

Income Taxation and State Capacity in Chile: Measuring Institutional Development Using Historical Earthquake Data



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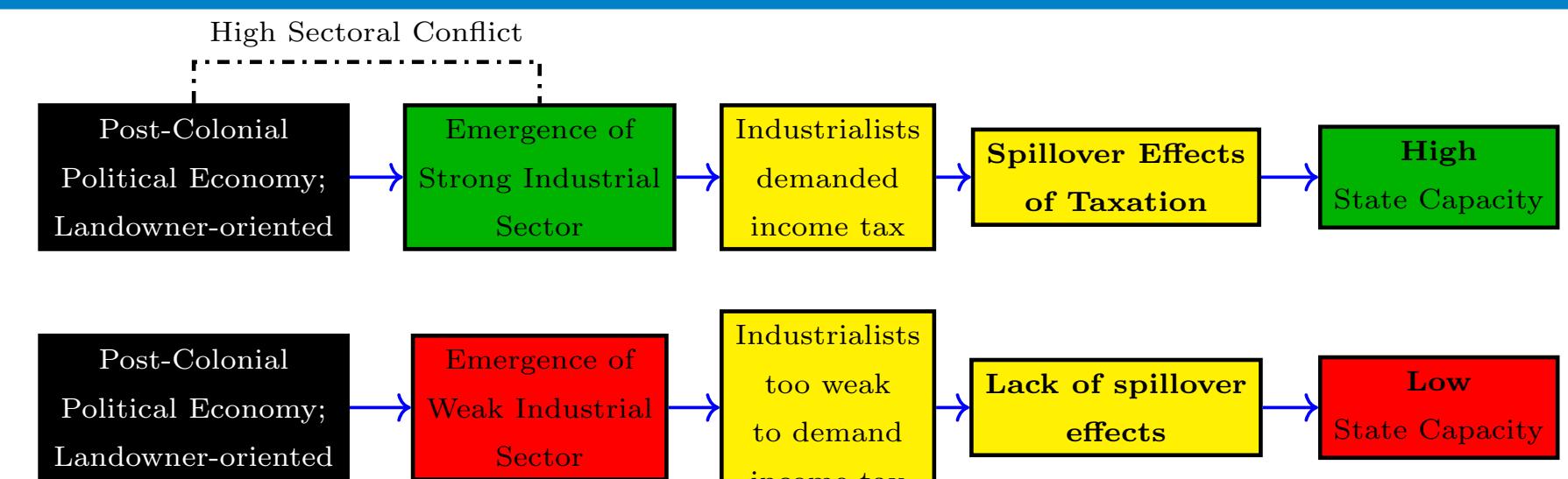
CONTRIBUTION AND MAIN FINDINGS

Income taxation fostered via spillover effects increases in state-consolidation over time in Chile. I created a novel hand-collected longitudinal dataset on Chilean earthquake death tolls ($N=103$). Death tolls decrease (state capacity increases) once the income tax law was implemented in 1924. A sector approach is leveraged.

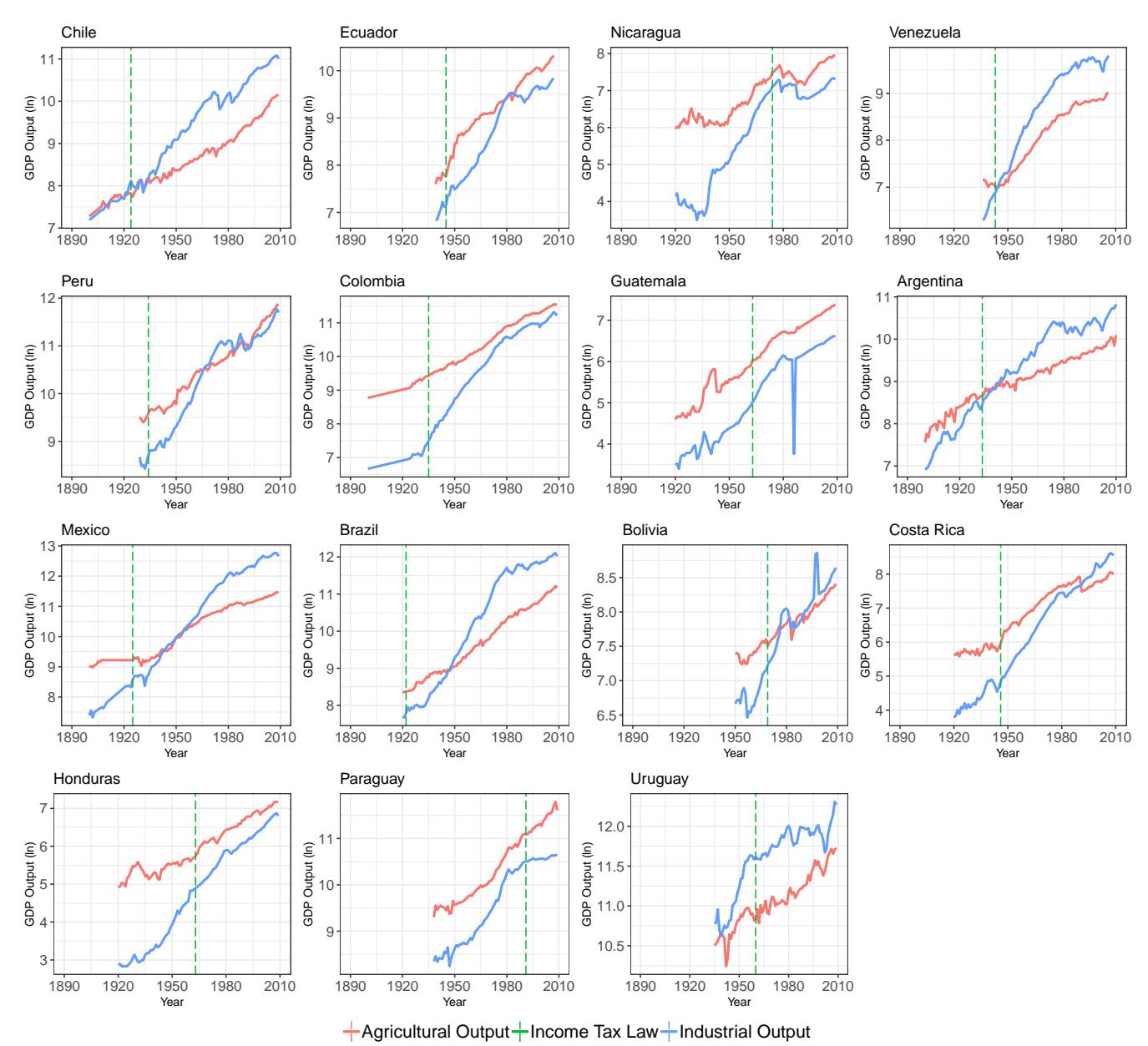
GAPS IN THE LITERATURE

1. The Literature has overlooked fiscal development in the developing countries.
 - Most theories explain European cases.
 - Focus is on external conflicts (wars): taxation and war.
 - Latin America has not seen the degree of conflict Europe had.
2. A measurement to capture overtime levels of state-capacity is lacking.
 - Most measurements capture contemporaneous levels of state-capacity: experimental and observational work.
 - However, we know that factors such as colonial legacies played an important role fostering/limiting state-capacity.

ARGUMENT



INCOME TAXATION IN LATIN AMERICA



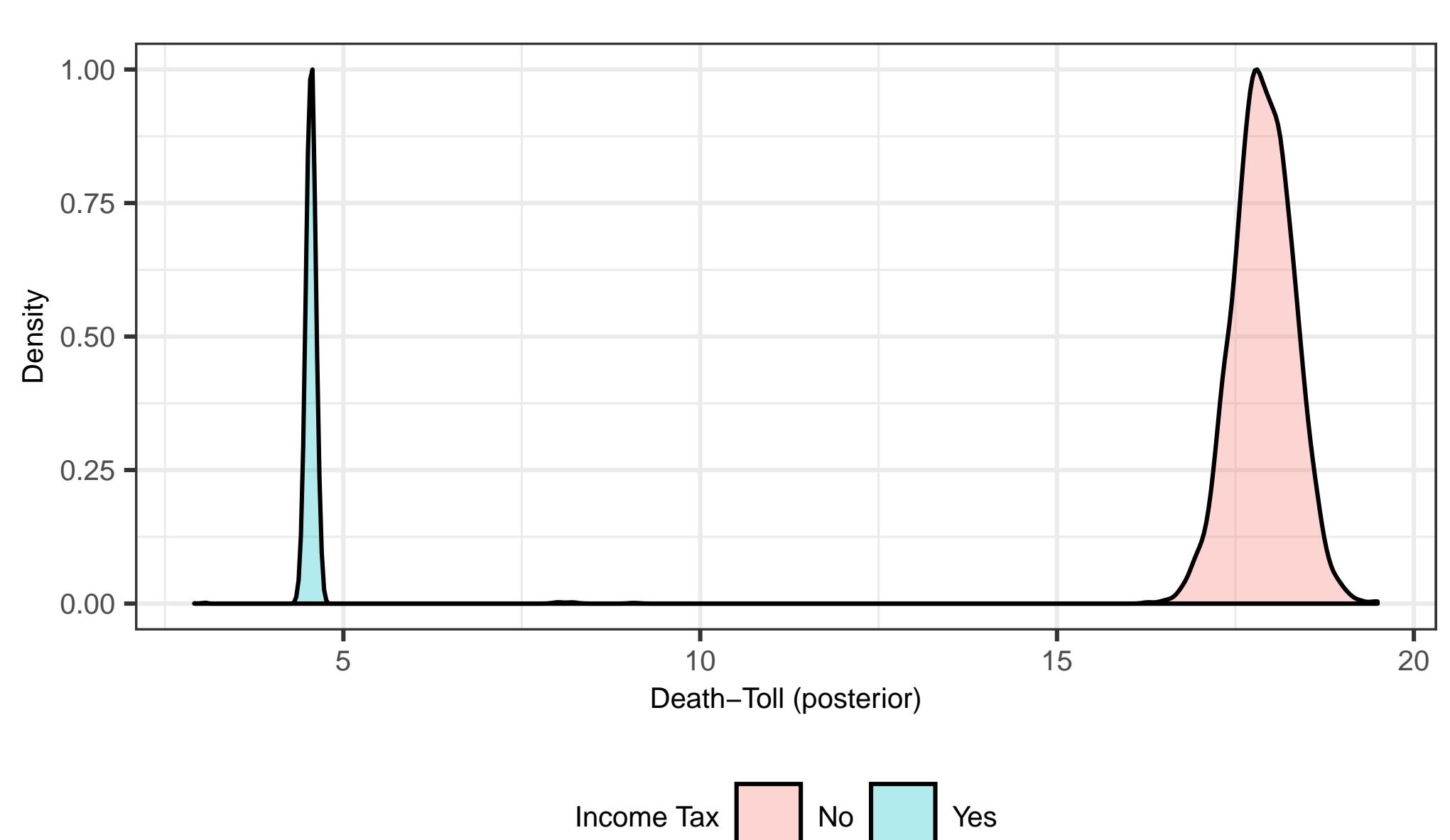
MAIN MODEL: POISSON

Deaths $\sim \text{Poisson}(\lambda_i)$

$$\begin{aligned} \log(\lambda_i) = & \mu + \beta_1 \text{Magnitude}_i + \beta_2 \text{Income Tax}_i + \\ & \beta_3 \text{Magnitude}_i \times \text{Income Tax}_i + \\ & \beta_4 \text{Population}_i + \beta_5 \text{Longitude}_i + \\ & \beta_6 \text{Latitude}_i + \beta_{7,k} \text{Sector}_i \end{aligned} \quad (2)$$

The unit of analysis is the earthquake. Each earthquake is associated with a death toll, a location, a magnitude, a local population, and an urban/rural setting. A count model was used to test the effect of implementing the income tax law on earthquake death tolls over time.

EARTHQUAKE DEATH TOLLS



Simulated posterior predictions. The death toll systematically decreases over time—i.e. levels of state capacity systematically increase over time—once the income tax law is implemented. By implementing the income tax, the baseline propensity of an earthquake increasing the death toll decreases from an estimated over time average of 18 to an estimated over time average of 5.

Both distributions were computed via a MCMC routine, particularly the iteration of five chains with 300,000 iterations per chain. Considering the Monte Carlo Markov Chain properties, the first 30,000 observations of every chain were discarded.

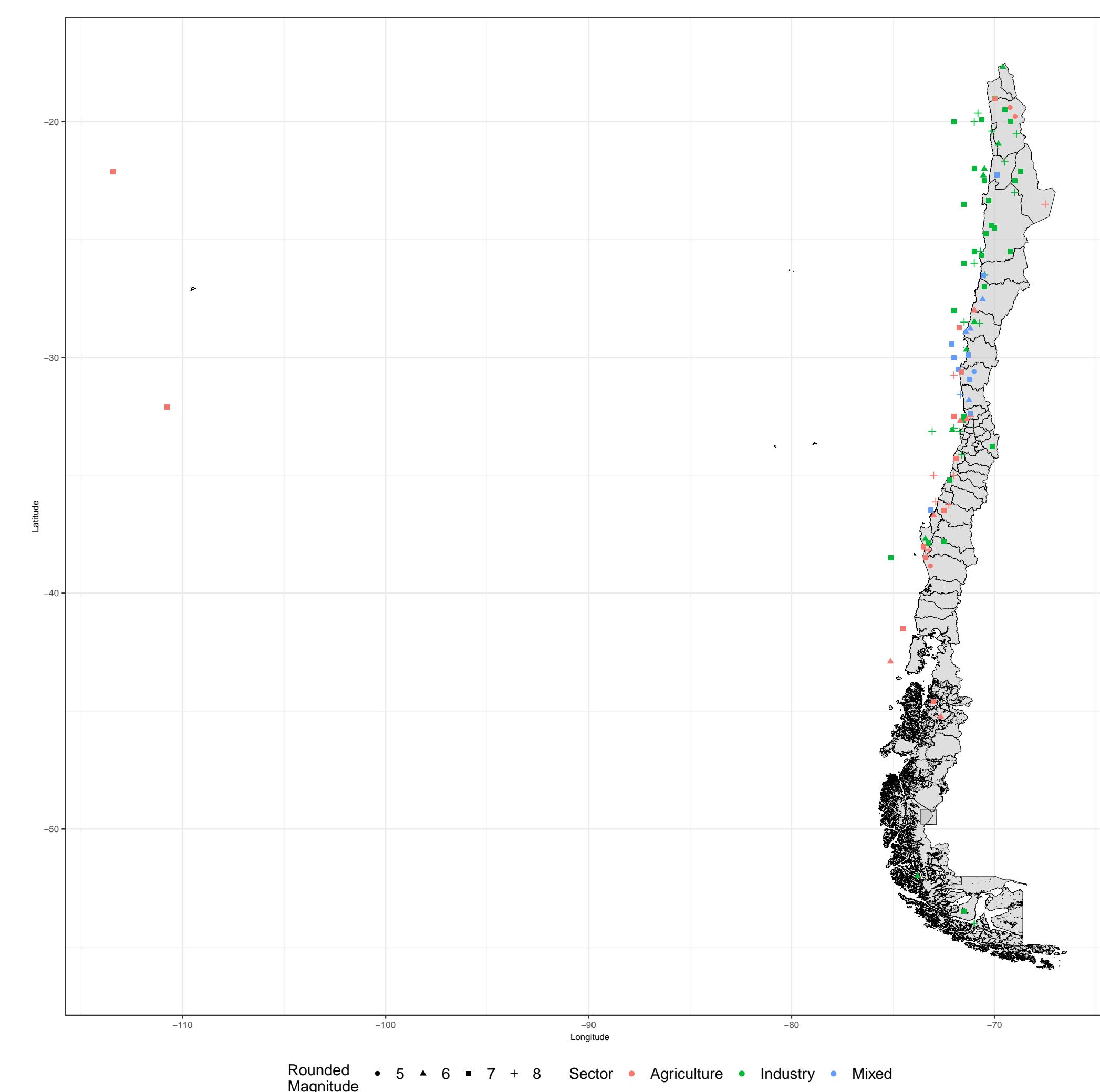
Instituto de Ciencias Sociales

EARTHQUAKE DATA: GEOGRAPHICAL DISTRIBUTION

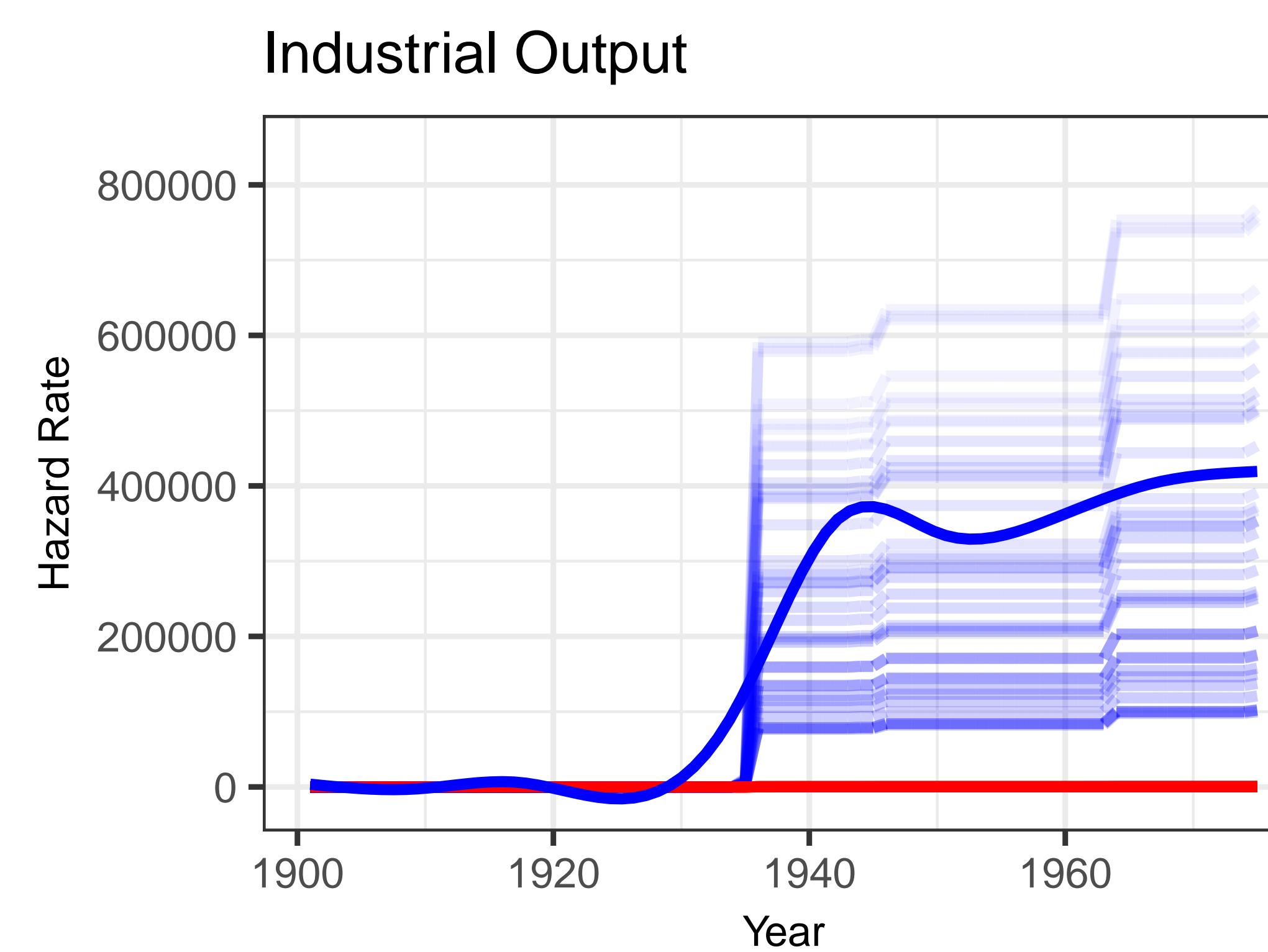
- Exploiting the **exogeneity of earthquake shocks**, I leveraged a novel hand-collected dataset on Chilean earthquake death tolls between 1900 and 2010.

- Earthquakes are **time-invariant**, and importantly, orthogonal to economic development and regime type.

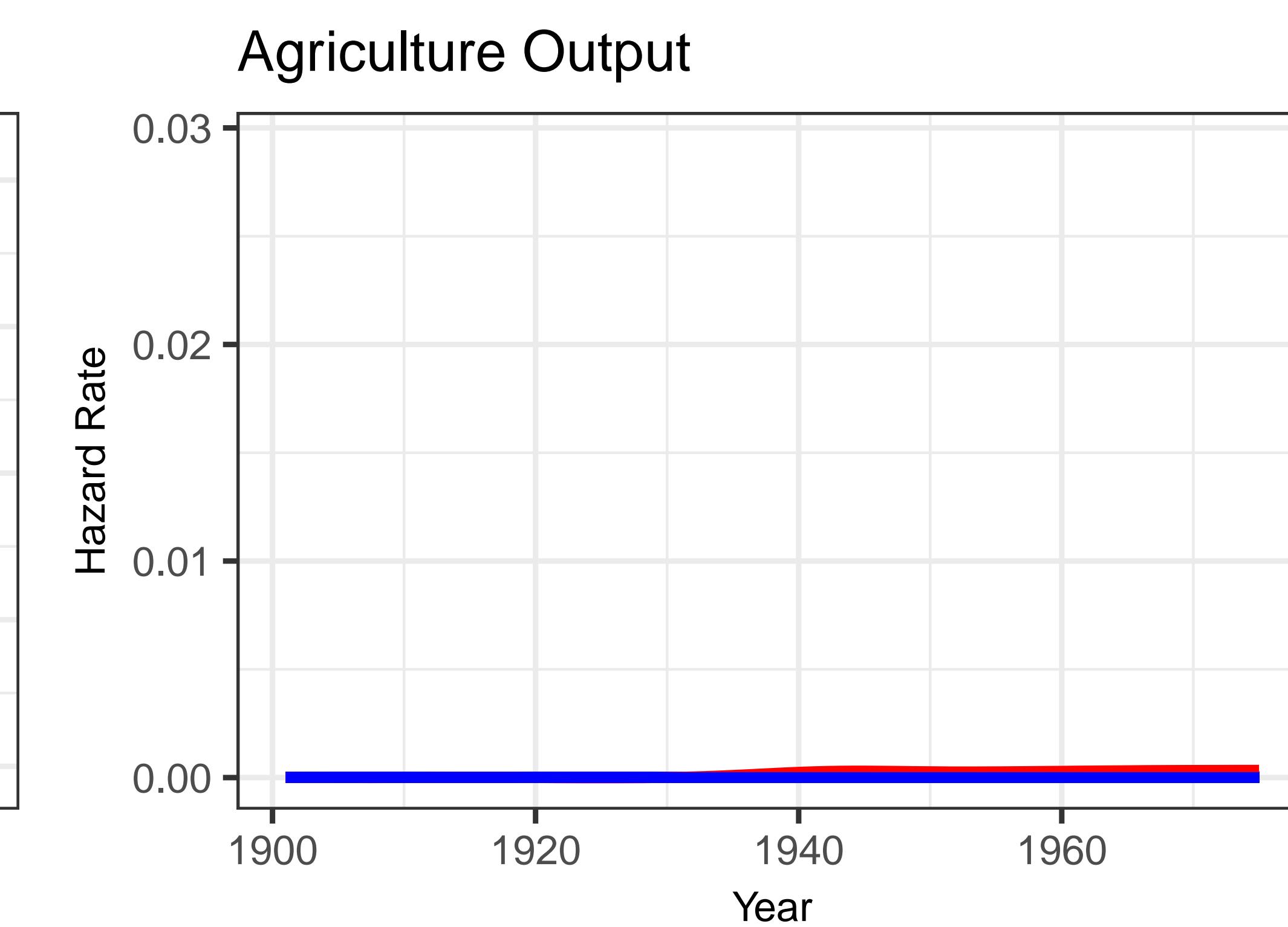
- ★ Under reasonable assumptions, if the state's capacity for enforcing and monitoring building codes throughout the territory is a reflection of overall state capacity, then death-toll differentials should be mainly associated with state capacity.



ACCELERATING THE IMPLEMENTATION OF THE INCOME TAX



$$h_i(t) = \exp(\beta_1 \text{Industrial Growth}_{i,t-1} + \beta_2 \text{Agricultural Growth}_{i,t-1} + \beta_3 \text{Total Population}_{i,t-1}) h_0(t) \quad (1)$$



Simulated Cox Proportional Hazards. The rise of a strong industrial sector accelerated the implementation of the income tax law in 15 countries in Latin America. Moreover, a strong agricultural sector not only has zero impact on fiscal development, but a negative one.