

# Income Taxation and State Capacities in Chile: measuring institutional development using a historical earthquake data

HÉCTOR BAHAMONDE

\*PhD Candidate • Political Science Dpt. • Rutgers University

e:[hector.bahamonde@rutgers.edu](mailto:hector.bahamonde@rutgers.edu)

w:[www.hectorbahamonde.com](http://www.hectorbahamonde.com)

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## Abstract

Building on the fiscal sociology paradigm, this paper argues that the development of the modern fiscal apparatus in Chile was product of a sectoral conflict around in the 1920's between the industrial and agricultural political elites. Particularly, I identify the importance of the income tax, and how it contributed to expand state capacities at the subnational level. Exploiting the quasi-randomness of earthquake shocks, I leverage a novel historical earthquake death tolls dataset and a Bayesian multilevel Poisson model to measure state capacities at the local level between 1900 and 2010. The results suggest that the implementation of the income tax has historically decreased the proportion of local deaths, and that the effect has been stronger in industrial localities.

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Students of the Latin American states have several *theories* to explain the causes and consequences of state capacities. Scholars also have countless alternatives to *measure* state capacities. However, there exists a huge deficit. On the one hand, most state formation theories (just to name a few) are situated during precolonial times,<sup>1</sup> during early<sup>2</sup> or late<sup>3</sup> independent Latin America. On the other hand, we lack of a measurement that corresponds *temporally* with the theories we have. While our explanations of state capacities are *historical* in nature, in practice most available measurements capture *contemporary* levels of stateness. In this paper I try to bridge this gap by providing an explanation of the origins of state capacities in Latin America and a corresponding indicator able to capture an *historical measurement* of state capacities. This paper then seeks to contribute to the state formation literature in general, both from a theoretical and methodological perspectives.

Building on the fiscal sociology paradigm,<sup>4</sup> I argue that the implementation of the income tax contributed to form the Latin American state. In turn, the income tax was product of an inter-sectoral conflict between agricultural and industrial elites (see [Figure 1](#)). Analytically, I consider sectoral conflicts as the spring of both fiscal expansion and state development. Economic sectors not only shape the economic landscape. Given that each sector has its corresponding political arm, the *sectoral* conflict is also a *political* conflict. Sectoral conflicts find their origins in the economic structural transformation characterized by “a secular decline of agriculture and substantial expansion of manufacturing.”<sup>5</sup> These gradual long-term changes imposed tight constraints on the way politics was run by the incumbent landowning class, who had inherited its institutional privileges since colonial times.<sup>6</sup> Exploiting the quasi-randomness of earthquake shocks, I leverage a novel historical dataset on Chilean earthquake death tolls and a Bayesian multilevel Poisson model to measure state capacities at the local level between 1900 and 2010. The capacity the Chilean state has had of enforcing and monitoring building codes has been a reflexion of the Chilean overall state capacities. I capture these state efforts throughout time. The results suggest that the implementation of the income tax has historically decreased the count of local deaths. This effect has been stronger in industrial localities, suggesting that the predominance of an institutional order that benefits the economic and political challenger (i.e. the industrial sector), increases overall state capacities. The rest of the paper proceeds as follows

pending.

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<sup>1</sup>Mahoney [2010].

<sup>2</sup>See Kurtz [2013] and Soifer [2015].

<sup>3</sup>Bahamonde [2017b].

<sup>4</sup>For an excellent overview of both classic and new fiscal sociology refer to Martin et al. [2009, Ch. 1].

<sup>5</sup>Johnston and Mellor [1961, 567].

<sup>6</sup>Bahamonde [2017a].

**Figure 1:** *Causal Mechanism*



## I. FISCAL SOCIOLOGY, SECTORAL CONFLICTS AND STATE CONSOLIDATION

The expansion of the fiscal system has a long tradition of being associated with sectoral conflicts. For example, Schumpeter sees “taxation in terms of group conflicts,”<sup>7</sup> while others see taxation as “an outcome of economic relations.”<sup>8</sup> Following this tradition, I sketch the theory around the sectoral conflict that existed between the industrial and agricultural elites in Latin America. Class conflicts are more likely to resolve in favor of direct taxation where income inequality *among the elite* is low.<sup>9</sup> Given that similar degrees of sectoral economic development can be converted into armies of similar capabilities,<sup>10</sup> elites will have incentives to reach agreements rather than engaging in conflict. That is, when levels of inter-elite inequality are low, war is more likely to exhaust all existent assets without producing positive outcomes for either sector.<sup>11</sup> In the Latin American context, considering the initial institutional and economical advantages the agricultural sector enjoyed since colonial times, reducing inter-elite inequality meant a rapid expansion of the industrial sector. Elsewhere, I have argued that the emergence of a strong industrial elite altered not only the structure of the economy but also the inter-sectoral balance of political power, making unsustainable the political monopoly run by the landed elites.<sup>12</sup>

A theory focused on sectoral conflicts offers also a theory of state consolidation. As others have argued, “state formation will be more likely to the degree that powerful individual actors form two groups on the basis of divergent economic and political interests.”<sup>13</sup> State centralization affects landowners and industrialists in different ways. Consequently, every sector will have different preferences towards taxation and state centralization.<sup>14</sup> On the one hand, as land fixity increases the risk premium of the landed elite’s main asset,<sup>15</sup> they systematically resisted taxation. On the other hand, as capital could be reinvested in nontaxable sectors, industrialists’ preferences toward

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<sup>7</sup>Monson and Scheidel [2015, 14].

<sup>8</sup>Seligman (1895). In Martin et al. [2009, 7].

<sup>9</sup>Tani [1966, 157] explains that the absence of “wealth groups” makes passing an income tax law easier.

<sup>10</sup>Boix [2015].

<sup>11</sup>Richard Salvucci in Uribe-Uran [2001, 48].

<sup>12</sup>Bahamonde [2017b].

<sup>13</sup>Hechter and Brustein [1980, 1085].

<sup>14</sup>See Acemoglu and Robinson [2009, 289] and Best [1976, 50].

<sup>15</sup>Robinson [2006, 512].

taxation were more elastic.<sup>16</sup> Going beyond the conflictive nature of the implementation of the income tax, its very implementation produced a secular accumulation of know-how, particularly, of technologies able to monitor individual incomes. Observing individual economies and transforming private income into public property is what causes state consolidation.<sup>17</sup> In fact, Musgrave [1992, 99] argues that since taxation (specially on incomes) requires such a high degree of state penetration, public finances offer the key for a theory of state-building. And while some situate the relevant state-building critical juncture at the end of the colonial period, before the class compromises I identify in this paper,<sup>18</sup> the implementation of the income tax was an important building block in this process.

In all Latin American economies during and right after the colonial period, agriculture was the most important sector.<sup>19</sup> And by extension, agricultural elites were the most powerful.<sup>20</sup> Particularly in Chile, Collier and Collier [2002, 106] argue that initially the “national government was dominated by the central part of the country, with owners of large agricultural holdings playing a predominant role.”<sup>21</sup> There existed an important asymmetry, however. While the agricultural and industrial sectors were growing at the same pace, the latter were kept from participating in politics. This asymmetry led these two ‘antagonistic elites’<sup>22</sup> to two bloody civil wars. Zeitlin [1984, 23] argues that the civil wars challenged a “large landed property [elite against a] productive capital [elite].” However, war was not sustainable over time. Given their relative similar degrees of economic development and military capacities, the two elites opted for a political compromise.<sup>23</sup> In 1924, industrial elites accepted to be income taxed by agriculturalist incumbents in exchange of having a more open political system. The non-agricultural sector “(reluctantly) accepted taxation, *while demanding state services and expecting to influence how tax revenues were spent.*”<sup>24</sup> In this paper I measure the extent these services actually helped the Chilean state to consolidate further, boosting its general state capacities.

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<sup>16</sup>Hirschman [1970] and Ronald Rogowski in Drake and McCubbins [1998, ch. 4]. However, see Bates and Lien [1985, 15].

<sup>17</sup>Musgrave [1992, 98] and Moore [2004, 298].

<sup>18</sup>Kurtz [2009, 2013], Soifer [2015]

<sup>19</sup>Keller [1931, 13].

<sup>20</sup>Wright [1975, 45-46].

<sup>21</sup>Similarly, McBride [1936, 15] explains that “Chile’s people live on the soil. Her life is agricultural to the core. Her government has always been of farm owners. Her Congress is made up chiefly of rich landlords. Social life is dominated by families whose proudest possession is the ancestral estate.” Emphases are mine.

<sup>22</sup>Keller [1931, 37-38].

<sup>23</sup>Geddes [1991] argues that competition between two rival parties of about the same size creates clearer incentives to invest in political institutions.

<sup>24</sup>Carmenza Gallo, in Brautigam et al. [2008, 165]. Emphases are mine. She refers specifically to nitrate producers.

## II. FROM EARTHQUAKE DEATH TOLLS TO STATE CAPACITIES

### I. Multilevel Analyses

### III. APPENDIX

In this section I model the number of dead individuals caused by earthquakes.

The data are fitted using a Bayesian Poisson regression. The main independent variables are the proportion of national agriculture output relative to industrial output and a dummy for whether in year  $t$  the law of income tax had been implemented. I expect the yearly death tolls to be lower when the national proportion of agricultural production decreases, when the law of income taxation has been passed, and where the industry predominates at the local level. The model controls for local population, an indicator for local urban/rural, and earthquake magnitude.

Since the ‘treatment,’ i.e. the proportion of agricultural output relative to industrial output, and the implementation of the income tax, takes place at the national level but the outcome (death tolls associated to earthquakes) is measured at the local level, I implement a multilevel model.<sup>25</sup>

Particularly, I include year fixed-effects to account for unobservable/unmeasured yearly factors such as the evolution of the political system, demographic, climate and cultural changes, economic shocks (both national and international), and others. Particularly, the multilevel component of **Equation 1** allows the slopes of the national proportion of agriculture relative to industry ( $\beta_{1_j}$ ) and the earthquake’s magnitude ( $\beta_{2_j}$ ) to vary by subnational sectoral predominance indexed by  $j$ . I consider whether affected localities were predominantly *agricultural*, *industrial* or *mixed*.

The latitude where the earthquake occurred was included to control for the proximity to the Andean mountains. This variable controls for a built-in tectonic predisposition of a higher propensity of earthquakes. Longitude controls for climate and other unobserved conditions that make agricultural development more difficult. In turn, both measurements serve as good proxies for terrain ruggedness and the difficulties the state had to face to centralize political power. More formally, I fit the next equation,

$$\begin{aligned} \text{Deaths} &\sim \text{Poisson}(\lambda_i) \\ \log(\lambda_i) &= \mu + \beta_{1_j} \text{Proportion}_i + \beta_{2_j} \text{Magnitude}_i + \beta_3 \text{Tax}_i + \\ &\quad \beta_4 \text{Population}_i + \beta_5 \text{Urban}_i + \\ &\quad \beta_6 \text{Latitude}_i + \beta_7 \text{Longitude}_i + \beta_{8_t} \text{Year}_i \end{aligned} \tag{1}$$

<sup>25</sup>Gelman and Hill [2006, 237].

Include summary stats here. Explain what’s national and what’s sub-national.

See if I included this lit. already.

where,

$$\begin{aligned} i_{1,...I} \text{ where } I = 91 \\ j_{1,...J} \text{ where } J = 3 \\ t_{1,...T} \text{ where } T = 59. \end{aligned} \tag{2}$$

The  $i$  subscript denotes the unit of analysis (i.e. earthquake),<sup>26</sup> the  $j$  index expresses the type of sub-national economic composition of the affected locality (agricultural, industrial, or mixed), and the  $t$  subscripts denotes the year when earthquake  $i$  happened. Finally,  $\mu$  is the intercept. Since earthquakes can happen more than once per year, in my dataset  $i > t$ .<sup>27</sup> The estimated parameters  $\beta_k$  have uninformative normally distributed priors, while the precisions  $\tau_p$  of  $\beta_{1_j}$ ,  $\beta_{2_j}$  and  $\beta_{8_t}$  have uninformative Gamma priors, of the form,

$$\begin{aligned} \beta_{k,...K} &\sim \mathcal{N}(0, 0.01) \text{ where } K = 8 \\ \tau_{p,...P} &\sim \mathcal{G}(0.5, 0.001) \text{ where } P = 3. \end{aligned} \tag{3}$$

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<sup>26</sup>Kahn [2005, 278] follows the same strategy.

<sup>27</sup>For the years in which there is just one earthquake, the ‘group’ variable has only one observation. This does not endangers the robustness of the model. Gelman and Hill [2006, 276] explains that it “is even acceptable to have one observation in many of the groups.”

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