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Fiscal Capacity in Non-Democratic States

Per F. Andersson

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Fiscal Capacity in Non-Democratic States

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Abstract

Investments in fiscal capacity have traditionally been linked to warfare and democratization. However, non-democratic states also invest in fiscal capacity, even in times of peace. In fact, the majority of income taxes – a prime example of an investment in fiscal capacity – were introduced by non-democratic states in peace time. In this paper I argue that institutions such as parliaments or councils of nobles – which were implemented to solve commitment problems between ruler and elite in the face of a challenge to the regime – also solve commitment problems related to investments in fiscal capacity. Institutionalized power-sharing ensures the elite of future influence, and thus reduces the risk of the ruler using the expanded fiscal capacity opportunistically. The empirical implications are straight-forward: income taxes are more likely to be introduced in non-democratic states with power-sharing institutions. I find support for this prediction by analyzing several new, high quality, historical datasets over political institutions, the introduction of taxes, and government tax revenue, covering as many as 54 countries from the early nineteenth century to the present day.

Scholars across the social sciences have recently begun to emphasize state capacity – the ability of the state to implement various policies – as a key factor behind the success of today's developed countries (for a review see Johnson and Koyama 2017). A strong and capable state can protect private property rights and invest in growth-promoting public goods such as education (Besley and Persson 2011). However we still have a poor understanding of when and why (and why not) governments choose to expand this capacity. One view is that more open and democratic political institutions promote higher state capacity, as well as economic growth (Besley and Persson 2009; Dincecco 2011; Levi 1988). Other explanations hold that state capacity is most readily explained by interstate warfare (e.g, Gennaioli and Voth 2015) or by the state competing with civil society (Acemoglu and Robinson 2017).

In this paper I argue that earlier explanations are incomplete when considering one of the key investments in the fiscal side of state capacity during the last two centuries: income tax.[1] Surprisingly, given the focus in the literature on war and democracy, most income taxes were introduced by non-democratic states in peacetime. In fact, in a sample of 79 countries, only seven introduced a permanent income tax in wartime, and only 26 introduced it while being democratic.[2] In the majority of cases, 50, income tax was introduced by non-democratic states in peacetime. This fact is not well explained by the dominant theories of state and fiscal capacity.

If income tax is not only the result of redistributive demands from newly enfranchised poor citizens or by the immediate exigency of war, what is missing? A recent explanation is offered by Mares and Queralt (2015), where income tax is still explained by redistribution, but redistribution between different elites. Brambor (2016) instead explains the introduction of income tax in non-democratic states with reference to legacy effects: an income tax introduced by an undemocratic government generates less revenue than one introduced by a democratic government.

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[1] Specifically, this paper focuses on the *personal* income tax. See Andersson 2019 (CITE) for a comparison with the *corporate* income tax.
[2] I follow Boix, Miller and Rosato (2012) in defining democracy as a political system where the executive is elected, directly or indirectly, in popular elections and is directly responsible to voters or to a legislature, which in turn is elected in free and fair elections. Moreover, in order to be classified as democratic, a majority of adult men needs to have the right to vote.

In this paper I propose that in order to explain the introduction of income tax we need to understand this as a case of an investment in fiscal capacity – not redistribution or war finance – and that different non-democratic institutions affect the likelihood of this investment. This implies shifting the focus from redistribution (between classes or between elites) to the capacity to solve investment problems. I claim that these investment problems are more readily solved in undemocratic states with institutionalized power-sharing arrangements, such as councils of nobles or parliaments from which the elites can exercise power over the ruler.

While the first permanent income taxes were introduced in the nineteenth century (for example, the United Kingdom introduced the tax in 1842), others were introduced much later. Thus, a long-term perspective is crucial in order to properly investigate the origins of income tax. Earlier efforts (e.g., Aidt and Jensen 2009 and Mares and Queralt 2015) have been constrained geographically by focusing heavily on Europe and English speaking off-shoots (analyzing samples of between 15 and 17 countries).[3] By using the new Tax Introduction Database, TID (Seelkopf et al. 2019), which provides information on the introduction of six different taxes covering 220 states from 1750 to 2015, I am able to overcome these limitations.[4]

My empirical analyses controlling for war and economic development suggest that power-sharing institutions have a positive impact on the probability of income tax introduction in non-democratic states, providing support for the argument that income tax was an investment made possible by institutionalized power-sharing. In contrast, I find no evidence in support of elite competition theory, the major alternative explanation for the non-democratic introductions of income taxes. A short case study of the adoption of income tax in Sweden provides clues as to why elite competition fails to explain income tax adoption, while

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[3] Aidt and Jensen (2009) covers 17 countries over 124 years (in total 920 observations), and Mares and Queralt (2015) cover 17 countries over 97 years (in total 849 observations).

[4] Because of limited information on important covariates, my sample is reduced to 54 countries. Also, I am only concerned with sovereign states, excluding cases where the tax was included by a colonial power (which is not an uncommon mode of introduction, see Seelkopf et al. (2019)). This means that a sample of 54 is not small considering that there were only 55 sovereign states in the beginning of the twentieth century (Karatnycky 2000).

demonstrating how political institutions play into actors preferences for tax reform.

The paper is related to several literatures concerned with institutions, development, and taxation. One of the more well-known explanations for tax reform is war. Warfare means a sharp increase in government spending that needs to be financed, for example by a tax on income.[5] Recent empirical efforts have shed more light on this link by using detailed historical case studies (Dincecco, Federico and Vindigni 2011) and by considering the variegated nature of warfare in terms fiscal pressure (Gennaioli and Voth 2015) and mass mobilization (Scheve and Stasavage 2010). However, while war seems to be linked to taxation in Europe, this is not the case in Latin America (Centeno 1997). There are two additional problems with explaining the adoption of permanent income taxes with interstate warfare. First, it takes time to develop a bureaucracy to administer the tax, too long time if the revenue is needed to finance an urgent crisis such as a war. Second, when the war is over, there is no longer a need for the tax. Thus, we would be more likely to observe loan finance and temporary taxes in times of war instead of permanent investments in fiscal capacity. Or, as pointed out by Morgan and Prasad (2009), war might increase the revenue extracted from existing taxes.[6]

Others have emphasized the redistributive potential of taxation and link income tax to inequality and democratization (e.g., Acemoglu and Robinson 2001; Boix 2003; Meltzer and Richard 1981). The underlying logic is that democracy grants effective representation of previously excluded poor citizens that demand more taxation overall, and in particular progressive taxes such as those on income. The empirical evidence, however, is mixed: some find that democracies are more likely to introduce income taxes (Seelkopf and Lierse 2017), while others do not (Aidt and Jensen 2009). Moreover, there is evidence suggesting that democracies tend to increase regressive taxes (Timmons 2010*b* and 2010*a*), and that

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[5] While this argument is most commonly associated with the work of Charles Tilly (in particular 1990) versions of it goes back to at least Hintze (1970) and Schumpeter (1991) [1918].

[6] On a grander scale, Schumpeter saw war as the main driver behind the evolution from the domain state of medieval Europe to the modern tax state. A version of this argument is that war was an urgent factor forcing rulers to make representative concessions in exchange for taxation, setting in motion the "taxation for representation" dynamic that ended in democracy (Tilly 1990). This paper is concerned with the introduction of a specific tax, not the general activity of taxation per se.

democracy has a positive impact on the share of income tax revenues only in highly urbanized states (Andersson 2018).

A related approach posits that the important conflict in non-democratic states is between different elites, not between different classes (Ansell and Samuels 2014). In this theory, taxation is used as a tool for redistribution between different elites, and not as a way for the poor to expropriate the wealthy. In particular, income tax is claimed to have been introduced in non-democracies as a way for the old landed elite to check the increasing economic influence of the new industrial elite, or when franchise is tied to payment of tax (Mares and Queralt 2015).

A somewhat different explanation is that when income tax is introduced by non-democratic, right-wing governments they yield less revenue, and are thus less harmful for those introducing it (Brambor 2016). Different kinds of taxes are introduced in democracies and non-democracies, taxes in the latter being much less effective. Another recent contribution proposes that the shift from self-employment to employee-jobs was a causal factor behind the rise in income tax capacity in the United States (Jensen 2016). In contrast to Brambor (2016) and Jensen (2016), this paper is concerned with the *decision* to introduce an income tax, not its long term *yield*.

The notion that institutions can solve commitment problems, and by extension facilitate greater fiscal capacity is not new (see for example, Besley and Persson 2009 and 2011, North and Weingast 1989, Dincecco 2009, and Karaman and Pamuk 2013), but explaining the *general rise* in fiscal capacity is not the same as explaining the *origins* of fiscal capacity. In the early modern period, and well into the nineteenth century, taxes on international trade and specific goods were still the most important components of many governments' budgets. Focusing on one tax allows for a closer study of the mechanisms behind the decision compared to focusing the overall development of tax revenue over a longer period of time. This strategy also reduces the risks of conflating fiscal capacity investments with a general willingness to pay or taxation in exchange for representation which is the case with earlier research focusing on the general rise in revenues and more general constitutional changes.

My argument is closely related to work emphasizing representative and/or constraining institutions as key for the development of the modern fiscal state (e.g., Dincecco 2009; Karaman and Pamuk 2013). Scholars have argued that constitutions

constraining the ruler in autocratic states allow governments to credibly commit to honor promises (with respect to e.g., private property rights and loans), thus allowing the state to borrow at a lower interest rate (North and Weingast 1989; Stasavage 2002) and attract more private investment (Gehlbach and Keefer 2011, 2012; Stasavage 2002).

I build on this literature, but diverge from it in important ways. First, this literature primarily stresses commitment problems between the state and the private sector (e.g., with respect to government loans or private investment), while my focus is on public investments in fiscal capacity and commitment problems within the ruling class.[7] Second, most of the earlier literature is concerned with how constitutions are linked to the general rise of government revenue and growth in the early modern period (for an exception, see Gehlbach and Keefer 2011) while I focus on the last two centuries, when the foundation of the current fiscal system was laid. Moreover, instead of focusing on the general increase of tax revenues or the interest rate on government bonds, I am concerned with a specific political investment in fiscal capacity: the introduction of the personal income tax.

A different literature is concerned with how policy is made in autocracies. In contrast to the large literature on how institutions in democratic states affect policymaking, we know less about how political institutions function in non-democratic states. These states are often treated as a residual category, only defined by them not being democratic, yet concealing large institutional variation within them (Svolik 2012, ch. 1). For instance, recent accounts of the rise of the tax state focusing on political institutions either treat institutions similarly to polarization (as in "cohesiveness" in Besley and Persson (2011)), or as a dichotomy between absolutist/authoritarian and representative regimes (Dincecco 2009; Karaman and Pamuk 2013). The literature on authoritarian politics provides a more comprehensive analysis of the unique challenges facing political actors in non-democratic states, and how institutions can solve them (for an excellent review of this literature, see Gehlbach, Sonin and

[7] In order to borrow money a state needs the capacity to generate state revenue, and be able to credibly commit to repaying the debt. North and Weingast (1989) assume the first one exists, and focuses on the second challenge. I focus on the first.

Svolik (2016)). Some argue that the important conflict in non-democratic politics is between the rich elite and the poor masses (e.g., Acemoglu and Robinson 2001), and others that it is between different elites – such as the old landed rural elite and the new urban industrial elite (e.g., Ansell and Samuels 2014; Mares and Queralt 2015). In contrast, my argument follows the literature on autocratic power-sharing (e.g., Myerson 2008; Svolik 2012) which focuses on the conflict between the ruler and the support coalition.[8]

The next section presents the main argument of the paper, that power-sharing institutions can explain income tax adoption in undemocratic states. Section 2 presents the data and the statistical analyses. In section 3, I provide a short illustration of the argument by describing the introduction of the income tax in Sweden. The final section concludes.

I. Theory

According The theoretical framework is concerned with fiscal capacity investments non-democratic states. I follow Boix, Miller and Rosato (2012) and define a country as democratic if the executive and legislature is elected (directly or indirectly) in free and fair elections, and if a majority of adult men has the right to vote. That is, a country in which there is broad participation and free contestation of political power. A non-democratic state lacks one or both of these features.

Fiscal capacity is an element of the broader concept of state capacity. I follow Lindvall and Teorell (2016) and define state capacity as "the strength of the causal relationship between the policies that governments adopt and the outcomes that they intend to achieve." (p. 1). One of the key elements strengthening this relationship is the ability of the state to raise money, its *fiscal capacity*. As I explain in the next section, it is important not to conflate potential and realized capacity. The introduction of a new tax means a new tool available to

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[8] Using the terminology in Svolik (2012), the most important actors in non-democratic politics are the leader and his/her support coalition. This could be a monarch and a group of influential barons, or a military dictator and a group of officers. What matters is that these actors are not different classes or elites, but actors within the ruling regime.

the government, and this is distinct from the sheer amount of money raised by the tax system as a whole.

My argument is based on three assumptions. First, following Levi (1988) (and many others) I assume that rulers are revenue maximizers, and thus that the regime prefers to invest in fiscal capacity. For example, a negative shock to existing sources of revenue (such as deteriorating international trade) forces the ruler to think about new, different sources of revenue. This is especially the case if the existing sources of revenue are volatile, such as taxes on international trade (see for example He (2013) on the importance of a reliable source of domestic revenue for the fiscal capacity of the United Kingdom in the 18th century). Importantly, this is not about war. War is a temporary crisis situation where all actors' preferences are aligned, and when a temporary tax can be used to solve the problem. In short, the ruler/regime prefers a stable and scalable source of revenue to a volatile and low yielding source of revenue.

Second, introducing a new tax does not imply prohibitively high short-term costs for the ruler. This simply means that the ruler prefers a more capable tax system both in the short and in the long run. As I will explain later, the decision to introduce a tax is a strategic one which depends on the support coalition and power-sharing institutions. The ruler will not adopt a new tax if this implies a risk of losing support from key parts of the elite.

Third, the coalition of elites on whose support the regime/ruler relies on to stay in power also prefer investment in a new tax, which they do if their time horizon is long enough. There are two reasons for this. First, in order to reap the benefits of the new system, the support coalition needs to be in a position of power also in the future. This is the case since a new tax is an investment, a policy which makes "welfare tradeoffs at the expense of the present and in favor of the future," exchanging "a given amount of short-run welfare" for "greater long-run welfare" (Jacobs (2016), 434-435). It takes time to set up the bureaucratic system needed to administer the new tax. Second, there is a risk of executive overreach in the future. The support coalition will only back an investment in fiscal capacity if they can be ensured influence in the future as well, and hence influence over the tax and how the revenue is spent. Section 1.2 deals with this problem directly by suggesting that commitment problems associated with tax reform are easier to resolve in undemocratic states with institutionalized power-sharing. But before this, I will explain

why income tax introductions in undemocratic states should be understood as investments in fiscal capacity.

Income Tax as Investment

By a tax I mean an "obligation to to contribute money or goods to the state in exchange for nothing in particular" (Martin, Mehrotra and Prasad (2009) p. 3). As mentioned above, this paper is concerned with the *personal* income tax, which is a "tax levied on the directly assessed income of a personal taxpayer" (Seelkopf and Genschel 2017, p. 5). As mentioned above, the introduction of income tax is usually explained with reference to redistribution, either between rich and poor or between different elite groups. But in non-democratic countries, redistribution should be less salient as a motivation since the (poor) majority of the population is excluded from power, thus making income tax less relevant in terms of class-based redistribution (an exception might be Communist dictatorships where redistribution is part of the ruling ideology). Instead I argue income tax should be seen as an investment in tax capacity.

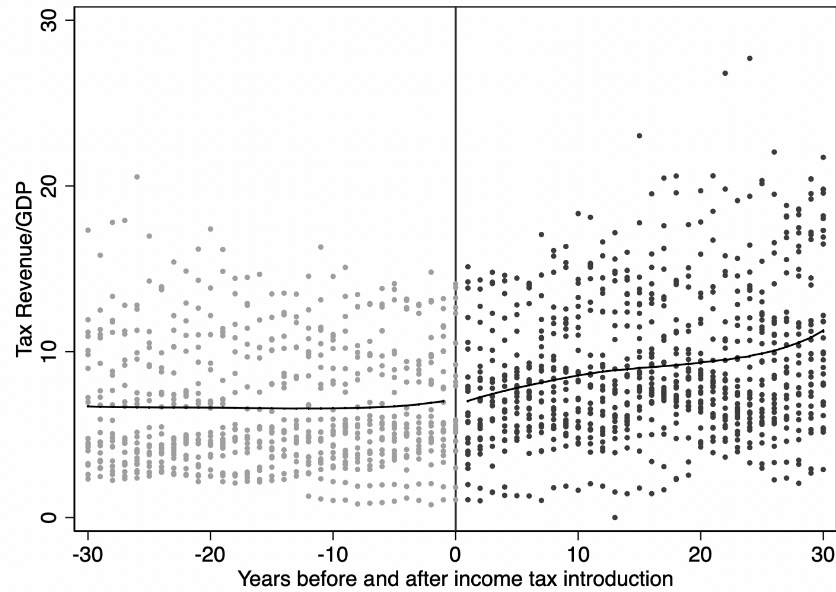
Income tax is an effective means of generating government revenue. States with a tax system capable of generating large amounts of revenue efficiently are said to have a high tax capacity (which in turn is an important component in economic development, see Besley and Persson 2009 and 2011).[9]

Figure 1 plots tax revenues as a share of GDP before and after the introduction of income tax, showing that the income tax allowed for an increase in overall tax take.[10] Figure 3 (in appendix) shows the development of income, property, customs, excise and consumption tax revenue from 1800 to 2012, documenting the development in which income tax has become a corner stone of government budgets. In recent times, on average 40% of tax revenues come from income tax.

[9] When I use the term tax capacity I mean the capacity of the government to raise *tax* revenue. Tax capacity is a part of fiscal capacity, the capacity of the state to generate revenue. Fiscal capacity in turn is a major component of overall state capacity.

[10] The data on government tax revenues is from Andersson and Brambor (2017) and cover 31 countries from 1800 to 2012.

Figure 1: Tax Revenue Before and After Income Tax



Loess line. Data from Andersson and Brambor (2019) and Seelkopf and Genschel (2017).

While the share of total tax revenue coming from income tax has been put forward as a consistent measure of *state capacity* (Rogers and Weller 2014), it is less suitable as an indicator of *tax capacity*.[11] The reason is that revenue from an income tax is a function not only of having the capacity to tax, but also the willingness to tax. That is, it conflates the outcome of capacity with capacity. Having a functioning income tax means having the capacity to increase total tax revenue, but it does not mean using it to the full effect all of the time. But in the case of an event increasing the need for government revenue (such as a war), states with an income tax in place will be better equipped to expand overall taxation.[12] This means that Figure 1 represents *realized capacity*, not *potential capacity*.[13]

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[11] For a different way of measuring state capacity using the information capacity of the state, see Brambor et al. 2018.
[12] See also Morgan and Prasad (2009)
[13] One might argue that for any tax to be feasible, there needs to be a certain level of state capacity. In the case of the income tax, however, it is unlikely that the administration and bureaucracy to collect this tax would be in place before the decision to introduce the tax. More generally, there are structural conditions – such as monetization of the economy and urbanization – that facilitate the collection of income tax (Riezman and Slemrod 1987).

Power-sharing Institutions and Investments

Investments such as income tax are often associated with a dilemma. While those in control of the state gain from a stronger, more effective state[14], there is a risk involved: if the elite lose their influence, the capacity of the state can be used against them (this problem is similar to that described in Weingast (1995): "A government strong enough to protect property rights and enforce contracts is also strong enough to confiscate the wealth of its citizens" (p.1)). In the case of the income tax, there are two concrete aspects that pose a risk for the support coalition (the group of elites whose support is needed for the ruler to stay in power). First, income tax can be used to effectively redistribute resources by implementing a highly progressive rate while targeting spending in a way that does not benefit the support coalition. Second, since a working income tax is based on assessment of income, it implies a powerful tax administration with the ability to collect a wealth of information on the income of members of the support coalition. Not only will income tax increase what Seligman (1911) called the "bureaucratic inquisition" (p. 34-35), but also the record keeping requirements for taxpayers (Penndorf 1930). Thus, when a ruler of a non-democratic state wishes to invest in fiscal capacity by introducing an income tax, the ruler needs to be able to commit to use this new tool in line with the preferences of the support coalition, or they will not support its introduction. In the absence of a commitment device there is nothing stopping the ruler/regime in a future period, when less dependent on the elites, from reneging on promises made when the income tax was introduced.[15] Being part of the regime, the support coalition also gains from a more efficient revenue system. Not only since it increases the potential monetary rewards of supporting the ruler, but also since it increases the resilience of the regime to challengers.

One of the main insights from the literature on non-democratic politics is that institutions such as parliaments play a different role in non-democracies than in democracies (Gehlbach, Sonin and

[14] But see Sonin (2003) for a situation in which this is not the case.

[15] The problem of time inconsistent preferences and commitment problems is related to the literature on the "inefficient use of power" (Powell 2004), exploring bureaucratic insulation (de Figueiredo 2002), wars (Fearon 1995 and civil wars (Fearon 2004), and coups (Acemoglu and Robinson 2000, 2001) as sub-optimal policies insuring against a future decline in power. In contrast, this paper is concerned with inefficient inaction.

Svolik 2016; Svolik 2009; Gandhi 2010). In general, this literature focuses on two challenges facing non-democratic regimes: information asymmetries and credible commitments. The first arises as a result of the leader having both exclusive access to information and incentives to not reveal that information truthfully to his/her coalition of supporters. The second arises when there is bargaining without a third party present that can enforce contracts (a common problem also in democratic politics). Both problems are easier to overcome when there is institutionalized power-sharing between the leader and the group of elites that currently support him/her (the support coalition) (Boix and Svolik 2013; Svolik 2012; Myerson 2008). By empowering the support coalition – through, for example, increasing the influence of the parliament over budget decisions – the ruler can be punished if s/he deviates from a previous agreement.

The ruler needs the support coalition to fend off challengers and to stay in power. By supporting the ruler, members of the support coalition gain access to benefits. However, once the ruler is safely in power (e.g., after a challenger has been defeated), he/she has an incentive not to provide the benefits promised. In Svolik (2012), in the absence of institutions, the only means the support coalition has to check the leader's behavior is to rebel, which is costly and inefficient. Power-sharing institutions such as a parliament or council of nobles decrease information and monitoring costs, reducing the probability of an inefficient rebellion. Thus, it is in the ruler's interest to introduce checks on his/her own power, since this allows commitment problems to be solved, and thus makes it easier to attract supporters and stay in power (Myerson 2008).

The ability to overcome commitment problems is also central when explaining why political investments are made when the distribution of future gains is uncertain (Andersson and Lindvall 2018, Jacobs 2011). In the same way as the support coalition's decision of whether or not to support the current leader depends on his/her belief that the promised reward will be realized after the challenge is over, the decision whether to support the introduction of a new income tax also depends on beliefs regarding the future. The new tax means greater tax capacity in the future, but support for it crucially depends on the ruler being able to commit to use the tax and its revenue in the way it was intended. The support coalition is more likely to support the new tax if it can ensure that the revenue will be spent on activities it likes – such as defense – instead of activities it

does not like, such as redistribution. Institutionalized power-sharing facilitates these agreements by guaranteeing the support coalition a seat at the table when decisions are made in the future. In other words, the utility of an income tax for the support coalition depends on its likelihood of it being able to check opportunistic behavior by the leader in the future, after the tax has been introduced. In the absence of these arrangements, there is a greater risk associated with the tax since it can be used against the interest of the support coalition. Power-sharing institutions solve this problem by regulating the present and future interaction between the leader and the support coalition.

There are two reasons for an autocratic leader not impose an income tax without the consent of the support coalition even in the absence of institutionalized power-sharing. First, without at least the tacit support of the elite, widespread evasion might render the tax ineffective in terms of generating revenue. Second, and even more problematic, the elite might shift their support to a potential challenger, jeopardizing the survival of the regime.[16] Thus, potential resistance constrains the effectiveness of a tax without elite support. While an income tax in the absence of institutionalized power-sharing also has the advantage of giving the leader more discretion over spending, this is less of an advantage if the revenues generated are small and the tax threatens the survival of the regime.

From the support coalition's point of view, an income tax without institutionalized power-sharing is bad news. It provides the ruler with a tool with which resources can be effectively transferred from them to any other group. Moreover, a modern income tax means a fairly developed administrative apparatus capable of collecting information on, among other things, the sources of income of individual members of the elite. The de facto power of the support coalition is not always enough to discourage executive opportunism. The reason for this is that the tools of resistance – evasion and rebellion – are both costly and risky. This means that the threat constraining the ruler is only credible if the level of executive overreach is high.

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[16] In North and Weingast (1989), it is the demonstrated ability to remove monarchs through rebellions and civil war that lends credibility to the elite. Without these successful instances of toppling the regime, William III would never have agreed to the constraints on his power set out in the aftermath of the Glorious Revolution.

Thus, a system of regularized interaction wherein compliance and loyalty are exchanged for power over how the money is used is beneficial for both the leader and the support coalition. With institutionalized power-sharing the ruler gains from a high-yielding income tax with lower levels of evasion and low risk of rebellion, while the support-coalition in exchange for paying more in tax have real influence over the budget.

In sum, power-sharing institutions in non-democratic states should positively affect the probability of income tax adoption since they help overcome commitment problems associated with investments.

II. The Effect of Power-Sharing Institutions on Income Tax Adoption

This section presents empirical evidence linking power-sharing institutions to the introduction of income tax in non-democratic states. It relies on a new dataset on tax introductions (presented in the next section) and newly available information on the legislative constraints on the executive – my proxy for power-sharing – from the Historical V-dem dataset, allowing me to cover the entire 1800-2012 period. In addition to the econometric evidence, I report a short case study of the introduction of income tax in Sweden in order to explore the motivations of key actors more closely and to compare my argument to that of elite competition theory.

Dependent Variable

Using data on the introduction of income tax from the Tax Introduction Dataset (TID) (Seelkopf et al. 2019) is a major advantage. While earlier contributions (e.g., Mares and Queralt 2015 and Aidt and Jensen 2009) cover only small samples of Western states, TID covers 220 countries that existed at some point between 1750 and 2015. It provides information on the *permanent* introduction of six different taxes: income tax (personal and corporate), inheritance tax, social security contributions, general sales taxes, and value-added taxes. This is by far the largest dataset over tax introductions

available.[17] I use the variable from TID indicating the adoption of a *personal* income tax (PIT).[18]

The typical PIT was introduced in the decades before the Second World War, but the variation in introduction year is large (see Figure 2 in Seelkopf et al. (2019)). The Kaplan-Meier curve for the entire sample (Figure 4 in the appendix) shows that most countries had introduced the tax after 150 years. The median survival time is 95 years, which means that the median country was sovereign – my definition of being at risk of introducing PIT – for 95 years before introducing the income tax. There is no clear regional pattern of introduction, with European and non-European states introducing the tax at a similar rate (Figure 5 in the appendix).

Although the TID dataset cover up to 220 states (or state-like entities), the regressions below are based on only 54 countries.[19] There are several reasons for this. First, the TID dataset includes many small states (e.g., Baden) that existed only for a fraction of the years in which I am interested (and some ceased to exist before introducing income tax). For many of these small, short-lived states there is also missing data on covariates. Second, the TID includes colonies. In my specifications, a country is only at risk when it is sovereign, thus losing observations where a colony had a PIT imposed by the metropole. Naturally, the sample available changes depending on which covariates are included in the model. In order to reduce the risk of results being driven by changing sample and not by added controls, I restrict all models to the smallest sample available, which is the one used in Model 4.

Independent Variables

Institutionalized power-sharing helps leaders in non-democratic countries to overcome commitment problems associated with the introduction of an income tax. One of the few attempts to measure

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[17] In total (factoring in that I could not find information on covariates for all states covered by TID) the models in section 2.4 are based on between 54 countries over two centuries (total 1 916 observations). In comparison, the data used in Aidt and Jensen (2009) covers 17 countries over 124 years (in total 920 observations), and Mares and Queralt (2015) cover 17 countries over 97 years (in total 849 observations).
[18] This is separate from a tax on corporations and/or business income, which is important to keep in mind in the light of recent contributions interpreting the introduction of the income tax as a means of the old landed elite to tax the new industrial elite (Mares and Queralt 2015). For more details about the definition and coding, see Seelkopf et al. (2019) and the TID codebook.
[19] Listed in the appendix.

institutionalized power-sharing in non-democratic states quantitatively is Svolik (2012) who measures elements in the executive, the legislature, and parties in order to estimate the level of power-sharing in undemocratic states.[20] Svolik's data, however covers only the period between 1946 and 2008, a period when most countries in my data already had a permanent income tax in place. Another drawback when using a short time period is that different types of non-democratic states are more common in certain periods. Covering the entire 1800 - 2012 period means that my sample will include both monarchies and one-party states, for example. An additional problem with Svolik's conceptualization is that many elements in his index – such as the executive being selected by the majority in elections – are closely related to electoral democracy. Thus, there is a risk of conflating vertical and horizontal constraints.

The main constitutional arena for elite influence during the period when most income taxes were introduced were national legislatures.[21] As mentioned above, these legislatures played different roles in non-democratic states. The more influence the legislature has over the executive, the stronger the degree of institutionalized power-sharing. In order to measure the degree of legislative power vis-a-vis the executive, I use the V-dem legislative constraints on the executive index (Coppedge et al. 2017). This index presents information on the extent to which the legislature and government agencies are capable of exercising oversight over the executive. It takes values from 0 to 1, where higher values indicate a higher degree of legislative constraints on the executive (in the analysis I rescaled the variable to 0 - 100). The V-dem data covers (at most) 201 countries from 1789 to 2011.

Importantly, this measure is not strongly correlated with key elements of electoral democracy such as suffrage (r=0.2), but more closely related with the budgetary powers of parliament, r=0.4.[22] Crucially for the tests below, non-democratic states vary in how much power the legislature has.

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[20] Specifically, Svolik codes the circumstances surrounding executive selection (unelected, selected by party, or by overwhelming majority in elections), the legislature (appointed, one party, or nonpartisan), and parties (banned completely, only one party, or multiple parties).

[21] Royal courts, emphasized by Myerson (2008), were probably more important in earlier periods.

[22] Using the budgetary reversion power measure from the Legislative Powers Dataset (Cox 2016). This dataset, however, only stretches back to 1875.

I measure electoral democracy by using the Boix, Miller and Rosato (2012) dataset. This binary indicator of democracy codes a country as being democratic if the executive is elected, directly or indirectly, in popular elections and is directly responsible to voters or to a legislature, which in turn is elected in free and fair elections. Moreover, in order to be classified as democratic, a majority of adult men needs to have the right to vote. Importantly, this measure focuses on participation and contestation and is silent on constraints on the executive. Thus, this indicator is concerned with *vertical accountability* – the constraints on rulers from the people, either in direct elections or through an elected legislature – and not the constitutionally specified relationship between the legislature and the executive.[23] The Boix, Miller and Rosato (2012) dataset covers 219 countries from 1800 to 2007.

The proxy for institutionalized power-sharing – legislative constraints – and my measure of democracy are clearly linked to horizontal and vertical accountability, respectively, and are conceptually and empirically distinct. This allows me later to investigate the impact of power-sharing in non-democratic states by specifying an interaction effect.

These indicators closely follow the point made in the autocratic politics literature that constitutions in non-democratic states have a different function. Importantly, this does not preclude the possibility that the relationship between the legislature and the executive plays a role in democracies. This potential effect, however, is outside the scope of the analysis.

Econometric Specification

The most widely used methods for estimating models with a binary dependent variable are probit and logit regressions. However, these approaches are problematic since they ignore the temporal dimension of the data. In particular, the assumption that observations are temporally independent is likely to be violated in the case of income tax where the probability of adoption probably increases over time, which could cause t-values to be inflated.

[23] This is also the preferred measure of vertical constraints in Cox and Weingast (2018).

A common way to solve this problem is to run logit/probit models and introduce natural splines (Beck, Katz and Tucker 1998) or cubic polynomials of time (Carter and Signorino 2010) to correct for temporal dependence.[24] This is also the method used in earlier research on historical tax introductions (e.g., Aidt and Jensen 2009; Mares and Queralt 2015; Seelkopf and Lierse 2017).

I have instead opted for the Cox proportional hazard model, which is a semi-parametric technique for estimating time-to-event.[25] The dependent variable is the hazard rate, which in this case can be roughly translated as the probability that an income tax will be introduced in a given year, conditional on it not being introduced up until that point.[26] The key advantage of the Cox model is that the functional form of the baseline hazard – the reference risk when all covariates are at zero – is left unspecified. This makes it possible to estimate the impact of co-variates without strong assumptions of the underlying probability distribution of income tax introduction. As pointed out by Metzger and Jones (2018*a*), by parameterizing the baseline hazard (e.g., through using a cubic polynomial in a logit/probit framework), we run the risk of misspecification, which can lead to biased or inefficient estimates. In addition, the choice of model for the baseline hazard can affect the interpretation of the hazard.[27]

In the results below, a country is defined as being at risk of introducing an income tax if it does not currently have one, and if it is sovereign according to Boix, Miller and Rosato (2012).[28] To aid interpretation, I provide graphs of transition probabilities for theoretically interesting scenarios.

There are two important confounders that need to be controlled for. First, it is possible that war (civil as well as interstate) causes both

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[24] But see Beck (2010) on why using cubic polynomials of time can be problematic.
[25] As pointed out it Beck, Katz and Tucker (1998), the grouped duration model is easily derived from the Cox model.
[26] In the regressions below, I employ the Breslow method for ties.
[27] There are two additional reasons for using the Cox approach in this context: first, it makes testing of the proportional hazard assumption more straightforward; second, interpretation – a reason many use logit with cubic polynomials – has recently been made easier by new routines in R (de Wreede, Fiocco and Putter 2010 and 2011) and Stata (Metzger and Jones 2018*b*).
[28] This is important since many income taxes were introduced in countries when they were colonies. As mentioned previously, this is one of the reasons the final sample is smaller than the available data on tax introductions. Income taxes had been introduced temporarily already in the 18th century (the first one being adopted in Massachussets 1706 (Aidt and Jensen 2009).

more power-sharing institutions (as predicted by Myerson 2008 and Svolik 2009), and an expansion of taxation (Hintze 1970; Tilly 1990). In the models that follow I therefore control for both interstate and civil war using data from PIPE (Przeworski 2013) and Correlates of War (Singer, Bremer and Stuckey 1972). Another important factor is economic development which might affect taxation (Hinrichs 1966) as well as political institutions (Lipset 1959). I control for GDP/capita (logged) using data from the Maddison Project (Bolt et al. 2018). Finally, a concern might be that states with a higher tax capacity, with many modern taxes in place, are more likely to introduce power-sharing constitutional reform, and at the same time be less likely to introduce new taxes (since the capacity is already high). Moreover, already existing taxes – such as general sales tax – might make the introduction of income tax more likely (e.g., through already existing administrative capacity in the tax authority), while at the same time create demand for more power-sharing. In order to alleviate these and similar concerns I have included models controlling for the previous introduction of other, non-income, taxes in the TID dataset: inheritance tax (inh), corporate income tax (cit), social security contributions (ssc), general sales tax (gst), and value-added tax (vat).[29]

I present four models with different sets of controls introduced. The main variable of interest is my proxy for institutionalized power-sharing – legislative constraints on the executive – in non-democratic states. This conditional effect is produced by interacting legislative constraints with the binary democracy indicator from Boix, Miller and Rosato (2012). All independent variables are lagged one year in order to alleviate concerns that changes to the tax system and to institutionalized power-sharing occurred simultaneously.

Results

Table 1 shows the results from the Cox regressions, presenting hazard ratios. Model 1 only include the variables of interest, while models 2 and 3 include controls for war (intra- and interstate) and economic

[29] Importantly, the TID does not provide information on temporary taxes, so we do not know if, for example, there was a temporary GST in place when the PIT was permanently introduced, and only later a permanent GST was adopted. Moreover, including other taxes as controls might introduce post-treatment bias. For these reasons I will include models both with and without these additional controls.

development respectively. The preferred specification, Model 4, also includes controls for already existing taxes.

Table 1: Results

	(1)	(2)	(3)	(4)
Leg. Constraints	1.01*	1.01	1.01	1.02**
	(0.01)	(0.01)	(0.01)	(0.01)
Democracy	1.94	2.08	2.08	1.52
	(1.41)	(1.53)	(1.54)	(1.82)
Leg. Const. X Democracy	0.99	0.99	0.99	0.99
	(0.01)	(0.01)	(0.01)	(0.02)
War		1.09	1.08	1.45
		(0.53)	(0.54)	(0.70)
Civil War		0.55	0.55	0.37
		(0.61)	(0.62)	(0.49)
GDP/cap (log)			1.02	0.66
			(0.21)	(0.18)
SSC				0.97
				(0.45)
INH				1.16
				(0.50)
CIT				8.83***
				(6.64)
VAT				1.54
				(0.89)
GST				0.72
				(0.68)
N	1916	1916	1916	1916
Pseudo R^2	0.02	0.03	0.03	0.13
χ^2	8.21	7.94	8.01	18.6
Log pseudolikelihood	-81.72	-81.55	-81.54	-72.95
Number of Countries	54	54	54	54

Exponentiated coefficients (hazard ratios)
Standard errors clustered by country in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The results show that the impact of institutionalized power-sharing (as measured by legislative constraints) in non-democratic states on the probability of introducing income tax remains positive and of similar magnitude across all models. In Models 2 and 3, the coefficient is slightly below conventional levels of statistical significance.

The preferred model – Model 4 – suggests that the impact of institutionalized power-sharing is positive and statistically significant even when controlling for, warfare, economic development and previously existing taxes. It is interesting to note that in this specification warfare and economic development both seem unrelated to the likelihood of income tax adoption, while the existence of a corporate income tax (CIT) is positively related to PIT introduction.[30]

Since the models are not linear, it is useful to investigate how the effects vary over time and for different values of the covariates. Using the results it is possible to simulate transition probabilities for different theoretically interesting scenarios. Figure 2 presents transition probabilities over time for two scenarios. The first, the solid line (with thinner lines representing 95 % confidence bands), shows the likelihood that a country with a low degree (25th percentile) of institutionalized power-sharing has introduced income tax in a non-democratic state.[31] The second, dashed, line shows the same but for a country with a high degree of institutionalized power-sharing (75th percentile). In both scenarios, the economic development is set at the median and in peace time. The figure shows the likelihood that the income tax has been introduced in a certain year, or anytime before that year.

For example, after fifty years of being at risk (that is, being sovereign), the likelihood that income tax has been introduced in a non-democratic country with a high degree of power sharing is almost eighty percent, while the probability in a country with a low level of power sharing is only about fifty percent. As we can see from the graph, in both scenarios countries are more likely to introduce income tax over time, but the likelihood is always higher for non-democratic states with a high degree of institutionalized power-sharing. This suggests that, in non-democratic countries, the degree to which power-sharing is institutionalized (as measured by the power of the legislature) matters for income tax adoption.

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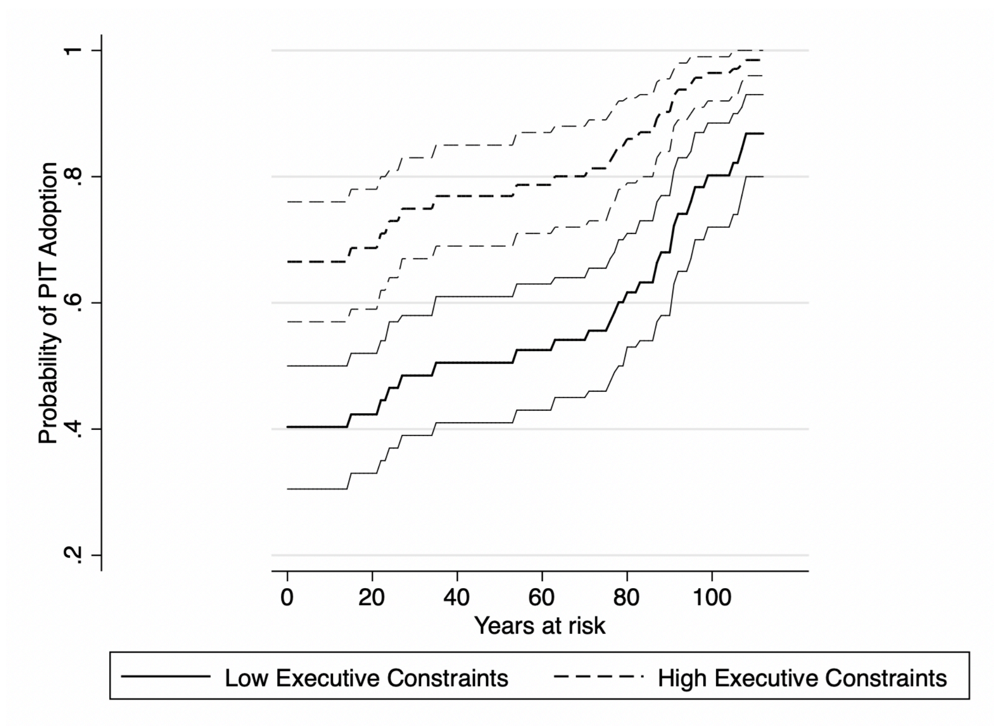
[30] Tests on the basis of Schoenfeld residuals (implemented using the estat phtest routine in Stata) reveal that the proportional hazards assumptions are violated for civil war and CIT. Stratifying on these variables does not change the main results, although the main effect is measured somewhat less precisely (p=.083)

[31] The percentiles are from the reduced sample. The 25th and 75th percentile for the full sample are very similar.

My explanation does not necessarily rule out elite competition as an explanation. In section 9 of the appendix, I test the impact of the indicator of landed elite power suggested in Mares and Queralt (2015): rural inequality based on the family farm data from Vanhanen (2009). Interestingly, the results suggest there is no measurable impact of rural elite power on the likelihood of income tax adoption.

Figure 2: Power-sharing and Income Tax Introduction



Transition probabilities with 95 % confidence bands.

Finally, the lack of a statistically measurable interaction effect suggest that greater legislative constraints also matter in democratic states. Although this is outside of the scope of this paper, it is worth noting that this results contradicts expectations based on veto players theory, where a larger number of constitutional veto players is expected to increase policy stability

The next section illustrates the proposed causal mechanism – and compares it with the elite competition approach – by looking closer at a non-democratic country that introduced income tax in peacetime: Sweden.

III. The Non-democratic Introduction of Income Tax in Sweden

The introduction of income tax in Sweden – in 1902 – is a case of income tax adoption in a non-democratic country with power-sharing institutions in place. In Sweden at the time the parliament had considerable influence, but the King could veto laws and dissolve parliament unilaterally. After a constitutional reform in 1866, in which the former four chamber Diet was turned in to a two-chamber parliament, the legislative constraints increased even more (the indicator from V-dem used in section 2 increases from 79.5 to 82.6 on a scale from 1 to 100).[32] Democratic participation was very limited both in terms of who could run for parliament and in terms of who could vote. There were income and property requirements for the franchise, and more than eighty percent of the adult population did not have the formal right vote in national elections.[33]

The story about the income tax of 1902 starts with a major reform to defense and taxation in 1892. Ancient taxes on farmland were to be removed step by step during a ten year period, reducing the tax by 10% each year until 1902. At the same time, it was decided that the old allotment system staffing – and to some degree financing – the armed forces were to come to an end by 1904 (Gårestad 1987). Thus, a new way of financing the defense was needed.[34]

Although a proximate cause of the income tax was increasing defense expenditures, the late nineteenth century also saw structural economic changes making the taxation of personal (and corporate) incomes easier (Rodriguez 1981): In 1905, industry surpassed agriculture in value (Dahlgren (1990). Moreover, arguments focused not only on the need for more defense spending, but also investments in infrastructure. According to Dahlgren (1990), there was a political consensus that the state needed to be more active in the economy, and the first step to increase this capacity of the state was to improve its finances. The income tax was seen as an attractive

[32] An example of the constrained nature of the monarchy was when the King promised military support to Denmark in the 1863 war against Prussia, support that did not materialize due to resistance from the government.
[33] As in many other countries, Sweden had had temporary income taxes before, the first one in 1712 (Karlsson 1994), the second one in 1810 (Åkerman 1967).
[34] However, this was hardly a crisis. The recently removed taxes generated only around ten percent of tax revenue at the turn of the century (Gårestad 1987).

tool since it was less volatile and dependent on international circumstances than tariffs. Evidence of income tax as an effective money raiser came both from the earlier experience of the tax in 1809 and from more recent times in Prussia.

However, many were also apprehensive of the tax, in particular concerns were raised about the privacy of tax payers. The system of personal tax returns was coupled with wide ranging bureaucratic powers and sanctions for tax fraud. The increased information on private citizens which would become available to government bureaucrats made many high income earners anxious, and efforts were made to alleviate these concerns. For example, revealing private information was made illegal and the tax returns were made confidential (Paradell 2011).[35]

The fact that some parliamentarians were worried about the increased power of authorities, and that there were alternative tax reforms suggested focusing on indirect taxes, suggest that there was real concern about the tax.

These concerns were overcome thanks to certain aspects of reform that increased the benefits of the elite, and reduced the risks. First, the Conservatives in parliament favored a stable, and expanded, revenue system in order to invest in infrastructure (from which they would benefit) and modernize the defense (Dahlgren and Stadin 1990). The prize they paid was low since the the tax rate was low and progressivity weak (Stenkula 2013), and the wealthy had many different sources of income and thus did not see the income tax as a major threat economically.[36]

Second, the way the tax reform was implemented there were constitutional checks protecting the wealthy elites represented in parliament from potential government overreach.

The taxes removed from 1892 and onward were so called ordinary revenues, controlled by the King. The new income tax was classified as an "extraordinary" tax, and thus under greater control of the parliament.[37] In practice, this meant taxes could be changed by the

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[35] Making private tax returns confidential required changes in laws regulating freedom of information, delaying the implementation of the tax until 1903 (Paradell 2011).

[36] There were proposals for tax reform based on an expansion of indirect taxes – which would be preferable for the rich elite – but these were deemed insufficient to finance the new defense bill (Dahlgren 1990).

[37] Interestingly, a minority of Conservative parliamentarians wanted the new income tax to be treated as a law in the lower chamber, meaning that the upper house and the King could veto it (in the belief that the King would be a guarantor against over taxation). However, this proposition failed. Importantly, both in

legislature without the King being able to veto them (Dahlgren 1990). Thus, the income tax meant moving revenue power from the executive to the parliament.[38] Moreover, the tax did not change the suffrage (at the time the franchise was linked to tax payments), which protected the elite against potential redistributive demands from lower classes (c.f. Mares and Queralt 2015). A final aspect of the 1902 reform that convinced skeptics was that it was supposed to be temporary.

We can also view the Swedish case in light of the elite-competition approach to income tax introduction in non-democratic states. As shown in table 6 in section 9 of the appendix, I found no quantitative support for the elite competition approach. A reason for this could be that the argument in Mares and Queralt (2015) is constrained to the early adopters of the tax in Europe and its English speaking offshoots (and Japan) between 1815 to 1939. My investigation, on the other hand, covered far more states from 1850 to 2011.[39] However, there might also be more fundamental flaws with the elite competition argument.

Interestingly, among the main opponents to the new income tax in Sweden we find both landed nobility and business elites (since the old taxes on farm land did not hurt corporations) (Dahlgren and Stadin 1990). Recent research on the estates of Swedish parliamentarians might explain why, while also casting doubt on the foundational assumptions of the elite competition approach. Bengtsson and Olsson (2018) present evidence showing that farmer members of parliament in the mid to late 19th century Sweden were not only wealthy in terms of the amount of land they owned, but they also had a diverse source of income and wealth. Among the most wealthy farmers in Bengtsson and Olsson's sample (people who would most definitely belong to the "landed elite" in terms of land ownership), the largest share of their wealth was not in animals or

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1902 and in 1910, there was a majority in both houses against any proposition regarding taxes that would imply a royal veto (Dahlgren 1990.

[38] The importance of giving the parliament more power of taxation is interesting given the political conflict over tariffs in the late nineteenth century, a conflict in which the King actively intervened at one point and dissolved the second chamber triggering a reelection (Lewin 1992).

[39] The reason Mares and Queralt (2015) can go back further than the extent of the Vanhanen data is because they back-cast the data using flat values of the last observation. In other words, all years before 1850 are set at the 1850 level of rural inequality. Mares and Queralt also use a different strategy to fill in missing values.

land, but in urban real estate, shares in modern sector companies such as railway and steam boat companies, as well as shares in banks. Most interestingly, wealthy farmers, as well as landed nobility, founded local, modern, factories and invested in stocks. Thus, among the landed elite in mid to late 19th century Sweden (both nobility and non-nobility) there were no clear urban-rural or industrial-agricultural divide with respect to assets: the elite were invested in both sectors. While the wealthy farmers and estate owners had a shared interest in not extending the franchise (Bengtsson and Olsson 2018), it does not seem like the asset-based elite competition approach have much to offer with respect to income tax. This also explains why there was no conflict among the ruling classes in relation to the introduction of the income tax.

The reform was successful: five years after its introduction, the income tax generated 15 percent of total tax revenue, and total tax revenue increased by almost forty percent. The support-coalition in Sweden at the time had no qualms about increasing the fiscal capacity of the state since it effectively controlled parliament, which shared power with the monarch. It is likely that the behavior was affected by the fact that members of the elite knew they would have influence in the future, and was certain that the income tax would not be used against their interests, and that they could ensure that the revenue would be spent on their preferred activities

IV Conclusion

The rise of the fiscal state cannot be explained by democracy and war alone. In fact, many of the investments in fiscal capacity were made by non-democratic states, a puzzle that has only recently received attention from social scientists.

The first point made in this paper is that when analyzing the introduction of taxes it is crucial to consider the motivation behind it. Adopting a tax to invest in fiscal capacity is very different from adopting a tax in order to reach distributive goals. The second point is that there are important institutional differences between non-democratic states, differences that makes a difference when explaining tax policy.

Using a newly available dataset over tax introductions and historical information on political institutions, the analysis in this paper suggests that institutionalized power-sharing is positively related to income tax adoption in non-democratic states. The results indicate that when investigating the institutional origins of fiscal capacity it is important to distinguish not only between democracies and non-democracies, but also between different institutional configurations within non-democratic countries.

The short case study illustrated how the support-coalition used existing institutions in order to ensure power over the new income tax by avoiding the royal veto. This was important since there was serious concern, not only about the redistributive potential of the tax, but also about the increased capacity of the state to gather information on its citizens. The Swedish case also provided hints as to why there was no quantitative support for the elite competition approach: some members of the old landed elite and the new business class opposed the income tax, and many farmer politicians had a diverse portfolio of wealth and income, blurring the lines between rural and urban tax preferences.

It is interesting to note that the empirical analysis suggests a different channel through which power-sharing leads to stability: state capacity. Income tax strengthens state capacity, making it easier for the ruler to defeat challengers.

An important drawback in using observational data is that power-sharing institutions are expected to lead to a higher survival rate of autocratic regimes (Boix and Svolik 2013). This result, coupled with the spread of democracy, means we should observe fewer and fewer non-democratic states with a low degree of power-sharing over time.

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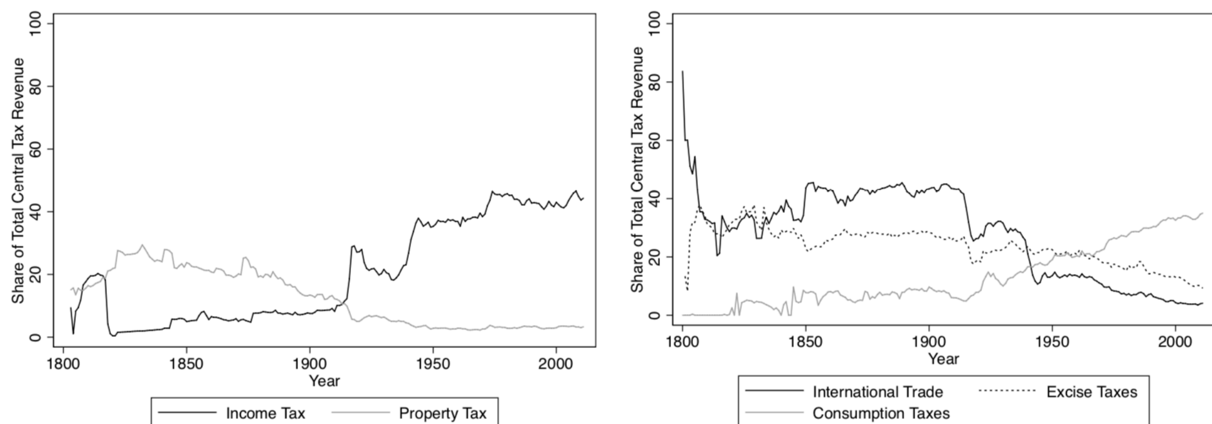
Appendix

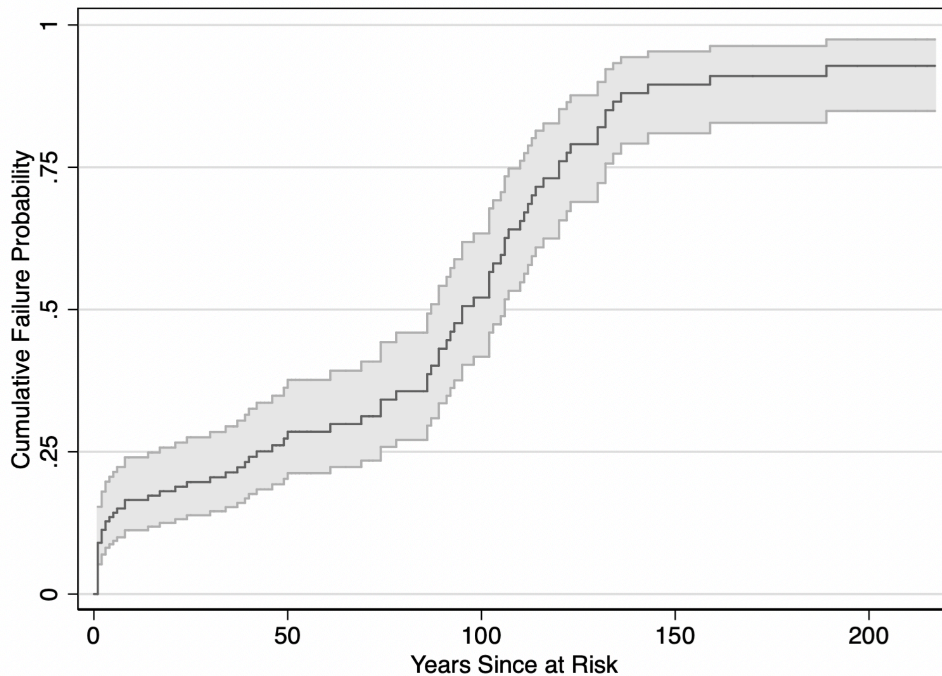
Financing the State: 1800-2012

Figure 3: Share of Direct and Indirect Taxes



7 List of Countries

Angola	Argentina
Armenia	Australia
Bahrain	Belgium
Bosnia and Herzegovina	Brazil
Bulgaria	Burundi
Canada	Chile
China	Colombia
Congo	Costa Rica
Croatia	Cuba
Denmark	Ecuador
France	Germany
Greece	Guatemala
Guinea-Bissau	Haiti
Honduras	Italy
Jordan	Kuwait
Liberia	Mexico
Mongolia	Morocco
Mozambique	Netherlands
Nicaragua	Oman
Panama	Paraguay
Peru	Portugal
Qatar	Romania
Rwanda	South Africa
Spain	Sweden
Switzerland	United Arab Emirates (UAE)
United Kingdom	Uruguay
Vietnam	Yemen



Kaplan-Meier Curves

Elite Competition

One of the most recent attempts at explaining the introduction of income tax in non-democratic states emphasizes elite competition. Mares and Queralt (2015) claim that the distributive logic of taxation hold even in non-democratic states. The only difference is that instead of redistribution between income classes, the distributive game in non-democracies is played by different elites. In Mares and Queralt, higher landholding inequality – a proxy of landowner power – is expected to increase the probability of income tax adoption. I follow the approach in Ansell and Samuels (2014) and measure rural inequality as (1 - Family Farms) (1 - Urbanization) / 100, where data on family farms and urbanization is from Vanhanen (2009). The data covers 173 countries from 1850 to 2007. The results are unchanged if the pure, non-normalized, measure of family farms is used. Importantly, my variable differ in two ways from the one used by Mares and Queralt (2015). First, they use a nearest neighbor flat interpolation (what they call "flat-steep-flat coding"), meaning that if

there is information from 1880, 1890, and 1900, then from 1881 to 1890 they set the value of 1880, and between 1890 and 1900 the value of 1890. Second, they use the same method to forecast backwards, meaning that if the first observation is in 1880, then all years prior to this is filled in with the value for 1880. In contrast, I use linear interpolation to fill in data between the data points which are provided by decade in Vanhanen. Moreover, I do not perform a flat extrapolation backwards in time and instead leave these observations as missing values.

Figure 5: Kaplan-Meier Plots for European and Non-European Countries