


RESEARCH ARTICLE

No taxation without informational foundation: on the role of legibility in tax state development

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Abstract

This article combines cross-national statistical analysis and in-depth historical case studies of Argentina and Chile to explore the relationship between two crucial dimensions of state capacity. We show that information capacity contributes to the development of fiscal capacity. When states have accurate information about their subject populations, territories, and economies, they are more effective at mobilizing revenues. In developing this argument this article makes three broader contributions. First, while existing scholarship either treats distinct dimensions of state capacity as separate entities, or simply assumes that they complement each other, our findings urge scholars to treat state development as sequential and to further investigate how multiple dimensions of state capacity are interrelated. Second, the paper suggests a broader underlying set of mechanisms – economies of scope – which connect these dimensions, and explores them in the specific context of how information capacity facilitates fiscal capacity. Third, we join the scholarship on the importance of societal compliance in the creation of the fiscal state, but with a focus on elite cooperation with the state's information collection efforts, which we show to be crucial to tax state development.

Key words: fiscal capacity; information capacity; Latin America; mixed methods; state capacity; state formation; taxation

JEL classification: C23; H20; H83; N46

1. Introduction

States shape economic development. There is a broad agreement in the literature that state institutions and their actions have major implications for economic growth and transformation (Leftwich, 2008; Rueschemeyer, 2005). But not all states are equally equipped to foster economic development because of differences in *state capacity*. Indeed, scholars have shown that the capacity of states to secure property rights, steer economic activities, transform class relations, and engage in redistribution often varies dramatically both across and within countries, and over time (Evans, 1995; Sandbrook *et al.*, 2007).¹ It is therefore not surprising that state capacity has become a widely accepted analytical tool for studying the role of states in economic development.

Its background conceptualization is largely uncontroversial. Scholars of various theoretical and disciplinary backgrounds agree that state capacity refers to the capability of states to effectively implement their initiatives throughout the territory they claim to govern (Saylor, 2013; Soifer and vom Hau, 2008). There is also a broad-based consensus that state capacity should be understood as something that states have, independent of the specific goals it is used for (Centeno *et al.*, 2017).

¹High-capacity states might of course use their capacity to hinder economic transformation and generate dramatic failures.

But how to approach state capacity as a systematized concept (Adcock and Collier, 2001) that can be clearly operationalized remains a matter of intense debate (Hendrix, 2010; Savoia and Sen, 2015; vom Hau, 2012). While scholars agree that state capacity is a multi-dimensional concept, they focus on different sets of dimensions (e.g. Hanson and Sigman, 2021; Soifer, 2008) and there is no consensus on which aspect of state capacity should be considered most fundamental and therefore privileged when developing a plausible measurement strategy.

A significant body of work from a variety of different disciplines treats *fiscal capacity*, the state's ability to mobilize revenues, as indicative of overall state capacity (e.g. Bräutigam et al., 2008; Centeno, 2002; Dincecco, 2011; Ertman, 1997; Mann 1993; Slater, 2010; Tilly, 1990; Ziblatt, 2008). The basic logic of this approach is that states require resources to exercise control and pursue their projects. Without revenues, it is difficult to build and maintain effective bureaucracies that can plan and execute policy objectives. Thus, many studies assess variations in state capacity by focusing on (income) tax ratios or comparable indicators of state revenues during historical periods (e.g. Queralt, 2019; Thies, 2005).

Yet the focus on fiscal capacity as the central component or underlying locus of state strength has been challenged. A growing body of work suggests that another aspect of state capacity – *information capacity* – should be given conceptual priority. This aspect of the state is defined as the basic knowledge states hold about the make-up of their populations and territories. Making societies 'legible' (Scott, 1998) has long been a focus of state efforts. States frequently count, measure, and otherwise record detailed information about their populations, territories, and economies, whether through population censuses or cadastral records, and rely on a diverse set of tools, including specialized statistical agencies and statistical yearbooks, to do so. Some scholars argue that this information capacity lies at the core of the state's overall strength (Lee, 2020; Scott, 1998).

In this article, we build on, yet also move beyond, both of these bodies of work. We begin with the presumption that both fiscal capacity and information capacity are central aspects of the state and important determinants of development outcomes. But whereas existing scholarship has treated these two dimensions separately, we explore the relationship between them. Our paper tests the hypothesis that information capacity facilitates fiscal capacity – that the modern tax state is in part enabled by the state's prior development of information capacity. We do so through a mixed-methods approach that combines cross-national statistical analysis with in-depth historical case studies of Chile and Argentina as two middle-income countries that represent two of the earliest and more successful instances of state development in the post-colonial world. This allows us to move beyond the better-known experience of developed countries and investigate the historical development of information and tax capacity in less well-studied middle-income states. Moreover, when compared to other regions such as Sub-Saharan Africa or Southeast Asia, the emergence of Latin American states more than 200 years ago also makes arguments about long-term historical developments easier to explore.

Both components of our empirical analysis find strong support for the hypothesis, and we therefore conclude that information capacity should be seen as one of the causes of the development of the fiscal state. In the statistical analysis, which is based on the most cutting-edge cross-national dataset on information capacity currently available (Lee, 2020; Lee and Zhang, 2017), the paper shows a significant association between legibility and various measures of taxation for 1980 to 2010, even when controlling for other theoretically relevant factors. Levels of information capacity and taxation have also been relatively stable over time, with high-performing states maintaining their respective position, and low-performing states only rarely catching up.

Because tax state development is so path dependent, we turn to its formative moments to explore the contributions of information capacity. Our case studies of this crucial phase of state building in 19th-century Argentina and Chile show that taxation developed in the wake of successful initiatives to centralize and systematize information collection, most importantly through the establishment of a statistics office, a regular population census, and a land cadaster. Our case studies demonstrate that the construction of information capacity, itself driven in part by elite cooperation, provided human capital and legibility, which facilitated tax state development.

This paper thus makes three contributions to scholarship on the fiscal state and state capacity more broadly. First, while existing scholarship either treats distinct dimensions of capacity as separate entities, or simply assumes that they complement each other, our findings urge scholars to treat state development as sequential and further investigate how multiple dimensions of state capacity are interrelated. Second, the paper suggests a broader underlying set of mechanisms – economies of scope – which connect these dimensions, and explores them in the specific context of the dependency of fiscal capacity on information capacity. Third, we join scholarship on the importance of societal compliance in the creation of the fiscal state, but with a focus on elite cooperation with the state's information collection efforts, which was crucial to tax state development.

The next sections develop these theoretical arguments in greater detail, by theorizing the links between information and fiscal capacity and then evaluating them in the light of available evidence. Our empirical analysis first presents the cross-national statistical analysis, moving from measurement issues to our research strategy to the main results. The following sections present the two case studies, while the conclusion identifies some open threads and suggests directions for future research.

2. How information capacity underpins fiscal capacity

At the most basic level, fiscal capacity captures the ability of states to mobilize revenues. While premodern states often resorted to tax farming, modern states started to progressively rely on official personnel to extract resources from their populations (Kiser, 1994). These public officials employed different methods of extraction, ranging from easier-to-collect taxes on trade and natural resource wealth to highly complex income taxes. Information capacity refers to the ability of states to gather and analyze reliable information about their subject populations and territories (Brambor *et al.*, 2020). Commonly-used means of information collection include population censuses and cadastral maps, while specialized statistical agencies are critical for information analysis.

In the existing scholarship, these two dimensions of state capacity are often thought of as the very foundation of other state functions, and thus as indicative of overall levels of state capacity. A significant body of work going back to Schumpeter (1954) treats extraction as the basis for all other state activities. According to this line of thought, states can do little without having the necessary resources (Tilly, 1990). Conversely, another literature puts information capacity at the core of the state's capacity. In this perspective, all the other 'classic' state functions of extraction, coercion, and public goods provision require reliable information in order to be pursued effectively (Lee, 2020; Scott, 1998).

Our paper explores how these two dimensions of the state might be interrelated and develops a more specific argument about the relationship between fiscal capacity and information capacity. Most existing scholarship on fiscal capacity focuses on the *motives* that underpin efforts to build a modern tax state with permanent, salaried officials extracting revenues. These motives range from war and external threats (Downing, 1992; Ertman, 1997) to self-enrichment (Olson, 1993; Tilly, 1985). But this scholarship assumes that motivation is sufficient for modern tax state development to succeed. It fails to problematize the state's ability to acquire information on the whereabouts and assets of its subjects that will enable effective taxation.

By contrast, the recent 'informational turn' in the study of state building explores precisely this issue. This scholarship (Brambor *et al.*, 2020; D'Arcy and Nistotskaya, 2017, 2018; Lee and Zhang, 2017) identifies the state's collection and analysis of information about its citizens as a fundamental component of state capacity. Its starting point is the observation: 'States that cannot gather accurate information about their populations are likely doing little else effectively' (Lee, 2020: 22).

Based on this line of argument, we hypothesize that information capacity is important in facilitating fiscal capacity. Better information allows rulers to replace tax farmers with fiscal bureaucracies for the extraction of revenues from subjects, makes tax design and collection more efficient, and allows the state to move to more sophisticated and potentially more profitable forms of taxation. Some basic knowledge about the demographic characteristics and wealth of individuals and their households and businesses makes it much easier for rulers to use public officials rather than tax farmers, thereby

reducing information asymmetry and the delegation problems tax farming entails. Moreover, knowledge of the whereabouts and assets of their subjects enables rulers to tax more effectively and to move from taxing production (e.g. rents derived from profitable resources) to more sophisticated and potentially more profitable forms of extraction that revolve around taxing people and their consumption and wealth. In fact, even the calibration of tariffs and customs collected at ports benefits from the availability of systematic information about the prevailing economic activities in society. States with information capacity are expected to be capable of handling even sophisticated taxation systems such as income or consumption taxes, whereas modern states without informational foundations struggle even with comparatively less complex taxes such as customs. Thus, information capacity shapes both how effectively the state can tax and, as a result, the types of taxation it chooses to implement.

In claiming that the causal arrow connecting these elements of state capacity is fundamentally uni-directional, we argue that fiscal capacity does not play a fundamental role in the development of information capacity. One might respond that the development of statistical agencies and systematic data collection and management does require expenses on the part of the state, and that therefore the causal arrow may be reversed. Yet there are reasons to believe that this argument is overstated. As we show in our case studies, the initial information administrations established in Chile and Argentina that made significant gains in information collection and systematization were small operations that employed a handful of officials. Much information collection was carried out by territorial administrators (prefects and governors) who had this task added to their duties, or (in the case of vital statistics) via the use of information collected by the Catholic Church, an institution which already had a widespread and effective territorial administration. These initial efforts, which bore massive fruit in terms of laying the foundation for the tax state, therefore required fairly little investment of government resources.² More generally, these findings align with recent scholarship that moves away from treating the availability of revenues as the *primum movens* in state development and instead focuses on the appropriation of infrastructures and technologies initially controlled by non-state actors as crucial incubators of state capacity (Gorski, 2003).

The remainder of the paper explores the insights and limitations of this hypothesis empirically. In doing so, we contribute to the analysis of the temporal order in which state development unfolds, and thus improve on existing scholarship that either treats distinct types of capacity as separate entities, or simply assumes that they 'travel together' and complement each other, without accounting for the specific links and dependencies among them. To the best of our knowledge, this paper is the first study of how information capacity facilitates fiscal capacity.

Another issue that has been little explored in existing scholarship is the set of mechanisms by which different dimensions of state capacity relate to and depend on each other. The concept of economies of scope – the effect of production of a single output on the marginal cost of producing additional outputs – provides some useful intuition to underpin these dependencies. On the one hand, the kinds of information the state collects about its population and territory can be put to multiple uses by the state. Thus, once the state collects demographic information from individuals via the census and property ownership information via a cadaster, it can more efficiently design public health policies, conscript, and more effectively design and collect taxes. On the other, the technological infrastructure built and the personnel used to systematize this information can be repurposed. Once individuals are trained and deployed to collect and analyze a population census or a land cadaster, they can also more easily collect and systematize other kinds of information that underpin a range of other state functions. Thus, the economies of scope generated by informational capacity encompass both the *reuse of information* for multiple purposes, and the *repurposing of the informational apparatus* for multiple purposes, including taxation.³

²Another approach to the development of information capacity that required little investment on the part of the state, can be found in the case of Porfirian-era Mexico, which managed to construct a cadaster of landholdings over much of the country by contract to private firms in return for a share of the land surveyed. (Holden 1994)

³We thank an anonymous reviewer for suggesting the phrasing used in this sentence.

The development of information capacity therefore has spillover effects or complementarities with other state functions; these cost savings and gains in efficiency, or economies of scope, represent the mechanisms by which information capacity contributes to tax state development. In our case studies, we show these links and dependencies empirically. Our paper, then, aligns itself with a growing body of work on the intra-state determinants of state development (Soifer, 2015; vom Hau, 2008). While much of the existing scholarship focuses on external causes of fiscal capacity – most prominently geography, geopolitical conflict, and the power configurations between different societal actors – it is also important to explore the evolution of human capital and technologies of data collection internal to the state that facilitate modern state development.

Our focus on the interdependencies between different dimensions of state capacity also provides a fresh perspective on the origins of the fiscal state, and modern state development more broadly. Thus, we move beyond both the intuitive view of extraction as something imposed on society and the argument of Levi (1988) that societal compliance facilitates tax state construction. Our case studies show that the role of elites goes beyond compliance with taxation to active participation and encouragement of the development of systematic information collection. In both Chile and Argentina, we find evidence that the state's endeavors to collect demographic and economic information – the kinds of knowledge crucial to the creation of fiscal capacity – were supported by economic elites, who saw the state's information-gathering interventions as useful for their own interests in multiple ways. For example, regular population censuses, and knowledge about the whereabouts and economic assets of the population generated by them, enabled economic elites to more accurately plan their own investments. For the same reasons, elites would cooperate with the state's efforts to gather and systematize information about the national economy (e.g. on prices and production levels) and conduct land cadasters.

Information capacity (like many other aspects of the state) should thus be seen as something that emerges from a combination of state initiative and societal collaboration, and the interests of both sets of actors play roles in its development. We therefore complement Levi (1988) in arguing that the creation of a tax state requires societal compliance, but we see elites as playing a more active role in the development of the tax state through their support of the state's information capacity development.

3. The informational foundations of fiscal capacity: a cross-national statistical analysis

In this section we use cross-national statistical analysis to explore the association between information capacity and fiscal capacity. We begin by detailing how we operationalize these two concepts, and the trade-offs implied by each of the existing indicators. We then discuss the statistical modeling choices and present our results.

3.1 Methods and data

The operationalization of information capacity puts the analytical spotlight on the main information-gathering technologies employed by states. A particularly central role is played by the administration of a national census, which reflects the ability of states to generate basic knowledge about society within their borders (Lee and Zhang, 2017; Soifer, 2013). We draw on the State Capacity Scores, an original longitudinal dataset recently assembled by Lee and Zhang (2017; see also Lee 2020) for more than 120 countries, as our main measure of information capacity. The State Capacity Scores trace variations in the state's ability to make legible citizens and their activities by concentrating on the quality of population censuses. Specifically, Lee and Zhang draw on demographic techniques to calculate the extent to which the age information included in a population census follows a smooth curve and thus is accurate, or whether the census is characterized by age 'heaping' around certain numbers (e.g. 0 and 5). The latter pattern is indicative of limited *legibility* either because a state does not issue birth certificates and therefore citizens do not know their exact date of birth, or because census-takers face severe constraints in administering the census.

For robustness checks we draw on two other plausible measures of information capacity. The first one is the *information capacity* measure developed by the research group State-Making and the

Origins of the Global Order in the Long 19th Century and Beyond (STANCE) at Lund University (Brambor *et al.*, 2020). This combined measure of different information-capacity subindicators identifies when a state first had a statistical agency (even if it was later abolished) and when it first conducted a modern population census.⁴ It also captures whether a civil and a population register were present in a given year, and calculates graded indexes of census ability and yearbook ability. Second, we use the *cadaster* indicator developed by D'Arcy and Nistotskaya (2017, 2018). This cross-sectional measure sums the number of years a state has experience in administering a land cadaster, weighted by the quality of the cadaster⁵ and thus captures variations in information-gathering on the location and distribution of valuable economic assets within the state's territorial boundaries, most importantly land. Compared with the State Capacity Scores, both these indicators are more limited in their coverage. The STANCE dataset is geographically biased toward Western Europe and the Americas and includes only 86 polities that have been characterized by relatively durable forms of sovereign statehood for the last 200 years, while the cadaster dataset includes 78 countries, selected because of their relatively durable experience of democratic rule.

To identify differences in fiscal capacity we use various tax ratios (all adjusted for GDP) from the ICTD/UNU-WIDER Government Revenue Dataset, widely considered the most accurate and reliable cross-national data source on taxation. The first main measure of interest is direct taxes, which encompass income tax, land tax, personal property tax, and taxes on profits and capital gains. Direct taxes are indicative of high fiscal capacity, given that they are paid straight to the state by (usually reluctant) individuals and organizations. We also use personal income taxes, which have frequently been treated as the 'gold standard' for measuring the fiscal capacity in the developed world, but usually make up only a very small amount of total tax revenues in developing countries (Bird and Zolt, 2005). Last but not least, we include the non-resource component of indirect taxes, which include taxes on goods and services (e.g. VAT) and taxes on international trade, yet exclude resource-driven taxes on exports. Despite being somewhat less demanding to collect than taxes on income, profits, and capital gains, indirect taxes still need an effective tax administration. To cross-check our findings we also rely on measures of total tax revenue and total resource revenue, expecting the latter to be negatively associated with fiscal capacity. In our supporting materials, we examine the correlations between legibility and taxation, and find strong associations for each of our indicators except total resource revenue. This finding gains further support from the visual inspection of scatter plots (Figures A1–A5 in supplementary materials) of legibility and the different measures of fiscal capacity.⁶

3.2 Cross-national statistical analysis

Our statistical model is inspired by Lee and Zhang's (2017) analysis of legibility and its effects on public goods provision outcomes. Our main explanatory variable is legibility, and our dependent variables are the various measures of taxation discussed above. We use an OLS model with country-decades as the unit of analysis. The time fixed effects include the decades of 1980, 1990, 2000 and 2010. The choice of this time period is due to limited data availability for taxation measures, which do not go further back than 1980. The number of observations for each country-decade usually varies between 40 and 60 countries, though they are significantly lower for the total resource revenue measure, which only has 22 countries.

We control for GDP per capita and political regime type (measured by using the Polity index), since economically more developed countries are more effective at taxation while democracies likely enjoy greater tax legitimacy. The geographic variables used by Lee and Zhang (2017) are also included in

⁴When compared with the legibility measure, the STANCE index captures only that a census took place; it does not assess its quality.

⁵For another recent study that uses the cadaster as an indicator of state capacity, see Dimitruk *et al.* (2021).

⁶These materials are included in an earlier working paper version of this article and are available at <https://www.wider.unu.edu/publication/no-taxation-without-informational-foundation>

our model. Higher population density is known to promote tax collection. On the other hand, ruggedness of the terrain is said to hamper both tax collection and census administration. We also include decade-fixed effects to control for period-specific factors, and cluster standard errors by country.

Table 1 shows our main results. Columns 1, 3, 5, 7 and 9 show the results with legibility alone to ensure that there are no ‘suppression effects’ and that the results do not derive from the inclusion of particular controls. Columns 2, 4, 6, 8 and 10 display the main indicators of interest with all the relevant control variables included.

Overall, the results point in the hypothesized direction. Legibility is positive and statistically significant for different measures of fiscal capacity. It is positively associated with higher levels of revenue from overall taxes, direct taxes, and indirect taxes. Moreover, and again in line with our theoretical expectations, this association does not exist for resource revenues. Since the standard deviation of the legibility measure is 1.01, the coefficients can be interpreted as the change in the dependent variable when a standard deviation in legibility is increased. An increase in legibility by one standard deviation is associated with an increase of 3.1 points in tax revenue, 1.0 point in revenue from direct taxes, and 2.1 points in revenue from indirect taxes as a percentage of GDP. The fit of our overall statistical model is best for total tax revenues and direct taxes, while it is severely limited for indirect taxes.

This supports our claim that the ability of states to process reliable information about their subject populations appears to be less relevant to the collection of indirect taxes. The model also does not identify an association between information capacity and total resource revenues – a finding that might at least in part be driven by the significant drop in cases for this particular taxation measure. Surprisingly, we also do not find a statistically significant relationship between information capacity and personal income taxes, a result that might be related to the relative insignificance of this tax in much of the developing world, coupled with a general trend toward lower and flatter personal income tax rates since the 1980s (Sabirianova Peter *et al.*, 2010). In Appendix B of the supplementary materials, we provide the results of ancillary analyses with different measures of information capacity (the STANCE information capacity and the cadaster measures) and using different estimation strategies. Our results are generally robust to these alternative approaches.

In all, our statistical analysis has shown that states with greater capabilities to gather and analyze information also tend to be more effective at taxing their subject population, even when we control for the socio-economic, political, and geographic characteristics of countries. Given that the development of fiscal capacity is usually path-dependent (Ertman, 1997), we proceed by focusing on the historical moment when the tax state was initially constructed to further examine the relationship between information capacity and fiscal capacity. This critical juncture is what the two historical case studies of Chile and Argentina will explore in greater detail.

4. Information capacity and tax state construction in 19th-century Chile

Scholars of the Latin American state coincide in tracing the emergence of the effective tax state in Chile to the period between 1840 and 1880 (Kurtz, 2013; Saylor, 2014; Soifer, 2015).⁷ During this period, Chile experienced several significant commodity booms (Saylor, 2014) and, more broadly, a process of rapid economic modernization (Ortega Martínez, 2005). The country also won two wars against its northern neighbors, and some scholars attribute Chilean state development, and the formation of its tax capacity in particular, to these victories (Schenoni, 2021). We also seek to explain the development of fiscal capacity in Chile, but we do so by exploring intra-state dynamics, namely the ways in which the growth of information capacity underpinned tax state development.

This section is organized accordingly: it begins by detailing the development of fiscal capacity in Chile after 1840, drawing on primary and secondary sources. We then turn to showing that the same period saw the development of information capacity. Here we rely largely on the excellent work of Andrés Estefane (2012, 2016, 2017) on the evolution of state statistics in Chile. Third, we

⁷By focusing on this earlier period, we bracket a robust debate in the case literature about the effects of the nitrate boom that began in the 1880s on the fiscal state.

Table 1. Legibility and variants of taxation: cross-national results

Dependent variable	Total taxes		Direct taxes		Indirect taxes		Total resource revenue		Personal income taxes	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Legibility	6.456*** (0.644)	3.054*** (0.963)	2.766*** (0.385)	1.098*** (0.399)	1.358*** (0.384)	2.082*** (0.744)	-0.858* (0.510)	-0.790 (0.662)	1.743*** (0.295)	0.334 (0.326)
GDP per capita		3.346** (1.318)		1.754*** (0.420)		-1.371 (0.975)		0.605 (0.713)		1.387*** (0.390)
Democracy		1.845** (0.801)		0.628** (0.314)		0.497 (0.553)		-1.540 (1.082)		0.761*** (0.243)
Population density		-1.634*** (0.502)		-0.468 (0.372)		-0.358 (0.336)		-1.408* (0.729)		-0.542* (0.305)
Terrain ruggedness		-0.367 (0.644)		-0.131 (0.272)		0.308 (0.402)		-0.504 (0.729)		-0.180 (0.274)
Constant	17.753*** (1.097)	18.389*** (1.022)	5.531*** (0.538)	5.802*** (0.519)	9.173*** (0.694)	9.088*** (0.632)	4.697*** (1.481)	4.207*** (1.288)	2.873*** (0.409)	3.055*** (0.344)
Decade FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	225	225	217	217	214	214	130	130	205	205
R ²	0.512	0.614	0.440	0.537	0.118	0.163	0.090	0.227	0.333	0.480
Adjusted R ²	0.504	0.600	0.429	0.519	0.101	0.130	0.061	0.176	0.319	0.458
Residual Std. Error	7.330 (df = 220)	6.579 (df = 216)	3.318 (df = 212)	3.044 (df = 208)	4.196 (df = 209)	4.127 (df = 205)	5.021 (df = 125)	4.704 (df = 121)	2.884 (df = 200)	2.573 (df = 196)

Note: * p , ** p , *** $p < 0.01$. Source: authors' construction.

show that the development of information capacity underpinned the changes in fiscal capacity in these decades in Chile, and show that both the economies of scope from information capacity and elite partnership with its development were facilitating conditions for increased fiscal capacity. We focus here on the two logics theorized above (the mechanism of economies of scope from information capacity and the role of elite cooperation in the development of information capacity) as facilitating conditions for increased extraction.

4.1 Fiscal capacity

Between 1840 and 1880, the Chilean tax state sharply expanded its capacity. Internal taxation increased almost 40-fold between 1840 and 1875 – growing far faster than population, GDP per capita, or overall government revenue, and marking the emergence of an important complement to trade taxes. The state also developed the ability to collect a wider range of taxes, which reflected greater capacity. Whereas in 1840, the only internal taxes were monopoly rents on tobacco, playing cards, and salt, over the next two decades the state introduced a transfer tax on the sale of properties, license fees for a variety of professions, and a series of increasingly standardized taxes on property value based on the assessment of values of more than 43,000 properties that generated significant revenue for state coffers.⁸

Though direct taxes never represented a large share of taxes (which continued to be generated mainly from customs duties), they did represent a growing amount of revenue, and increased especially in the 1870s, more than doubling between 1874 and 1880. Taxes on land value alone reached as high as 8% of government revenues in 1875 (Soifer, 2015: 164). An inheritance tax on wealth was introduced in 1878 and an income tax in 1879 (Sater, 1979: 93ff). Though customs revenues continued to dominate state income, these other taxes represented a significant expansion in the state's ability to extract taxes directly from its citizens. Thus, by 1880, the Chilean state taxed wealth, income, inheritance, and the sale of properties; this constellation of revenue sources in the form of direct taxation reflected a massive increase in fiscal capacity; nothing less than the emergence of the modern tax state.

4.2 Information capacity

The state's informational capacity grew sharply during the same era. The Chilean state's limited capacity to collect information prior to 1840 is reflected in its census and cadaster initiatives of the 1830s, when the census reached only about half of the country's administrative units. Its director acknowledged its limitations by announcing that its population figures should be adjusted upward by 10 percent due to errors and gaps in the enumeration process (Estefane, 2017: 50). The cadaster, which relied on local commissions to provide reports on the income of rural properties, did collect information from every province in the country, though it managed to register only about 12,000 properties (Correa, 2014: 8).

The country's Statistics Office, provisionally established in 1843 and formally opened in 1847, represented a major step toward centralized and systematic information collection. At times, its ambitious program of 'national investigation' on a variety of subjects ranging from demography to topography and economic and political conditions (Estefane, 2016: 42) exceeded the ability of its agents. Over time, bureaucratic experimentation, increased support from Congress and other government agencies, and increased compliance from society generated more information collection and systematization. This is reflected, for example, in improvements in the census. The 1854 census still relied on parish records and was characterized by obvious irregularities in data quality, but information was received from every administrative unit in the country within six months.

Other state agencies also developed the capacity to collect and organize statistical information. For example, judicial statistics began to be collected in the 1830s, and data on imports and exports in the port of Valparaíso were published from 1835 onwards; by 1843 data were collected from all official

⁸See Correa (2014) for a detailed history of property taxation in Chile.

border crossings (Estefane, 2017). Not surprisingly, given the fiscal dependence on trade taxes, commercial statistics 'had reached a higher level of development than other sectors' by the 1840s (Estefane, 2017: 98). Medical statistics began to be compiled at a national level in 1845, supplementing the parish records that had previously been the state's source of vital statistics. Standard decimal weights and measures were acquired from France and distributed nationwide in the 1850s (Memoria del Ministerio de Interior 1859: 13). Most notably, the *Anuario Estadístico* or statistical yearbook began its coverage in 1848, though the first volume was not published until 1860. Overall, then, by the 1850s we can already see significant gains in information capacity compared with two decades earlier, even as the national statistical agency remained a vestigial bureaucracy, with a handful of officials in the capital and one in each province. Rather than develop a sizable organization, the state initially instead established regional statistical commissions of prominent citizens and officials in other agencies (Estefane, 2017: 79) and then created the post of provincial statistics official in 1855 (*ibid.*, 116–7). Given the difficult fiscal situation in which Chile existed in the early decades after independence, there was no possibility of greater bureaucratic development, and even these gains required piecemeal and difficult political negotiation and bureaucratic maneuver, as Estefane details.

The next two decades saw even greater information capacity forged. Census administrators worked steadily to ensure coverage of a mobile rural labor population, to overcome popular resistance, and to accurately count the indigenous populations of the southern frontier; and by the 1870s the systematization and efficiency of the census had greatly increased. State information capacity also improved as the state's relationship with the Catholic Church evolved. Throughout the period under consideration, the state worked closely with church officials to implement the census, using their data on parishioners as the core of the census in its initial years and relying on the information the Church collected at the parish level on births and deaths for decades thereafter. This was possible because the clerical hierarchy saw the census as a sporadic activity that did not compete with its central place in the life of its parishioners. The state's efforts to collect vital statistics on a more regular basis generated greater tensions with a Church that sought to maintain its monopoly over the institutions of birth, death, and marriage. This was reflected in the fact that, although a first bill for a Civil Registry was introduced to Congress in 1868, it was not approved until 1884 (Estefane, 2017: 169–70).

In 1869 the post of statistics inspector was created (Estefane, 2012) and the statistical bureaucracy began to emerge as a sizable institution in its own right. Statistics inspectors conducted visits throughout the country, working to systematize local procedures of data gathering and processing. This initiative resulted in more timely and consistent data collection at the local level after the early 1870s (Estefane, 2017: 177ff). Regular visits (*Anuario Estadístico* 1871–2: xiii) provided opportunities for training, for introducing standard practices, for evaluating the quality of local employees, and for overcoming in other ways the effects of autonomy and discretionality that were inherent in postings with multi-faceted job descriptions to the four corners of Chile's extended territory. Since statistics inspectors were responsible for data collection across a range of substantive areas, there was increased professionalization of statistics, which resulted in improvements in information capacity across many kinds of data the state sought to collect – an example of the economies of scope mechanism we suggested above.

4.3 Links and dependencies

Not only did these two developments occur coterminously, but there is strong evidence that information capacity was key to tax state development. A review of official state documents shows that limitations in the state's knowledge about its territory and population were a constant worry to Chilean tax officials in the early decades after independence. Tax governance confronted political, economic, and administrative problems generated by the absence of a definite territorial demarcation, a direct consequence of the lack of up-to-date information on geographical and statistical matters. In 1834, before the development of the state's information apparatus, the Minister of Finance attributed the parlous state of government revenues in part to the reliance on 'arbitrary and inefficient tax collection' necessitated by the lack of a well

institutionalized infrastructure of data collection procedures in his agency (Memoria del Ministerio de Hacienda [MHAC] 1834: 10). Officials repeatedly cited the lack of statistics about regional administration and commerce as an obstacle to budgeting and fiscal administration, and the absence of reliable population statistics and administrative mapping as an obstacle to the allocation of Congressional seats and the implementation of voting procedures (MHAC 1834: 44–45).

Information capacity served directly to increase the state's fiscal capacity. The implementation of the first republican census, conducted in the midst of the independence conflict, was explicitly justified by bureaucrats in the finance ministry to the politicians who had to authorize its adoption as a means to compile the information needed for tax collection (Estefane, 2017: 38), and state officials repeatedly echoed this argument over the next decades. Similarly, the initial cadaster of the 1830s allowed the state to introduce direct taxation for the first time and was seen as a first step toward the implementation of a systematic wealth tax (MHAC 1835: 18), though it included only rural property.

A new cadastral map completed in 1874⁹ included urban property for the first time (Correa, 2014: 128), which allowed a tax on urban property value to be imposed in 1878 (Sater, 1976: 326). By 1880, this tax, along with inheritance and income taxes, was the sixth largest in revenue, rising to fourth in 1882 and third in 1883 (Sater, 1976: 328). Though all these taxes were eliminated during the subsequent nitrate boom, the fact that the state could so quickly generate so much revenue from new direct taxes was clearly a consequence of the information capacity it had developed in the preceding decades. Thus, information capacity provided the state with the data it needed to plan modernizing shifts in its tax structure and to implement those effectively.

The development of information collection, and therefore taxation, was also facilitated by the support of economic elites. Estefane documents the growing realization by landowners in the late 1860s that greater information about economic activity would provide more stable and predictable commodity prices and thus facilitate their economic decision-making. This view of the state's information collection came to outweigh distrust and the fear that it would be used to increase taxation. The result was that the Sociedad Nacional de Agricultores (national association of large landowners) came to take an active part in efforts to collect data on agricultural production (Estefane, 2017: 171). The association, in its capacity as one of the country's most powerful interest groups, pushed state officials at the provincial level to collect more detailed and comprehensive figures, and national officials to expand the nationwide presence of the agrarian bureaucracy. Thus, elite's positive attitudes toward information collection further contributed to tax state development.

5. Information capacity and tax state construction in 19th-century Argentina

A central feature of the development of the tax state in Argentina was the extensive nature of provincial autonomy during the decades after independence, especially in the so-called Rosista period (1828–52). After this period, two separate political units were created (the Estado de Buenos Aires and the Confederación), which joined forces in 1861 and consolidated Argentina as a single political unit with a federal organization. Despite this unification, regional clashes persisted until the federalization of Buenos Aires in 1880 (Miguez, 2021). Like Chile from the 1840s onwards, Argentina after 1860 benefited from growing political stability and world market integration.¹⁰ Our analysis confirms that, meanwhile, the Argentine state acquired an increasing ability to reach its citizens and collect high-quality information, which crucially contributed to the creation of fiscal capacity. We show how improvements in information capacity allowed the Argentine state both to establish efficient tax systems (in the sense of maximizing revenue) and the progressive consolidation of more 'information-intense' taxes.

Closely following the organization of the Chile case study, the first and the second parts of this section show, respectively, the formation of fiscal and information capacity in Argentina during the

⁹Data from this have recently been digitized by Naím Bro Khomasi as part of a larger project on the political effects of land inequality in Chile.

¹⁰Mazucca (2021) argues that this period marked the onset of trade-based state formation in Latin America.

19th century and up to the First World War. The last part concentrates on the interaction between these capacities and the relevance of the two aforementioned mechanisms.

5.1 Fiscal capacity

The Argentine tax state expanded from the 1860s onwards, in terms of both size and tax composition. During the first half of the 19th century tax yields stagnated (Garavaglia, 2014; Gelman and Santilli, 2006), even though tax levels in per capita terms were among the highest in Latin America, particularly in the Province of Buenos Aires (Garavaglia, 2010). Moreover, trade taxes were the prevailing form of taxation, accounting for 83 percent, 93 percent, and 86 percent of total revenues in the Province of Buenos Aires during the periods of liberal reform (1821–28), Rosas's domination (1829–52), and the 1850s, respectively; it also accounted for 95 percent of total receipts of the Argentinean Confederation during the 1850s (Garavaglia, 2014). Once the country was unified, total tax revenues jumped from 2 percent of GDP in 1864 to 5 percent during the early 1870s, increasing again during the last decade of the 19th century to 7 percent of GDP and then maintaining this level until WWI (Ferrerres, 2005).

Taxation diversified from the 1890s onwards. Tax authorities introduced a variety of taxes on alcohol, beer, matches, sugar, tobacco, and wine in 1890 and 1891, and as a result a significant decrease in the relative importance of trade taxes took place from 1892 to 1899 (Rayes, 2021: 129). Then, indirect internal taxes started to account for at least 40 percent of total tax revenues and around 2 percent of GDP. Given the rapid growth of the Argentine economy during this period, this implies a 12-fold expansion of indirect internal taxes in nominal terms between 1890 and 1913.

5.2 Information capacity

During the second half of the 19th century, information capacity also expanded in Argentina. In 1853 the *Mesa Estadística de la Provincia de Buenos Aires* was created. From 1854 onwards, this institution regularly published the *Registro Estadístico*, which offered information on issues ranging from trade to population demographics. The *Mesa* was part of a broader set of state institutions in the Province of Buenos Aires that sought to collect and analyze relevant information. Among the most prominent was the Departamento Topográfico, which in 1864 published 'the first cadastral map covering most of the legally owned territory of Buenos Aires province' (Gautreau and Garavaglia, 2012: 15). Interest in the creation of information capacity was not exclusive to the Province of Buenos Aires. In 1855, the Argentine Confederation also created a statistical office that executed a census in 8 of the state's 13 provinces (Otero, 2007).

These institutional antecedents in both the Province of Buenos Aires and the Confederation set the stage for a growing expansion of information capacity after unification. It is true that there was an incomplete institutionalization and differences between Buenos Aires (which continued to publish the *Registro*) and the rest of regions persisted, particularly until 1880 (González Bollo, 1999; Otero, 2007). However, a National Statistics Office was finally created in 1864. The office was composed of one director, three officials and a concierge and required \$ 3.261, which accounted for 0,4 percent of total expenses of the Ministry of Interior (Memoria del Ministerio de Hacienda 1865). Despite its very small size and constant fiscal hardship, it published seven different volumes of the *Registro Estadístico de la República Argentina*. This allowed the construction of continuous series on trade from 1861 onward, which were based initially on the most important customs offices and since 1870 on all customs offices. It was also during this period that the first modern population census was implemented, namely in 1869.

Moreover, the Argentinean historiography identifies the 1860s as the period when a national system of statistics started to be crafted (Otero, 2007; González Bollo, 2014). Indeed, whereas the National Statistics Office was closed in 1875, some of its tasks were tackled by the *Oficina Estadística Comercial* (1876–1884), the *Departamento General de Inmigración* (1876–1943) or the *Departamento Nacional de Estadística* (1884–1894). Furthermore, Law 2681, promulgated in 1889, consolidated the figure of civil marriage and allowed a growing control of the state over parish records

on baptisms, marriages and deaths. Likewise, the *Dirección General de Estadística* was created in 1894 and charged with the collection and presentation of statistical information on demography, trade, economic activity, education, public finances, and transport.

Closely aligned with these institutional changes, state officials started to systematically collect specific sectoral information, as evident in the pursuit of manufacturing censuses in various provinces, the Agrarian Census of 1888, and censuses on national assets. Similarly, the second modern census in 1895 provided information on population, manufacturing production, agrarian production, and trade. The state created a specific office dedicated to the yearly collection of industrial data in 1898. Sectoral censuses executed in 1908 were followed by the third modern census in 1914, which is seen by case specialists as the consolidation of information capacity. (Novick, 2002; Otero, 2007; González Bollo, 2014; Rayes, 2016).

Similar to Chile, Argentina was among the first countries to carry out modern censuses.¹¹ Furthermore, thanks to the data provided by Somoza and Lattes (1967), we can identify a sizable improvement in legibility between 1869 and 1895,¹² which, at least to a certain extent, indicates a greater ability of census officials to reach the population and compile accurate information.

5.4 Links and dependencies

The development of information capacity can lay the groundwork for further improvements in other areas of state intervention, including fiscal capacity. A clear example in Argentina is related to the organization of the Departamento Topográfico. Initially, the accumulation of cadastral information depended on landowners' willingness to provide information and the effective collection of information by private agents (*agrimensores públicos*). In this individualized, map-based system, public officers only validated cadastral maps *a posteriori* (Gautreau and Garavaglia, 2012). In order to cope with these problems and ensure the accumulation of compatible information, the Province of Buenos Aires adopted a standardization strategy during the 1850s that reduced the discretion of the *agrimensores públicos*. At the same time, the *demand* for cadasters by landowners increased. This was due to their interest in a better definition of property rights in the context of the progressive integration of the Buenos Aires economy to the world market (Gautreau and Garavaglia, 2012). Therefore, thanks to the higher bargaining power of the state over *agrimensores públicos* and to elite cooperation, information capacity improved during the mid-19th century. This, in turn, had an important indirect effect on fiscal capacity: cadasters contributed to a better definition of property rights, which in turn fostered exports and, therefore, trade taxes.

The growing consolidation of national statistics offices that took place during the second half of the 19th century also offers evidence about the economies of scope mechanism. In fact, this process went hand in hand with the progressive formation of an independent and professionalized body of statistics bureaucrats. At the end of the 19th century, this group was not only dedicated to information gathering but also offered their own economic analysis and recommendations (Otero, 2007; González Bollo, 2014). Since the most prominent figures among them worked in very different state dependencies across their lives, this implied the transfer of statistical knowledge across a variety of state organizations. These are examples of economies of scope related with the *repurposing of the informational apparatus*.

There are also examples about how the *reuse of information* worked to improve fiscal capacity. The generation of continuous trade series allowed state leaders to assess the evolution of the economy, as well as to demonstrate to foreigners (both migrants and capital owners) the economic potential

¹¹The 1869 census can be defined as a modern one since it was executed by a single government unit; it presented universal and uniform questions; data were collected simultaneously throughout the country; and the questions did not present extra-statistical considerations (Otero 2007). Before 1869, only Western European countries, Nordic countries, and the United States deployed modern censuses. From a Latin American perspective, only Uruguay (1852), Chile (1854), and Costa Rica (1864) ran a modern census before Argentina.

¹²Following Lee and Zhang's (2017) operationalization strategy, the Myers Score for Argentina is 23.71 in 1869 and 17.78 in 1895.

of the country (González Bollo, 2014; Otero, 2007). Those series, however, were also central in the revenue-maximization strategy that characterized tariff policy during this period (Hora, 2009; Tarsitano, 2010). Indeed, thanks to these new data, public authorities could discuss the tax-elasticities of the different types of imports (Memoria del Ministerio de Hacienda 1864), as well as acquire information on market prices in foreign ports that helped them to set the official price to be imposed on imports (Rayes *et al.*, 2020).

Likewise, the striking rise in indirect internal taxes during the 1890s described above cannot be understood as a mere consequence of the expansion of a new tax base or the fiscal urgencies derived from the Baring crisis. Indeed the greater interest of the Argentinean state in the production of sectoral information after the onset of industrialization during the 1880s (Rocchi, 2005) facilitated a better definition of tax rates, and therefore, collection potential. For instance, the Memoria del Ministerio de Hacienda (1897: L–LVI) discusses the effect of tax-rate increases on alcohol production by using monthly statistics on alcohol production, consumption, and stocks from 1895 to 1897. Public officials stated that, whereas information on these variables was available since 1891, they were focusing on the post-1895 period because the establishment of the Oficina de Control y Estadística in 1895 assured the quality and robustness of the data (MHAC 1897: LIV).

The interest of agrarian elites in the consolidation of cadasters suggests that the improvement of information capacity was not a mere top-down process. In fact, according to González Bollo (2014: 51–58) specific concerns of these elites should be considered as one of the main determinants of information capacity in Argentina during the second half of the 19th century. For instance, elite interest in the attraction of migrants to expand labor supply fostered the creation of different private institutions that ended up being ‘nationalized’ by public organizations. Likewise, the lack of sufficient information to predict agrarian yields and production levels explain the constant support of the *Sociedad Rural Argentina* (SRA, the main agrarian lobby) for projects such as the agrarian census. The SRA provided information and data-gathering skills that helped the state to collect census data. Yet elite support did not imply complete alignment. For instance, there was a bargaining process around the specific set of questions to be included in census forms and the reliability of the information provided in specific issues was questioned.

Argentine industrialists were, at least initially, more reluctant to support the expansion of information capacity. Their reservations were fueled in part by the free trade orientation expressed by the most prominent figures of the statistics bureaucracy and the protectionist claims of industrialists. Then, not surprisingly, when in 1885 the *Dirección Nacional de Estadística* asked the two main industrial lobbies at the time (*Club Industrial* and *Centro Industrial*) for support with information gathering, only one consented. But during the 1890s the already unified industrialist lobby (*Unión de Industriales Argentinos*) contributed to the planning of the second modern census. Collaboration was higher in those sectors where tariff protection had increased such as wine, wheat flour, beer. In fact, there is agreement that the second modern census provided accurate information about the quantity of industrial establishments but fairly poor data about production levels or capital in the sector (Herández Bollo, 2014; Otero, 2007). In 1914 the state asked both agrarian and industrial lobbies for collaboration with the third national census of 1914, this time instigating broad-based cooperation (Otero, 2007: 83, 107). Overall, this suggests that the effective consolidation of revenue sources beyond trade taxes depended on the availability of information, the quality of which was, at least in part, determined by elite cooperation.

6. Conclusion

In this article we have combined cross-national statistical analysis and in-depth historical case studies of Argentina and Chile to explore the relationship between two crucial aspects of state capacity: information capacity and fiscal capacity. Our empirical findings indicate that information capacity contributes to tax state development. States require accurate information about their subject populations in order to effectively mobilize revenues.

These findings also connect with and contribute to a number of broader debates in the study of states and development. For students of *state capacity* our analysis cautions against treating fiscal capacity as synonymous with overall state strength, given the informational foundations of taxation we have identified for the period under study. This paper similarly questions the well-known claim that state capacity is multidimensional. While our findings reinforce the view that state capacity has multiple and interrelated dimensions, they also urge scholars to move beyond this established wisdom and further theorize and empirically explore how core dimensions of state capacity relate to and affect each other.

For research on the rise of *fiscal states* our study brings information capacity, a currently underappreciated factor, to the analytical forefront. Existing scholarship draws on a variety of theoretical approaches to explain why there are persistent differences in the ability of states to tax, including geography (e.g. Herbst, 2000; Nunn and Puga, 2012; Stasavage, 2011), ethnic diversity and other forms of social inequality (e.g. Easterly and Levine, 1997; Engerman and Sokoloff, 2002), and international war and external threats more generally (e.g. Centeno, 2002; Hui 2005; Tilly, 1990). Another body of work emphasizes the crucial role of institutions, in particular colonial institutions and their long-run consequences for the fiscal state (e.g. Frankema and Booth, 2019; Mahoney, 2010), and the role of constraints on the executive (e.g. Ricciuti *et al.*, 2019). While these structural and historical-institutional factors are certainly useful for explaining enduring differences in fiscal capacity, they do not pay sufficient attention to intra-state determinants. This is precisely what a focus on information capacity and its relationship to the construction of fiscal states can bring to the table.

We close the article by pointing to avenues for future research to expand this line of work. Empirically, our cross-national statistical analysis would have benefited from greater geographical and temporal coverage of datasets on information capacity. Thus, one possible future contribution to the study of information capacity and its relationship to fiscal capacity would be an extension of the legibility dataset compiled by Lee and Zhang (2017) to include micro-level historical census data from before 1960, which would help trace the prevalence of age heaping further back in time. Similarly, a cross-national cadaster dataset that builds on D'Arcy and Nistotskaya (2017, 2018) by including multiple observations on the frequency and quality of land cadasters since the early 19th century would further test the claims advanced in this paper and extend their applicability to a wider set of countries. Another possible extension of this study would be the development of detailed case studies, based on multiple primary sources and relevant secondary literature, in other world regions. While our focus on 19th-century Argentina and Chile has illustrated the importance of taking a historical perspective on the construction of information capacity and the fiscal state, systematic cross-regional comparisons would allow further testing of our argument.

This said, the two Latin American states – in many ways typical cases of tax state development, when seen from a global perspective – already illustrate the usefulness of the framework developed in this article. Thus, we hope to have laid the foundation for a research program that takes information capacity and its relationship to fiscal capacity seriously when studying tax states and development.

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