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Constraints on the executive and tax revenues in the long run

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Abstract: We argue that tax revenues and political institutions placing constraints on the executive power may reinforce each other over time and so co-evolve in the long run. This may also bring a shift in the composition of revenues, from taxes levied on a narrow base to broadly levied taxes. To test these hypotheses, we use historical cross-country data covering 31 countries for 1800–2012 and panel time series methods allowing for different forms of country-specific heterogeneity and cross-section dependence. The results offer three main findings. First, executive constraints, whether they are judicial or legislative, and tax revenues are cointegrated: there is a long-run relationship between the two. While in the short run they can drift apart, this will be temporary because they tend to co-evolve. Second, evidence of cointegration is strongest for revenues from direct taxes, suggesting that the existence and nature of a long-run relationship may be mainly related to the emergence of broad-based taxation. Third, long-run causality runs mostly from executive constraints to taxation. This is most evident for income taxes. Our findings link Sustainable Development Goals 17 and 16, implying that the goal of promoting inclusive and accountable institutions may work in synergy with that of generating internal resources to finance development goals.

Key words: constraints on the executive, tax revenues, institutions, Sustainable Development Goal 17

JEL classification: H61, N46, O4, P5

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1 Introduction

Modern states are much more complex organizations and perform a much broader range of functions than states did only a century ago. And they have an important role in economic development. Recent research argues that the most-developed economies are those where effective states can exercise a crucial productive role, such as providing public goods and services, effectively administering justice, and resolving coordination failures.[1] Acquiring *fiscal capacity* is a fundamental condition for effective statehood. This is a required transition from a state relying on resources derived from the monarch's domain to a state where resources come from the power to tax, and which ultimately develops a sophisticated tax administration capable of raising revenues from a broad tax base.

Research on how tax systems arise and develop has extensively studied this process in European countries (e.g., Bonney 1999; Tilly 1992). It is not clear, however, whether findings from advanced economies can be extended to and illustrate how developing countries learn to tax (e.g., Yun-Casalilla and O'Brien 2011), as these states are much less effective and taxation often yields only a fraction of the revenues of rich countries.[2] Understanding such mechanisms would provide states in less-developed economies with much-needed resources to provide public goods and services. And it is relevant to policy, because Sustainable Development Goal (SDG) 17 highlights the importance of generating internal resources to finance development goals.[3]

This paper focuses on the dynamic relationship between political institutions placing limits on the executive power and taxation. It is increasingly recognized that constraints on the executive power can be an important condition to explain reforms or the inertia of tax systems (e.g., Besley and Persson 2011). However, it is not well documented how these constraints affect tax revenues and whether they affect each other over time. This paper contributes to a fairly thin empirical literature in this area, providing new evidence on the relationship between political institutions limiting the executive power, and the amount and composition of government revenues. We argue that tax revenues and executive constraints may reinforce each other over time and so co-evolve in the long run. This may also bring a shift in the composition of revenues, from taxes levied on a narrow base to broadly levied taxes. To test the above hypotheses, we use panel time series methods and recent historical cross-country data from the V-Dem project (Coppedge et al. 2020) and Andersson and Brambor (2019), covering 31 countries over the 1800–2012 period. Allowing for different forms of country-specific heterogeneity and cross-section correlation, the paper offers three main findings. First, we find that executive constraints and tax revenues are cointegrated: there is a long-run relationship between the two. This implies that while in the short-run executive constraints or

[1] For reviews of this literature, see Acemoglu and Robinson (2019), Bardhan (2016), and Besley and Persson (2011).

[2] See Besley and Persson (2013, 2014). The literature on the long-run determinants of state capacity has hitherto highlighted the role of historical factors, such as the incidence of external or internal conflicts (Besley and Persson 2011) and the experience of statehood (Bockstette et al. 2002), and the effects of geography, such as abundance of natural resources (e.g., Jensen 2011) or the conditions affecting population density (Herbst 2000). There is also an important literature at micro level, often using randomized controlled trials and natural experiments, assessing revenue administration performance (e.g., looking at the effects of interventions on information collection on the amount of taxes that are due); see Pomeranz and Vila-Belda (2019).

[3] Target 17.1 focuses on strengthening domestic resource mobilization, including through international support to developing countries, to improve domestic capacity for tax and other revenue collection; it adopts total government revenue as a proportion of GDP as the indicator to measure progress. See Bolch et al.(2022) on the prospects of domestic revenue mobilization for poverty reduction.

tax revenues can drift apart, one variable drives the other. Second, the result is most evident for direct taxes, often significant for indirect tax revenues, and absent for trade taxes. Third, we find evidence that long-run causality runs mostly, yet not exclusively, from executive constraints to taxation. These findings highlight the importance of executive constraints as a structural condition for fiscal development, as well as the emergence of broad-based taxation as a key source to finance the state and support political institutions in holding the government accountable for its actions.

The paper proceeds as follows. In Section 2, we review the relevant literature. Section 3 presents the data and Section 4 outlines the empirical strategy. The results are presented in Section 5. Section 6 concludes.

2 On the relationship between constraints on the executive and tax revenues

How do countries learn to tax? Recent political economy explanations have argued that the presence of political institutions placing limits on the executive power is a key long-term factor explaining fiscal capacity.[4] This argument suggests that greater constraints on the executive power have a positive effect, because they provide stronger incentives for incumbent groups to invest in tax systems. In particular, as Besley and Persson (2011) also argue, 'constraints on the executive will diminish the concern that the government is run in the interests of a narrow group' (Bardhan 2016: 871). Such mechanisms may include 'various kinds of checks and balances including constitutional constraints on executive power, separation of powers, electoral rules, independent judiciary, free media and other accountability mechanisms for the state leadership' (Bardhan, 2016: 871). Similarly, according to Dincecco (2017: 21–22), the presence of 'an institutional player within the national government that has the formal political authority to regularly monitor state finances' is an essential mechanism for effective statehood. In parliamentary democracies, such a role will be played by an effective parliament—one which the political leader cannot form, control, or disband at will. Here, an effective parliament can 'regularly oversee the state's budget, including authority over taxation, the right to audit previous government spending, and the right to veto new expenditures' (Dincecco 2017: 22). In autocracies, such checks and balances on the executive may be weaker. However, as Besley and Kudamatsu (2008) point out, even in autocracies there may be constraints placed on the autocrat by government insiders—the 'selectorate' (Bueno de Mesquita et al. 2003)—whose power does not depend on the current executive and who can remove poorly performing executives, if necessary. Thus, limits on executive power promote a *common interest* environment and may translate into new and more sophisticated forms of taxation and more effective revenue authorities (e.g., Besley and Persson 2009).[5] The empirical literature, although still rather thin, has hitherto largely supported the hypothesis that constraints on the executive have a long-run positive impact on fiscal capacity and, in turn, on the amount of revenues collected.[6] It is questionable, however, whether one can separate the forces that lead from political

[4] Fiscal capacity is a product of investments in state structures, including monitoring, administration, and compliance (e.g., competent tax inspectors and an efficient revenue service).

[5] Note that explanations focusing on executive constraints do not equate to claiming that 'democracy' leads to greater fiscal capacity. There is indeed an interesting literature looking at the role of regime types and the introduction of electoral competition. For example, Mares and Queralt (2015, 2020) explain why income tax was introduced first in countries with limited franchise extension. Because of intra-elite competition, such fiscal innovation would be more palatable to landowning elites, which saw it as a tool to rebalance in part the economic losses from the rise of manufacturing.

[6] For example, Besley and Persson (2009) provide evidence based on conditional correlations. Ricciuti et al. (2019a, b) provide instrumental variable estimates suggesting that greater constraints on the executive have a positive long-run effect on fiscal capacity, as captured by various measures of quality of tax administration, monitoring, and

institutions to the development of the tax system from those that lead from taxation to institutional change. In an authoritative survey on taxation and development, Besley and Persson (2013: 106) note:

> States that raise significant revenues will find themselves facing strong demands for accountability and representation, creating a two-way relationship between political development and the growth of the tax system. Little is yet known about this relationship. But it seems far from coincidental that states that are able to appropriate nearly half of national income in the form of taxation have also evolved strong political institutions, particularly those that constrain the use of such resources.

The foregoing quote implies that one aspect requiring systematic analysis is the dynamics of the relationship between constraints on the executive and tax revenues: whether they co-evolve in the long run. A separate literature, mainly based on the European experience, has argued that central to how tax systems develop is also the bargaining process between the state and the citizenry. Citizens enter a *fiscal contract* with the state, which involves an exchange of tax revenues for goods and services, giving them more control over its actions (Bräutigam et al. 2008; Levi 1988; Moore 2007; Prichard 2015; Ross 2004; Tilly 1992). This implies that there may be a feedback effect from tax revenues to political institutions placing limits on the executive power. As an increase in the amount of revenues levied comes with greater demand for scrutiny over government actions, one can hypothesize also that increased tax revenues could in turn reinforce executive constraints, as taxpayers will demand greater accountability from the ruling power.[7] This ultimately suggests that there may be a long-run relationship between executive constraints and tax revenues such that they are cointegrated. The existing empirical literature has not yet investigated this proposition. Some empirical literature on the structural determinants of tax revenues has looked at the effect of political representation (Aidt and Jensen 2009; Andersson 2018; Cheibub 1998; Timmons 2010) or elite competition (Beramendi et al. 2018) on taxation. Other studies consider the effect of taxation on regime type (Dom 2018; Pritchard 2015: chapter 1; Ross 2004). Some of these studies have used historical macro data (Albers et al. 2020; Andersson 2018; Beramendi et al. 2018). Nonetheless, no study explicitly focuses on constraints on the executive or, above all, on the dynamic aspects of the relationship between these constraints and taxation.

Is the existence and nature of a long-run relationship different for different forms of taxation? The dynamic relationship between constraints on the executive and taxation may be different for different taxes because constraints on the executive, by supporting the emergence of fiscal capacity, may also have an effect on the composition of tax revenues. Investments in fiscal capacity bring greater organizational ability on the part of revenue authorities, so that states can 'earn' taxes: for example, states can increasingly substitute revenues from taxing land or its produce and taxes on the movement of goods (via customs on external borders and various types of taxes on internal sales and excises, such as salt or tobacco) with revenues from taxes levied on accounting categories (e.g., income, profits, value added), which require greater organizational effort. This should result in a transition from taxes with a narrow base to broad-based taxation over time. Indeed, Besley

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compliance; on the share of revenues collected; and on the ability of states in developing economies to deliver effective financial planning.

[7] Moore (2004: 299–302) summarizes the context and mechanisms behind the causal connection between the dependence of governments on broadly levied taxes and the existence of binding constraints on governments and institutionalized political representation in Western Europe. See Moore (2007) and Prichard (2015) for a discussion on the mechanisms through which taxation may result in more responsive and accountable governments in less-developed economies.

and Persson (2013: 56–63) show that one of the stylized facts on taxation and development is that more-advanced economies tend to rely much more on broad-based taxes than less-developed ones: this is the result of changes in the composition of revenues, from trade taxes and excises towards labour income and other broad bases.[8] Since broad-based taxes are *consensual*, they require a fiscal bargain between the state and the citizens, where compliance with taxation is exchanged for institutionalized influence over the mode of taxation and the use of revenues. Hence, broad-based taxes are more likely to have a feedback effect on executive constraints rather than narrow-based taxation, so that a long-run relationship may be more likely to exist for direct taxes, such as on income, than for trade taxes and excises.

How general is the proposition that there is a long-run dynamic relationship between executive constraints and taxation? The dynamics of the relationship may be different in different contexts because the effect of constraints on the executive on government revenues, and how fiscal bargaining develops over time, may depend on country-specific factors, such as culture and history. First, the amount and composition of revenues collected depend on the level of *tax morale* (Luttmer and Singhal 2014), a culturally driven aspect of tax compliance (Andriani et al. 2021). Second, colonial heritage matters: colonial governors appointed on the basis of patron–client ties may be less willing to invest in fiscal capacity or to enter a fiscal bargain with the citizens (Xu 2019). Third, a civic culture based on reciprocal obligations facilitates, and sustains over time, a fiscal bargain that does not develop if such a culture is lacking (Besley 2019). Fourth, taxation preferences in different countries may reflect different preferences for redistribution (Alesina and Angeletos 2005). Further arguments include how aspects of the structure of the economy, such as reliance on natural resource rents, aid, and the prevalence of agriculture, may adversely affect the emergence of a tax system and its functioning (see Moore 2007). This ultimately suggests that the dynamic relationship between constraints on the executive and tax revenues may be heterogeneous across countries, because it is subject to country-specific cultural, economic, and political history. This may contribute to explaining why certain countries have seen a transition from a *domain* to a *tax* state and others have not.

In the next sections, we produce evidence on cointegration between executive constraints and taxation, testing whether a long-run relationship exists for different taxes and in different contexts.

[8] Kiser and Karceski (2017) offer a comprehensive survey of the characteristics and structure of taxation in premodern and modern states. See Seelkopf et al. (2021) on the introduction and diffusion of modern taxation. See Moore (2007: 10–14) for an illustration of the historical shift of state revenues in Western Europe, from sources requiring low organizational effort to broad-based taxation, and how this relates to the possibility of fiscal development in less-developed economies. In such contexts, the tax structure may struggle to shift towards broad-based taxes, because developing countries may have adopted institutions that facilitate resistance to taxation too early rather than consolidating state institutions first (D'Arcy 2012).

3 Data

Empirical research on fiscal development often faces a trade-off: choosing between a dataset with substantial cross-sectional (number of countries) and short time dimensions and a dataset with a long temporal dimension (number of years observed) and relatively few countries. In our case, studying the dynamic relationship between executive constraints and taxation means documenting long-run phenomena that originate from institutional changes and hence are best observed with measures spanning many decades. Consequently, our analysis focuses on measures that have substantial time series variation, for as many countries as possible. In particular, we use historical data on central government tax revenues covering the period from 1800 to 2012 obtained from the 'Financing the State' dataset (Andersson and Brambor 2019), which includes 31 countries: all countries from South America, North America, and Western European countries with a population of more than one million, plus Australia, Japan, Mexico, and New Zealand.[9] This dataset provides a rich set of comparable taxation measures and has the crucial advantage of providing the longest temporal coverage. The first measure we select is the ratio of central government total tax to GDP, as this measures the extent to which a state is financed by taxes. Our analysis focuses also on the composition of revenues and, in particular, on differences between broad- and narrow-based taxes. We exploit, for this purpose, various measures on tax composition. We use the share of total taxes collected through direct and indirect taxation. Such variables broadly map onto the narrow-/broad-based tax categorization, but they do not perfectly reflect it.[10] Hence, we focus also on the share of specific taxes, as they may more neatly reflect this categorization. We select measures of income, consumption, and trade taxes as a share of total central tax revenues. Income tax is a prime example of broad-based taxation. Consumption and, above all, trade revenues belong to the category of narrow-based taxes.[11] Definitions of the tax shares are provided in Figures 1–3 and in Appendix D (as well as in Andersson and Brambor 2019: 3–5).

To measure political institutions that constrain the power of the executive—expressing to what extent they provide institutionalized checks and balances—we resort to the V-Dem dataset (Coppedge et al. 2020). Apart from being methodologically innovative and covering over 200 years for a global sample of countries, it provides a new, more granular measure of executive constraints. Checks and balances can operate through the legislative and judicial branches. The former works through parliamentary systems, which institutionally oversee and audit the state budget, and the latter through independent judicial systems enforcing the rule of law. The V-Dem dataset provides variables measuring each aspect. The 'judicial constraints on the executive' index (*v2x_jucon*) addresses the following question: 'To what extent does the executive respect the constitution and comply with court rulings, and to what extent is the judiciary able to act in an independent fashion?'. The 'legislative constraints on the executive' index (*v2xlg_legcon*) addresses the question: 'To what extent are the legislature and government agencies, e.g., controller general, general prosecutor, or ombudsman, capable of questioning, investigating, and exercising oversight over

[9] The countries included in the dataset are Argentina, Australia, Austria, Belgium, Bolivia, Brazil, Canada, Chile, Colombia, Denmark, Ecuador, Finland, France, Germany, Ireland, Italy, Japan, Mexico, Netherlands, New Zealand, Norway, Paraguay, Peru, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States of America, Uruguay, and Venezuela.

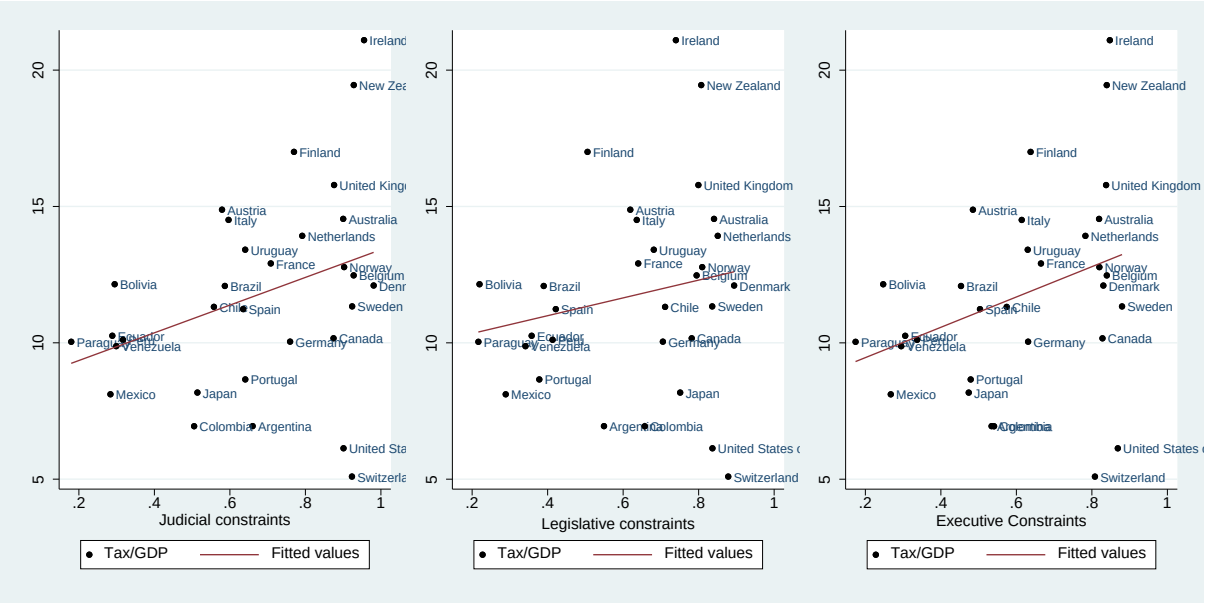
[10] Direct taxes include levies on land and real estate, which may have a narrow tax base. Similarly, indirect taxes include value-added taxes, which may have a broad tax base. Full details on which revenues each variable includes can be found in Andersson and Brambor (2019).

[11] The Andersson-Brambor dataset also includes the share of total revenues from excises, another variable neatly capturing narrow-based taxation. We could not use this because of its sparse coverage.

the executive?'. We use such measures individually or combined in a single index, labelled '*Executive Constraints*', which is the arithmetic mean of the legislative and judicial constraints. The variables range from 0 to 100, with lower values indicating lower constraints on the power of the executive (and hence more executive discretion) and vice versa.

Figures 1–3 give an initial illustration of the relationship between taxation and constraints on the executive. The horizontal axis shows the V-Dem measures, while the vertical axis reports various measures of tax shares. All variables are averaged over the entire sample period, hence offering a visualization of the long-run relationship between variables. We observe two main facts. First, one apparent regularity is that countries with greater constraints on the executive tend to have higher ratios of central tax to GDP (Figure 1). This holds for both legislative and judicial constraints and implies that constraints on the executive are associated with greater reliance of states on taxation. Second, more-effective constraints on the executive tend to shift the composition of tax revenues. Countries with greater constraints on the executive collect a greater share of direct taxes (Figure 2) and, in particular, of income taxes (Figure D1). Vice versa, there is a negative correlation between executive constraints and the share of indirect taxes (Figure 3) and, in particular, consumption taxes (Figure D2). Last, there is weak correlation between executive constraints and the share of trade taxes (Figure D3). While this evidence does not lend itself to causal interpretation, it points to the fact that countries placing greater checks and balances on the executive power tend to transition from revenues obtained from narrow tax bases (such as on consumption) to more broad-based taxation (such as on income).

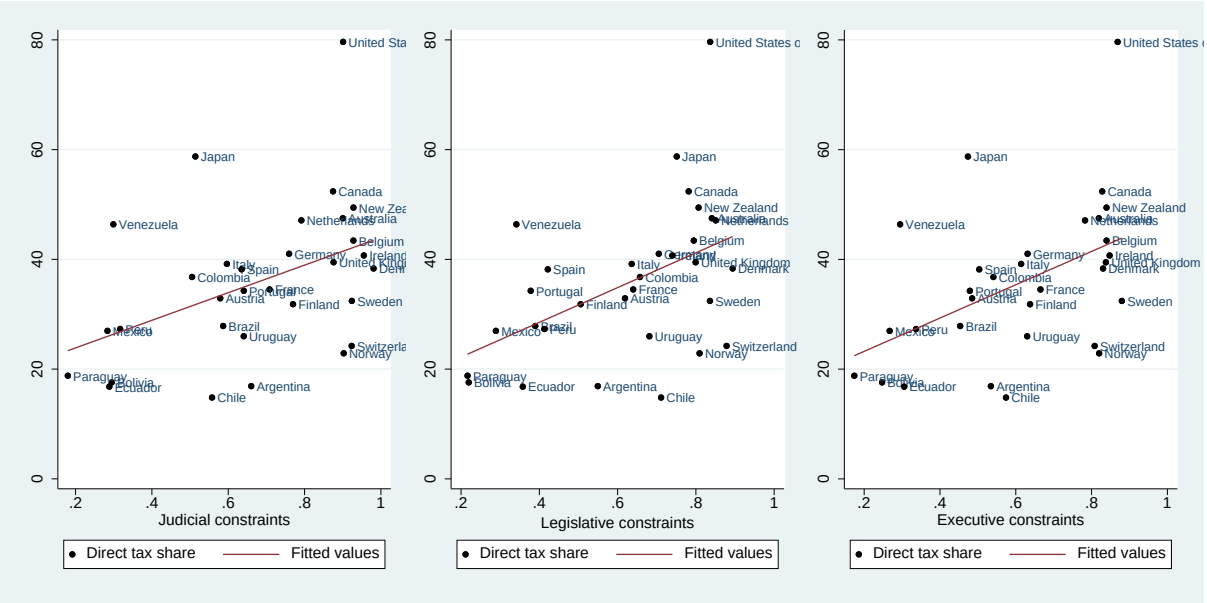
Figure 1: Taxation and executive constraints, 1800–2012



Note: the Y-axis variable is total central government tax revenues as a share of GDP.

Source: authors' illustration based on data from Andersson and Brambor (2019).

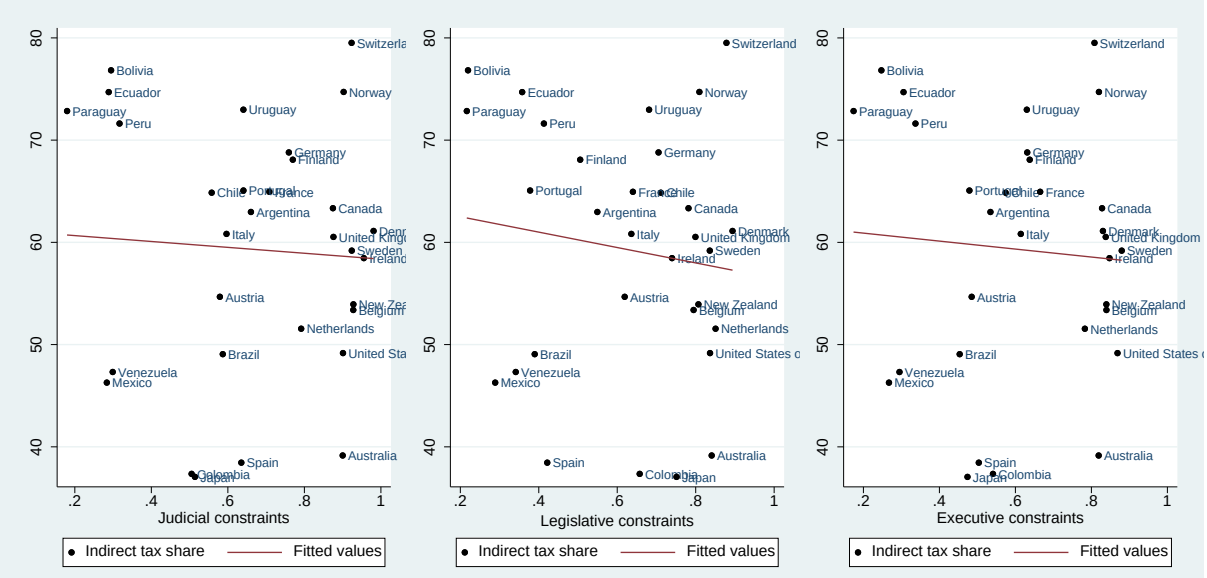
Figure 2: Direct taxes and executive constraints



Note: the Y-axis variable is the share of total central government tax revenue from direct taxes; a direct tax is one imposed directly upon an individual person (legal or natural) or property; direct taxes include taxes on income and property, among others (see Andersson and Brambor 2019).

Source: authors' illustration based on Andersson and Brambor (2019).

Figure 3: Indirect taxation and executive constraints

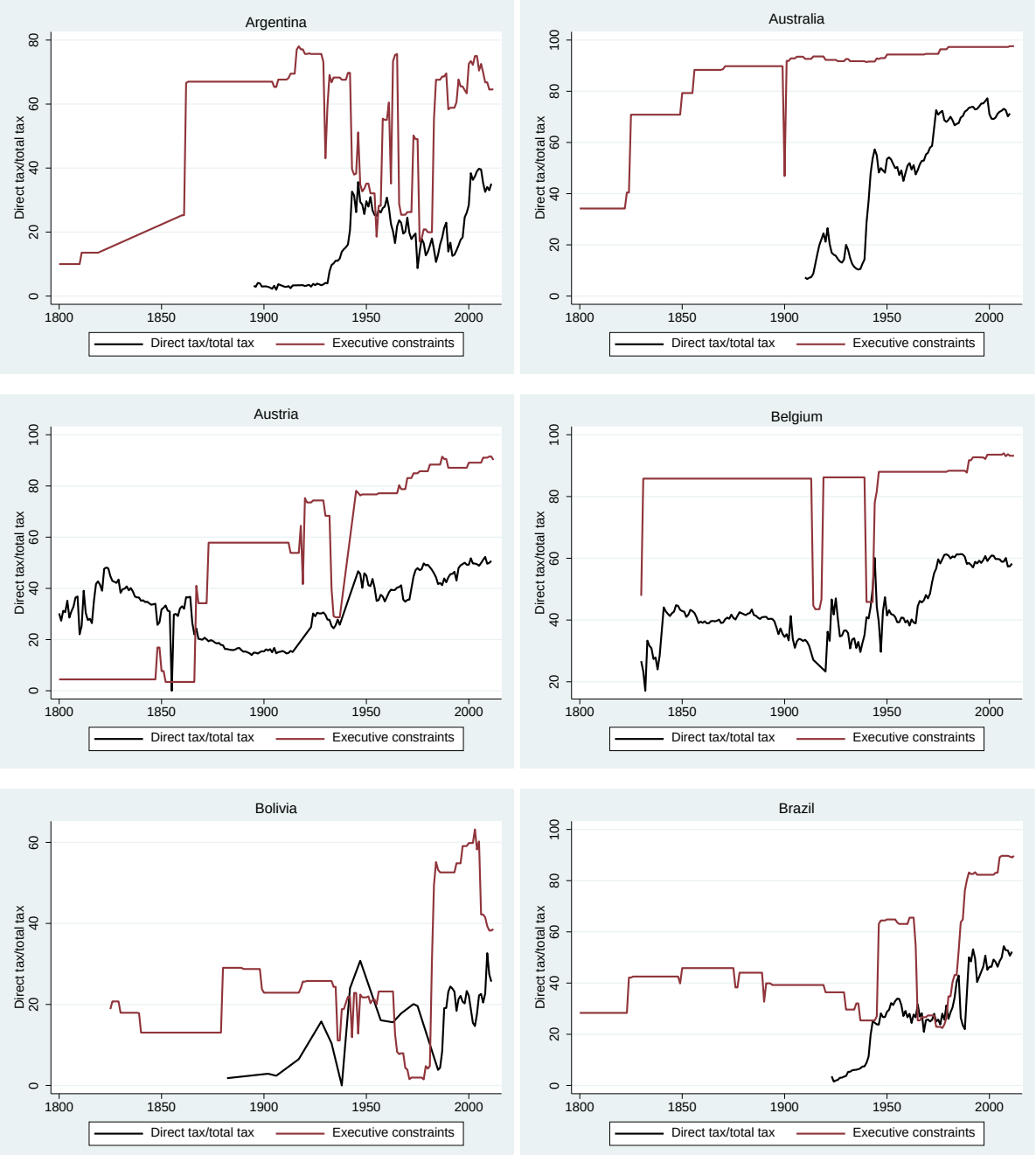


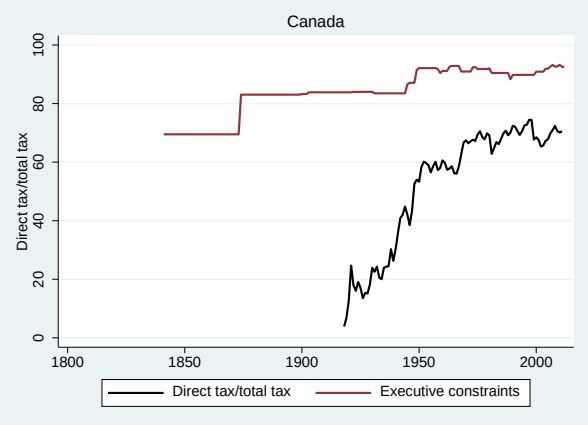
Note: the Y-axis variable is the share of total tax revenue from indirect taxes; an indirect tax is a tax on a type of transaction, for example sales or importing goods; indirect taxes include excises, customs, and consumption taxes, among others (see Andersson and Brambor 2019).

Source: authors' illustration based on Andersson and Brambor (2019).

How do the variables behave over time? Focusing on direct taxes, Figure 4 reports the time series plots for the 31 countries. We observe a marked increase in central government revenues from direct taxes—an important form of broad-based taxation. The direct tax revenues of most European states increased sharply during the nineteenth and especially the twentieth centuries. Most evident in this respect was the United Kingdom, where the share of direct revenues increased nearly three-fold between the early nineteenth and late twentieth century. This pattern is common to most current advanced economies (e.g., Australia, Belgium, Canada, Finland, Germany, Italy, Norway, Spain, United States). Outside the group of advanced economies, many countries showed comparable increases. Argentina, Brazil, Chile, and Mexico have seen a marked increase in the share of direct revenues. In Peru, Ecuador, Bolivia, Colombia, Uruguay, and Venezuela, there has been more limited (or no) increase and substantial volatility. Notably, the countries experiencing a long-run increase in the share of direct tax revenues include many resource-rich economies.

Figure 4: Direct taxes and executive constraints, 1800–2012




Canada
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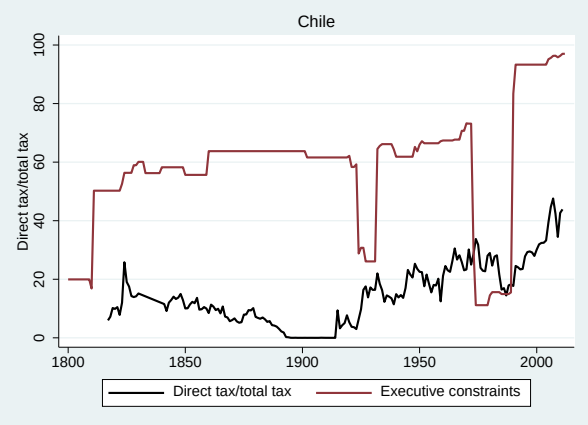
Executive constraints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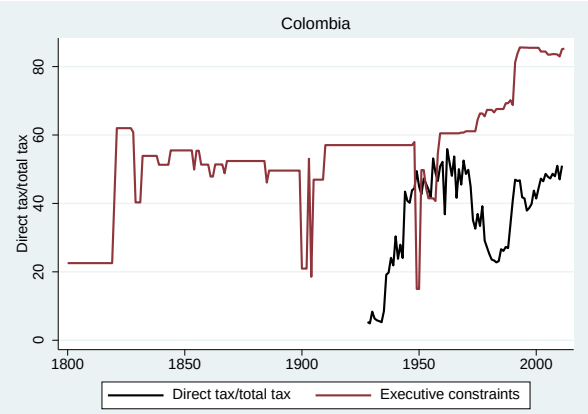
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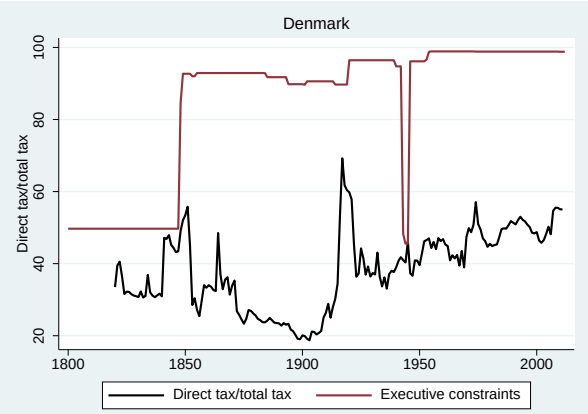
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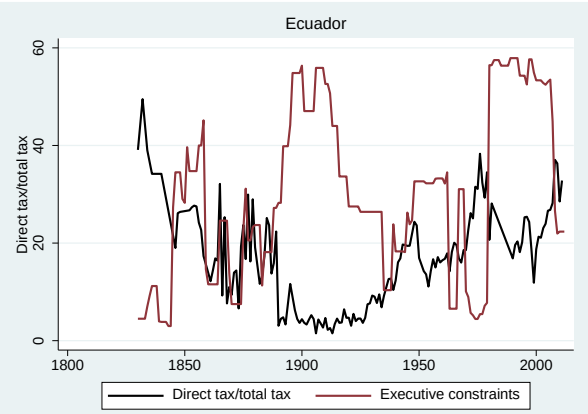
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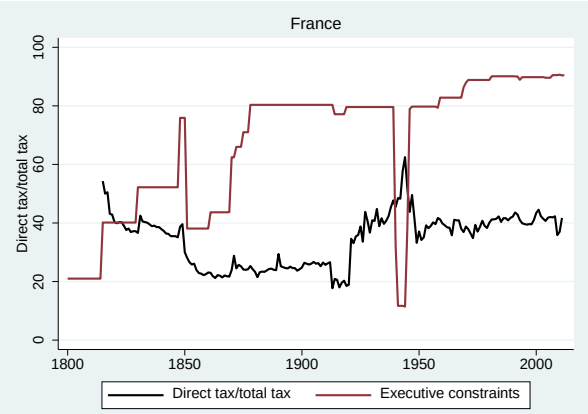
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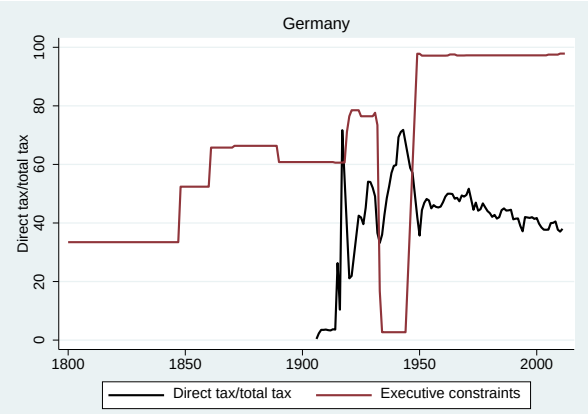
Executive constraints


Germany
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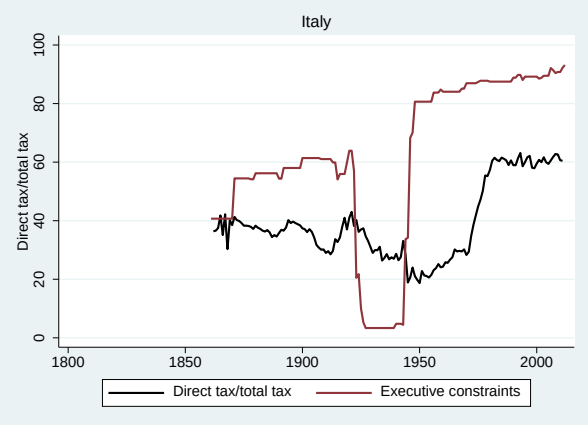
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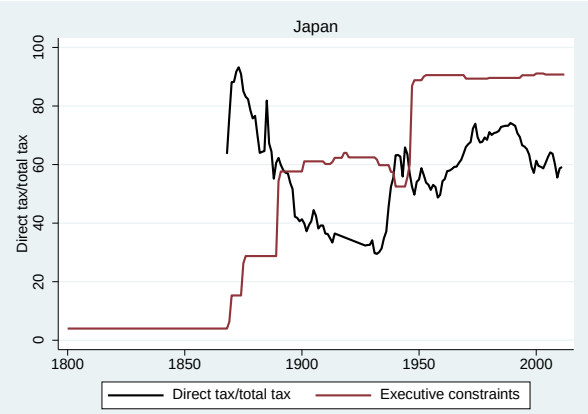
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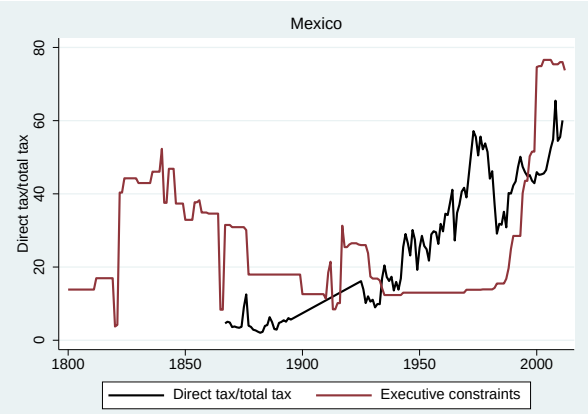
Mexico
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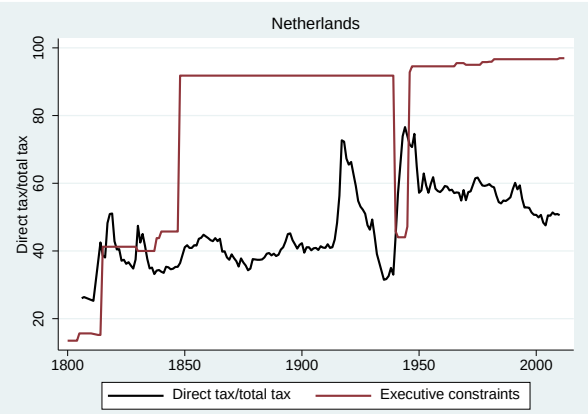
Direct tax/total tax
Executive constraints


Netherlands
Direct tax/total tax
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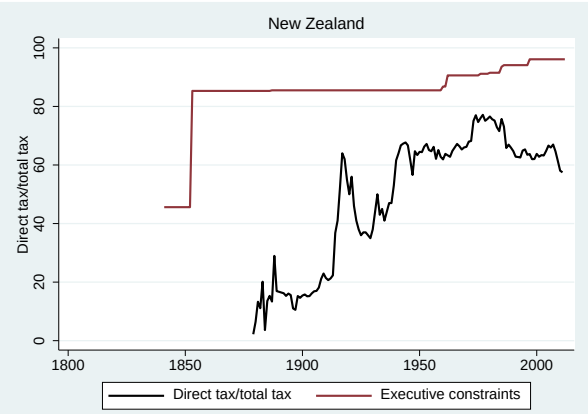
Direct tax/total tax
Executive constraints


New Zealand
Direct tax/total tax
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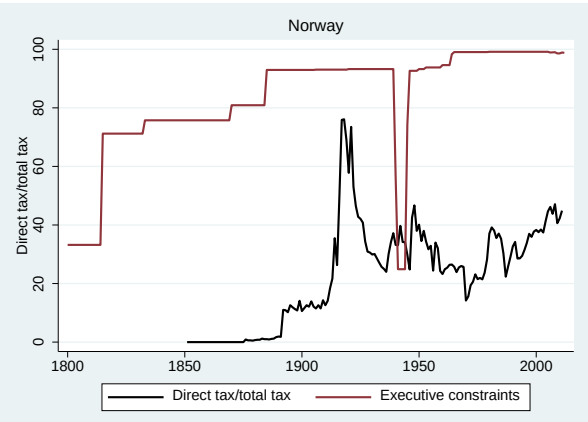
Direct tax/total tax
Executive constraints


Norway
Direct tax/total tax
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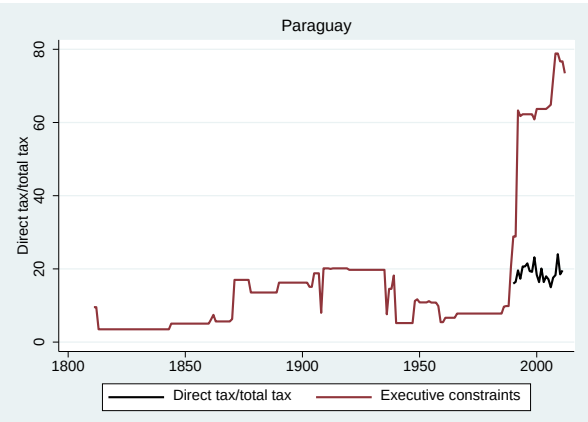
Direct tax/total tax
Executive constraints


Paraguay
Direct tax/total tax
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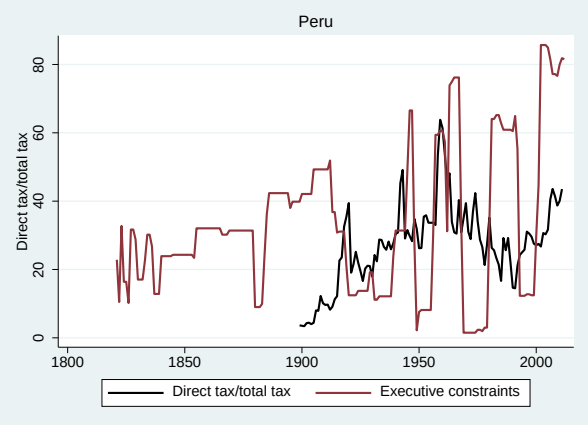
Direct tax/total tax
Executive constraints


Peru
Direct tax/total tax
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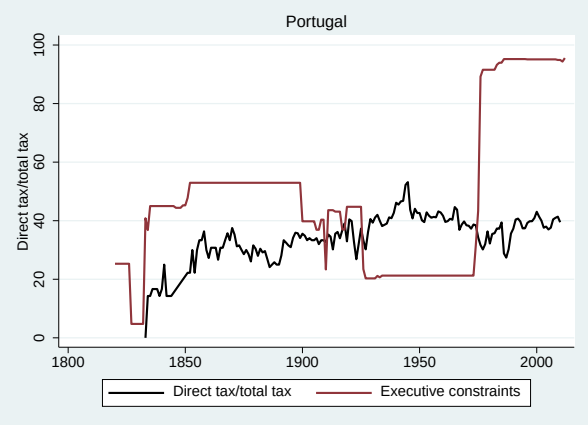
Direct tax/total tax
Executive constraints


Portugal
Direct tax/total tax
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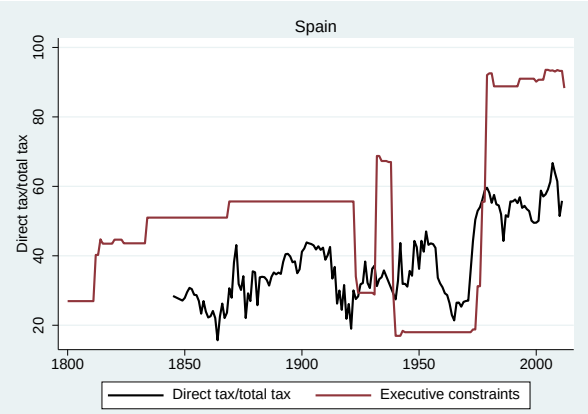
Direct tax/total tax
Executive constraints


Spain
Direct tax/total tax
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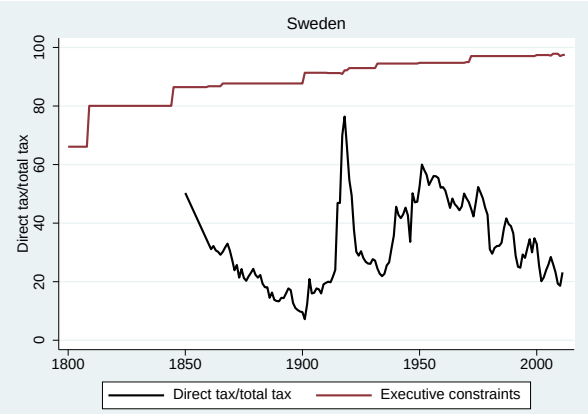
Direct tax/total tax
Executive constraints


Sweden
Direct tax/total tax
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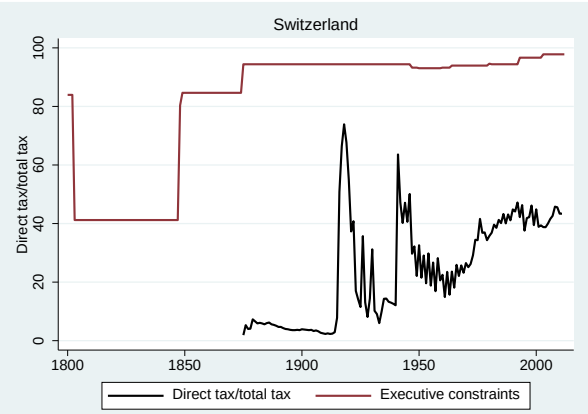
Direct tax/total tax
Executive constraints


Switzerland
Direct tax/total tax
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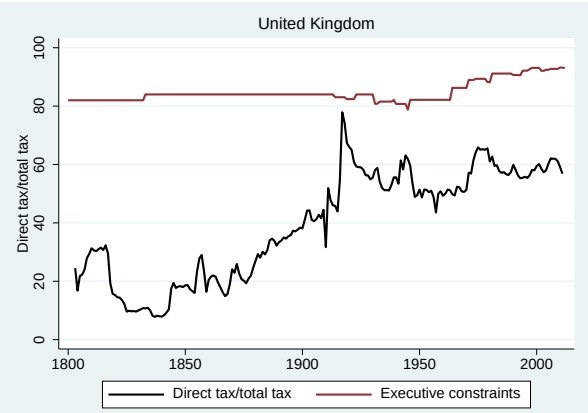
Direct tax/total tax
Executive constraints


United Kingdom
Direct tax/total tax
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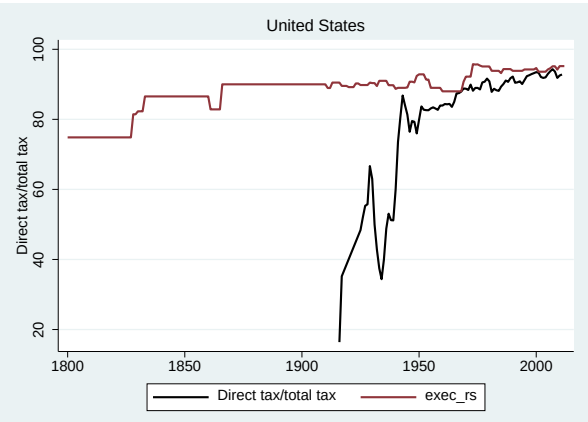
Direct tax/total tax
Executive constraints


United States
Direct tax/total tax
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Direct tax/total tax
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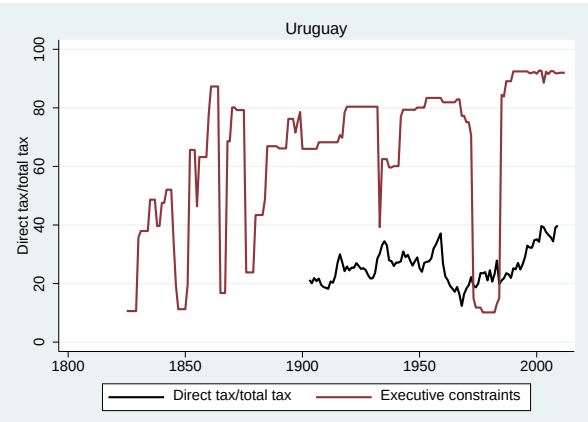
Uruguay
Direct tax/total tax
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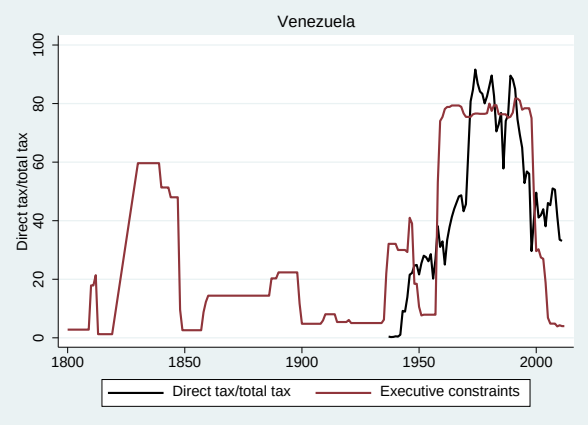
Direct tax/total tax
Executive constraints



Note: the left-hand vertical axis variable is the share of total central government tax revenue from direct taxes; the right-hand vertical axis variable is executive constraints (arithmetic mean of judicial and legislative constraints).

Source: authors' illustration based on data from Andersson and Brambor (2019).

We also observe that constraints on the executive and taxation tend to move together: changes in executive constraints are followed by changes in direct tax shares, and vice versa. Both variables are trended (formal unit root tests, presented in Appendix A, confirm non-stationarity). This is most evident in the current group of advanced economies. It is also observable in Brazil, Chile, and Mexico. On the other hand, it is less clear in Peru, Ecuador, Bolivia, Uruguay, and Venezuela, where there seems to be significant volatility in both variables. Figure 4 ultimately suggests that fiscal and political development experiences vary to a significant extent across countries. Indeed, the historical literature recognizes that the path to fiscal development can be heterogenous because it is subject to country-specific circumstances (e.g., Yun-Casalilla and O'Brien 2011). However, it also recognizes that political motives, as shaped by institutions, are intertwined with the evolution of the tax system. Steinmo (2018) offers evidence, based on historical case studies, that fiscal capacity and tax compliance co-evolve. Sweden is an example of a virtuous cycle where effective administrative institutions increased trust in the state among taxpayers so that they would be willing to accept higher taxes (Nistotskaya and D'Arcy 2018). Italy may be understood as a partial exception to this (see D'Attoma 2018, for a historical illustration). Yet in this case too, executive constraints and tax shares tend to move together. Even the status of a resource-rich economy, where the presence of a significant natural-resources sector can weaken the incentive to invest in tax systems, may not necessarily limit fiscal development (for a case study on Bolivia, see Peres-Cajías 2015; for a historical comparison of public finance in Bolivia, Chile, Peru, Norway, and Sweden, see Peres-Cajías et al. 2020). Historical case studies on Latin America (specifically Argentina and Chile) and Africa show that the emergence of a natural-resources sector, depending on the type of political institutions and of political coalitions ruling during a resource boom, is not incompatible with promoting state-building (Saylor 2014). Masi et al. (2020) present cross-country evidence suggesting that resource-rich economies with greater executive constraints neutralize the negative effects of resource rents on fiscal capacity.

4 Empirical strategy

Our interest is in modelling the bivariate long-run relationship between taxation—as captured by the shares of direct, indirect, income, consumption, and trade taxes in total central government taxation—and measures of constraints on the executive. For $i = 1, 2, \dots, N$ countries over the time period $t = 1, 2, \dots, T$, we adopt a common factor approach of the form:

$$tax_{it} = \beta_i' CV_{it} + u_{it} \qquad u_{it} = \alpha_i + \lambda_i' f_t + \varepsilon_{it} \tag{1}$$

Where tax_{it} represents the log of the tax shares while CV_{it} represents the log of the constraints variables. A fundamental aspect of the model in Equation 1 is allowing the vector of parameter coefficients (β_i) to differ across countries. The countries included in the Andersson and Brambor (2019) dataset are a mixture of developed and developing countries, and thus we do not expect the long-run relationship between tax shares and constraints to be the same across countries. Arguments for cross-country heterogeneity in this relationship were presented in Section 2.

Equation 1 also incorporates unobserved heterogeneity, modelled through country-specific fixed effects (α_i) and a constellation of unobserved common factors (f_t) with factor loadings that can differ across countries (λ_i). The country-specific heterogeneity may reflect social and cultural norms, political history—as argued in Section 2—and geography (including natural resource endowment, country size, and location). The common factors can be represented by a combination of a limited number of 'strong' factors and an unlimited number of 'weak' factors (Chudik et al. 2011; Stock and Watson 2002). The former represents global effects, which affect all countries irrespective of their location, (initial) level of development, and polity, while the latter represents local spillover effects, which may occur through geographic proximity as well as social or economic interaction. The impacts of these shocks, and countries' abilities to respond, differ across countries. Ultimately, unobserved common factors may be a source of endogeneity, leading to inconsistent estimates (see Kapetanios et al. 2011). Test results, presented in Appendix A, point to pervasive cross-section dependence, thus justifying the inclusion of f_t in Equation 1.

Given the length of the sample period, persistence in the data raises further econometric issues. Tax revenues (and the associated tax shares) and political institutions display considerable inertia over time. For example, constitutional changes that enact increased (or reduced) institutionalized checks and balances on the power of the executive evolve slowly over time. This calls for a distinction between short-run and long-run impacts. A dynamic specification is thus preferable, with at least two clear advantages over its static counterpart. First, it allows for a distinction between short-run and long-run effects. Additionally, the error correction term (ρ_i) can be used as a supporting test for cointegration between taxation and constraints on the executive, while the error correction and long-run coefficients (β_i) can be used to test for the direction of long-run causality between variables. Second, a dynamic specification following an error correction model (ECM) easily encapsulates the feedback effects postulated by our primary hypothesis: increased accountability brought about by increased taxation (with the effect possibly stronger for direct tax shares). Thus, we employ an ECM specification of the form:

$$\Delta tax_{it} = \alpha_i + \rho_i\left(tax_{it-1} - \beta_i^{CV} CV_{it-1} - \lambda_i f_{t-1}\right) + \gamma_i^{CV} \Delta CV_{it} + \gamma_i^{F} \Delta f_t + \mu_{it} \tag{2}$$

Where the β_i^{CV} in Equation 2 represents the long-run equilibrium relationship between taxation and executive constraints in the model, γ_i^{CV} represents the short-run relationship, and ρ_i is the error correction term indicating the speed of convergence of the economy to its long-run equilibrium. The expression in parentheses represents the potential cointegrating relationship we

seek to investigate. Unobserved common factors are included in the long-run relationship, which implies that we will investigate an equilibrium relationship between tax shares, executive constraints, and the unobservables (Banerjee and Carrion-i-Silvestre 2017; Eberhardt and Presbitero 2015; Eberhardt and Teal 2013).

Following Pesaran (2006), we employ the common correlated effects mean group (CCEMG) estimator, which uses (weighted) cross-section averages of the dependent ($\overline{tax}_t$) and independent ($\overline{CV}_t$) variables constructed to filter out unobserved common factors f and omitted elements of the cointegrating relationship. The estimator thus augments the country-specific ordinary least squares (OLS) regressions with cross-sectional averages. Chudik and Pesaran (2015) extend the standard Pesaran (2006) approach to accommodate dynamics (feedback) from weakly exogenous regressors and find that the standard CCEMG is subject to small-sample bias in such contexts. The empirical strategy they propose in order to curb this bias is based on the inclusion of lags of cross-section averages:

$$\Delta tax_{it} = \pi_{0i} + \pi_i^{EC} tax_{it-1} + \pi_i^{CV} CV_{it-1} + \Phi_i^{CV} \Delta CV_{it} + \pi_{1i}^{CA} \overline{tax}_t + \pi_{2i}^{CA} \overline{tax}_{t-1} + \pi_{3i}^{CA} \overline{CV}_{t-1} + \pi_{4i}^{CA} \overline{\Delta CV}_t + \sum_{l=1}^{p} \pi_{5i}^{CA} \overline{\Delta tax}_{t-p} + \sum_{l=1}^{p} \pi_{6i}^{CA} \overline{\Delta CV}_{t-p} + \varepsilon_{it} \quad (3)$$

and/or the inclusion of cross-section averages of one or more further covariates (other than the constraints variables) that may help to identify the unobserved factors. Further details on this approach are provided in Appendix E.

4.1 Cointegration and causality

The main hypothesis is a direct test for bivariate cointegration between constraints on the executive and taxation. A suitable test—one which allows for greater flexibility in cross-sectional dependence—is provided by Gengenbach et al. (2009). The test is based on a conditional ECM of the form:

$$\Delta tax_{it} = \alpha_i tax_{it-1} + \gamma_{1i}' CV_{it-1} + \gamma_{2i}' f_{it-1} + \sum_{s=0}^{p_i} \pi_{1is}' \Delta CV_{it-s} + \sum_{s=1}^{p_i} \pi_{2is}' \Delta tax_{it-s} + \sum_{s=0}^{p_i} \pi_{3is}' \Delta f_{it-s} + \varepsilon_{it} \quad (4)$$

The procedure in Equation 4 is based on the CCEMG (Pesaran 2006) whereby common factors f are approximated by cross-section averages, including cross-section averages of lagged Δtax_{it} and ΔCV_{it}, depending on the lag-length p_i. The test is for a null hypothesis of no error correction (and hence no cointegration) against an alternative of error correction (cointegration). The test statistic $\bar{\tau}^*$ is the average of the t-ratios for $\hat{\alpha}_i$, from country regressions. The individual t-ratios, as well as their averages, have non-standard distributions under the null hypothesis, so Gengenbach et al. (2009) provide simulated critical values. The test is run for each CCEMG model with different deterministic terms (neither intercept nor trend; intercept; intercept and trend). Finding cointegration between tax shares and political institutions is important, as it will imply that no important non-stationary variable has been omitted: any omitted non-stationary variable that is meant to be part of the cointegrating relationship will now be part of the error term, producing non-stationary residuals and failure to detect cointegration (Herzer 2020; Herzer and Nagel 2019).

An appealing feature of cointegration is that it allows the direction of long-run causality between variables to be tested. This is of particular interest here, since we have hypothesized in Section 2 that executive constraints and taxation may reinforce each other. If there exists a cointegrating relationship between tax shares and executive constraints, the Granger representation theorem (Engle and Granger 1987; Granger 1988) states that long-run causality must run in at least one direction (equivalent to at least one variable adjusting to maintain an equilibrium relationship) and

the variables can be represented in the form of a dynamic ECM. For the pair of cointegrated variables CV_{it} and tax_{it}, we estimate:

$$\Delta tax_{it} = \rho_{1i} + \theta_{1i}\hat{e}_{it-1} + \sum_{j=1}^{K} \lambda_{11ij} \Delta \text{tax}_{it-j} + \sum_{j=1}^{K} \lambda_{12ij} \Delta CV_{it-j} + \epsilon_{it}^{tax} \quad (5)$$

$$\Delta CV_{it} = \rho_{2i} + \theta_{2i}\hat{e}_{it-1} + \sum_{j=1}^{K} \lambda_{21ij} \Delta CV_{it-j} + \sum_{j=1}^{K} \lambda_{22ij} \Delta tax_{it-j} + \epsilon_{it}^{CV} \quad (6)$$

where $\hat{e}_{it-1}$ is the error correction term $\hat{e} = tax - \hat{\beta}_i CV - \hat{d}$ constructed using the cointegrating relationship between the variables (d represents deterministic terms obtained after estimating Equations 5 and 6). Equations 5 and 6 also include cross-section averages of the non-error terms in the weak exogeneity regressions. The lagged differences capture the short-run dynamics, while the error correction term represents how far the variables are from the equilibrium relationship, with the error correction mechanism then indicating the speed of adjustment following a deviation from the long-run equilibrium (Canning and Pedroni 2008). Each variable may react to its lagged differences, as well as lagged differences of other variables in the cointegrating relationship. The Granger representation theorem implies that at least one of the adjustment coefficients θ_{1i} and θ_{2i} must be non-zero if a cointegrating (equilibrium) relationship between the variables is to hold (Canning and Pedroni 2008). If $\theta_{1i} \neq 0$, then CV_{it} has a long-run causal impact on tax_{it}; and if $\theta_{2i} \neq 0$, then tax_{it} has a long-run causal impact on CV_{it}. If both θ_{1i} and θ_{2i} are non-zero, then CV_{it} and tax_{it} determine each other jointly.

The ECM regressions are estimated at the country level and empirical estimates of θ_i are investigated using standard t-ratios, given that all of the variables in the ECM regressions 5 and 6 are stationary (Canning and Pedroni 2008; Eberhardt and Presbitero 2015). Following Canning and Pedroni (2008), we present the group-mean statistic (GM), which averages the θ_i from individual country estimations of Equations 5 and 6, and the test for the null of 'no long-run causal impact' is computed from the averaged t-ratio from country regressions ($\bar{t}_{\theta_2} = N^{-1} \sum_{i=1}^{N} t_{\theta_2}$). The GM statistic follows a standard normal distribution.

5 Results

This section presents the results, in two steps. First, we discuss the results from the cointegration analysis on the existence of a long-run equilibrium relationship between the variables and its dynamics. Second, we present the evidence from the causality tests.

5.1 Cointegration

Inference on cointegration is provided in Table 1. The results are based on the Gengenbach et al. (2009) cointegration test with one lag.[12] Model 1 has no deterministic terms (no intercept or trend), model 2 includes only an intercept, and model 3 includes an intercept and a linear trend. Gengenbach et al. (2009) tabulate critical values for different combinations of N (number of countries), T (number of years), and m (number of regressors). Inference is based on comparing the test statistic, $\bar{\tau}^*$, with the simulated critical values: if the absolute value of the test statistic is larger than the absolute value of the simulated critical values, we reject the null hypothesis of no error correction and hence no cointegration. The results show a clear rejection of the null hypothesis for total taxation (as a share of GDP). However, evidence of cointegration is strongest for the share of direct taxes and all measures of executive constraints. It is less clear, on the other hand, that indirect taxes and different measures of executive constraints are cointegrated, as the test statistic is often below the five per cent level. Table B1 in Appendix B reports cointegration tests on tax composition. For the share of income taxes—a dimension of broad-based taxation—we find evidence supporting cointegration for both legislative and judicial constraints. On the other hand, for the share of trade taxes—an example of narrow-based taxation—we mostly cannot reject the null hypothesis of no error correction across specifications. Finally, the share of consumption taxes also shows evidence of cointegration with the executive constraints measures.

[12] This follows standard practice in time series analysis. Including more lags results in a loss of degrees of freedom and the number of parameters increases more than proportionally. Besides, the consensus in time series literature is to follow specific-to-general modelling: that is, starting from lower lags and successively including more lags.

Table 1: Gengenbach et al. (2009) cointegration test: taxation and executive constraints

	Test statistic, $\bar{\tau}^*$	10%	5%	1%
Panel A: Executive constraints				
Tax/GDP and executive constraints				
Model 1	−2.987***	−1.995	−2.065	−2.190
Model 2	−3.198***	−2.458	−2.517	−2.611
Model 3	−3.203**	−2.875	−2.925	−3.010
Direct tax share and executive constraints				
Model 1	−2.954***	−1.995	−2.065	−2.190
Model 2	−3.174***	−2.458	−2.517	−2.611
Model 3	−3.420**	−2.875	−2.925	−3.010
Indirect tax share and executive constraints				
Model 1	−2.364***	−1.995	−2.065	−2.190
Model 2	−2.539**	−2.458	−2.517	−2.611
Model 3	−2.864	−2.875	−2.925	−3.010
Panel B: Judicial constraints				
Tax/GDP and judicial constraints				
Model 1	−2.684***	−1.995	−2.065	−2.190
Model 2	−2.790***	−2.458	−2.517	−2.611
Model 3	−2.870	−2.875	−2.925	−3.010
Direct tax share and judicial constraints				
Model 1	−2.989***	−1.995	−2.065	−2.190
Model 2	−3.230***	−2.458	−2.517	−2.611
Model 3	−3.476***	−2.875	−2.925	−3.010
Indirect tax share and judicial constraints				
Model 1	-2.404***	-1.995	-2.065	-2.190
Model 2	-2.505*	-2.458	-2.517	-2.611
Model 3	-2.842*	-2.875	-2.925	-3.010
Panel C: Legislative constraints				
Tax/GDP and legislative constraints				
Model 1	−3.000***	−1.995	−2.065	−2.190
Model 2	−3.338***	−2.458	−2.517	−2.611
Model 3	−3.261***	−2.875	−2.925	−3.010
Direct tax share and legislative constraints				
Model 1	−2.842***	−1.995	−2.065	−2.190
Model 2	−3.129***	−2.458	−2.517	−2.611
Model 3	−3.306***	−2.875	−2.925	−3.010
Indirect tax share and legislative constraints				
Model 1	−2.458***	−1.995	−2.065	−2.190
Model 2	−2.367**	−2.458	−2.517	−2.611
Model 3	−2.899*	−2.875	−2.925	−3.010

Note: ***, **, and * indicate significance at 1, 5, and 10%, respectively; significance will indicate rejection of the null hypothesis; H_0: no error correction, hence, no cointegration, H_1: error correction, hence cointegration; models 1–3 refer to an ECM without any deterministic terms, with intercept, and with intercept and trend, respectively.

Source: authors' calculations based on data from Anderson and Brambor (2019); Coppedge et al. (2020).

5.2 Short- and long-run effects

Next, we focus on the dynamics of the relationship between executive constraints and taxation, as expressed in Equations 2 and 3. Our first task, having observed unambiguous evidence of cointegration, is to see how taxation behaves when deviating from the long-run equilibrium. The results are shown in Table 2. Without exception, error correction (EC) coefficient estimates are negative and significant, reflecting the fact that executive constraints and tax revenues are cointegrated. The EC coefficient captures the adjustment towards the long-run equilibrium: what proportion of the disequilibrium in the dependent variable in one period is corrected in the next period. In this case, a deviation of total tax revenues from the long-run equilibrium will be corrected by approximately 15 per cent in the next period. A hypothetical 'fiscal shock' would have effects on the total amount of revenues collected that are slowly absorbed in the economy. A relatively slow adjustment of tax revenues should not come as a surprise, as this depends on the functioning of tax systems, which may be slow to react because such institutions are persistent.

Our second task is to see how executive constraints impact the amount and composition of tax revenues. While there is evidence of strong error correction, the long- and short-run coefficients of executive constraints on taxation appear statistically insignificant throughout. These estimates represent *average* effects (short- and long-run) across our panel of countries.[13] Lack of significance does not imply the absence of any significant effects, but rather highlights the presence of pervasive heterogeneity across countries, where dynamic effects can be mixed and so *on average* cancel each other out. There is an important exception to this result. The estimated long-run effect on the share of total taxes from income tax is positive and significant (see Table C1 in Appendix C). This supports the idea that the effect of executive constraints works through broad-based taxation. Finally, the CD statistics in Table 2 drop considerably compared with those in Table A1 and often show that the null of cross-sectionally independent residuals cannot be rejected.

Evidence from historical data covering 31 countries suggests that there is a long-run relationship between taxation and political institutions placing limits on the executive power. One way to extend the analysis is to ask if cointegration also exists for a broader sample of countries. This is not guaranteed, as our results also show that this relationship can be different in different contexts, and hence it is worth exploring. We make a first pass here. We resort to the Government Revenue Dataset (UNU-WIDER 2020), which provides comparable tax variables for a global sample of countries for 1980–2018. ECM estimates support the existence of a long-run relationship for a sample of up to 119 countries and confirm that country heterogeneity may be important (see results in Appendix F). One, however, should read these results with caution. We are analysing historical phenomena, which requires many years of data. Existing global datasets have, instead, rather limited temporal coverage and the Government Revenue Dataset is no exception. This is a significant limitation for cointegration analysis. Whether cointegration between executive constraints and taxation extends to global sample is perhaps something we cannot empirically support yet.

[13] We provide the long-run average (LRA) estimates, which are obtained by averaging ECM coefficients first before computing the long-run average. This is different from the average long-run (ALR), which is obtained by computing the long-run coefficient in each country before averaging them. The LRA is preferred to the ALR, since the latter is more sensitive to outliers.

Table 2: ECM estimates: total taxes, shares of direct and indirect taxes

Panel A: Total taxes/GDP and executive constraints			
	Judicial	Legislative	Exec. constraints
Long-run executive constraints	0.100 [0.095]	0.104 [0.089]	0.023 [0.092]]
Short-run			
Short-run executive constraints	−0.074 [0.067]	−0.051 [0.067]	0.0002 [0.054]
EC coefficient			
y_{it-1}	−0.152*** [0.016]	−0.169*** [0.019]	−0.154*** [0.016]
t-statistic	−9.74	−8.99	−9.68
CD test (p-value)	−3.138 (0.000)	−1.986 (0.047)	−2.663 (0.008)
Observations (N)	4,454 (31)	4,175 (31)	4,454 (31)

Panel B: Share of direct taxes and executive constraints			
	Judicial	Legislative	Exec. constraints
Long-run executive constraints	0.088 [0.232]	0.207* [0.124]	0.099 [0.114]
Short-run executive constraints	0.026 [0.040]	0.021 [0.061]	-0.008 [0.033]
EC coefficient			
y_{it-1}	−0.184*** [0.022]	−0.200*** [0.025]	−0.182*** [0.022]
t-statistic	−8.27	−7.86	−8.13
CD test (p −value)	−1.708 (0.088)	−1.199 (0.230)	−1.908 (0.056)
Observations (N)	3,907 (31)	3,574 (31)	3,907 (31)

Panel C: Share of indirect taxes and executive constraints			
	Judicial	Legislative	Exec. constraints
Long-run executive constraints	−0.060 [0.292]	−0.184 [0.019]	0.051 [0.106]
Short-run executive constraints	0.003 [0.049]	−0.008 [0.037]	0.020 [0.027]
EC coefficient			
y_{it-1}	−0.100*** [0.013]	−0.112*** [0.017]	−0.105*** [0.014]
t-statistic	−7.86	−6.78	−7.46
CD test (p-value)	−3.859 (0.000)	−3.116 (0.002)	−4.001 (0.000)
Observations (N)	4,304 (31)	3,992 (31)	4,304 (31)

Note: results are based on an ECM for all 31 countries in the sample; the long- and short-run averages are reported, with standard errors reported in parentheses; CD test is the Pesaran (2015) test distributed $N(0,1)$ under the null of weak cross-section independence (p-value in parentheses); *, **, and *** indicate significance at 10, 5, and 1% respectively.

Source: authors' calculations based on data from Anderson and Brambor (2019); Coppedge et al. (2020).

5.3 Causality tests

Table 3 presents tests for the direction of long-run causality, focusing on estimates from Equations 5 and 6. GM denotes the group-mean statistic (which is the average of country-specific t-ratios on the disequilibrium term and is distributed $N(0,1)$). The test statistic is for the null of 'no causal impact', which in our case can be interpreted as the variable not adjusting to maintain the long-run equilibrium. While our primary interest is in the GM statistic, we also report the robust $\hat{\theta}_i$ estimate and its associated t-statistic. At best, the panel robust $\hat{\theta}_i$ complements the GM statistic. We would expect a high t-statistic on the average $\hat{\theta}_i$ coefficients in the regular equations (which can be interpreted as evidence of a long-run causal relationship from executive constraints to tax variables) and a low t-statistic (below 1.96) in the 'reverse causality' equations (Eberhardt and Presbitero 2015).[14]

There is clear evidence that long-run causality runs mostly from constraints on the executive to tax shares. This result is most evident for direct tax shares and, specifically, for income tax shares. On the other hand, we find very little evidence that causality runs from taxation to executive constraints. Specifically, there is some evidence of bidirectionality only for measure of total taxes and income taxes, but no evidence for consumption or trade taxes. In sum, the results favour the hypothesis that causality runs from executive constraints to taxation, and broad-based taxes specifically, although we cannot rule out the possibility of bidirectionality. The lack of unambiguous evidence of unidirectionality may not imply the absence of any significant long-run causality, but may rather reflect the presence of pervasive heterogeneity across countries, where a feedback effect from tax revenues to political institutions may or may not materialize depending on context-specific conditions.

[14] The group-mean tests also allow for estimation of the panel robust $\hat{\theta}_i$ and its associated t-statistic (Canning and Pedroni 2008): both reported in the final two columns of Table 3. The t-statistics reaffirm our primary findings on causality: for the constraints variables the t-statistics are higher while for the tax shares equations the t-statistics are typically lower than 1.96 (with few exceptions).

Table 3: Weak exogeneity tests

	GM	*p*-value	Mean $\hat{\theta}_i$	*t*-stat
Total taxes/GDP				
Judicial constraints to tax/GDP	−2.151	0.031	−0.125	−7.579
Tax/GDP to judicial constraints	*0.268*	*0.789*	*0.008*	*2.476*
Legislative constraints to tax/GDP	−2.220	0.026	−0.149	−7.478
Tax/GDP to legislative constraints	*0.357*	*0.721*	*0.006*	*1.167*
Executive constraints to tax/GDP	−2.240	0.025	−0.143	−7.798
Tax/GDP to executive constraints	*0.265*	*0.791*	*0.012*	*1.249*
Direct taxation				
Judicial constraints to direct taxes	−2.422	0.015	−0.132	−8.635
Direct taxes to judicial constraints	*0.228*	*0.819*	*0.000*	*0.022*
Legislative constraints to direct taxes	−2.313	0.021	−0.147	−8.202
Direct taxes to legislative constraints	*−0.066*	*0.947*	*0.001*	*0.230*
Executive constraints to direct taxes	*−2.451*	*0.014*	*−0.132*	*−8.961*
Direct taxes to executive constraints	0.247	0.805	0.004	*0.721*
Income tax				
Judicial constraints to income taxes	−2.378	0.017	−0.140	−7.036
Income taxes to judicial constraints	*−0.107*	*0.915*	*−0.002*	*−1.119*
Legislative constraints to income taxes	−2.147	0.032	−0.146	−6.725
Legislative constraints to income taxes	*0.008*	*0.993*	*0.001*	*0.443*
Executive constraints to income taxes	−2.362	0.018	−0.132	−7.225
Income taxes to executive constraints	*0.210*	*0.834*	*0.013*	*2.010*
Indirect taxation				
Judicial constraints to indirect taxes	−1.930	0.054	−0.089	−6.365
Indirect taxes to judicial constraints	*−0.038*	*0.969*	*0.004*	*0.717*
Legislative constraints to indirect taxes	−1.743	0.082	−0.100	−5.738
Indirect taxes to legislative constraints	*−0.183*	*0.855*	*0.003*	*0.319*
Executive constraints to indirect taxes	−1.875	0.061	−0.096	−7.157
Indirect taxes to executive constraints	*0.060*	*0.952*	*0.002*	*0.121*
Consumption taxes				
Judicial constraints to consumption taxes	−1.457	0.145	−0.123	−4.478
Consumption taxes to judicial constraints	*−0.138*	*0.890*	*−0.013*	*−1.402*
Legislative constraints to consumption taxes	−1.321	0.186	−0.163	−5.148
Consumption taxes to legislative constraints	*−0.344*	*0.731*	*0.001*	*0.137*
Executive constraints to consumption taxes	−1.381	0.167	−0.155	−4.636
Consumption taxes to executive constraints	*−0.137*	*0.891*	*0.005*	*0.244*
Trade taxes				
Judicial constraints to trade taxes	−1.435	0.151	−0.076	−4.484
Trade taxes to judicial constraints	*0.185*	*0.853*	*0.001*	*0.589*
Legislative constraints to trade taxes	−1.540	0.123	−0.086	−4.818
Trade taxes to legislative constraints	*−0.367*	*0.714*	*−0.002*	*−1.672*
Executive constraints to trade taxes	−1.595	0.111	−0.083	−5.206
Trade taxes to executive constraints	*0.025*	*0.980*	*0.002*	*0.509*

Note: the rows in italics are for 'reverse causality', where causality runs from taxation to constraints variables.

Source: authors' calculations based on data from Anderson and Brambor (2019); Coppedge et al. (2020).

6 Conclusion

Political institutions placing constraints on the executive power can positively affect the ability of states to collect revenues. In turn, the emergence of new forms of taxation can itself increase the pressure on governments to become more accountable. This paper has studied the dynamic aspect of this relationship, offering panel time series evidence that allows for cross-sectional dependence and unobserved heterogeneity at country level of different forms, whether fixed effects or parameter heterogeneity. We find that executive constraints, whether they are judicial or legislative, and tax revenues are cointegrated: there is a long-run relationship between the two. While in the short run executive constraints or tax revenues can drift apart, this will be temporary because they tend to co-evolve. We also find that the existence and nature of a long-run relationship may be mainly related to the emergence of broad-based taxation. Evidence of cointegration is strongest for variables capturing the share of revenues from direct taxes such as income tax, much weaker for indirect tax revenues, and absent for trade taxes. Moreover, we find evidence that long-run causality runs mainly (albeit not exclusively) from executive constraints to taxation. This is most evident for broad-based taxes. Finally, we find evidence of pervasive heterogeneity, suggesting that the dynamic relationship between executive constraints and taxation is also subject to country-specific conditions. These results hold for a sample of 31 advanced and emerging economies for the 1820–2012 period. Whether a long-run relationship between executive constraints and taxation extends to a global sample is a question left for future research. Initial evidence from a sample of up to 119 countries for 1980–2018 supports this possibility.

The above findings are policy-relevant. With respect to SDG 17 Target 1, which requires the strengthening of domestic resource mobilization, our findings imply that institutions providing effective checks and balances on the executive power can be an important political condition for progress on this target. Much donor support for revenue administrations' development tends to focus on technocratic solutions, such as upgrading infrastructure or reforming recruitment practices in the public sector. While this is important, our findings suggest that a technical fix alone may not be enough, if political institutions providing the incentive to invest in fiscal capacity are missing. Our findings are also relevant to promoting 'effective, accountable and transparent institutions at all levels', as SDG 16 Target 6 requires. The emergence of revenues from broad-based taxation reinforces institutions' role in holding state leadership accountable, contributing to their long-term consolidation. Hence, the effect of mobilizing domestic revenues can have benefits that go beyond the immediate positive economic effect on public finance. If the intent of the Sustainable Development Goals is that different targets should work in synergy, this is one case where this may succeed.

References

Acemoglu, D., and J.A. Robinson (2019). 'Rents and Economic Development: The Perspective of Why Nations Fail'. *Public Choice*, 181: 13–28. https://doi.org/10.1007/s11127-019-00645-z

Aidt, T.S., and P.S. Jensen (2009). 'Tax Structure, Size of Government, and the Extension of the Voting Franchise in Western Europe, 1860–1938'. *International Tax and Public Finance*, 16: 362–94. https://doi.org/10.1007/s10797-008-9069-9

Albers, T.N.H, M. Gerven, and M. Suesse (2020). 'The Fiscal State in Africa: Evidence from a Century of Growth'. African Economic History Working Paper 55/2020. Online: African Economic History Network.

Alesina, A., and G.-M. Angeletos (2005). 'Fairness and Redistribution'. *American Economic Review*, 95(4): 960–80. https://doi.org/10.1257/0002828054825655

Andersson, P.F. (2018). 'Democracy, Urbanization, and Tax Revenue'. *Studies in Comparative International Development*, 53(1): 111–50. https://doi.org/10.1007/s12116-017-9235-0

Andersson, P.F., and T. Brambor (2019). 'Financing the State: Government Tax Revenue from 1800 to 2012. Version 2.0'. Lund: Lund University.

Andriani, L., R. Bruno, E. Douarin, and P. Stepien-Baig (2021). 'Is Tax Morale Culturally Driven?' *Journal of Institutional Economics*, forthcoming. https://doi.org/10.1017/S1744137421000072

Banerjee, A., and J.L. Carrion-i-Silvestre (2017). 'Testing for Panel Cointegration Using Common Correlated Effects Estimators'. *Journal of Time Series Analysis*, 38(4): 610–36. https://doi.org/10.1111/jtsa.12234

Bardhan, P. (2016). 'State and Development: The Need for a Reappraisal of the Current Literature'. *Journal of Economic Literature*, 54(3): 862–92. https://doi.org/10.1257/jel.20151239

Beramendi, P., M. Dincecco, and M. Rogers (2018). 'Intra-Elite Competition and Long-Run Fiscal Development'. *The Journal of Politics*, 81(1). http://dx.doi.org/10.1086/700273

Besley, T. (2019) 'State Capacity, Reciprocity, and the Social Contract'. Unpublished manuscript.

Besley, T., and M. Kudamatsu (2008). *Making Autocracy Work. In Institutions and Economic Performance*, ed. E. Helpman. Cambridge, MA: Harvard University Press. https://doi.org/10.2307/j.ctv21hrgnz.15

Besley, T., and T. Persson (2009). 'The Origins of State Capacity: Property Rights, Taxation, and Politics'. *American Economic Review*, 99(4): 1218–44. https://doi.org/10.1257/aer.99.4.1218

Besley, T., and T. Persson (2011). *Pillars of Prosperity: The Political Economics of Development Clusters*. Princeton, NJ: Princeton University Press. https://doi.org/10.23943/princeton/9780691152684.001.0001

Besley, T., and T. Persson (2013). 'Taxation and Development'. In A. Auerbach, R. Chetty, M. Feldstein, and E. Saez (eds), *Handbook of Public Economics*. Amsterdam: Elsevier. https://doi.org/10.1016/B978-0-444-53759-1.00002-9

Besley, T., and T. Persson (2014). 'Why Do Developing Countries Tax So Little?' *Journal of Economic Perspectives*, 28(4): 99–120. https://doi.org/10.1257/jep.28.4.99

Bockstette, V., A. Chanda, and L. Putterman (2002). 'States and Markets: The Advantage of an Early Start'. *Journal of Economic Growth*, 7(4): 347–69. https://doi.org/10.1023/A:1020827801137

Bolch, K.B., L. Ceriani, and L.F. López-Calva (2022). 'The Arithmetics and Politics of Domestic Resource Mobilization for Poverty Eradication'. *World Development*, 149: 105691. https://doi.org/10.1016/j.worlddev.2021.105691

Bonney, R. (ed.) (1999). *The Rise of Fiscal States in Europe c.1200–1815*. Oxford: Oxford University Press. https://doi.org/10.1093/acprof:oso/9780198204022.001.0001

Bräutigam, D., O.H. Fjeldstad, and M. Moore (2008). *Taxation and State-Building in Developing Countries: Capacity and Consent*. Cambridge: Cambridge University Press. https://doi.org/10.1017/CBO9780511490897

Bueno de Mesquita, B., A. Smith, R.M. Siverson, and J.D. Morrow (2003). *The Logic of Political Survival*. Cambridge, MA: MIT Press. https://doi.org/10.7551/mitpress/4292.001.0001

Canning, D., and P. Pedroni (2008). 'Infrastructure, Long-Run Economic Growth and Causality Tests for Cointegrated Panels'. *The Manchester School*, 76(5), 504–27. https://doi.org/10.7551/mitpress/4292.001.0001

Cheibub, J.A. (1998). 'Political Regimes and the Extractive Capacity of Government Taxation in Democracies and Dictatorships'. *World Politics*, 50(3): 349–76. https://doi.org/10.1017/S0043887100012843

Chudik, A., and M.H. Pesaran (2015). 'Common Correlated Effects Estimation of Heterogeneous Dynamic Panel Data Models with Weakly Exogenous Regressors'. *Journal of Econometrics*, 188(2): 393–420. https://doi.org/10.1016/j.jeconom.2015.03.007

Chudik, A., M.H. Pesaran, and E. Tosetti (2011). 'Weak and Strong Cross-Section Dependence and Estimation of Large Panels'. *The Econometrics Journal*, 14(1): C45–90. https://doi.org/10.1111/j.1368-423X.2010.00330.x

Coppedge, M., J. Gerring, C.H. Knutsen, S.I. Lindberg, J. Teorell, D. Altman, M. Bernhard, M.S. Fish, A. Glynn, A. Hicken, A. Luhrmann, K.L. Marquardt, K. McMann, P. Paxton, D. Pemstein, B. Seim, R. Sigman, S.-E. Skaaning, J. Staton, S. Wilson, A. Cornell, N. Alizada, L. Gastaldi, H. Gjerløw, G. Hindle, N. Ilchenko, L. Maxwell, V. Mechkova, J. Medzihorsky, J. von Römer, A. Sundström, E. Tzelgov, Y.-T. Wang, T. Wig, and D. Ziblatt (2020). 'V-Dem [Country–Year/Country–Date] Dataset v10'. Gothenburg: Varieties of Democracy (V-Dem) Project, V-Dem Institute, University of Gothenburg. https://doi.org/10.23696/vdemds20

D'Arcy, M. (2012). 'Taxation, Democracy and State-Building: How Does Sequencing Matter?' Quality of Government Working Paper 2012: 4. Gothenburg: The Quality of Government Institute, University of Gothenburg.

D'Attoma, J. (2018). 'Explaining Italian Tax Compliance: A Historical Analysis'. In S.H. Steinmo (ed.), *The Leap of Faith: The Fiscal Foundations of Successful Government in Europe and America*. Oxford: Oxford University Press. https://doi.org/10.1093/oso/9780198796817.003.0005

Dincecco, M. (2017). *State Capacity and Economic Development*. Cambridge: Cambridge University Press. https://doi.org/10.1017/9781108539913

Ditzen, J. (2018). 'Estimating Dynamic Common-Correlated Effects in Stata'. *Stata Journal*, 18: 585–617. https://doi.org/10.1177/1536867X1801800306

Dom, R. (2018). 'Taxation and Accountability in Sub-Saharan Africa: New Evidence for a Governance Dividend'. ODI Working Paper 544. London: Overseas Development Institute (ODI).

Eberhardt, M., and A.F. Presbitero (2015). 'Public Debt and Growth: Heterogeneity and Non-Linearity'. *Journal of International Economics*, 97(1): 45–58. https://doi.org/10.1017/9781108539913

Eberhardt, M., and F. Teal (2013). 'No Mangoes in the Tundra: Spatial Heterogeneity in Agricultural Productivity Analysis'. *Oxford Bulletin of Economics and Statistics*, 75(6): 914–39. https://doi.org/10.1111/j.1468-0084.2012.00720.x

Engle, R.F., and C.W. Granger (1987). 'Co-integration and Error Correction: Representation, Estimation, and Testing'. *Econometrica: Journal of the Econometric Society*, 55(2): 251–76. https://doi.org/10.2307/1913236

Gengenbach, C., J.-P. Urbain, and J. Westerlund (2009). *Error Correction Testing in Panels with Global Stochastic Trends (December 2009)*. Maastricht University: METEOR.

Granger, C.W. (1988). 'Some Recent Development in a Concept of Causality'. *Journal of Econometrics*, 39(1–2): 199–211. https://doi.org/10.1016/0304-4076(88)90045-0

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

Herzer, D. (2020). 'How Does Mortality Affect Innovative Activity in the Long Run?' *World Development*, 125: 104688. https://doi.org/10.1016/j.worlddev.2019.104688

Herzer, D., and K. Nagel (2019). 'The Impact of Adult and Non-Adult Mortality on Development: Two Centuries of Evidence from a Panel of Industrial Countries'. *Journal of Policy Modeling*, 41(2): 352–71. https://doi.org/10.1016/j.jpolmod.2019.02.008

Jensen, A.D. (2011). 'State-Building in Resource-Rich Economies'. *Atlantic Economic Journal*, 39: 171–93. https://doi.org/10.1007/s11293-011-9269-z

Kapetanios, G., M.H. Pesaran, and T. Yamagata (2011). 'Panels with Non-Stationary Multifactor Error Structures'. *Journal of Econometrics*, 160(2): 326–48. https://doi.org/10.1016/j.jeconom.2010.10.001

Kiser, E., and S.M. Karceski (2017). 'Political Economy of Taxation'. *Annual Review of Political Science*, 20(1): 75–92. https://doi.org/10.1146/annurev-polisci-052615-025442

Levi, M. (1988), *Of Rule and Revenue*, Berkeley: University of California Press.

Luttmer, E.F.P., and M. Singhal (2014). 'Tax Morale'. *Journal of Economic Perspectives*, 28(4): 149–68. https://doi.org/10.1257/jep.28.4.149

Mares, I., and D. Queralt (2015). 'The Non-Democratic Origins of Income Taxation'. *Comparative Political Studies*, 48(14): 1,974–2,009. https://doi.org/10.1177/0010414015592646

Mares, I., and D. Queralt (2020). 'Fiscal Innovation in Nondemocratic Regimes: Elites and the Adoption of the Prussian Income Taxes of the 1890s'. *Explorations in Economic History*, 77: 101340. https://doi.org/10.1016/j.eeh.2020.101340

Masi, T., A. Savoia, and K. Sen (2020). 'Is There a Fiscal Resource Curse? Resource Rents, Fiscal Capacity, and Political Institutions in Developing Economies'. WIDER Working Paper 2020/10. Helsinki: UNU-WIDER. https://doi.org/10.35188/UNU-WIDER/2020/767-5

Moore, M. (2004). 'Revenues, State Formation, and the Quality of Governance in Developing Countries'. *International Political Science Review*, 25(3): 297–319. https://doi.org/10.1177/0192512104043018

Moore, M. (2007). 'How Does Taxation Affect the Quality of Governance?' IDS Working Paper 280. Brighton: Institute of Development Studies.

Nistotskaya, M., and M. D'Arcy (2018). 'Getting to Sweden: The Origins of High Tax Compliance in Swedish Tax State'. In S.H. Steinmo (ed.), *The Leap of Faith: The Fiscal Foundations of Successful Government in Europe and America*. Oxford: Oxford University Press. https://doi.org/10.1093/oso/9780198796817.003.0002

Peres-Cajías, J.A. (2015). 'Public Finances and Natural Resources in Bolivia, 1883–2010: Is There a Fiscal Curse? In H. Badia-Miró, M., Pinilla, and V. Willebald (eds), *Natural Resources and Economic Growth: Learning from History*. London: Routledge. https://doi.org/10.4324/9781315769356-9

Peres-Cajías, J., S. Torregrosa-Hetland, and C. Ducoing (2020). 'Resource Abundance and Public Finances in Five Peripheral Economies, 1850–1939'. Lund Papers in Economic History: General Issues 2020: 216. Lund: Lund University.

Pesaran, M.H. (2006). 'Estimation and Inference in Large Heterogeneous Panels with a Multifactor Error Structure'. *Econometrica*, 74(4): 967–1012. https://doi.org/10.1111/j.1468-0262.2006.00692.x

Pesaran, M.H. (2007). 'A Simple Panel Unit Root Test in the Presence of Cross-Section Dependence'. *Journal of Applied Econometrics*, 22(2): 265–312. https://doi.org/10.1002/jae.951

Pesaran, M.H. (2015). Testing Weak Cross-Sectional Dependence in Large Panels'. *Econometric Reviews*, 34(6–10): 1089–117. https://doi.org/10.1080/07474938.2014.956623

Pomeranz, D., and J. Vila-Belda (2019). 'Taking State-Capacity Research to the Field: Insights from Collaborations with Tax Authorities'. *Annual Review of Economics*, 11: 755–81. https://doi.org/10.1146/annurev-economics-080218-030312

Prichard, W. (2015). *Taxation, Responsiveness and Accountability in Sub-Saharan Africa: The Dynamics of Tax Bargaining*. Cambridge: Cambridge University Press. https://doi.org/10.1017/CBO9781316275511

Ricciuti, R., A. Savoia, and K. Sen (2019a). 'How Do Political Institutions Affect Fiscal Capacity? Explaining Taxation in Developing Economies'. *Journal of Institutional Economics*, 15(2): 351–80. https://doi.org/10.1017/S1744137418000097

Ricciuti, R., A. Savoia, and K. Sen (2019b). 'What Determines Administrative Capacity in Developing Countries?' *International Tax and Public Finance*, 26(5): 972–98. https://doi.org/10.1007/s10797-019-09535-y

Ross, M. (2004). 'Does Taxation Lead to Representation?' *British Journal of Political Science*, 34(2): 229–49. https://doi.org/10.1017/S0007123404000031

Saylor, R. (2014). *State Building in Boom Times: Commodities and Coalitions in Latin America and Africa*. Oxford: Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199364954.001.0001

Seelkopf, L., M. Bubek, E. Eihmanis, J. Ganderson, J. Limberg, Y. Mnaili, P. Zuluaga, and P. Genschel (2021). 'The Rise of Modern Taxation: A New Comprehensive Dataset of Tax Introductions Worldwide'. *The Review of International Organizations*, 16: 239–63. https://doi.org/10.1007/s11558-019-09359-9

Steinmo, S.H. (ed.) (2018). *The Leap of Faith: The Fiscal Foundations of Successful Government in Europe and America*. Oxford: Oxford University Press. https://doi.org/10.1093/oso/9780198796817.001.0001

Stock, J.H., and M.W. Watson (2002). 'Forecasting Using Principal Components from a Large Number of Predictors'. *Journal of the American Statistical Association*, 97(460): 1167–79. https://doi.org/10.1198/016214502388618960

Tilly, C. (1992). *Coercion, Capital and European States, AD 990–1992*. Cambridge, MA, and Oxford: Blackwell.

Timmons, J.F. (2010). 'Taxation and Representation in Recent History'. *Journal of Politics*, 72(1): 191–208. https://doi.org/10.1017/S0022381609990569

UNU-WIDER (2020). GRD: Government Revenue Dataset. September. Available at: https://www.wider.unu.edu/project/government-revenue-dataset (accessed November 2020).

Xu, G. (2019). 'The Colonial Origins of Fiscal Capacity: Evidence from Patronage Governors'. *Journal of Comparative Economics*, 47: 263–76. https://doi.org/10.1016/j.jce.2019.01.001

Yun-Casalilla, B., and P.K. O'Brien (eds) (2011). *The Rise of Fiscal States: A Global History 1500–1914*. Cambridge: Cambridge University Press. https://doi.org/10.1017/CBO9781139004237

Appendix A: Cross-section dependence and stationarity tests

We apply the Pesaran (2015) test to investigate cross-section correlation properties in the data and report the CD statistic (as well as its corresponding p-value). The CD statistic is normally distributed and the null hypothesis of the test is weak cross-section independence, against the alternative hypothesis of weak cross-section dependence. The results, presented in Table A1, point to pervasive cross-section dependence across different variable specifications (levels versus first differences). The CD statistics are considerably lower for variables in first differences.

Table A1: Cross-section dependence

Panel A	Variables in levels							
	Direct tax	Indirect tax	Consumption tax	Trade tax	Tax/GDP	Judicial constraints	Legislative constraints	Executive constraints
CD	138.72	105.27	129.66	60.32	178.74	133.49	142.34	159.17
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Panel B	Variables in first differences							
CD	9.18	15.25	0.24	17.61	4.69	5.36	2.07	8.58
p-value	0.000	0.000	0.813	0.000	0.000	0.000	0.039	0.000

Note: (i) we use the stata routine 'xtcd2' developed by Jan Ditzen (2018). CD is the Pesaran (2015) test for cross-section dependence distributed $N(0,1)$ under the null of cross-section independence. Panels A and B test for cross-section dependence in the variable series for levels and first differences, respectively. Direct tax share, indirect tax share, consumption tax share, trade tax share, tax/GDP ratio, judicial constraints, legislative constraints, and executive constraints all in logs.

Source: authors' calculations based on data from Andersson and Brambor (2019).

Cross-section dependence results in over-rejection of the null hypothesis of non-stationarity in standard panel unit root tests (Pesaran 2007). Thus, we employ a panel unit root test, the CIPS test, which allows for cross-section correlation. Panel unit root tests are applied to the variable series following the procedure in Pesaran (2007). The test is based on a standard Augmented Dickey-Fuller (ADF) regression, augmented with cross-section averages of the dependent and independent variables to account for cross-section dependence. We report the Ztbar statistic (and its associated p-value) for the null hypothesis of non-stationarity in all countries' variable series against the alternative hypothesis of stationarity in some countries' variable series. For variables in levels, non-stationarity cannot be rejected once the ADF equation is augmented with a sufficient number of lags and/or a linear trend (Tables A2a and A2b). Non-stationarity is rejected for all variables in first differences.

Table A2a: Panel unit root tests: taxation

Levels: CIPS test with intercept only										
Variable	Tax/GDP		Direct tax		Indirect tax		Consumption tax		Trade tax	
Lags	$Ztbar$	p	$Ztbar$	p	$Ztbar$	p	$Ztbar$	p	$Ztbar$	p
0	−9.53	0.00	−10.13	0.00	−6.54	0.00	−7.05	0.00	−0.19	0.43
1	−6.81	0.00	−7.65	0.00	−4.76	0.00	−4.25	0.05	−1.08	0.14
2	−4.45	0.00	−5.82	0.00	−2.68	0.02	−0.55	0.29	0.31	0.62
3	−4.42	0.00	−3.74	0.02	0.80	0.79	0.07	0.53	1.77	0.96
4	−3.20	0.00	−4.03	0.00	0.77	0.78	1.15	0.88	0.61	0.73
5	−2.42	0.01	−4.78	0.00	1.54	0.94	2.27	0.99	2.27	0.99
6	−2.32	0.01	−1.40	0.08	2.33	0.99	4.88	1.00	2.98	0.999
Levels: CIPS test with intercept and trend										
Variable	Tax/GDP		Direct tax		Indirect tax		Consumption tax		Trade tax	
Lags	$Ztbar$	p	$Ztbar$	p	$Ztbar$	p	$Ztbar$	p	$Ztbar$	p
0	−8.14	0.00	−9.97	0.00	−5.15	0.00	−4.33	0.00	1.58	0.94
1	−4.84	0.00	−7.21	0.01	−2.91	0.00	−1.76	0.04	0.49	0.69
2	−2.60	0.00	−4.64	0.00	−1.06	0.14	1.44	0.92	2.44	0.99
3	−2.04	0.02	−2.50	0.01	2.47	0.97	2.11	0.98	3.95	1.00
4	−0.99	0.16	−2.59	0.01	2.48	0.98	3.89	1.00	2.91	0.998
5	0.21	0.59	−3.54	0.00	2.89	0.998	4.75	1.00	5.00	1.00
6	0.53	0.70	0.06	0.52	4.03	1.00	7.64	1.00	4.91	1.00
Differences: CIPS test with drift										
Variable	Tax/GDP		Direct tax		Indirect tax		Consumption tax		Trade tax	
Lags	$Ztbar$	p	$Ztbar$	p	$Ztbar$	p	$Ztbar$	p	$Ztbar$	p
0	−26.86	0.00	−25.98	0.00	−26.09	0.00	−23.73	0.00	−26.79	0.00
1	−26.49	0.00	−25.16	0.00	−26.01	0.00	−20.30	0.00	−25.78	0.00
2	−25.15	0.00	−23.38	0.00	−25.49	0.00	−16.67	0.00	−24.15	0.00
3	−24.11	0.00	−21.32	0.00	−23.48	0.00	−12.27	0.00	−21.66	0.00
4	−22.02	0.00	−16.46	0.00	−21.20	0.00	−9.08	0.00	−20.59	0.00
5	−20.00	0.00	−14.15	0.00	−18.26	0.00	−7.19	0.00	−17.12	0.00
6	−17.58	0.00	−12.27	0.00	−14.69	0.00	−6.06	0.00	−13.63	0.00

Note: tax/GDP = central tax–GDP ratio; direct tax = direct tax/total central tax; indirect tax = indirect tax/total central tax; consumption tax = consumption tax/total central tax; trade tax = trade tax/total central tax.

Source: authors' calculations based on Andersson and Brambor (2019).

Table A2b: Panel unit root tests: constraints on the executive

Levels: CIPS test with intercept only						
Variables	Judicial constraints		Legislative constraints		Executive constraints	
Lags	$Ztbar$	p	$Ztbar$	p	$Ztbar$	p
0	−3.24	0.00	−3.54	0.00	6.62	1.00
1	−4.39	0.00	−2.82	0.00	7.03	1.00
2	−3.86	0.00	−3.10	0.00	7.17	1.00
3	−4.06	0.00	−2.13	0.02	7.38	1.00
4	−2.89	0.00	−1.25	0.11	7.15	1.00
5	−2.76	0.00	−1.39	0.08	6.76	1.00
6	−2.29	0.01	−1.48	0.07	7.16	1.00
Levels: CIPS test with intercept and trend						
Variables	Judicial constraints		Legislative constraints		Executive constraints	
Lags	$Ztbar$	p	$Ztbar$	p	$Ztbar$	p
0	−0.48	0.32	−1.88	0.03	8.31	1.00
1	−1.86	0.03	−1.51	0.07	8.63	1.00
2	−1.13	0.13	−2.21	0.01	8.43	1.00
3	−1.16	0.12	−0.75	0.23	8.41	1.00
4	−0.29	0.39	0.05	0.52	8.00	1.00
5	−0.24	0.41	−0.21	0.42	7.50	1.00
6	0.19	0.57	−0.33	0.37	7.75	1.00
Differences: CIPS test with drift						
Variables	Judicial constraints		Legislative constraints		Executive constraints	
Lags	$Ztbar$	p	$Ztbar$	p	$Ztbar$	p
0	−26.91	0.00	−26.91	0.00	−11.28	0.00
1	−26.91	0.00	−26.72	0.00	−11.28	0.00
2	−26.78	0.00	−25.83	0.00	−11.00	0.00
3	−26.46	0.00	−24.20	0.00	−10.35	0.00
4	−25.01	0.00	−21.38	0.00	−8.49	0.00
5	−23.22	0.00	−18.48	0.00	−7.25	0.00
6	−21.45	0.00	−16.29	0.00	−5.42	0.00

Source: authors' calculations based on based on data from Andersson and Brambor (2019).

Appendix B: Cointegration tests: income, consumption, and trade taxes

Table B1: Gengenbach et al. (2009) cointegration test: tax shares and executive constraints

	Test statistic, τ^*	10%	5%	1%
Panel A: Executive constraints				
Income tax share and executive constraints				
Model 1	−2.515***	−1.995	−2.065	−2.190
Model 2	−2.721***	−2.458	−2.517	−2.611
Model 3	−2.856	−2.875	−2.925	−3.010
Consumption tax share and executive constraints				
Model 1	−2.632***	−1.995	−2.065	−2.190
Model 2	−2.859***	−2.458	−2.517	−2.611
Model 3	−2.911*	−2.875	−2.925	−3.010
Trade tax share and executive constraints				
Model 1	−1.898***	−1.995	−2.065	−2.190
Model 2	−2.199***	−2.458	−2.517	−2.611
Model 3	−2.911*	−2.875	−2.925	−3.010
Panel B: Judicial constraints				
Income tax share and judicial constraints				
Model 1	−2.474***	−1.995	−2.065	−2.190
Model 2	−2.700***	−2.458	−2.517	−2.611
Model 3	−2.892*	−2.875	−2.925	−3.010
Consumption tax share and judicial constraints				
Model 1	−2.800***	−1.995	−2.065	−2.190
Model 2	−3.015***	−2.458	−2.517	−2.611
Model 3	−3.118***	−2.875	−2.925	−3.010
Trade tax share and judicial constraints				
Model 1	−1.842	−1.995	−2.065	−2.190
Model 2	−2.916	−2.458	−2.517	−2.611
Model 3	−2.180	−2.875	−2.925	−3.010
Panel C: Legislative constraints				
Income tax share and legislative constraints				
Model 1	−2.603***	−1.995	−2.065	−2.190
Model 2	−2.840***	−2.458	−2.517	−2.611
Model 3	−2.989**	−2.875	−2.925	−3.010
Consumption tax share and legislative constraints				
Model 1	−2.693***	−1.995	−2.065	−2.190
Model 2	−3.092***	−2.458	−2.517	−2.611
Model 3	−3.190***	−2.875	−2.925	−3.010
Trade tax share and legislative constraints				
Model 1	−2.013*	−1.995	−2.065	−2.190
Model 2	−2.394	−2.458	−2.517	−2.611
Model 3	−2.713	−2.875	−2.925	−3.010

Note: ***, **, and * indicate significance at 1, 5, and 10%, respectively; significance will indicate rejection of the null hypothesis; H_0: no error correction, hence, no cointegration, H_1: error correction, hence cointegration; models 1—3 refer to an ECM without any deterministic terms, with intercept, and with intercept and trend, respectively.

Source: authors' calculations based on data from Andersson and Brambor (2019); Coppedge et al. (2020).

Appendix C: Short- and long-run effects: income, consumption, and trade taxes

Table C1: ECM estimates: shares of income, consumption, and trade taxes

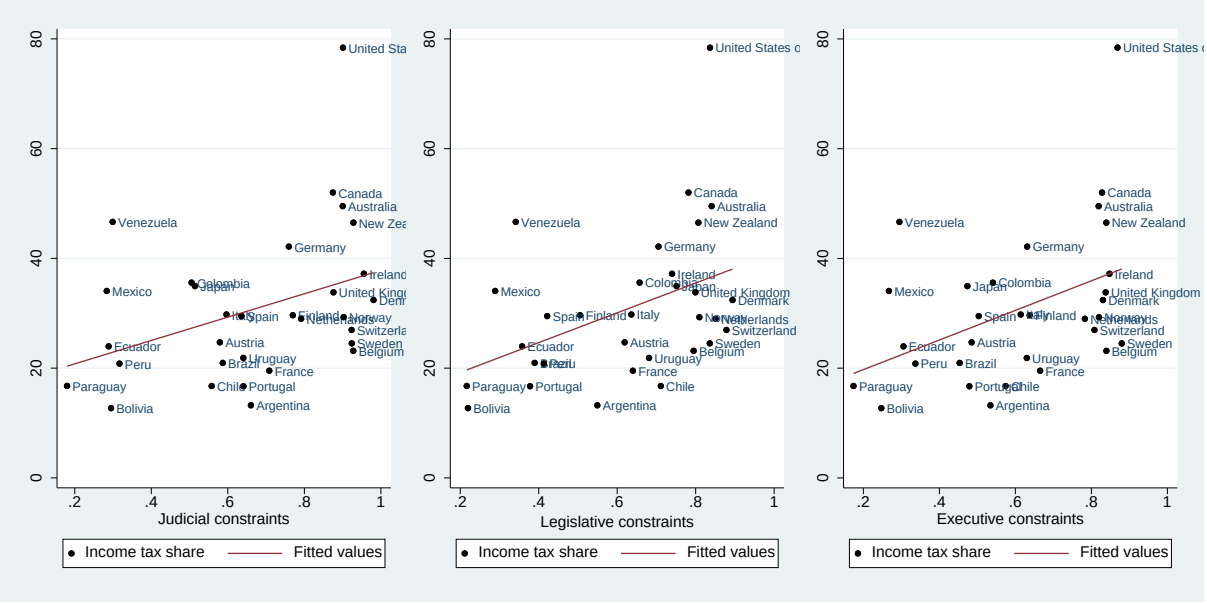
Panel A: Income taxes/total taxes and executive constraints			
	Judicial	Legislative	Exec. Constraints
Long-run executive constraints	0.259 [0.234]	0.432** [0.202]	0.561** [0.222]
Short-run executive constraints	−0.076 [0.063]	0.062 [0.089]	−0.034 [0.047]
EC coefficient			
y_{it-1}	−0.169*** [0.022]	−0.183*** [0.026]	−0.149*** [0.019]
t-statistic	−7.69	−6.96	−7.95
CD test (p-value)	−3.102 (0.002)	−2.410 (0.016)	−3.035 (0.002)
Observations (N)	3,239 (31)	2,999 (31)	3,239 (31)
Panel B: Consumption taxes/total taxes and executive constraints			
	Judicial	Legislative	Exec. Constraints
Long-run executive constraints	0.301 [0.248]	0.328 [0.470]	0.146 [0.105]
Short-run executive constraints	0.097 [0.071]	0.022 [0.159]	−0.037 [0.084]
EC coefficient			
y_{it-1}	−0.301*** [0.052]	−0.328*** [0.051]	−0.293*** [0.048]
t-statistic	−5.77	−6.45	−6.09
CD test (p-value)	−2.390 (0.017)	−1.555 (0.120)	−2.015 (0.044)
Observations (N)	2,065 (30)	1,859 (30)	2,065 (30)
Panel C: Trade taxes/total taxes and executive constraints			
	Judicial	Legislative	Exec. Constraints
Long-run executive constraints	0.231 [0.580]	−0.574 [0.553]	−0.082 [0.317]
Short-run executive constraints	0.175 [0.086]	0.033 [0.114]	0.126* [0.071]
EC coefficient			
y_{it-1}	−0.089*** [0.023]	−0.114*** [0.030]	−0.086*** [0.022]
t-statistic	−3.87	−3.76	−3.98
CD test (p-value)	−3.185 (0.001)	−2.995 (0.003)	−3.503 (0.000)
Observations (N)	4,026 (31)	3,726 (31)	4,026 (31)

Note: *, **, and *** indicate significance at 10, 5, and 1% respectively.

Source: authors' calculations based on data from Andersson and Brambor (2019); Coppedge et al. (2020).

Appendix D: Figures

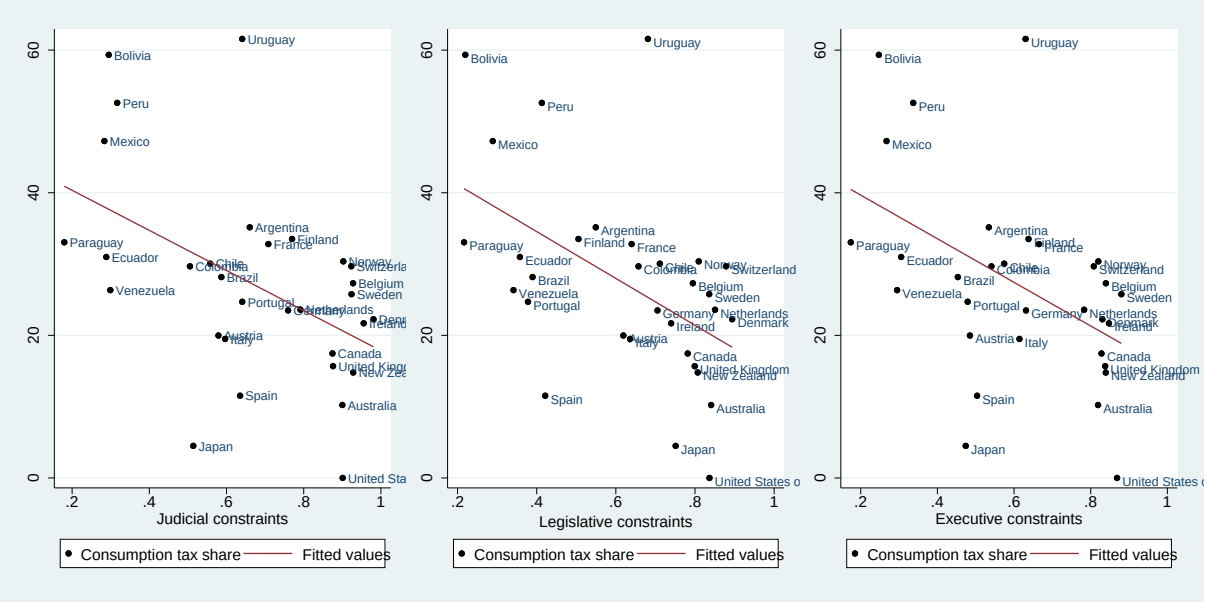
Figure D1: Income taxation and executive constraints



Note: the Y-axis variable is the share of total central government tax revenue from income taxes; these include taxes on (i) income, profits, and capital gains by individuals; (ii) income, profits, and capital gains by corporations and other enterprises; and (iii) payroll and workforce.

Source: authors' illustration based on data from Andersson and Brambor (2019).

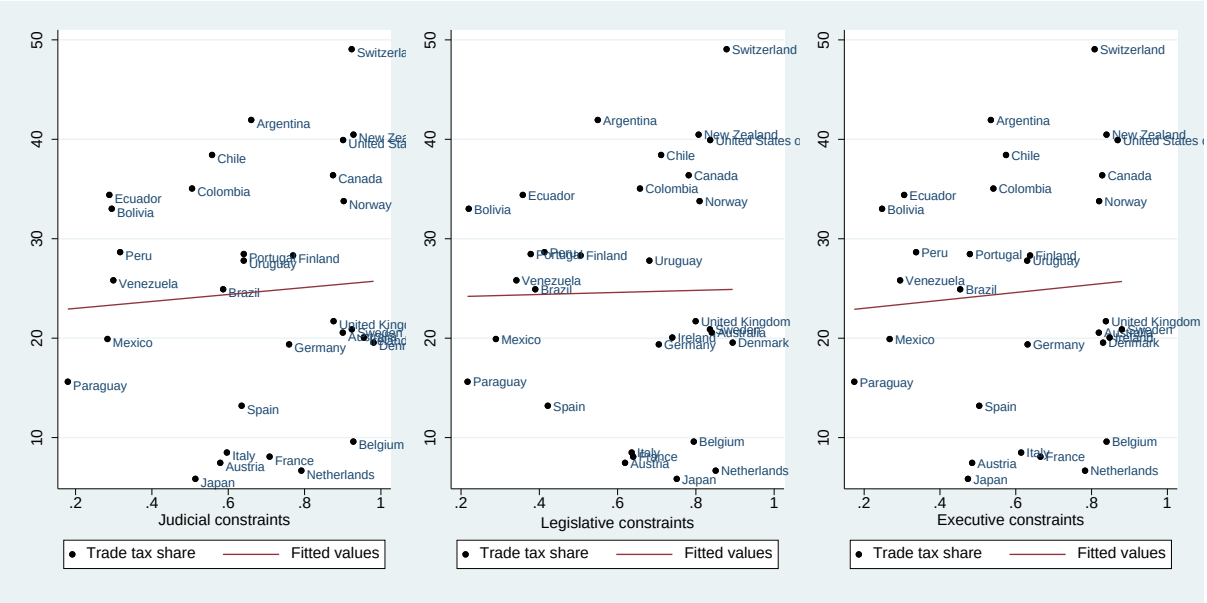
Figure D2: Consumption taxation and executive constraints



Note: the Y-axis variable is the share of total tax revenue from consumption taxes; this category includes levies on value-added taxes, sales taxes, and turnover; and other general taxes on goods and services.

Source: authors' illustration based on data from Andersson and Brambor (2019).

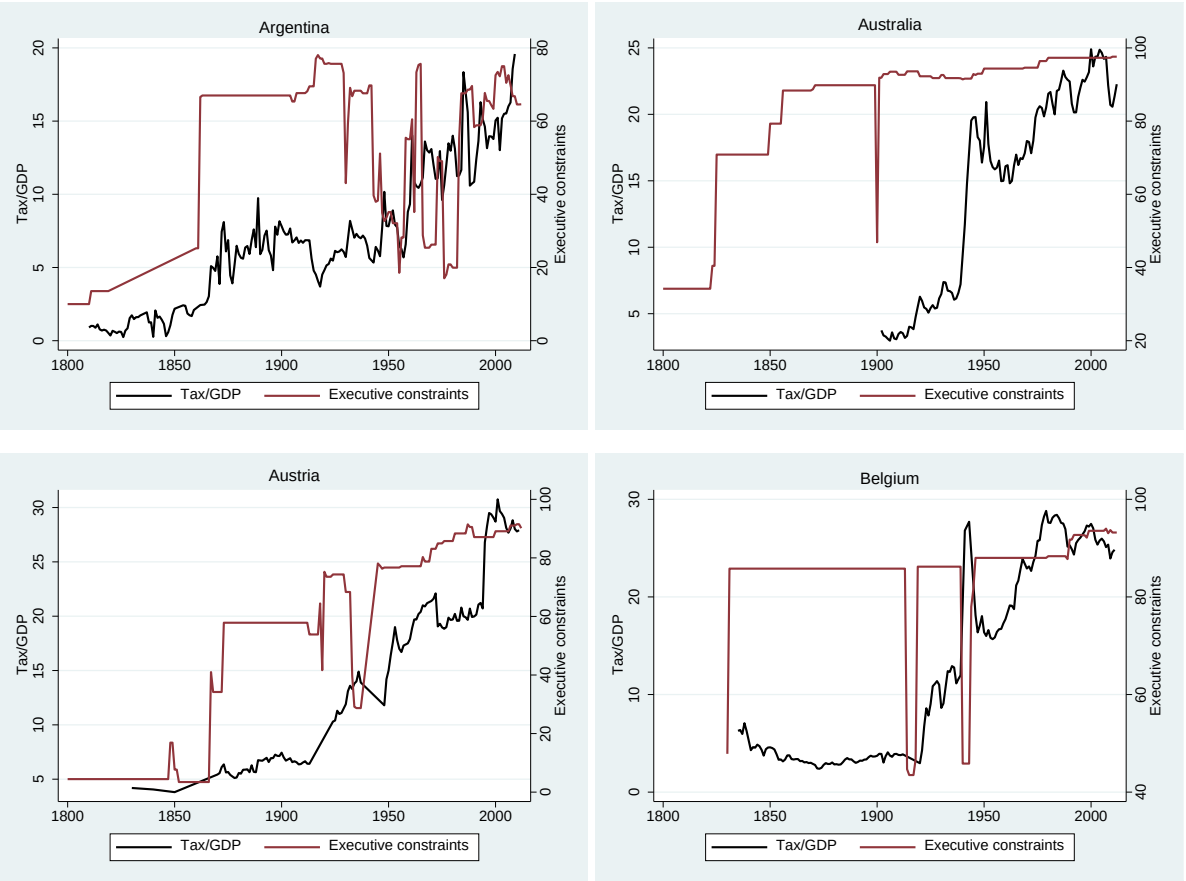
Figure D3: Trade taxation and executive constraints



Note: the Y-axis variable is the share of total tax revenue from customs and taxes on international trade; customs are the international pendant to excises in that they tax the flow of goods across a country's borders; the measure of customs includes (i) customs and other import duties, (ii) taxes on exports, (iii) taxes on profits of export or import monopolies, (iv) exchange profits, (v) exchange taxes, and (vi) other taxes on international trade and transactions.

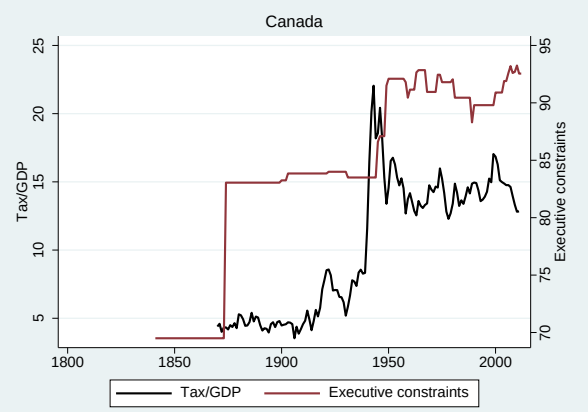
Source: authors' illustration based on data from Andersson and Brambor (2019).

Figure D4: Taxation and executive constraints, 1800–2012




Bolivia
Tax/GDP
Executive constraints
Tax/GDP
Executive constraints


Brazil
Tax/GDP
Executive constraints
Tax/GDP
Executive constraints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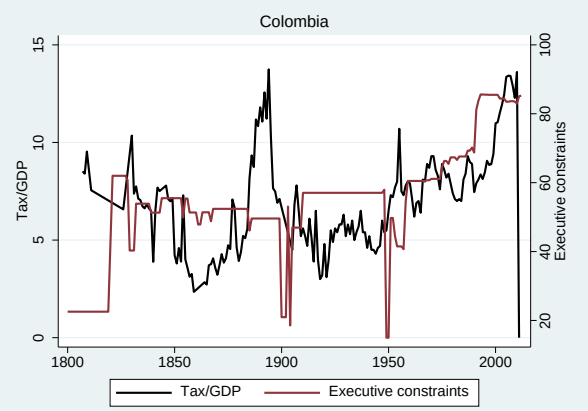
Tax/GDP
Executive constraints
Tax/GDP
Executive constraints


Chile
Tax/GDP
Executive constraints
Tax/GDP
Executive constraints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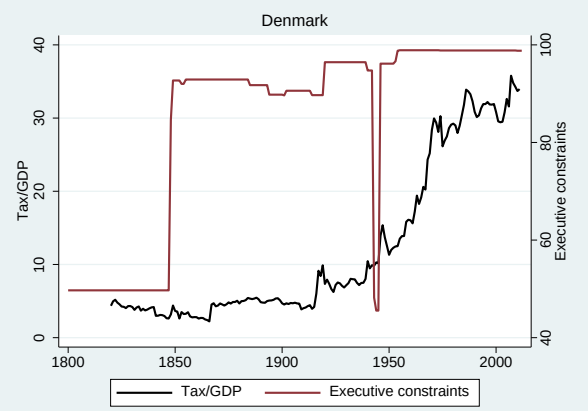
Tax/GDP
Executive constraints
Tax/GDP
Executive constraints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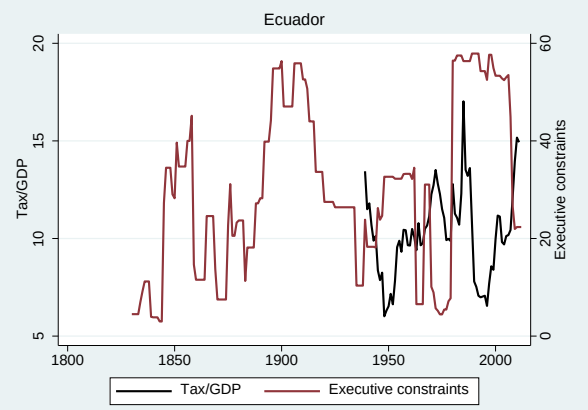
Tax/GDP
Executive constraints
Tax/GDP
Executive constraints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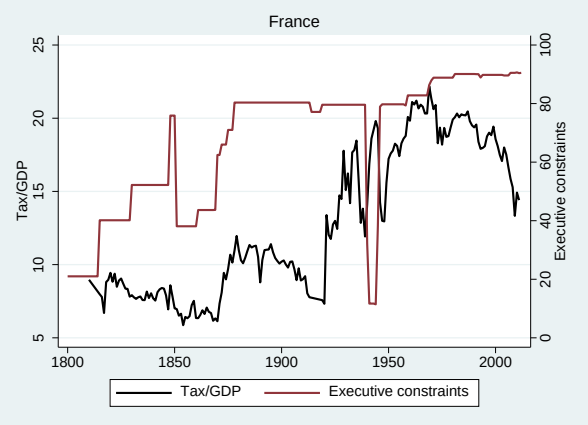
Tax/GDP
Executive constraints
Tax/GDP
Executive constraints


Finland
Tax/GDP
Executive constraints
Tax/GDP
Executive constraints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Tax/GDP
Executive constraints
1800
1850
1900
1950
2000


Germany
Tax/GDP
Executive constraints
1800
1850
1900
1950
2000


Ireland
Tax/GDP
Executive constraints
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1850
1900
1950
2000


Italy
Tax/GDP
Executive constraints
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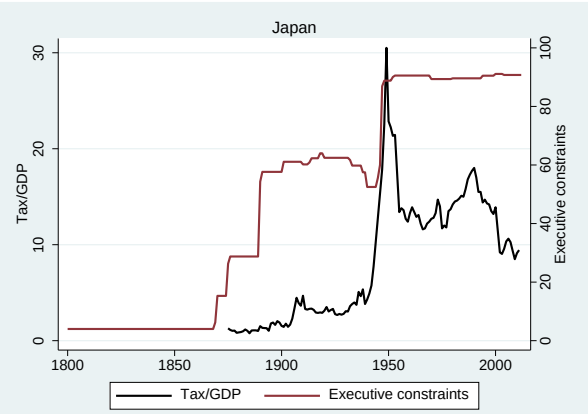
1850
1900
1950
2000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Tax/GDP
Executive constraints
1800
1850
1900
1950
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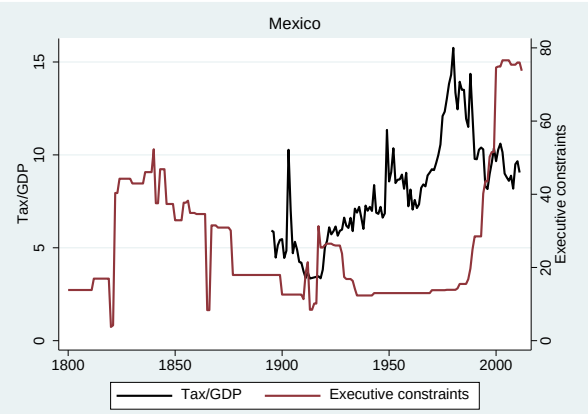
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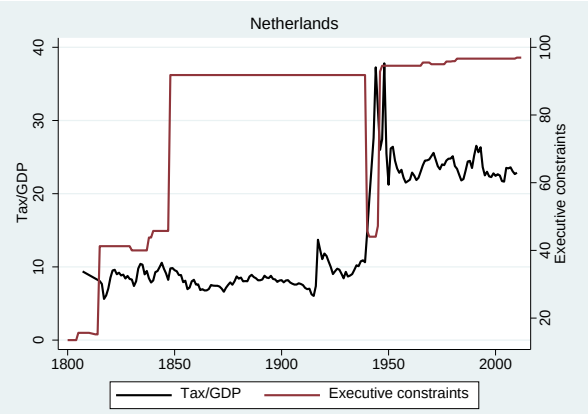
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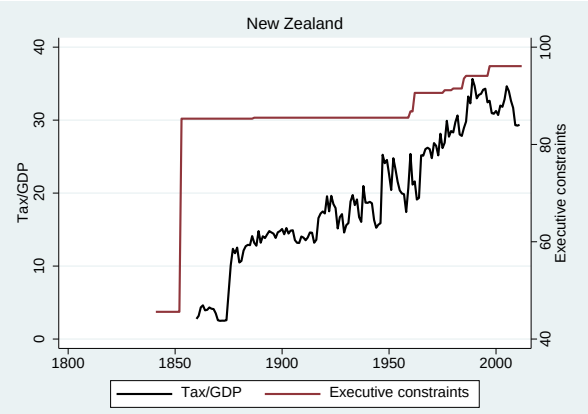
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Tax/GDP
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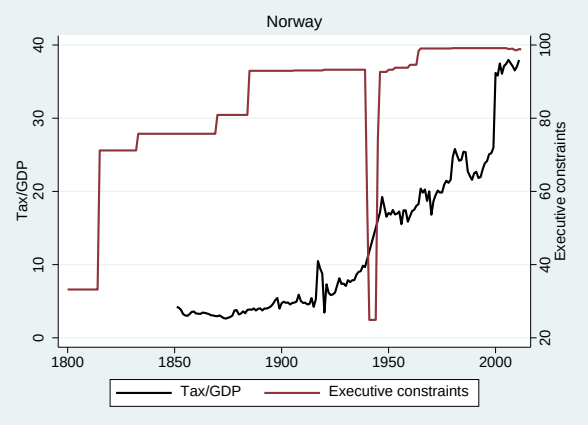
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Tax/GDP
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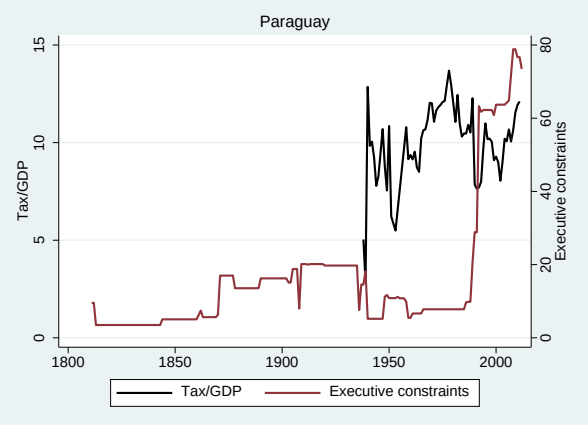
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Tax/GDP
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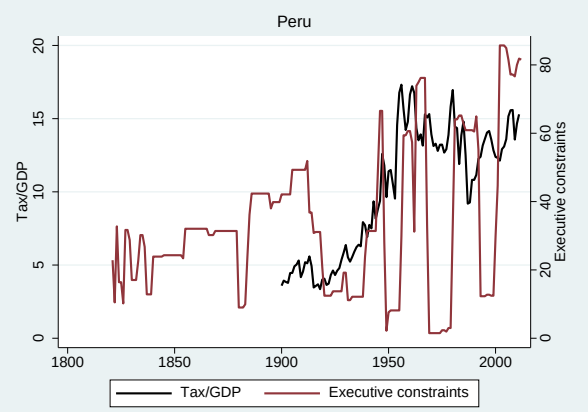
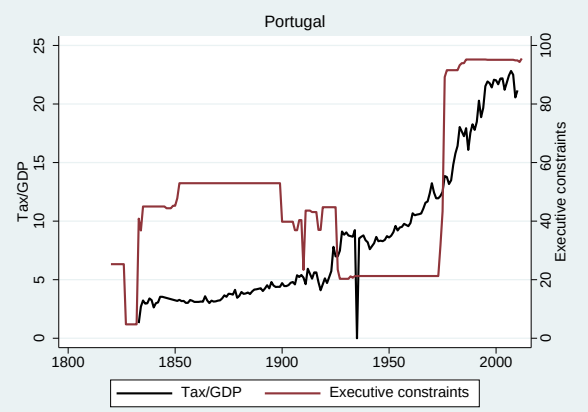

Peru
Tax/GDP
Executive constraints
1800
1850
1900
1950
2000


Portugal
Tax/GDP
Executive constraints
1800
1850
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Spain
Tax/GDP
Executive constraints
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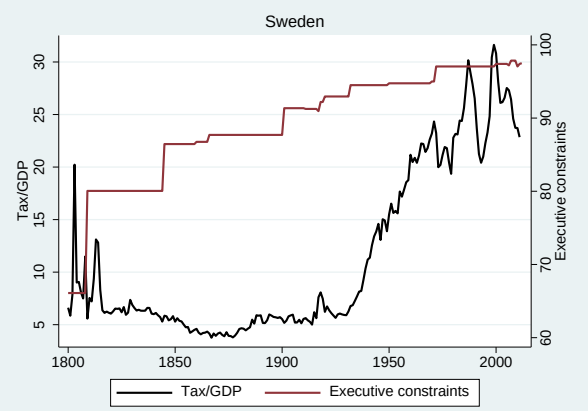
1950
2000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Tax/GDP
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1850
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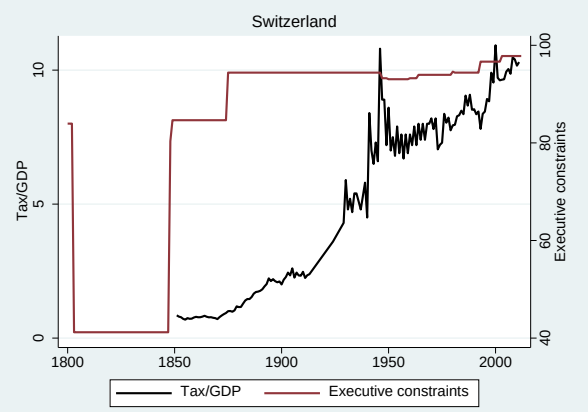
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Tax/GDP
Executive constraints
1800
1850
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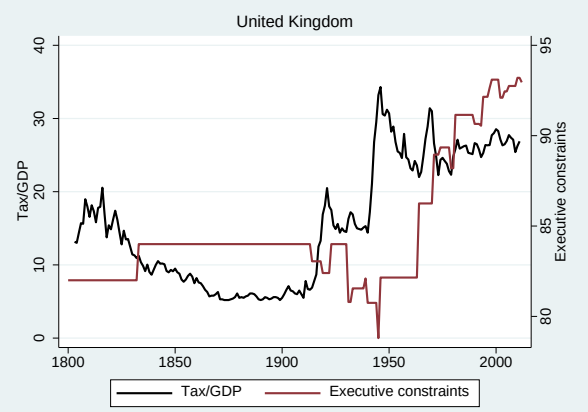
United Kingdom
Tax/GDP
Executive constraints
1800
1850
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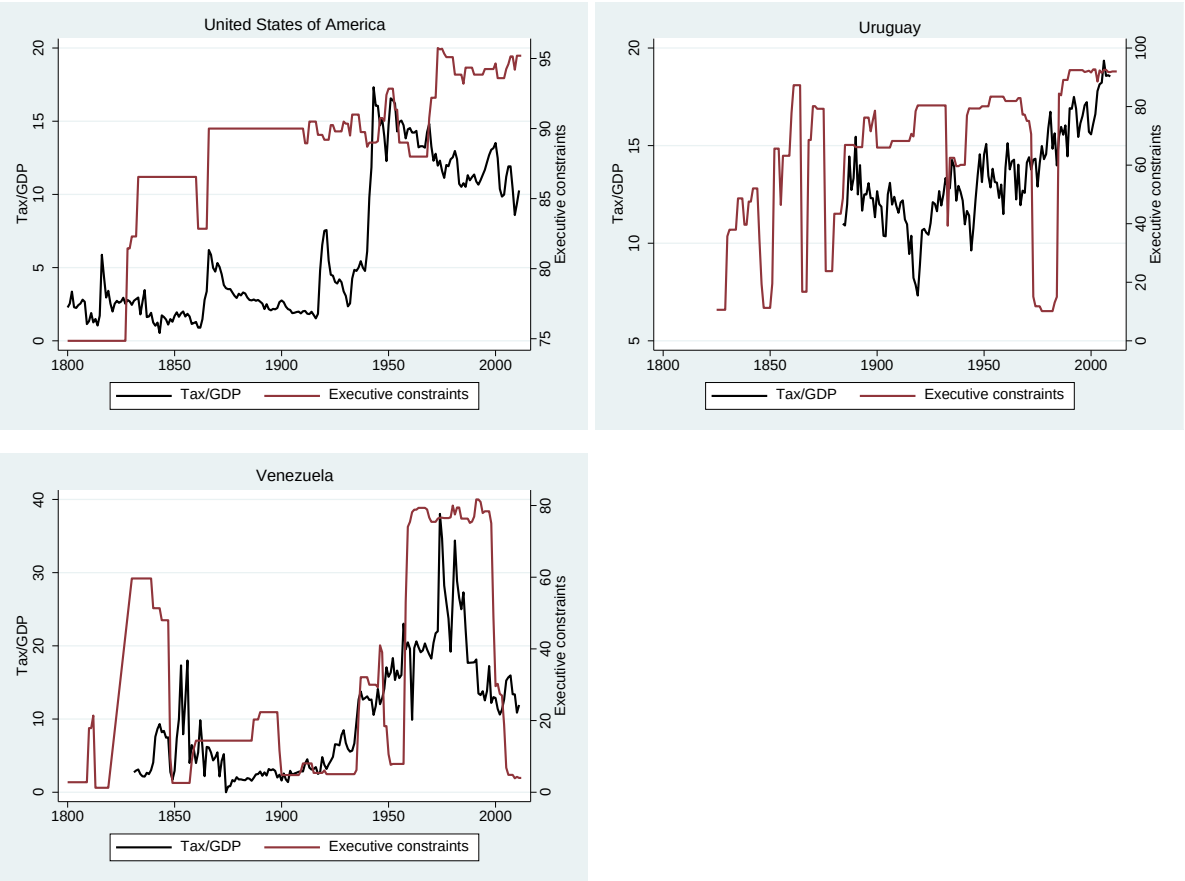
1950
2000



Note: the left-hand vertical axis variable is the share of total central government tax revenues as a share of GDP; the right-hand vertical axis variable is executive constraints (arithmetic mean of judicial and legislative constraints).

Source: authors' illustration based on data from Andersson and Brambor (2019).

Appendix E: Empirical strategy: further details on CCEMG estimation

Here we provide further details on the CCEMG approach based on Pesaran (2006) and extended in Chudik and Pesaran (2015). The objective in Equation 3 is to identify the unobserved common factors f_t by including the cross-section averages of potential determinants of tax shares. In this setup,

$$\sum_{l=0}^{p} \pi_{7i}^{CA} \overline{\Delta \Upsilon}_{t-p}$$

where π_s and Φ_s represent the long-run and short-run coefficients respectively, and $\pi^{CA}{}_s$ represents the coefficients on the cross-section averages of the dependent and independent variables (all coefficients yielding the standard CCEMG estimator). $\sum_{l=1}^{p} \pi^{CA}{}_s$ represents the coefficients on the additional lags of cross-section averages which Chudik and Pesaran (2015) suggest adding to the standard CCEMG estimator (yielding the dynamic CCEMG estimator) and Υ represents further covariates included in the model. As a rule of thumb, the lags of the cross-section averages to be added to the standard model are chosen by $p = \sqrt[3]{T}$ (Chudik and Pesaran, 2015). From the terms in levels (π_i^{CV}), we can obtain the long-run coefficients, $\beta_i^{CV} = -\frac{\pi_i^{CV}}{\pi_i^{EC}}$, whereas the regression coefficients on the terms in first differences capture the short-run (transitory) effects and can be read off directly from estimation.

Appendix F: Evidence from a global sample

Taxation data come from the Government Revenue Dataset, version 2020 (UNU-WIDER 2020), for 126 developed and developing countries (including all the countries in Andersson and Brambor 2019) and covering the period 1980–2018. Below we report the countries. We select the total tax–GDP, non-resource tax–GDP, direct tax–GDP [15], indirect tax–GDP, total income tax–GDP, consumption tax–GDP (taxes on goods and services), and trade tax–GDP ratios. From the above we calculate the shares of direct, indirect, income, consumption, and trade taxes in total taxation to ensure comparability with the Andersson-Brambor dataset. Tables F1–F6 report ECM estimates, replicating Table 2 results with the Government Revenue Dataset.

Countries (countries from the Andersson-Brambor sample are in italics): Algeria, Angola, Argentina, *Australia*, *Austria*, Bangladesh, *Belgium*, Belize, Benin, Bhutan, Bolivia, Botswana, Brazil, Burkina Faso, Burundi, Cameroon, *Canada*, Cape Verde, Central African Republic, Chad, Chile, China, Colombia, Comoros, Democratic Republic of Congo, Republic of Congo, Costa Rica, Cote d'Ivoire, Cuba, *Denmark,* Djibouti, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Ethiopia, Fiji, *Finland*, *France*, Gabon, Gambia, *Germany*, Ghana, Grenada, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, India, Indonesia, Iran, *Ireland*, *Italy*, Jamaica, *Japan*, Jordan, Kenya, Kiribati, Kyrgyzstan, Laos PDR, Lebanon, Lesotho, Madagascar, Malawi, Malaysia, Maldives, Mali, Marshall Islands, Mauritania, Mauritius, Mexico, Mongolia, Morocco, Mozambique, Myanmar, Namibia, Nepal, *Netherlands*, *New Zealand*, Nicaragua, Niger, *Norway*, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, *Portugal*, Rwanda, Samoa, São Tomé and Príncipe, Senegal, Seychelles, Sierra Leone, Solomon Islands, South Africa, *Spain*, Sri Lanka, St Vincent and the Grenadines, St Kitts, St Lucia, Sudan, Suriname, Swaziland, *Sweden*, *Switzerland*, Tanzania, Thailand, Togo, Tonga, Tunisia, Turkey, Uganda, *United Kingdom*, *United States of America*, *Uruguay*, Vanuatu, *Venezuela*, Vietnam, Zambia, Zimbabwe.

Table F1: ECM estimates: Total taxes, Government Revenue Dataset

	Judicial	Legislative	Executive
Long-run constraints	0.034	−0.045	0.124
	[0.065]	[0.062]	[0.095]
Short-run constraints	0.073***	0.005	0.017
	[0.027]	[0.031]	[0.030]
EC coefficient			
y_{it-1}	−0.383***	−0.490***	−0.476***
	[0.021]	[0.025]	[0.024]
t-statistic	−17.88	−19.62	−19.86
CD test	0.781	2.508	2.503
(p-value)	(0.435)	(0.012)	(0.012)
Observations (N)	3,987 (119)	3,722 (118)	3,722 (118)

Note: results are based on the ECM as in Table 2; the long-run and short-run averages are reported, with standard errors reported in parentheses below; CD test is the Pesaran (2015) test distributed $N(0,1)$ under the null of weak cross-section independence (p-value in parentheses below); *, **, and *** indicate significance at 10, 5, and 1% respectively.

Source: authors' calculations based on data from UNU-WIDER (2020).

[15] We use total tax–GDP and non-resource tax–GDP ratios excluding social contributions.

Table F2: ECM estimates: direct taxes/total taxes, Government Revenue Dataset

	Judicial	Legislative	Executive
Long-run constraints	0.104	0.023	0.155*
	[0.071]	[0.064]	[0.081]
Short-run constraints	0.081**	−0.043	0.036
	[0.041]	[0.026]	[0.039]
EC coefficient			
y_{it-1}	−0.447***	−0.556***	−0.535***
	[0.027]	[0.027]	[0.028]
t-statistic	−16.44	−20.38	−20.30
CD test	−0.671	0.719	0.462
(p-value)	(0.502)	(0.471)	(0.644)
Observations (N)	3,314 (110)	3,104 (109)	3,104 (109)

Note: see Table F1

Source: authors' calculations based on data from UNU-WIDER (2020).

Table F3: ECM estimates: indirect taxes/total taxes, Government Revenue Dataset

	Judicial	Legislative	Executive
Long-run constraints	0.094*	0.019	0.048
	[0.052]	[0.038]	[0.054]
Short-run constraints	-0.014	0.022*	0.026
	[0.017]	[0.012]	[0.024]
EC coefficient			
y_{it-1}	−0.394***	−0.489***	−0.467***
	[0.023]	[0.024]	[0.024]
t-statistic	−16.90	−20.42	−19.51
CD test	0.355	3.923	1.741
(p-value)	(0.722)	(0.000)	(0.082)
Observations (N)	3,417 (111)	3,212 (111)	3,212 (111)

Note: see Table F1.

Source: authors' calculations based on data from UNU-WIDER (2020).

Table F4: ECM estimates: income taxes/total taxes, Government Revenue Dataset

	Judicial	Legislative	Executive
Long-run constraints	−0.073	0.015	−0.043
	[0.089]	[0.092]	[0.107]
Short-run constraints	−0.040	−0.056*	−0.067
	[0.039]	[0.031]	[0.043]
EC coefficient			
y_{it-1}	−0.383***	−0.459***	−0.468***
	[0.029]	[0.021]	[0.026]
t-statistic	−13.25	−21.76	−19.15
CD test	−1.377	−0.165	−0.395
(p-value)	(0.168)	(0.869)	(0.693)
Observations (N)	3,240 (106)	3,057 (106)	3,057 (106)

Note: see Table F1.

Source: authors' calculations based on data from UNU-WIDER (2020).

Table F5: ECM estimates: consumption taxes/total taxes, Government Revenue Dataset

	Judicial	Legislative	Executive
Long-run constraints	0.077 [0.092]	0.016 [0.067]	0.142 [0.109]
Short-run constraints	−0.022 [0.035]	0.029 [0.028]	0.004 [0.038]
EC coefficient			
y_{it-1}	−0.411*** [0.029]	−0.446*** [0.028]	−0.425*** [0.028]
t-statistic	−14.19	−16.07	−14.99
CD test (p-value)	−0.200 (0.842)	1.279 (0.201)	1.841 (0.066)
Observations (N)	3,200 (106)	3,002 (105)	3,002 (105)

Note: see Table F1.

Source: authors' calculations based on data from UNU-WIDER (2020).

Table F6: ECM estimates: trade taxes/total taxes, Government Revenue Dataset

	Judicial	Legislative	Executive
Long-run constraints	0.058 [0.148]	−0.109 [0.139]	0.034 [0.161]
Short-run constraints	−0.012 [0.050]	−0.041 [0.038]	−0.018 [0.062]
EC coefficient			
y_{it-1}	−0.332*** [0.028]	−0.401*** [0.029]	−0.397*** [0.030]
t-statistic	−11.70	−13.99	−13.22
CD test (p-value)	−0.679 (0.497)	2.156 (0.031)	0.801 (0.423)
Observations (N)	2,998 (103)	2,799 (102)	2,799 (102)

Note: see Table F1.

Source: authors' calculations based on data from UNU-WIDER (2020).