly unequal and young democracies. Consider a newly democratized regime with low capacity, in this case, voluntary compliance is more important, given that the state is weak. This is especially true for high income

\(^5\) Empirical evidence in support of the Meltzer and Richard (1981) model is rather small. While Finseraas (2009) finds support for the Meltzer-Richard hypothesis at a micro level in Europe, others, for example Kenworthy and McCall (2008), have reported contrarian findings. At the macro level, empirical results are mixed as to whether inequality is associated with higher redistribution across democracies (e.g., Milanovic, 2000; Moene and Wallerstein, 2003; Iversen and Soskice, 2006; Elis, 2011; Lupu and Pontusson, 2011). There are two particular concerns, however, about the null finding between inequality and redistribution in democracies. The first possibility is that authoritarian elites constrain future levels of redistribution in cases where inequality is particularly high. This could be achieved through influencing political institutions during the transition (Albertus and Menaldo, 2011; Ardanaz and Scartascini, 2013) or, as I argue here, state and fiscal capacity in the prior regime (see also: Acemoglu, Ticchi and Vindigni, 2011). Second, government policy already influences market inequality and may thus distort the expected empirical relationship (Morgan and Kelly, 2013).
earners who are likely to be financing a large part of the expected revenue. Yet, when redistributive pressures are high, the most powerful tax payers have strong incentives to avoid taxation and undermine any strengthening of the state. In contrast, when authoritarian elites want to increase the capacity of the state, they are more likely to voluntarily comply with their own tax policies.

Fiscal capacity in new democracies is path dependent upon investments under prior regimes and directly affects the equilibrium level of taxation and redistribution. Low levels of fiscal capacity keep the new democratic regime from increasing taxes and ultimately constrain redistributive policies and public spending (Clements, Gupta and Inchauste, 2004; Bird and Zolt, 2004, 2008). Increasing fiscal capacity in unequal authoritarian regimes therefore raises the expected cost of future redistribution. Since tax capacity directly influences the equilibrium level of taxation in the new regime, the cost associated with the transition is increasing in capacity, holding all else constant. Therefore, when authoritarian elites assign some positive probability to the event of democratization, higher inequality leads to less investment in fiscal capacity.

Following this part of theoretical argument, the first hypothesis about the relationship between inequality and investment in fiscal capacity is the following.

**Hypothesis 1:** Where inequality is higher the expected future cost of democratization increases and thus fiscal capacity will be lower.

Given that investments in fiscal capacity are costly, and carry with them an expected cost of increased redistribution in the future, the question becomes when autocrats ever want to strengthen the state’s ability to collect taxes?

Raising tax capacity can become optimal when authoritarian elites demand high levels of government spending under the current regime. This is for two reasons. First, higher capacity increases the efficiency of revenue collection. Second, increasing
capacity raises the total level of revenue that is available to the state. For example, higher demand for government spending could be due to the threat of war and increased military spending (Tilly, 1990; Dincecco, 2011; Besley and Persson, 2011). In contrast, however, I argue here that domestic factors and in particular the type of capital owned by the political elite can also create a demand for increased government spending.

The crux of the argument is that the elite can directly benefit from government investment and government spending, depending on the type of capital they own. When capital investment by elites is complemented by government spending on public goods and services, direct income gains from raising the state’s capacity in order to tax and spend can outweigh possible future costs of democratization. As the preferred level of government spending increases, low levels of fiscal capacity become more detrimental to the elite’s interest.

I argue that government spending can increase the return to the elite’s private capital, depending on the economic activity they are engaged in. Certain types of economic activity benefit more from government spending than others. The argument builds in part on endogenous growth models and a large literature in economics that contends that certain types of government spending, especially government investment can be growth enhancing (e.g Romer, 1989; Barro, 1990, 1991; Easterly and Rebelo, 1993). Specifically, Barro (1990) argues that specific types of government investment complement production in the private sector (Devarajan, Swaroop and Zou, 1996). Evidence from both cross-country and within country analyses supports the idea that certain government investment, especially in infrastructure and education, can have positive effects on growth (Easterly and Rebelo, 1993; Cashin, 1995; Devarajan, Swaroop and Zou, 1996). I apply this idea to the individual level of capital ownership of autocratic elites.

Similar to the models by Barro (1990); Barro and Sala-i Martin (1992); Cashin
I argue that government investment can directly influence private production functions for the economic elite. Government spending can raise the return to private investment. Importantly, however, I contend that the complementarity between government spending and private investment depends on the type of capital owned by the elite. Capital intensive investment that requires highly skilled labor, profits more from government spending on education and healthcare. For example, public education increases the productivity of workers, while public health spending can aid their reliability and longevity. On the other hand, other types of capital, such as large land holdings and farming, benefit little from increased government spending.

Thus, when the autocratic elite in power owns capital that is complemented by government investment, for example manufacturing, they have an incentive to demand higher government spending. Consider, on the other hand, areas in which the autocratic elite derives its income from natural resource extraction or agriculture. The demand for skilled labor is low and capital owners do not benefit from the expansion of public education or other government investments. Similar to the argument made by Galor, Moav and Vollrath (2009), a conflict exists between large land owners who prefer abundant and cheap unskilled labor and those elites who benefit from increasing the productivity of the workforce. When natural resources are rare, autocratic elites pursue economic activities that are capital intensive and require skilled labor. In this case, government spending on health and education has a positive effect on the return to private investment for the autocratic elites, which raises the demand for taxation.

The use of tax revenue and government spending is valued over private investments for several reasons. First, many of these investments are similar to public goods. The private spending of one elite member can be utilized by others and free riding can occur when they are privately financed (Olson, 1971). For example, if one factory owner privately educates his workforce, nothing prevents other firms from
poaching the newly educated - the classic free rider problem. Government spending can work similar to a commitment device for authoritarian elites. Secondly, the production of these goods are likely to exhibit economies of scale. The marginal cost of provision decreases when spending is a coordinated effort through the government. Third, in regards to education, income and credit constraints are likely to limit the ability of the poor to privately finance their own education, which can incentivize elites to sponsor their education (Bourguignon and Verdier, 2000). In addition, utilizing taxation can be especially beneficial to the autocratic elite, since other members of society pay part of the bill, i.e. much of the tax revenue comes from other elite members or from individuals outside the autocratic elite.

Most importantly, as the elite’s demand for government spending rises, investing in fiscal capacity can become optimal. The higher the equilibrium spending level under the current regime, the more the benefit from raising tax capacity can outweigh possible future costs. As spending increases, low capacity in the authoritarian regime becomes more costly and investment in fiscal capacity can become the equilibrium strategy. Fundamentally, depending on their own capital investments, if the authoritarian elite benefits from government spending on public goods and services, higher fiscal capacity can become optimal.

This leads to the formulation of the second hypothesis:

**Hypothesis 2:** Elite-owned capital that is complemented by government spending leads to demands for higher tax revenue and therefore more investment in fiscal capacity.

Given that fiscal capacity investments are slow, improvements in the ability to raise revenue are not expected to occur immediately. In the long run, however, regimes with authoritarian elites that own types of capital that are complemented by government investment will raise tax capacity.
4.3 Case Selection: 19th century Prussia

Studies concerning the development of taxation and political economy of redistribution generally investigate empirical relationships at the national level. The main reason is that capacity investments are often decided and made by national governments. This is especially true for quantitative historical studies where, up until now, most data is only available for larger political units (e.g. Dincecco, 2011; Karaman and Pamuk, 2013). This paper is unique in that I take advantage of newly collected data on tax revenue and spending at the local county level (Kreis) in 19th century Prussia.

While Prussia is a specific case, I claim that the data and case are particularly well suited to investigate the broader theoretical argument. First, in 19th century Prussia the distributive conflicts over both political power and fiscal policy were at the forefront of political debates. Indeed, the political system after the 1848 revolution very closely resembled the theoretical autocratic societies envisioned in Boix (2003) or Acemoglu and Robinson (2006). Political power was directly linked to economic power and was essentially held by the economic elite until the early 20th century (see Section 4.3.1 below). Secondly, during the time period studied in this paper, industrialization took full effect within Prussia. Yet, stages of economic development differed significantly throughout its geography and political elites relied on very different sources of income. In fact, elites ranged from large industrial magnates to nobility and land owners. I utilize this geographical variation to investigate the theoretical argument. Third, as is further discussed in section 4.3.2 and shown in Figure 4.2, the latter half of the 19th century was a time of profound fiscal innovation in Prussia. For example, the central state’s per capita revenues grew from 5.11 in 1850 to 19.63 per capita gold grams in 1905.6

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6 These data on national government revenues were taken from Dincecco (2011) and are calculated
An additional advantage of using the Prussian state as a case study is the quality of data. Increasingly researchers have questioned the quality of cross-national data, especially in regards to non-democratic regimes (Ross, 2006; Jerven, 2013; Magee and Doces, 2014). The data utilized here comes directly from Prussian census documents, which were produced regularly. While data is not available for all years, when collected, the census data is of high quality and very few observations are missing (Becker et al., 2014). The data collection was often done by authorities of the central state. In contrast to cross-national data, few incentives existed for local elites to manipulate statistics.

Moreover, while section 4.3.2 discusses some of the tax reforms and political battles at the national level, the counties had considerable lee way in adding to the central government’s taxes. Most importantly, counties were responsible for tax administration and tax collection. An additional advantage of the set of observations is that it essentially holds constant two possible confounding factors: 1) the threat of war; 2) democratization. First, much of the time period analyzed in the data is after the conclusion of the French-Prussian war (1870-1871), which resulted in a significant gain of territory for Prussia and a reduction in the demand for military spending. Second, defense spending was a responsibility of the central government and should not influence differences between Prussian counties. Additionally, using sub-national data holds constant the political system. As discussed in the next section in more detail, the power of elites differed across counties, however, the overall political system was the same across the geography.

Thus, whereas the data used here is specific to the Prussian case, the empirical results speak to the larger debate on distributive conflicts under authoritarian governments as well as the origin and development of fiscal capacity in general.

in per capita gold grams.
Figure 4.2: This plot shows the growth in government revenues from 1850 to 1905. The data were taken from Dincecco (2011) and are calculated in per capita gold grams. It is easy to see that Prussia experienced a transformation in revenue collection and taxation in the latter half of the 19th century. Over this time period per capita revenue grew four fold.

4.3.1 The Political System of Prussia

As outlined in the theoretical section above, this paper is concerned with the elite decision making in non-democratic governments with regards to investments in fiscal capacity and taxation. While one could claim that Prussia moved towards a more representative constitution after 1849, I contend that the political system was far from democratic. Instead, political power was still very much in the hands of the land- and wealth-owning elites. This did not significantly change until 1919. I here provide a short overview on the political system in Prussia in the 19th century, which will show the disparity in political power and why Prussia ought to be considered a strong example of elite authoritarianism.

In the aftermath of the 1849 revolution the new Prussian constitution was developed, which gave way to two representative chambers underneath the crown. Any changes to the law of the land would have to be approved by both chambers and signed by the king to go into effect. Membership in the upper chamber (the House of Lords or “Herrenhaus”) was based on hereditary, land ownership, or appointment
by the king. Members of the lower chamber (“Abgeordnetenhaus”) were elected by electoral delegates, who in turn were elected by all male citizens over the age of 24. Importantly, as Hallerberg (2002) notes, the lower chamber was more powerful in regards to tax reform and the budgetary process, since the upper chamber could only reject or approve budgetary laws.

While de jure every male citizen of Prussia over 24 was allowed to vote, the system was de facto highly undemocratic with very little representation for the poor. This was due to the so called “Dreiklassenwahlrecht” (three-class franchise) and the indirect election of representatives. The electoral rules ensured the continued large influence of wealthy voters at the national level.

As the name “Dreiklassenwahlrecht” indicates, voters were split into three classes. Each class of voters elected the same number of electoral delegates, who then elected members to the lower house. As a consequence, each of the three classes had the same indirect voting power in electing delegates. The three classes, however, differed significantly in size. This meant that the power of individual votes varied greatly across the three classes. Male citizens were assigned to one of the three classes based on their tax payments. The first class of voters would be all those citizens with the highest tax payments until one third of the locality’s total tax revenue was reached. The second class would include the next wealthiest individuals until the second third of tax revenue was fulfilled. The last class included all other voters. Each class then elected the same number of electoral delegates, who would elect the lower house representative with absolute majority (Thier, 1999, 858 ff.).

Each of the three classes elected approximately one third of the electoral delegates. Members of the lower house were elected by the delegates with absolute majority. This meant, that the poor effectively could never elect members of the lower house without the help from one of the other two classes. The inequity of the electoral system is exemplified by the example of industrial magnate Alfred Krupp. As the by
far wealthiest man in the city of Essen, at one point, he was the only voter in the top
electoral class. As Hallerberg explains, even at the most open election in 1913 (after
the period studied here), the top class consisted of only 4.5 per cent of Prussia’s
population, while the second class consisted of 15.8 per cent of the population. Thus
the votes of just over 20 per cent of the population received a weight of 67 per cent
in electing the delegates (Hallerberg, 2002).

In addition to a voting scheme that heavily favored wealthy voters, the votes on
electoral delegates were public. Thus poorer voters were often subject to pressure by
their employers and could rarely choose freely (Thier, 1999; Hallerberg, 2002). Fur-
thermore, while the political power remained with the wealthy elites, rural districts
with strong agrarian economies also benefited from a larger number of represen-
tatives. As Hallerberg shows, the seat share of parties in the lower house stayed
surprisingly constant between 1879 and 1913, even though the economic background
in Prussia and the population changed dramatically. This all points to the fact that
the conservatives were quite successful at preserving their political power in a chang-
ing environment (Hallerberg, 2002). As Spoerer (2010) highlights, while over the
latter part of the 19th century the rich were increasingly more burdened by taxa-
tion, due to the “Dreiklassenwahlrecht”, the higher tax payments actually meant an
increase in political power.

4.3.2 Taxation in Prussia

In the first half of the 19th century Prussia relied mostly on taxes on product to
raise revenue. The same was the case in most other west European countries. Across
the continent, however, the idea gained traction that people should pay according
to their ability. In the early 19th century various laws were passed in an attempt
to ease the taxation of products and develop some form of direct taxation. Yet,
politically powerful landed elites were regularly successful demanding exceptions for
rural districts. In 1812 a first income tax was passed to finance the war, however it was abolished in 1814. After customs were abandoned within the Prussian territory the state was in need of more revenue sources.

Scholars of finance, and some politicians, increasingly supported the idea of the “ability to pay” principle. This led to the introduction of the class tax in 1820, which was supposed to be applied to the whole country. Nevertheless, 132 larger towns received exceptions. These cities were instead subject to a small business tax, stamp tax, and a combined grist and slaughter tax. The class tax functioned similar to an income tax, however tax payers were sorted into classes according to social standing, occupation, and their estimated wealth. Even though the class tax was aimed to increase fairness of the tax system, it was not applied in most large cities and the wealthiest only paid slightly more than others. For example, in 1848 in all of Prussia, only 346 citizens were taxed in the highest class. The general public and scholars of finance increasingly advocated for the establishment of a true income tax, which was introduced for citizens with incomes above 1000 Thalers in 1849. The enforcement, however, was highly questionable, as the state did not have the ability to determine the tax payers’ incomes (Seligman, 1911). Indeed, it lacked fiscal capacity.

Nevertheless, Prussia’s lawmakers passed a class and classified income tax in 1851. The old class tax was applied to those with incomes up to 1000 Thalers, except in the 83 largest cities. Incomes above 1000 Thalers were subject to an income tax. Tax officials were supposed to asses incomes, yet were not allowed to actually investigate and ascertain true incomes. Moreover, individuals could completely escape the income tax by spending more than half the year in one of the large cities. As exemplified by tax administrator Kühne’s quote in the introduction, the income tax was toothless. While small reforms took place until the 1880s, the income and class tax did not increase in effectiveness. For example in 1873 out of 9.3 million tax
payers, 5 million paid in the lowest class possible and by some calculations one-half to two-thirds of incomes were not reached by the tax (Seligman, 1911, 244). In 1873 the grist and slaughter tax, previously of great importance was generally abandoned and only allowed in very few cities and localities. Furthermore, a new class tax was introduced for all physical persons with incomes up to 3000 Mark. The classified income tax was applied to citizens with incomes above 3000 Mark. Yet again, incomes were estimated by local commissions, which were composed to one third of local politicians and two thirds of tax payers. “Any inconvenient intrusion into the private situation of income and wealth” was forbidden (von Heckel, 1904, 180), which made true assessment of incomes impossible. Few incomes were correctly estimated and many tax payers were able to avoid higher tax payments.

The most comprehensive reform of Prussian taxation was undertaken in the 1890s by minister of finance Johannes Miquel. Miquel’s taxreform led to the introduction of a general income tax applied to all incomes above 900 Marks. Tax rates were made more progressive and income above 100,000 Marks was taxed at 4%. Furthermore, for the first time, tax payers were required to declare their income and assessment was strengthened (Seligman, 1911; Hallerberg, 2002). In fact, the state’s assessment of incomes grew significantly, to a point where it was seen as intrusive and inquisitorial, such that a liberal critic of the law called out in the Reichstag: “the country is covered with a perfect system of espionage” (as cited in Seligman (1911, 264)).

The politics of taxation at the national level were driven by conflict between land vs. urban representatives and conservatives vs. liberals. Due to the strong political power of landed elites national taxes were often blocked and only limited reforms implemented. The agricultural class had a strong hold in the lower house and even more so in the upper house, due to malapportionment and wealth of the landed elite. Land owners used their political power to keep their own tax rates low and tax mostly capital and labor (Hallerberg, 2002).
Miquel’s tax reform also included a change in how Prussian localities were able to raise revenue. With some level of freedom counties were able to raise their own taxes but most importantly, they could add to the income tax. Furthermore, the local counties were responsible for tax assessment. This led to large differences in the amount of local taxation across Prussia (Von Gerlach, 1893). These differences in connection to the geographic distribution of elites across Prussia and differences in their basis of income are utilized in the empirical section below. They allow me to investigate whether local inequality and the type of capital owned by elites impact investments in tax capacity and revenue levels.

Local constituencies varied highly in terms of per capita taxation. For example, Figure 4.3 shows the differences in per capita taxation in Mark between cities and rural areas in 1891 and 1892 (data from Von Gerlach (1893, 32)). In line with the theoretical argument made above, local addition to taxation was generally higher in cities versus rural areas. While the added income tax in rural areas was generally under 150% of the state tax, the local addition in urban areas was often above 300% and in some areas even more than 500% (Von Gerlach, 1893, 32f.).

Similar to ideas later voiced by Tiebout (1956), German fiscal scholars partly justified this difference in taxation across localities with the closer relationship between interest in spending and tax payments at the local level as opposed to the national level. For example, Von Gerlach (1893, 20) argued that public spending at the local level benefits the population to differing degrees. “The advantages of spending by the municipalities benefit its citizens differently. For example, a good road network, good street lighting, etc, is of greater benefit to land owners who can continuously use these advantages, as well as businessmen”.

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Figure 4.3: This plot shows the difference in per capita government revenue in Mark in urban versus rural areas of Prussia for 1891/92 and 1892/93. The plots shows differences across all of Prussia, as well as different administrative units within Prussia. As one can easily see, taxation was much higher in cities versus rural areas.

4.4 Empirical Strategy & Data

As laid out above, the Prussian Kreise (local counties) were allowed to add to the central governments income tax rate and were responsible for tax collection. Local elites decided how stringent tax laws were enforced, how many, and how closely tax payer declarations were inspected. I utilize the ability of counties to add to the state’s taxation and to control tax collection to investigate whether inequality and the local economic structure affected fiscal capacity development.

The Prussian geography was divided into 25 administrative districts (Regierungsbezirke). Each of these administrative districts were split into a number of counties (Kreise), which make up the unit of analysis for this paper. Counties were supposed to have approximately similar population totals. Over time, many units were split...
and others were added to the territory, the number of counties therefore increased. The counties analyzed here are based on boundaries from the time of the earliest data used (1849). This results in 335 counties.7

To measure fiscal capacity at the county level, I collected data from German census files about tax revenue and administrative spending. By total tax revenue in this paper I refer to revenues from all direct taxation collected at the county level. In addition, I also collected data on administrative spending by county. To create a measure of fiscal capacity, I use the total revenue collected at the county level and divide it by the county’s administrative spending.8 The idea is to create a measure of efficiency of revenue collection, i.e. how much revenue is collected per every unit spent on administration. The data on revenue and administrative spending were collected for the year 1903 and were taken from the statistical yearbook for the Prussian state from 1908 (Königlich Preussisches Statistisches Landesamt, 1909, 266ff.).

Figure 4.4 shows the distribution of the fiscal capacity measure across the Prussian geography in 1903. It is easily visible that the western, more industrialized part of the country also exhibited higher levels of fiscal capacity (darker shades of red). On the other hand, the eastern part, which was more agricultural, had much less fiscal capacity at the time.9

Based on the theoretical argument outlined above and other recent work on fiscal capacity (e.g. Besley and Persson, 2011) changes in tax capacity are assumed to occur in the long run and not immediately. The expectation is that elites in

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7 The county data were combined and merged based on county keys provided by the Ifo Prussian Economic History Database (iPEHD), available here: http://www.cesifo-group.de/ifoHome/facts/iPEHD-Ifo-Prussian-Economic-History-Database/merging.html. Without their merge key, county files, and additional data this project would have been much more complicated (Becker et al., 2014).

8 I thank Nolan McCarty for this particular suggestion.

9 The shapefile for administrative boundaries for Prussia was taken from MPIDR – Max Planck Institute for Demographic Research and CGG – Chair for Geodesy and Geoinformatics, University of Rostock (2011).
Geographic Variation in Fiscal Capacity 1903

Figure 4.4: This map shows the geographical variation in fiscal capacity. Darker shades of red indicate counties with higher levels of fiscal capacity. For counties in black no data is available. The county boundaries are from 1862, the earliest year for which maps are available. It is easy to see the concentration of high fiscal capacity in the western parts of the country, where strong industrial development took place. The eastern part of Prussia, which was mostly agricultural, instead has less fiscal capacity (lighter colors). The shapefile for administrative boundaries for Prussia was taken from MPIDR – Max Planck Institute for Demographic Research and CGG – Chair for Geodesy and Geoinformatics, University of Rostock (2011).
those counties with high inequality did not invest in the development of fiscal capacity. On the other hand elites in counties where prospects of industrialization were high had ample incentives to increase tax capacity. Given that capacity can not be changed immediately, it is important that the empirical analysis investigates long term changes. In addition, while Prussia undertook many censuses between 1816 and 1903, different data were collected at different times and not all variables are available for all census years. Further, variables are not always available for the same years, especially not at the fine grained county level.

Based on the hypotheses about a long term effect, I use independent variables at two points in time: 1) as close as possible to 1860; 2) for the year 1849. More variables are available at the county level for years around 1860, unfortunately not all are measured in the exact same year. It is likely, however, that changes in the short run were minor. Additionally, I also estimate models with the independent variables measured in 1849, here fewer controls are available. The two specific points in time are selected because of data availability. To investigate the long term effects that are specified in the theoretical argument, I utilize independent variables at earlier time periods.

Since data on income inequality is not available, I follow other scholars and proxy inequality with land inequality (Ziblatt, 2009; Cinnirella and Hornung, 2011; Ardanaz and Scartascini, 2013). To create a local measure of inequality I rely on data on farm sizes. The Prussian census grouped all farms in a county by different sizes. I use this data to create two different measures of land inequality. The first measure (land concentration) is the share of farms in a county that fall into the largest bin. As the second measure I calculate a gini coefficient of farm size (land gini).\(^\text{10}\) Data on land

\(^{\text{10}}\) To calculate the gini for land inequality some assumptions have to be made. First, I assume each farm to be of the average size in its bin. For example, for farms between one and two hectare, I assume all farms in this bin are of size 1.5 hectare. For the last bin, i.e. farms over 100 hectare in 1882, I assume all farms are of size 100 hectare. This is more likely to underestimate inequality,
inequality come originally from Prussian census data but are taken from Becker et al. (2014). While land inequality is far from a perfect measure of income inequality, the two are likely to be correlated (Easterly, 2007b) and currently no measure of income inequality for Prussian counties exists. In the future I hope to add additional data that allows for the construction of a local measure of income inequality.

To proxy for the type of capital that is owned by the elites and its conduciveness to government investment I create measures of industrial employment as the share of total population. For 1849, I use data on the number of workers in factories divided by the total population in each county. For the 1860s, I collected data from the Prussian Statistic of 1867 (Engel, 1871). Employment was classified by sector, including a mining and industrial sector. I divide the number of employees in the industrial sector by total population for each county to create a measure of the share industrial employment.

Additional controls are taken from Becker et al. (2014) and include growth in population density from 1849 to 1903 or 1864 to 1903. I also include a measure of population density of 1903 in all models. Since data on GDP and GDP growth is not available for the time period or the level of analysis, I include growth in population density and absolute population density in 1903 in all analyses. Population density is generally seen as the best possible proxy for economic growth at this time. In addition, it is likely that it was easier to collect taxes in areas with high population density.11

Some of the models include the share of the military in the population to control for possible investments due to war or repression. I also include past tax revenue per capita and the share of protestants in the population in some of the estimations.

The notion that protestants have driven economic development and industrialization since many farms in the last category are larger than the limit.

11 The correlation between the share of industrial employment and population density is 0.19.
goes back to Max Weber (2010), but has not necessarily found grounding in empirical reality (Becker, Hornung and Wössmann, 2011a). While an analysis of panel data on taxation is not possible at this unit of analysis, in some of the models I include a measure of per capita tax revenues from 1869 to control for previous levels of taxation.

Unfortunately the data on tax revenue and administrative spending at the time was only collected for the so called “Landkreise” or rural counties, city counties were excluded from this fiscal census. I therefore restrict the analysis to these rural counties with available data. I believe, however, that this results in a stronger test of the theoretical argument. The reason being that urban counties are likely to fit the theoretical argument even better. First, the level of industrialization was especially high in urban areas and as shown in Figure 4.3 taxation was generally higher within cities. Second, using land inequality as a proxy for inequality is likely to work better in rural areas, while urban areas are more likely to suffer from low land inequality. As a robustness check, I show in Section 4.5.2 that the results hold when using per capita income tax revenue for all counties as the dependent variable.

4.5 Findings

As a first test of the hypotheses specified above I estimate a standard OLS regression with the above described measure of fiscal capacity as the dependent variable. The main independent variables of interest are the measure of land inequality and the share of industrial employment. Additional controls always include population density in 1903 and growth in population density in each county. As explained above, the measure of fiscal capacity is for 1903, while the independent variables are measured at earlier time periods to allow for the long term development of capacity. Independent variables are either measured around 1860 or in 1849.

Figure 4.5 shows the coefficients and confidence intervals for the most basic model.
The black lines depict the 95% confidence interval for each variable, while the thick red lines show the 90% confidence interval. The model here is based on land inequality measured in 1858, the share of industrial employment is from 1867. Population density is measured in 1903 and growth of population density is calculated from 1864 to 1903. The results for this estimation are also shown in the first column in Table C.1 in the Appendix.

**Figure 4.5:** This plot shows the coefficients for the simple OLS regression. The thin line shows the 95% confidence interval, while the red thick line shows the 90% confidence interval. Independent variables are measured around 1860, the dependent variable is measured in 1903. Coefficients for land inequality and industrial employment are in the expected direction, substantively meaningful, and the 95% confidence intervals do not include zero.

As one can see, estimated effect of land inequality is large, in the expected direction, and its 95% confidence interval does not include zero. Similarly, as expected the coefficient of industrial employment on fiscal capacity is positive, meaning the higher the share of industrial employment in 1864, the more fiscal capacity a county
had in 1903. While the coefficients are of different magnitudes, this is largely due to the different scales. For example, a change in the share of industrial employment from the median value (0.175) by one standard deviation (0.11) is associated with a change in predicted fiscal capacity from 26.45 to 28.92. While the 95% and 90% confidence intervals for the estimated predictions overlap, the effect is still substantively meaningful. Similarly, for land inequality, a change from the median value in 1858 (0.009) by one standard deviation (0.015) is associated with an estimated decrease in predicted fiscal capacity in 1903 from 26.44 to 24.03. Again, the 95% and 90% confidence intervals for the predictions slightly overlap. Figure 4.6 shows the marginal effects for both land inequality and the share of industrial employment for the whole range of values in the sample. It is easy to see, that both variables have substantively meaningful effects on the predicted values of fiscal capacity. The changes from the median sample value by one standard deviation are depicted by the two red dots in both plots.

Table C.1 in the Appendix displays the results from a number of additional models with this measure of fiscal capacity as the dependent variable. First, model 2 shows the results when the gini coefficient for land inequality in 1858 is included. Model 3 includes additional controls for the share of military population and protesters in 1864. I then add an additional control for per capita tax revenues in 1869 in column 5. Furthermore, I estimate the same basic models using independent variables measured in 1849 in columns 6 and 7. Across all models the results are very robust and substantively similar. Land inequality, measured as both the share of the largest land holdings or the gini coefficient, is negatively associated with fiscal capacity development. The coefficient is precisely estimated across all models when the land concentration variable is used. For the gini coefficient the results are in the expected direction, but the 90% confidence interval does include zero. Note however, that the calculated gini coefficient likely underestimates land inequality for the extreme
cases due to the use of the lower limit for the largest estates. The share of industrial employment on the other hand is positively associated with fiscal capacity, again the 95% confidence intervals generally do not include zero.

Across all models estimated, growth in population density has a negative effect on fiscal capacity in 1903, while the level of population density in 1903 is positively associated with the capacity measure. The coefficient, however, is very close to zero in all models. The coefficient for share of protestants is positive but not significant at conventional levels. The estimated coefficient for the share of military population switches signs depending on whether per capita tax revenue in 1869 is included in the model. I generally I prefer models with fewer added control variables to limit any post-treatment bias.\(^\text{12}\) The results are robust to the inclusion of a number of

\(^{12}\) Additionally, the results are also essentially the same when only a control for population density
additional controls, for example the mean wage level in 1901.

4.5.1 Instrumental Variable Results

Despite the strong results from the OLS models, several concerns remain with regards to establishing the hypothesized relationship, let alone causality. For example, the results may suffer from omitted variable bias or measurement error. To further check the robustness of the results, I estimate an instrumental variable model for both potentially endogenous variables: land inequality and the share of industrial employment. A simple Hausman test leads to rejection of the hypothesis that either land inequality or industrial employment are exogenous, calling for the estimation of an instrumental variable model.

Given two endogenous variables, estimating an instrumental variable model becomes more difficult. The estimation is also complicated by the fact that both land inequality and the share of industrial employment are correlated with each other (−0.37). Furthermore, as practitioners know, it is very difficult to find an exogenous instrument that has enough predictive power for one of the two endogenous variables, let alone finding a good enough instrument for each of the two variables. Instead of having one particular instrument for each endogenous variable, I use a total of three instruments in an overidentified model. To instrument land inequality and the share of industrial employment I use the following three instruments:

- soil quality (percent of top soil)
- logged distance to large rivers
- logged distance to carboniferous areas

The percent of top soil is measured as the share of usable agricultural land that was loam and clay, a soil type associated with higher productivity. The data were in 1864 or no controls at all are included.
originally collected in an agricultural census (Meitzen, 1868ff.), but are here taken from (Kopsidis and Wolf, 2012). This is similar to the instrument for inequality used by Easterly (2007a) and Ardanaz and Scartascini (2013), who use the natural suitability of land to grow wheat or sugar cane as an instrument for inequality. The idea behind using soil quality as an instrument is that higher valued land is generally associated with less land inequality. As the value of land increases, the demand for land ownership rises and in turn farms sizes are smaller, and ownership is less concentrated. The same instrument is used by Cinnirella and Hornung (2011) to instrument for land inequality in estimating the expansion of education in Prussia.

One potential problem with soil quality as an instrument is that it could have an effect on tax revenue via agricultural productivity. If better soil increases farmers’ incomes, higher income for farmers could in turn affect tax revenues, independent of land inequality. I follow Cinnirella and Hornung (2011) and include an additional control in the instrumental variable regressions: a proxy for agricultural productivity. To account for agricultural productivity, I create a measure of the average yield per hectare across agricultural products. Unfortunately this measure is only available for 1886, however, it is unlikely that significant changes occurred over time. The data on agricultural productivity are taken from Becker et al. (2014).

The second instrument is logged distance to the closest big river, which is calculated based on each county’s centroid. The idea behind using distance to rivers as an instrument is that closeness to a river lowers the costs and difficulty associated with trade. Trade ought to increase the speed of technological transfer, as well as the demand for industrialized goods. The availability of trade networks is essential for industry location (Krugman, 1993). In addition, rivers would in general lower trade costs and improve supply of resources and goods that are not locally available. I therefore expect a negative relationship between distance to rivers and the propensity to industrialize. Additionally, the distance to rivers could potentially affect land
inequality, given that the ability to trade ought to increase land values. Similar to the effect of soil quality, I therefore expect a positive effect of distance to rivers and London on land inequality.

The last instrument is logged distance to carboniferous areas. Carboniferous areas were mapped by the Federal Institute for Geosciences and Natural Resources in Germany and are rock strata which formed during the carboniferous era (Asch, 2005). Carboniferous literally means “coal bearing” and during this period a high percentage of coal beds formed. As Fernihough and O’Rourke (2014) show, these carboniferous areas are highly correlated with later coal discovery. I therefore calculate the distance from each county centroid to the closest carboniferous area as mapped by Asch (2005). Coal was one of the most important natural resources during industrialization and a major driver of economic progress (Fernihough and O’Rourke, 2014). In fact, the industrial take-off in Europe would have been impossible without the large coal deposits in England (Pomeranz, 2002; Wrigley, 2010; Gutberlet, 2013). The availability of raw materials is imperative to industrial development and manufacturing, especially at a time when transport costs where still very high. Close location to coal mines should therefore be important to industry location and distance to carboniferous areas should be negatively correlated with industrial employment.

Table C.2 in the Appendix shows the results for the second stages of two instrumental variable regressions. The models are estimated by two-stage least squares and reported standard errors in all instrumental variable models are Huber-White robust standard errors.\(^{13}\) The first model includes the two variables of interest as well as the control for population density in 1903, growth in population density, and the additional control for agricultural productivity. The last control is included to account

\(^{13}\) The results are not substantively different if standard errors are instead clustered at the next higher administrative unit (Regierungsbezirke) or regular standard errors are calculated (not shown here).
for possible effects of soil quality on tax revenue via agricultural productivity. The second column shows the model with additional controls for military population and share of protestants. The results are similar across both specifications. Figure 4.7 shows the estimated coefficients from the second stage of the instrumental variable regression (column 1 in Table C.2 in the Appendix). While the results are similar to the simple OLS model, the estimated effect of land inequality becomes much stronger in the instrumental variable model and is precisely estimated. This is not surprising, given that the instrumental variable model estimates the local average treatment effect. The coefficient for the share of industrial employment is quite similar to the OLS regression results, however both the 90% and the 95% confidence intervals do include zero.

None of the instruments are sufficient by themselves, yet taken together the association between the instruments and both endogenous regressors is quite strong. For both first stage regressions the adjusted $R^2$ is above 0.17. Given that the two endogenous variables are correlated with each other, the $R^2$ in the individual first stage regressions are less meaningful. Moreover, because of the two instrumental variables, two first stage regressions are estimated. With multiple endogenous regressors, I instead focus on Shea’s partial $R^2$ to evaluate the predictive power of the combined estimates on each endogenous regressors. For both variables Shea’s partial $R^2$ is relatively high, 0.15 and 0.5 for land inequality and share of industrial employment, respectively. In instrumental variable regressions with one endogenous regressor, the F-statistic for joint significance of the instruments in the first stage regression is commonly used to judge the strength of the instruments. Again, because of the multiple first stage regressions, multiple F-statistics are estimated, which can not be easily interpreted by themselves (Cameron, 2009, 190).

Stock and Yogo (2005) suggest using the Cragg and Donald (1993) statistic to
Figure 4.7: This plot shows the coefficients for the second stage instrumental variable regression. The thin lines show the 95% confidence intervals, while the red thick lines show the 90% confidence intervals. The results are quite similar to the OLS regression results. Both the coefficient for inequality and the share of industrial employment are in the expected direction. The 95% confidence interval for inequality does not include zero. Both confidence intervals for the coefficient for share of industrial employment, however, do include zero.

test for weakness in the instruments.\footnote{In instrumental variable regressions with one endogenous regressor this equals the F-statistic.} Based on the 2SLS model presented in Figure 4.7 and column one of Table C.2, the minimum eigenvalue statistic (or Cragg-Donald Statistic) has a value of 4.73. The Stock-Yogo test provides critical values for testing whether weak instruments could lead to distorted Wald tests of joint significance of the instruments. Here the Cragg-Donald Statistic suggest potential weak instruments (Cameron, 2009, 190f.). To provide more confidence in the results I also show the results from the same models using different estimation techniques.

In addition to the 2SLS model, instrumental variable models can be estimated using limited information maximum likelihood (LIML), generalized methods of mo-
ments (GMM), or Jackknife IV techniques. Several authors have argued that the LIML estimator may have “better finite sample properties” than the standard 2SLS estimator and may perform better in cases with weak instruments (Cameron, 2009, 199). In addition, Angrist, Imbens and Krueger (1999, 57) suggest that the Jackknife IV estimator would be “superior, in terms of bias and coverage rates of normal-distribution-based confidence intervals, to those of 2SLS and similar to those of LIML in the case of many instruments which are only weakly correlated with the endogenous regressor”. Given that all estimators are readily available, I also estimate the instrumental variable model using the GMM, LIML, and the Jackknife IV estimators. The results are show in Figure 4.8. Importantly, the results are essentially the same across all estimation techniques. The confidence interval for inequality does cover zero when the Jackknife estimator is used. The consistency across estimators adds confidence to the results presented above, especially given that the Cragg-Donald Statistic of 4.73 is larger than the critical value for 15% distortions for the LIML estimator. The results are also shown in numerical form in Table C in the Appendix.

Since the estimations include more instruments than endogenous variables, the models are overidentified. This allows me to test the validity of the instruments when the model is estimated using optimal GMM. The results for the instrumental variable model estimated with GMM are shown in column two of Table C in the Appendix. Based on the GMM model with robust standard errors and the test of overidentifying restrictions, the validity of the instruments can not be rejected, i.e. the overidentifying restrictions are valid. While this does not guarantee that all instruments are valid, it lends more credence to the results presented above (Cameron, 2009, 185).
Figure 4.8: This plot shows the coefficients for the second stage instrumental variable regression comparing the four different estimation techniques. The thin lines show the 95% confidence intervals, while the thick lines show the 90% confidence intervals. Across all estimation techniques the results are quite similar, which gives additional confidence. Only for the Jackknife estimator does the 95% confidence interval for inequality cover zero.

4.5.2 Excluding Urban Areas & Income Tax Revenue

One concern with the presented results, even if city counties are excluded, is that they could be based on a few number of cases with large urban areas. For example, land inequality could be especially low in dense urban areas, due to high population density and few farms. To ensure that results are not just due to densely populated areas, I estimate the simple OLS models and the 2SLS instrumental variable model when counties with large urban populations are excluded. To do so, I exclude all counties with a share of urban population in the 75th percentile. The results for the OLS model are shown in Table C.4 in the Appendix. Across all models, the coefficient for land inequality based on the share of largest estates remains negative.
but the 95% confidence interval in the majority of models does cover zero. The share of industrial employment is positive across all models. For the models using independent variables measured in 1849 the confidence intervals do not include zero.

Additionally, Table C.5 in the Appendix shows the second stage results of the limited instrumental variable model. The results are based on estimation using 2SLS and again counties with the share of the urban population in the 75th percentile are excluded. The results regarding land inequality are similar to the results on the full sample, the coefficient is negative and precisely estimated. On the other hand, the coefficient for the share of industrial employment switches signs and is very imprecisely estimated. Nevertheless, I believe these findings strengthen the overall results. Excluding counties within the top 75th percentile of population density again significantly decreases the sample size, yet the results for land inequality are stronger than on the full sample. It is not surprising the results regarding industrialization become weaker if another large part of the observations and all densely populated areas are excluded.

Table C.6 displays the results for the same estimations when per capita income tax revenue collected at the county level is used as the dependent variable. The income tax is generally seen as the tax source that requires the highest level of fiscal capacity to be enforced properly. Therefore, using per capita income tax revenue as the dependent variable adds an additional layer of evidence to the analysis. Importantly, these data also include most of the city counties, increasing the sample to 329 counties. The coefficients and confidence intervals for the limited OLS model (column 1 in Table C.6 in the Appendix) are shown in Figure 4.9. Similar to the results presented above and in line with the theoretical argument, inequality has a negative effect on per capita income tax revenue, while the share of industrial employment has a positive effect. The 95% confidence intervals for both coefficients do not include zero.
Figure 4.9: This plot shows the coefficients for the OLS model with per capita income tax revenue as the dependent variable. The thin lines show the 95% confidence intervals, while the red thick lines show the 90% confidence intervals. The results are quite similar to the models when the preferred measure of fiscal capacity is the dependent variable. Both the coefficient for inequality and the share of industrial employment are in the expected direction. Inequality has a negative effect on per capita income tax revenue, while the effect of industrial employment is positive. The 95% confidence intervals for both coefficients do not include zero.

4.6 Discussion & Conclusion

This paper is concerned with the origins of fiscal capacity under authoritarian governments and specifically the question of when autocratic elites have the incentive to invest in state building and fiscal capacity. Essentially, I ask: When do authoritarian elites build the tools that can later be used to tax them?

Scholars in political science have invested many resources into understanding why some countries tax and redistribute more than others. In contrast, our understanding of when states develop the capacity to tax is limited. This is especially problematic since fiscal capacity is a necessary prerequisite for successful redistribution and tax-
ation. As long as we remain ignorant about the reasons for when elites do or do not invest in the tax capacity of the state, our understanding of the determinants of other fiscal policies will always be limited.

This paper aims to partly fill this void by investigating a theoretical argument about elite investment in fiscal capacity. I contend that authoritarian elites face a trade-off about whether to raise tax capacity levels. Ultimately, they must weigh increases in the efficiency of revenue collection under the current regime with raising the capacity for redistribution after a possible loss of power. Government spending, however, can be of direct benefit to the autocratic elite. When spending increases the returns to capital for the elite, the contemporaneous benefits of investments in capacity can outweigh the costs associated with a possible regime change. In the case of Prussia, I argue that industrial elites benefited from and demanded public investments. On the other hand, elites in highly unequal localities preferred to keep capacity low.

I introduce and make use of a unique set of data to investigate my argument empirically. Utilizing newly collected data on tax revenues and administrative spending of Prussian counties in 1903, I create a local measure of fiscal capacity. It is possible to use subnational data on tax capacity because of the fine grained statistical censuses that were regularly undertaken by the Prussian state. Moreover, local Prussian elites mattered for the development of fiscal capacity, as they could add to national tax rates and were responsible for tax administration and collection. The data allow me to assess the effect of inequality and local economic conditions on fiscal capacity at a time of profound changes in fiscal policies. Further, the setting enables me to hold constant two important competing explanatory factors: the threat of war and the political system.

I find strong evidence that inequality inhibits the expansion of fiscal capacity. The findings in regards to how elite capital affects investments in capacity, however,
are weaker. In addition to OLS regressions, I estimate instrumental variable models to strengthen the results. I also estimate a number of robustness checks. Anecdotal evidence in line with the theoretical argument and the results from the OLS regression largely confirms the results.

The return to capital for Prussia’s industrial elite was fundamentally affected by the availability of skilled labor and sufficient infrastructure. As Becker, Hornung and Wössmann (2011a, b) argue, even the most basic and menial tasks in factories required some level of literacy and math skills. Furthermore, basic education enabled faster adoption and development of new technologies. Tilly (1966, 484f.) also documents the demand by industrialists to increase government spending that would “generate external economies and make private investment, for example in metalworking enterprise, more profitable” (emphasis added). Indeed, over the time period studied here, investment in education and especially primary education rose significantly. As Spoerer (2010) documents, from 1864 to 1911 the expenditures for elementary education at the municipal level rose from 33 million to 421 million Marks. This translates to an increase in per student spending from 20 to 65 Marks. Moreover, other significant areas of municipal spending were related to infrastructure, i.e. electricity, water, and gas (Spoerer, 2010). The focus of local spending on these items further corroborates the theoretical argument in regards to elite-owned capital.

In addition, two particular examples illustrate that political elites were aware and feared redistribution and regime change when debating the introduction of new taxes and fiscal capacity. The first example is the strong resistance against the introduction of a wealth tax in Prussia. While some argued a wealth tax could alleviate part of the revenue needs of the Prussian state, the main reasoning against its introduction was not the opposition to higher taxes at the time. Instead, the wealthy feared that once the wealth tax was introduced, it could be expanded to confiscate and redistribute in the future, once political power was lost (Von Gerlach, 1893, 84). The
fear of a future confiscatory wealth tax under different political power constellations ultimately ended the debate its introduction. Similarly, Spoerer (2010) discusses the refusal of Prussian elites to allow the German Reich to undertake income tax collection. The opposition to give the central German state this particular power was due in large part to the fear that socialist forces would have an easier time gaining political power at the national level in the German Reich. Prussian elites felt their political power in Prussia was more secure, due to the particular political system outlined above. Both these situations nicely illustrate the refusal to increase certain powers of taxation because of a fear of losing political power in the future.

Based on the findings in this paper, more research is necessary and more data needs to be brought to bear. Using subnational data at a time when nation states were still relatively weak is a promising path for researchers who hope to gain additional leverage on questions concerning fiscal policies. Moreover, once we better understand when and where tax capacity is developed, I plan to investigate the relationship between fiscal capacity, redistribution, and regime change more precisely. Several additional question arise from the argument made in this paper. First, can the lack of fiscal capacity explain the absence of an increase in redistribution after transitions to democracy? Second, can differences in fiscal capacity explain whether democratic governments follow the demands of their electorates? With these questions in mind, several exciting avenues for future research exist.
Conclusion

The capacity to tax is fundamental to the ability of states to raise revenue. For a long time, political scientists have ignored the fact that many governments around the world are unable to govern across all of its geography or enforce the laws enacted by political actors. This is especially the case when it comes to taxation, where scholars generally presumed that states have the capacity to raise taxes. Yet, we can observe stark differences in the ability of states to enforce tax laws, which has direct consequences on whether governments can actually pursue spending and redistributive policies.

It takes long term investment of states to increase the capacity to tax and low capacity has long lasting effects. This is especially true in democracies with large distributional conflicts, since it directly constrains the policy choices of governments. As Nicholas Kaldor concludes in his writing: “Bad tax laws or bad tax administration – or both – are not only to be explained by lack of knowledge, of understanding, or of administrative competence; they are also the result of resistance from powerful pressure groups who block the way to effective tax reform” (emphasis added) (Kaldor, 1970, 160). If the most powerful tax payers oppose higher capacity, increasing the
ability to tax will be even tougher. As I argue in this dissertation, in young democracies fiscal capacity is often constant (at least in the short term) and thus policies are constrained by fiscal capacity investment in previous regimes. The decision to develop fiscal capacity under authoritarian rule has therefore long lasting affects on countries policies and economic development.

In this dissertation, I aim to shed light on the circumstances under which authoritarian elites invest in fiscal capacity and the reasons for when they forgo such investments. The project is separated into three essays. In the first chapter, I develop a general theoretical model of fiscal capacity development in authoritarian regimes. The theoretical model builds on work by Bourguignon and Verdier (2000); Boix (2003); Acemoglu and Robinson (2006). It imagines a theoretical autocratic society with a political elite and a mass citizenry that is politically powerless. In this society, the political elite owns the economic capital and makes decisions about taxation, government spending, and fiscal capacity. In addition to the political process, all actors in the model are tax payers, that individually decide whether or not to evade taxes.

The theoretical argument outlined in Chapter 2 is developed using computational modeling techniques and interacts the policy choices of the political elite with individual choices about tax evasion. The autocratic elite can raise taxes to increase government spending on public services or repression. High levels of taxation, however, require investment in fiscal capacity. When the tax capacity of the state rises because of elite investment, this has long lasting consequences. It increases the ability of democratically elected governments to redistribute income, should the autocrats ever lose power. As inequality rises, fiscal capacity investment is associated with higher potential costs of redistribution in the future. On the other hand, when the authoritarian elites benefit from government spending under the current regime, the gains from capacity investments can outweigh any potential future costs. Building
on endogenous growth models (e.g. Romer, 1989; Barro, 1990) and factor endowment
models (Engerman and Sokoloff, 2002; Easterly and Levine, 2003; Galor, Moav and
Vollrath, 2009), I argue that government spending can directly increase the return
to investment for political elites, depending on the capital they own. Thus, in areas
where elites are engaged in industrial production, government spending can be highly
beneficial. Yet, agricultural elites have little incentive to raise government spending.
Depending on a high or low demand for spending, authoritarian elites can have in-
centives to invest in capacity building. On the other hand, high inequality increases
future potential costs of capacity building and thus lowers elite’s propensity to do so. When the benefit from government spending is very high, elites increase fiscal
capacity, but at the same time use repression to avoid future regime changes.

Additionally, the theoretical model interacts the political decision making on
taxation, spending, and fiscal capacity investments with all tax payers’ decision on
tax compliance. I show that an interactive relationship between fiscal capacity and
the personal benefit to government spending affects the individual decision about
compliance. Moreover, tax evasion is predicted to be lower when tax payers expect
everybody else to comply. Both findings are in line with results from recent empirical
research (Del Carpio, 2013).

In the empirical chapters of the dissertation, I investigate the two most prominent
claims of the theoretical model: 1) that inequality lowers fiscal capacity investment;
2) that in more industrial economies, elites have incentives to raise fiscal capacity.
In the second essay, I examine whether the broad theoretical argument holds true
across a large number of cases in different time periods. I utilize data on over 90
authoritarian regimes from 1980 until 2007. This is the first empirical investigation
of fiscal capacity development in authoritarian regimes with such detailed time-series
cross-sectional data. Moreover, I develop and make the argument for a new cross-
national measure of fiscal capacity: one minus the share of tax revenue that is derived
from trade taxation. Across different model specifications, controlling for confounding factors, and various robustness checks, I find consistently that countries with high levels of inequality have lower levels of fiscal capacity. Secondly, those countries with higher levels of investment in manufacturing (manufacturing value added) are more capable of raising taxes. In line with the idea that building fiscal capacity is only possible in the long term, these results are especially pronounced when looking at between country differences or estimating long run effects.

One of the biggest problems when studying the development of fiscal capacity is the inability to control for confounding factors. The two most prominent theories about states expanding their revenue raising capacity are: 1) that external threats of war create a demand for taxation and higher capacity (Tilly, 1990; Besley and Persson, 2011; Karaman and Pamuk, 2013); or 2) that rulers trade taxation for more political representation (North and Weingast, 1989; Dincecco, 2011; Karaman and Pamuk, 2013). Both of these two competing theoretical arguments are hard to rule out in many empirical settings. First, the threat of war is often unobserved and can not be measured accurately. While scholars often control for the occurrence of external wars (as done in Chapter 3), by definition a threat can be present even without war actually ever breaking out. Similarly, increases in representation are often fluid and it is unclear what time point or change in institution is meaningful enough to be coded as such. The third essay of this dissertation makes use of a unique source of data to isolate the threat of war and political system as confounding factors.

In Chapter 4, I investigate the argument about inequality, elite capital ownership, and fiscal capacity development on subnational data for Prussian counties in the 19th century. To do so, I collected data on tax revenues and administrative spending at a time period when Prussia underwent rapid economic development. At the same time Prussia became one of the most prolific revenue machines. Both of these developments, however, did not take place consistently across its geography. I
make use of the differences in economic development and inequality across Prussia to explain variation in local fiscal capacity development. One of the main advantages of these data is that I am able to hold constant the threat of war and the political system. First, the threat of war ought to be very similar across all of Prussia. Second, military spending was a responsibility of the central state, whereas I utilize variation in tax capacity at the local level. In addition, the political system was essentially the same within Prussia, ensuring that change in political representation is ruled out as an explanatory factor. Using data on over 300 Prussian counties, I find strong evidence that those with high inequality had lower levels of fiscal capacity in 1903. On the other hand, counties with more industrial economies developed more capacity to raise taxes. Moreover, these results are robust to estimation via an overidentified instrumental variable model, where I instrument for both inequality and industrial propensity.

5.1 Implications & Future Research

This dissertation adds to existing research on regime change, fiscal capacity development, and fiscal policy differences in authoritarian regimes. I show extensively that inequality inhibits the development of tax capacity in authoritarian regimes, whereas an industrial economic base leads to more investment. While these findings give insight into the kinds of authoritarian states that develop the ability to tax, there are several implications that warrant discussion. Moreover, several parts of the dissertation ought to be expanded upon in future research.

As outlined above, taxation is paramount for states to function. Without the ability to tax, rulers are unable to fulfill even the most basic tasks. Moreover, efficient taxation and public spending is an important determinant of economic growth (Kaldor, 1970; Barro and Sala-i Martin, 2004; Sala-i Martin, Doppelhofer and Miller, 2004; Besley and Persson, 2011). When authoritarian elites do not invest in fiscal ca-
pacity and the state stays weak, this has long run consequences for leaders and their citizens. Not only are tax and fiscal policies constrained, but economic development is likely to suffer as well. Countries can enter a vicious cycle, of low capacity, an inefficient state, and subsequent dissatisfaction with governments. Low capacity investment by authoritarian elites is one path in which initial conditions like inequality and economic characteristics can have long run consequences for countries (Besley and Persson, 2011).

As identified here, countries with high inequality are more likely to experience elites which oppose investment in fiscal capacity and constrain government spending. This affects government investment in important items, such as public education and infrastructure. Most importantly, these effects are likely to linger, even in subsequent regimes. Thus, an authoritarian legacy can impede countries’ ability to raise taxes and develop economically.

While the importance of this topic is evident, the dissertation raises several questions that ought to be answered in the future. The immediate next step in this project is to better understand the composition of government spending in authoritarian regimes. In particular, the theoretical model in Chapter 2 makes several predictions about the trade-off between investment in fiscal capacity and spending on repression versus keeping fiscal capacity at low levels. The empirical chapters have mostly ignored this trade-off and instead attempted to control for state repression. This was in part due to the inability to reliably measure repression across countries and limited subnational use of repression in Prussia. Moreover, cross-national data on government spending in autocracies was severely limited. In future research, I first plan to investigate cross-nationally how different types of spending are affected by inequality and the most prevalent type of economic capital in autocracies. To do so, I will utilize newly available data on government spending by the Public Expenditure Database from the International Food Policy Research Institute and, where
available, add data from historical country sources. In addition, I plan to exploit
subnational variation in cases where repression and fiscal capacity investment varied
at the local level. This fine grained data would allow me to better understand how
repression and the development of fiscal capacity interact. Two of such cases are the
American south, before the end of the Jim Crow laws, and South Africa prior to the
end of Apartheid. In both cases, blacks were disenfranchised, but local white elites
were in control of spending decisions and investments in the fiscal capacity of the
state. The local variation in spending and capacity, as well as the availability of data
(e.g., see Case and Deaton, 1999; Naidu, 2012), makes these cases an optimal setting
to understand when members of the authoritarian elite invest in capacity and how
this influences spending on repression.

In addition, I plan to utilize data on local spending on public services in Prussia,
South Africa, and the American South to further investigate the theoretical argument
made above. In particular, I expect areas with higher levels of industrial and/or
manufacturing sectors to make strong investments in infrastructure, health care, and
public education. I will to collect more data on the composition of spending in
Prussian counties in the 19th century, well as subnational units in pre-Apartheid
South Africa, and early 20th century American South. Using the within country
variation in these three fundamentally different cases will allow me to further test
the empirical implications of the theoretical argument.

One major area of research that has been largely unexplored by political scientists
is the relationship between the fiscal capacity of the state and tax evasion. In the
theoretical chapter of this dissertation I derive a computational model that interacts
the political decision making process with the individual tax payer’s decision on tax
compliance. Previous research in political science or economics has largely focussed
on only one of these two areas in isolation (Luttmer and Singhal, 2014). The findings
in this dissertation show that often political elites can have an interest in keeping
fiscal capacity low, thus undermining tax compliance. This results in high tax evasion and low trust in government, a vicious cycle that is not easily broken (Uslaner, 2007). Moreover, as the theoretical model in Chapter 2 suggests, the state’s capacity to enforce tax policy, trust in institutions, and efficiency of government spending to citizens all interact and reinforce each other in affecting the decision to comply with tax laws.

Future research needs to consider the long term effect of authoritarian politics on tax evasion in newly democratic settings. This can be done at the macro level, using country estimates of tax evasion as well data from surveys, such as the World Value Survey or Afrobarometer. The more interesting research, however, is about the micro logic behind the decision making process of tax payers to comply with the state’s demand for taxation. Del Carpio (2013) for example, uses experimental evidence to show that reminders about the compliance of others and enforcement can lower the occurrence of tax evasion at the individual level. From a rational actor’s perspective, it is unclear why high capacity or enforcement would ever induce citizens to pay taxes, since the risk of detection is so low. Even in high capacity states such as the US, the probability of a government audit is miniscule. One question that could easily be tested in a lab or field experiment, is whether an increase in the probability of detection would actually lead to higher compliance or whether a treatment effect is only caused by a reminder that enforcement exists at all. Furthermore, this experimental study would include an interactive treatment of enforcement and information about what type of spending is financed by taxes. Thus, getting at the question whether enforcement and personal benefit truly interact in forming the tax payers compliance decision.

Lastly, I plan to return to the question that motivated this dissertation. As I outline above, one of the most intuitive predictions stemming from models in political science is the idea that democratization ought to lead to policies that are more
beneficial to the newly enfranchised masses. In contrast, empirically there is little
evidence that democracies pursue policies that are better for the poor (Mulligan, Gil
and Sala-i Martin, 2004; Ross, 2006). Similarly, whereas Acemoglu and Robinson
(2006) and Boix (2003) would expect increases in taxation and redistribution after
a regime change, the empirical evidence for this claim is rather weak (Elis, 2011).
Research on taxation and redistribution to date, however, has largely ignored fiscal
capacity. But, as we know capacity is in fact not equally distributed across countries
and often governments are severely limited in the kinds of fiscal policies they can
enact (Bird and Zolt, 2004; Besley and Persson, 2014).

The findings in this dissertation suggest that the inability of democratic govern-
ments to enact their preferred policy is often due to an “authoritarian legacy”. In
countries, where elites fear redistribution, fiscal capacity is kept low and taxation and
redistribution is impossible. In exactly those cases, where the theoretical models of
Boix (2003) and Acemoglu and Robinson (2006) would expect increases in redistribu-
tion, I would expect limited levels of fiscal capacity. In line with this argument,
Latin American countries, while democratic, have long suffered from high inequality
and yet relatively low levels of redistribution. Consequently, Tanzi (2008) describes
the personal income tax as one of the most underutilized tax sources on the Latin
American continent. More recently Latin American countries have begun to simplify
their tax system and pay special attention to large individual and corporate tax
payers to increase compliance. Thus with increasing regime age democracies slowly
increase fiscal capacity, as indicated in Figure 1.7 in Chapter 1.

Moving forward on this research agenda, the next step is therefore two fold.
First, it is imperative to understand how much of the variation in fiscal capacity in
democracies today can be explained by politics in the previous autocratic regime.
Second, I plan to test whether democratization does lead to more taxation and
redistribution, once one accounts for the intervening factor of fiscal capacity. To do
so, I will use the newly available data on tax revenues around the world (Wilson, Cobham and Goodall, 2014). While the first step would be to control for capacity when estimating the effect of regime change, more sophisticated modeling strategies are warranted. One way to understand the relationship between inequality, capacity, regime change, and post transition redistribution would be to estimate a two-stage selection model, with fiscal capacity as the intervening variable. Using this strategy, one can gain insights into how these different factors interact. Secondly, it would give insight if democracy does in fact lead to policies closer to the median voter, once the level of fiscal capacity is accounted for.

Another implication in terms of regime change follows from the theoretical argument made in this dissertation. As argued here, low fiscal capacity limits the level of redistribution in young democracies and is kept low in regimes with high inequality. If true, then once a transition to democracy occurs in these cases, a high level of expropriations should be observable. Instead of taxation and redistribution, newly elected governments may utilize expropriation to redistribute wealth. To test this implication empirically, I will utilize data on expropriations across newly democratized regimes.

5.2 Concluding Remarks

In this dissertation, I investigate the question when authoritarian elites invest in fiscal capacity. I develop a theoretical argument about how the type of elite capital can lead to a demand for government spending and thus higher tax capacity. On the other hand, high inequality is likely to raise future costs associated with fiscal capacity should it come to a regime change. In two empirical chapters, I show that across a large number of cases of post-world-war autocracies and at the subnational level within Prussia inequality leads to lower fiscal capacity. On the other hand, in more industrial settings fiscal capacity is higher. Not only does this dissertation shed
light on which countries develop capacity in an authoritarian setting, the argument also has consequences for democratic politics. The development of fiscal capacity or lack thereof, has long lasting consequences for subsequent regimes, effectively constraining tax and fiscal policies. Understanding the reason for the stark variation in capacity across the world is one of the keys to explain differences in actual fiscal policies. This dissertation is a start to gain insight how autocratic politics can explain some of that variation, but as outlined above more work is needed in the study of these topics.
Appendix A

Appendix Chapter 2
Figure A.1: The plot shows the effect of inequality and fiscal capacity on the share of the budget used for public service spending. Note that the x-axis (inequality) is flipped compared to all other plots.
Appendix B

Appendix Chapter 3
Table B.1: Cross-Sectional Regression – Simple Model

<table>
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<tr>
<td>(Intercept)</td>
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<td>0.801***</td>
<td>0.828***</td>
<td>0.850***</td>
<td>0.794***</td>
<td>0.774***</td>
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<td></td>
<td>(0.313)</td>
<td>(0.222)</td>
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<td>0.031</td>
<td>0.030</td>
<td>0.007</td>
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<td></td>
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<td>Manufacturing Val Added</td>
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<td>0.006</td>
<td>0.005</td>
<td>0.005</td>
<td>0.007†</td>
<td>0.010*</td>
<td>0.010**</td>
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<td>(0.004)</td>
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<td>(0.003)</td>
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<tr>
<td>Trade % GDP</td>
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<td>-0.007†</td>
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<tr>
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<td>35</td>
<td>38</td>
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<td>36</td>
</tr>
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<td>0.119</td>
<td>0.089</td>
<td>0.151</td>
<td>0.184</td>
<td>0.186</td>
<td>0.161</td>
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</tbody>
</table>

Standard errors in parentheses

† significant at $p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$
Table B.2: Cross-Sectional Regression - Full Models

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<th>2004</th>
<th>2005</th>
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<td>0.542*</td>
<td>0.229</td>
<td>0.611*</td>
<td>0.539</td>
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<tr>
<td>log GDP pC</td>
<td>0.150</td>
<td>0.066*</td>
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<td>0.104*</td>
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<td>0.045</td>
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</tr>
<tr>
<td>Manufacturing Val Added</td>
<td>0.002</td>
<td>0.006</td>
<td>0.006*</td>
<td>0.005</td>
<td>0.009*</td>
<td>0.011*</td>
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<td>adj. $R^2$</td>
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Standard errors in parentheses:
* significant at $p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$
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<td>0.015**</td>
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<td>−0.001†</td>
<td>−0.002</td>
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<tr>
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Standard errors in parentheses
† significant at \(p < .10\); *\(p < .05\); **\(p < .01\); ***\(p < .001\)
### Table B.4: Country Sample – TSCS models

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N = 408

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N = 158
### Table B.7: Random Effects Model - 1960-2007

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<td>0.05</td>
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<td>0.02</td>
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*N = 680*

### Table B.8: Random Effects Model - Alternative Fiscal Capacity Measure

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<th>upper 90 HPD</th>
<th>lower 95 HPD</th>
<th>upper 95 HPD</th>
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</thead>
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<td>Aid Within</td>
<td>0.00</td>
<td>0.00</td>
<td>-0.05</td>
<td>0.06</td>
<td>-0.06</td>
<td>0.07</td>
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<td>0.06</td>
<td>-0.12</td>
<td>0.23</td>
<td>-0.15</td>
<td>0.25</td>
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<td>GDP Within</td>
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<td>0.07</td>
<td>0.02</td>
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<td>0.14</td>
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<td>0.26</td>
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<td>-0.01</td>
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*N = 408*

### Table B.9: Random Effects Model - Cage Data on Taxation

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Table B.10: Random Effects Model - Alternative Measure for Industrial

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N = 408

Table B.11: Random Effects Model - Excluding Africa

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N = 180
## Table B.12: Error Correction Model

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N = 1765

## Table B.13: Random Effects Model - 10,000 estimations

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Appendix C

Appendix Chapter 4
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Standard errors in parentheses

* indicates significance at $p < 0.05$
Table C.2: Second Stage Instrumental Variable Results – Fiscal Capacity

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Robust standard errors in parentheses

* indicates significance at $p < 0.05$
Table C.3: Instrumental Variable – Model Comparisons

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Robust standard errors in parentheses

* indicates significance at $p < 0.05$
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Standard errors in parentheses
* indicates significance at $p < 0.05$
Table C.5: Second Stage Instrumental Variable Results – Fiscal Capacity – Excluding Urban Counties

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Robust standard errors in parentheses
* indicates significance at $p < 0.05$
Table C.6: OLS Results – Income Tax Revenue per capita

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Standard errors in parentheses
* indicates significance at $p < 0.05$


Biography

1. Florian Max Benjamin Hollenbach
2. Born on July 4, 1984 in Berlin, Germany
3. Diplom in Politikwissenschaft (Political Science), University of Potsdam, 2009
4. PhD in Political Science, Duke University, 2015

Publications:


Awards:

1. DIPE Research Funding, Spring 2013, Spring 2012

2. Duke University Graduate School Summer Research Fellowship, 2012

3. Fulbright Travel Grant, 2007–2008

4. Exchange Student Fellowship for Studies at Duke University, University of Potsdam, Germany, 2007–2008