

# Structural Transformations and State Institutions in Latin America, 1900-2010

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## Abstract

While virtually all countries in Latin America imposed the income tax, the policy only fostered state development when it was implemented under circumstances of fast industrial expansion. However, when implemented under slow agricultural expansion, income taxation did not produce state-building. I argue that this context in which countries implemented the policy, was a critical juncture. Leveraging the dual sector model of economic growth, and the fiscal sociology paradigm, I explain how balanced inter-sectoral growth, and income taxation, promoted economic growth and state consolidation in the early 20th century Latin America. My empirical strategy leverages economic history data since the 1900s for a number of Latin American countries, time-series analyses, and the Chilean case during the 1920s to contextualize the causal mechanism.

**Keywords**— Lewis model; income taxation; economic history; elites.

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*Practically all governments are engaged in promoting one [group]. There are [...] landlord governments against the peasants and the industrialists*

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Lewis (1965, 410)

The literature on the relationship between political and economic development is vast. Without surveying all of it, there is an agreement in that strong institutions cause better economic performance. Indeed, North (1990, 3) explains that the fact that “institutions affect the performance of economies is hardly controversial.” Unfortunately, however, most explanations of economic success focus on property rights protection.<sup>1</sup> I find that a limitation. For instance, authoritarian regimes with little (or no) respect for property rights, grow at levels that sometimes even surpass democratic countries.<sup>2</sup> While I still think that institutions matter for economic growth, this paper seeks to contribute to this literature by emphasizing the positive effects of sectoral conflicts between the industrial and agricultural political elites, on economic and political development.

In addition to that, scholars have traditionally focused on socio-economic cleavages between a *homogeneous* ruling elite, and politically excluded segments of the society, traditionally peasants or the bourgeoisie. Moore (1966), Tilly (1992), Boix (2003), Stasavage (2008) and Acemoglu and Robinson (2009) are among the most prominent examples supporting this view.<sup>3</sup> Alas, the study of sectoral divisions—e.g., conflicts *among* the elite—and political and economic development, has been overlooked. There are some important exceptions, however. Ansell and Samuels (2014) and Boix (2015) examine the role of economic inequality/equality among the elite on democratization, Saylor (2014, 8) looks at the “coalitional basis of state building,” and Mares and Queralt (2015) examine how income taxation in Europe was associated with inter-elite conflicts, particularly between the landed and industrial elites. While political economists have already studied the role of sectoral conflicts in the context of political development, most of the time the focus has been on democratic development. Using the same sectoral approach, this paper stresses how sectoral conflicts are also associated with state-building and economic development.

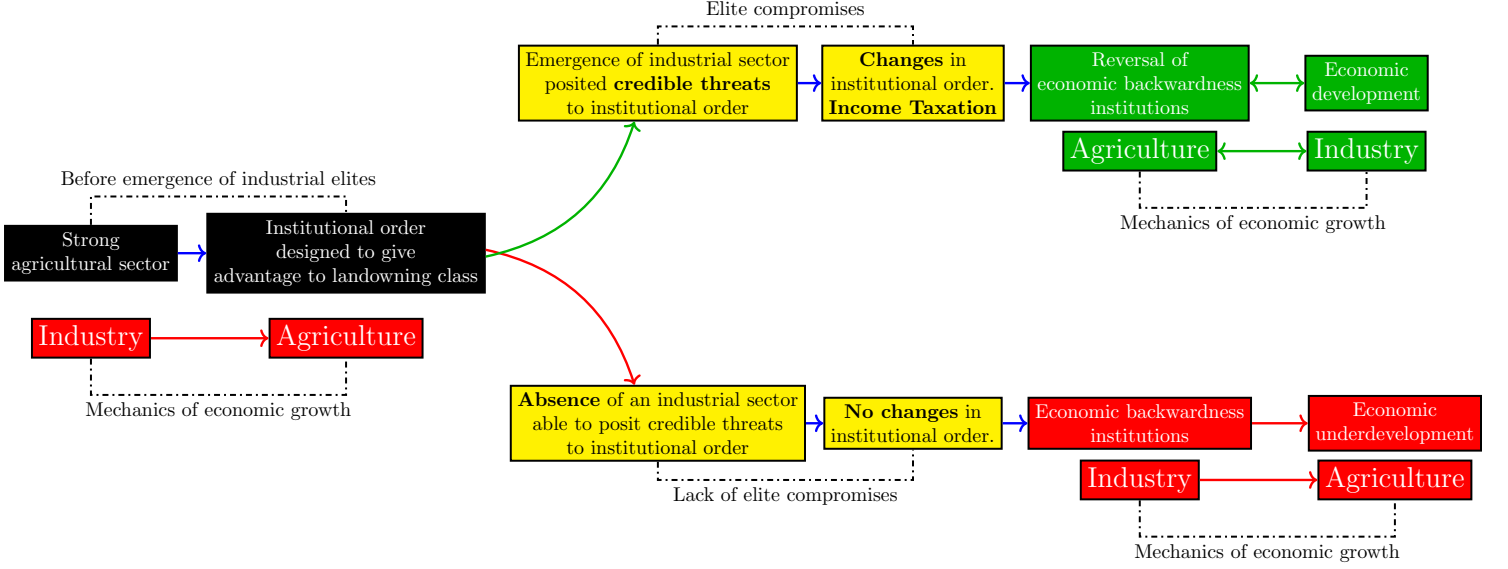
Hirschman (1958, 66) explains that “tensions, disproportions and disequilibria” among the industrial and agricultural sectors promote development. Building on that, in this paper I underline the conditions under which higher levels of sectoral contestation between the industrial and agricultural political elites are more likely to foster state development and long-term economic growth. I

theorize from two bodies of literature. First, I build on the fiscal sociology paradigm to argue that fiscal institutions have been the main *engine* of state-making.<sup>4</sup> Second, borrowing from the dual sector model of economic growth, I document how the secular structural transformation—e.g., the gradual emergence of the industrial sector—fostered the reversal of the backward institutional order implemented during colonial times, causing long-term economic growth. The paper exploits sectoral outputs from 1900 to 2009 for a number of Latin American countries,<sup>5</sup> vector autoregressive models, Granger-causality tests, impulse response functions, and the Chilean case to illustrate the causal mechanisms. The results amply suggest that when the implementation of the income tax coincided with lower levels of sectoral inequality—e.g., fast industrial expansion—both economic and political development were promoted.

## I. STATE-MAKING AND ECONOMIC GROWTH: THE ROLE OF SECTORAL CONTESTATION

I argue that both balanced sectoral growth and income taxation promoted sustained levels of economic growth and state-building as early as the 20th century in Latin America. Economic expansion does not refer to a higher GDP *per capita*, but to a *long-term* growth equilibrium between the industrial and agricultural sectors. Specifically, balanced growth consists of an inter-sectoral synergy where one sector expands in reaction to the other, and vice versa, over time. And since the economic forces alter the balance of political power of the elites invested in each of these two sectors, the theory of (un)balanced economic growth offers also a theory of political (under)development. The mechanism advanced in this paper explains that balanced levels of economic growth had positive—and long-lasting—consequences for political development. Particularly, the argument explains how balanced growth promoted higher levels of sectoral equality, not only precluding sectoral dominance on either sector, but also fostering higher levels of tax compliance among the elites, encouraging inter-elite cooperation and state-making—hence the circular arrows in [Figure 1](#).

On the one hand, the implementation of the income tax generated positive spillover effects for state-making, particularly, rising economies of scale of the operational efficiencies of the bureaucracy. That is, the same bureaucracies that were sent to collect and administer the tax, learned to execute other state(*making*) practices. Particularly, the development of the fiscal system required deploying skilled bureaucrats able to keep up with accounting books of every firm, as well as the employment



**Figure 1:** *Causal Mechanism*

structure of every factory. It also required knowledge on investments, levels of production and exports, among others. All these tasks shared important *technical complementarities* with other state activities, such as solving land disputes, dispensing justice, providing infrastructure, etc. In other words, the acquired expertise in taxing private incomes, was transferred—at marginally lower costs—to other state institutions.<sup>6</sup> Hence, the crux of this portion of the argument, is that tax collection rose the capacity utilization of the bureaucracy regarding other state tasks.

On the other hand, the mechanism also contends that the context under which countries implemented the income tax law was an important critical juncture for the foundation of the Latin American states. While virtually all countries in the region imposed the tax, the policy only fostered state development when it was implemented under circumstances of high sectoral conflict. That is, under circumstances where the industrial political elites were strong enough to challenge agricultural political elites, who have dominated the economy and the politics since colonial times. The nature of the conflict had to do with the sectoral losses or gains associated with fiscal expansion. Since taxation has affected landowners and industrialists in different ways,<sup>7</sup> economic elites have systematically been divided on their preferences towards fiscal policy,<sup>8</sup> and consequently, state centralization. As land fixity increases the risk premium of their main asset, agriculturalists have typically resisted

taxation.<sup>9</sup> In contrast, industrialists' preferences toward taxation have been more elastic, as capital can be reinvested in nontaxable sectors.<sup>10</sup> This sectoral cleavage was more likely to resolve in favor of direct taxation when income inequality among the elites was low,<sup>11</sup> or as I argue here, where sectoral competition was high. That is, when the industrial elites were strong enough to contest agricultural political elites. Importantly, higher dependence on infrastructure made industrial elites to be more willing to "pay" for public infrastructure, by imposing an income tax on themselves. In fact, Beramendi, Dincecco, and Rogers (2016, 18) find that as industrialists depended more on infrastructure implemented at the local level such as roads, railroads, and bridges; they "[*preferred*] to shoulder a higher tax burden through progressive direct taxation."

Importantly, where both economic sectors were equally developed, both of their corresponding political elites had the same means—and leverage—to voice their strategic preferences about taxation. Conflict, in particular, was an inefficient strategy, as both sorts of elites had access to the same military capacities.<sup>12</sup> Important for this argument is Kurtz (2009, 484)'s assertion in that "the incorporation of upper-class actors into the national political system is crucial to enabling cooperation in state building and public-goods provision activities, despite whatever other cleavages might divide them." Specifically, my argument stresses the political incorporation of both elites. In other words, higher levels of inter-sectoral equality fostered the political incorporation of both sectors under politically egalitarian conditions. And given that the post-colonial legacies had reproduced the advantages of the landowning sector, the political incorporation of both economic elites was fundamental for state-making.

In sum, the economic structural transformation, characterized by the "secular decline of agriculture and substantial expansion of manufacturing,"<sup>13</sup> imposed tight constraints on the way politics was run by the incumbent landowning class. Since industrialists had less negative attitudes towards taxation, sectoral incorporation played a big factor in state development, crystallizing a series of reforms that replaced the backwards post-colonial institutional order. However, where the sectoral conflict was too weak to trigger the political incorporation of industrial political elites, institutions kept reproducing the post-colonial order that benefited the landowning class. Even when the income tax law was eventually implemented in practically all Latin American countries, it did not necessarily reflect the sectoral fiscal conflict, which I argue was foundational for state-making. In these cases, the post-colonial institutional order was left unaltered, and the political advantages the landowning elites enjoyed since colonial times were preserved.

For instance, the implementation of the income tax law in Chile responded to endogenous sectoral domestic pressures, securing the political inclusion of both elites. The Chilean internal revenue service is among the finest tax institutions in Latin America. In contrast, Guatemala imposed the income tax law in 1963, and by 1967 the national income tax office employed 194 people, only 9 of whom had graduated from college.<sup>14</sup> While Guatemala did implement the tax, the institution was not product of the inter-sectoral conflict. In fact, the law responded to exogenous factors, being imposed by the US-backed dictator Colonel Enrique Peralta Azurdia. As industrialists were too weak to pose any credible threats, landowners were never challenged. There were less pressures to implement an income tax, and the backwards post-colonial institutional order was reinforced. The next [section](#) explains the dual sector model of economic growth, focusing on how balanced growth happens, and why it is important for political development.

## II. STRUCTURAL TRANSFORMATIONS AND THE DUAL SECTOR ECONOMY MODEL

*When by the improvement and cultivation  
of land [...] the labour of half the society  
becomes sufficient to provide food for the  
whole, the other half [...] can be employed  
[...] in satisfying the other wants and  
fancies of mankind*

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Smith (1904, I.11.59)

The “dual sector” or “balanced growth model,” explains the mechanics of modern economic growth,<sup>15</sup> by emphasizing the importance of macro-structural gradual transformations. The theory argues that the economy is divided into two sectors, loosely defined as “advanced or modern sector” or “manufacturing sector,” and “backward or traditional sector,” or “agriculture.”<sup>16</sup> The basic intuition of this paradigm, is that in order for the industrial sector to develop, it needs *first* an efficient and strong agricultural sector. As I explain later, contingent on efficient agricultural productivity, the industrial sector rises its productivity relative to the agricultural sector’s. If the agricultural sector lacks economic efficiency, the industrial sector hardly develops, leading to a stagnant economy. This literature is vast. While this section explains just the core, there are many current theoretical

and methodological extensions of the model. Just to name a few, Thirlwall (1986), Mathur (1990), Hatton and Williamson (1991), Blunch and Verner (2006), Tiffin and Dawson (2003), Kanwar (2000) and McArthur and McCord (2017) study sectoral growth, shock persistence, and other related topics using the same theoretical framework and methodology I employ in this paper (or some variation of it). Notably, Ansell and Samuels (2014) use this model in political science to explain democratization.

It was Lewis (1965, 151) who popularized the idea that “[t]he secret of most development problems is to maintain a proper balance between sectors.” The dual nature of the economy has been widely accepted and forms part of “a long tradition in development economics.”<sup>17</sup> And while dichotomizing the entire economy in just two sectors might sound as too much of an oversimplification, I follow Dixit (1973, 325) in that the dual economy model provides a significantly better description of the economy because “it reflects several vital social *and* economic distinctions.”<sup>18</sup> Johnston and Nielsen (1966, 280) also explain that “[t]he reality found in most underdeveloped countries approximates this dichotomy [...] sufficiently.” In fact, Lindert and Williamson (1985, 354) explain that the dual-sector model is “the dominant paradigm used by Third World observers.” However, “balanced growth is almost axiomatic as a desirable objective, for both developed *and* under-developed countries.”<sup>19</sup> For example, Bergquist (1986, 8) explains that “Colombia’s two traditional political parties crystallized in the 1840’s and reflected in many respects the dual nature of the Colombian economy.” While this is a stylized model, Dixit (1973, 326) is right in that a “major drawback of dualistic theories [...] is the total neglect of the service sector.” However, the literature is consistent in that the third sector necessarily develops *after* the industrial sector is developed.<sup>20</sup>

Economic development depends on the emergence of the industrial sector, which in turn depends on the development of a productive agricultural sector.<sup>21</sup> As Kuznets (1961, 59) puts it, “economic growth is *impossible* unless there is a substantial rise in product per worker in the agricultural sector.”<sup>22</sup> Similarly, Hayami and Yamada (1969, 105) argue that “[i]ndustrialization and modern economic growth are basically *conditioned* by the level of agricultural productivity.”<sup>23</sup> There are two main reasons for why agricultural development is a prerequisite of industrial development: efficient agricultures are more likely to supply the industrial sector with cheap foodstuff and cheap labor. In Johnston (1951, 498)’s words, “[e]xpanded agricultural productivity releases people from the land for employment in industry [and] provides food for the growing population.” If the expansion of the agricultural sector is compromised, it will necessarily compromise the expansion of the industrial

sector as well.<sup>24</sup>

The political correlate is that a weak inter-sectoral structure—e.g., a lack of structural complementarity between the two sectors—will truncate the emergence of a strong political challenger—the industrial class—able to contest the landed elites. However, under cases of balanced growth, each sector’s corresponding political arm had the same military resources and access to other bargaining assets, fostering inter-elite cooperation. I contend that higher levels of inter-elite contestation promoted political development. As Hechter and Brustein (1980, 1085) explain, “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.” Here I explain how these sectoral dynamics, helped to form the Latin American state, fostering economic growth as well. In simple, political development is more likely to be sustained under sectoral balanced economic growth because it fosters a *level* “playing” political field.

The first reason for why a productive agricultural sector is key to industrial development is that more efficient agricultural techniques make agricultural production less labor intensive, allowing landowners to free workers, which the industrial sector can rely on. The need for an improvement in agricultural production as a necessary step prior to industrialization “has been termed the ‘prerequisite’ hypothesis.”<sup>25</sup> Technologies such as “crop rotation, pest control, seed breeding [and] fertilizer use [represent] the major potential source of agricultural labor productivity,”<sup>26</sup> increasing also “non-agricultural value added per worker.”<sup>27</sup> Nicholls (1961, 339-340) shows that advanced industrial countries initially had relatively more developed and productive agricultural sectors. In fact, Gallo (1991, 57) finds that in Bolivia, a *primarily agricultural economy*, “[t]he tools employed in production were few and rudimentary, the use of fertilizers was minimal, and methods for conservation of the soil were practically unknown until the beginning of the 1950s.” However, highly industrialized countries such as Japan, the U.K., the U.S.S.R. and Taiwan adopted—*prior industrialization*—very efficient *agricultural* technologies such as higher-yielding varieties, fertilizers, and other activities that improved farm practices.<sup>28</sup>

Surplus of labor naturally leads to a reallocation of redundant workers into the industrial sector, which is the crux of economic development.<sup>29</sup> Nurkse (1953) in fact argues that development *means* to employ the surplus labor.<sup>30</sup> The literature coincides in that the “natural” role of the agricultural sector is to provide labor to the industrial sector.<sup>31</sup> For example, Dixit (1973, 326) argues that the “agricultural sector *must* fulfill [...] its dual role of supplier of labour to industry and of food for



the industrial labour force.”<sup>32</sup> While Lewis (1954) in his canonical work argued that there existed an “unlimited” supply of agricultural labor, a word of caution is in order. The meaning of the supposedly “unlimitedness” of labor, should *not* be taken literally, as in reality it means *redundant labor force*.<sup>33</sup> In fact, Nurske (1961, 225) points out that the concept “is commonly used to denote all types of rural unemployment.”<sup>34</sup>

The second reason for why a productive agricultural sector is key to industrial development is because efficient techniques in agricultural production are able to supply cheaper foodstuff.<sup>35</sup> “It is *self-evident* that without increasing food output, the capitalist sector must remain in a stationary state.”<sup>36</sup> Food surplus is a direct consequence of efficiency, and it is just as important as labor reallocation. In sum, as Kuznets (1961, 60) explains it, if “output per worker in agriculture does not rise substantially, economic growth in the first case will be stopped by scarcity of agricultural products, and in the second case by scarcity of labour.”

### III. DUALISM IN CHILE: A BRIEF ILLUSTRATIVE CASE

Historically, agriculturalists in Chile had been a hegemonic group protected by norms and institutions that originated in colonial times. Those norms had survived due to institutional inertia, perpetuating the advantaged position of the landed elites.<sup>37</sup> Collier and Collier (2002, 106) argue that the “national government was dominated by [...] owners of large agricultural holdings.”<sup>38</sup> Similarly, while Zeitlin (1984, 13) explains that “landowners controlled both the vote and the labor power of the agrarian tenants [and] peasants [...] and this was the *sine qua non* of their continuing political hegemony,” Baland and Robinson (2008, 1748) explain that “[c]ongressional representation was heavily weighted in favor of rural districts.” In the presidency also, landowners were the single most represented group.<sup>39</sup>

Historians still debate whether agriculturalists and industrialists comprised two *different* elites. Some claim that this dualism is incorrect.<sup>40</sup> They argue that since landowners also invested in industry,<sup>41</sup> there was a blurry class division between the mining, banking, and agricultural sectors.<sup>42</sup> Perhaps the most cited reference regarding this issue is Veliz (1963, 231-247). I contend that there are a series of stylized facts that strongly suggest that there was indeed a structural economic cleavage which led to the consolidation of two separate sectors. First of all, there were certain practices that mask the existence of a sectoral dualism. For example, it was common that industrialists invested in

real estate. However, in many instances they did so *just* to obtain credit. Kirsch (1977, 59) explains that “in a *rural society* land offered one of the best guarantees for loans [since] loans could not be secured by equipment, machinery, or inventory. Only real estate was acceptable collateral.”<sup>43</sup> In fact, this practice shows how the credit system was oriented to give unfair advantage to the landed elites. Similarly, Zeitlin (1984, 174) finds “the combined ownership of capital and landed property was a distinctive quality of *certain* [elites] actors,”<sup>44</sup> not something that was generalizable to *the* elites. There were also other instances where miners invested in banking. Yet, Segall (1953) argues that Chilean bankers, after the crisis of the mining sector around the 1870s, had acquired a number of mineral deposits given as collateral years before. Similarly, but for the Argentinean case, Hora (2002, 609) explains that “the image of an entrepreneurial elite with assets *scattered throughout several spheres of investment* does not appear entirely correct.”<sup>45</sup> In fact, Freeman and Quinn (2012) explains that asset diversification constitutes a later development “in international markets [roughly after 1980].” I contend that the nature of the main factors of production of agriculturalists and industrialists (land v. capital), in addition to their preferences over fiscal policy, produced a strong sectoral cleavage. I find little evidence in this paper in favor of the conventional wisdom, e.g. elites in Chile had one single fracture, particularly, regarding the role of the state versus the catholic church on society.

Agricultural economic hegemony initially promoted political biases, such as biased public investments.<sup>46</sup> However, lower levels of inter-elite inequality—granted by industrial expansion—posed credible threats to Chilean agricultural elites. Initially, both elites confronted each other in two civil wars. Zeitlin (1984, 23) argues that the civil wars challenged a “large landed property [elite against a] productive capital [elite].” Importantly, lower levels of inequality allowed both sets of elites access to similar military capacities. While *Balmacedistas* managed to secure the support of the army, *congresistas* (the anti-Balmaceda group) gathered support from the navy. However, war was not sustainable over time. There were a number of *aborted* coups in 1907, 1912, 1915 and 1919,<sup>47</sup> suggesting an equilibrium where no type of elite had more capacities than the other. The requirement of better public investments for Chilean industrialists forced both the agricultural and industrial elites to reach political compromises. The keystone of these inter-elite compromises was the implementation of the income tax. In 1924, industrial elites accepted to be income taxed by agriculturalist incumbents in exchange for having more *state services* and being included in state politics. As others have explained, the non-agricultural sector “accepted

taxation, *while demanding state services and expecting to influence how tax revenues were spent [...]* Consultation and cooperation were relatively institutionalised between the two sides.”<sup>48</sup> This is why the expansion of political rights *among the elite*, and the rise of the industrial sector, share the same timing. As Collier (1977, 683) has pointed out, “the real story of Chilean industrialization belongs to the Parliamentary period” (1891-1925).

The tax was not only important because of the new revenue it collected, however. While Humud (1969, p. 154) explains that the income tax generated considerable resources for the Chilean treasury,<sup>49</sup> the tax was important because it fostered state-making. Musgrave (1992, 99) argues that since taxation (especially on incomes) requires such a high degree of state penetration, public finances offer the key for a theory of state-building. Indirect taxes are easier to levy, and hence this kind of revenue is generally considered “unearned income”<sup>50</sup> or “easy-to-collect source of revenues.”<sup>51</sup> Given the relatively lower costs states have to incur to collect them, indirect taxes have a very low impact on state-building.<sup>52</sup> For example Krasner (1985, 46) explains that “tariffs and export taxes are easier to obtain than direct taxes, which require high levels of bureaucratic skill and voluntary compliance.” In fact, when early Latin American states depended heavily on trade taxes, the state apparatus tended to be less developed.<sup>53</sup> Since customs administrations have always been concentrated in a few critical locations; especially ports, tariffs, and customs duties did not require an elaborate fiscal structure.<sup>54</sup>

The very implementation of the income tax produced a secular accumulation of know-how, particularly, of better technologies able to monitor individual incomes. Unlike “regular” institutions, income taxation infiltrates the state’s coercive sovereignty unto the individual itself. Not only observing individual economies, but transforming them into public property, is what fostered state expansion.<sup>55</sup> This argument goes in line with Besley, Ilzetzki, and Persson (2013), who explain that implementing the income tax law has been “associated with investments in public administrative structures that support tax collection” in a number of countries, including Chile. The expertise the state accumulated was transferred to other state institutions via spillovers. For instance, it was necessary to send official emissaries to check on accounting books of the refinery in the north, the winery in the central valley, and the *hacienda* in the south. Eventually, these delegations became more complex, increasing the density of state presence. For instance, Strayer (2005) explains how official state delegations traveled the territory dispensing judicial decisions, fostering state centralization. Also, Dincecco (2015) explains that states became effective organisms

upon centralizing a system of direct taxation. Others find that the *introduction* of the income tax is associated with state expansion too. For instance, Dincecco and Troiano (2015, 3) find “a positive and significant relationship between the introduction of the income tax and (1) per capita total expenditures, (2) per capita education expenditures, and (3) per capita health expenditures.” Analytically, the effectiveness of income taxation on fiscal capacities, increased due to the nature of the implementation of the income tax. Aghion, Alesina, and Trebbi (2004, 566) explain how optimal institutional choices result from political settings where all involved actors “had a voice in the choice of institutions,” essentially contributing to an equilibrium of quasi-voluntary compliance.<sup>56</sup> The Chilean example suggests that inter-elite agreements helped to sustain these state-making policies over time.

#### IV. TIME SERIES ANALYSES: VECTOR AUTOREGRESSIVE MODELS AND GRANGER CAUSALITY TESTS

*what a sector does is not fully attributable  
or credited to it but is contingent upon  
what happens in the other sectors*

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Kuznets (1961, 41)

*Structural change is clearly an endogenous  
process, driven by a variety of economic  
forces [...] also in the statistical sense*

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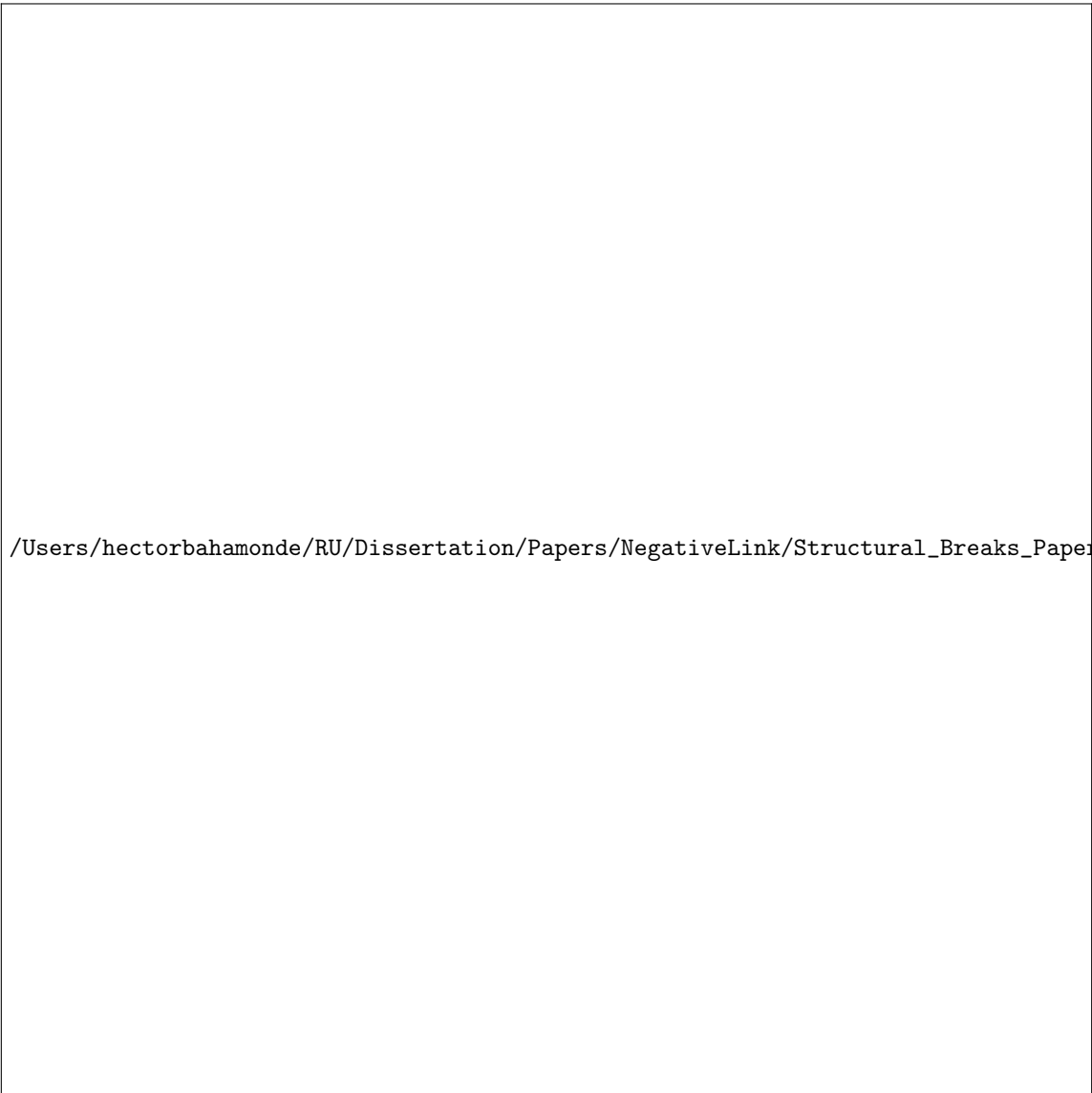
Temple and Wöckmann (2006, 212)

**Granger-causality Tests** Due to institutional inertia, where industrial expansion was slow relative to agriculture, the landowning elites kept enjoying the advantages of the post-colonial institutional order, which had generated economic growth in a way that mostly benefited their own sector. Even when the income tax was implemented in these countries, the policy did not reflect the sectoral cleavage. That is, industrial elites were too weak to trigger the implementation of the income tax law, causing no major changes to the political order. However, in cases where industrial elites were strong enough to pose credible threats, the income tax was implemented due to the

emergence of a strong industrial sector. In the first set of cases, we should see that the income tax was *not* associated with the reversal of the institutions that permitted balanced growth, perpetuating *unbalanced* growth. However, in the second set of cases, we should see that the income tax was associated with the reversal of backward institutions, permitting balanced growth. Empirically, we should see in the first set of cases that the agricultural sector grew *at the expense* of the industrial sector, *both before and after* of the implementation of the income tax. In the second set of cases, however, we should see that *after* the income tax was implemented, there was a *reversal* of the flow of inputs, generating growth *from* the agricultural sector *to* the industrial sector (balanced growth). Importantly, the industrial sector did *not* grow *at the expense of* agricultural development, but *because of* agricultural development. In econometric terms we should see that the income tax reversed the way in which one sector “Granger-caused” the other.<sup>57</sup>

I utilize the **MOxLAD** data, particularly the *agriculture value-added* and *manufacturing value-added* variables.<sup>58</sup> The dataset spans from as early as 1900 to as late as 2009.<sup>59</sup> **Table A1** specifies the country-specific available time spans. Using secondary sources, the table also states *when* the income tax was implemented, what the law was, and its corresponding source(s).<sup>60</sup> Following Mahoney (2010, 5) I consider two “advanced” economy countries (Chile and Argentina), two “intermediate” countries (Mexico and Colombia) and two “less advanced” countries (Guatemala and Nicaragua). **Figure 2** shows the sectoral outputs for each country, both before and after the income tax law was implemented. The econometric analyses in this section intend to recover Mahoney’s typology, linking the mechanics of economic development with fiscal expansion. To simplify, I expect *advanced* countries to have *unbalanced* growth *before* the implementation of the income tax, but *balanced* economic growth *after* the implementation of the tax. I also expect *less advanced* countries to have *unbalanced* economic growth *both before and after* the implementation of the tax—e.g., null results in favor of a reversal in sectoral Granger-causation.

In **Table 1** I test for Granger-causality both prior to and after the implementation of the income tax law.<sup>61</sup> The results strongly suggest that in *advanced* countries, particularly Chile, Colombia and Mexico, the implementation of the income tax was associated with the reversal of economically backwards institutions that promoted unbalanced economic growth. In these cases, before the income tax law, industrial growth Granger-caused agricultural growth, but after the income tax law, the agricultural sector Granger-caused industrial development (all p-values are significant at the .05 level).<sup>62</sup> These results suggest that the implementation of the income tax was associated



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**Figure 2:** *Sectoral Outputs Before and After the Implementation of the Income Tax Law*

with the reversal of the economic structure, going from an economic backwardness equilibrium, to a balanced growth equilibrium. I interpret this change in the mechanics of economic growth as the overthrowing of the political institutions and practices that permitted agricultural expansion at the expense of the modern sector. This reversal was possible due to the incorporation of political

outsiders—the industrialists—and how they were able to shape the institutional order in a way that also benefited their own sector. Following the fiscal sociology literature, I contend that when the income tax was implemented under contexts of sectoral contestation, this institution fostered the expansion of state institutions. In turn, these kinds of institutions set in motion a path of long-term economic development (Figure 1).<sup>63</sup> In Nicaragua and Guatemala, however, the tests suggest the exact opposite (all p-values are significant at the .05 level).<sup>64</sup> The implementation of the income tax did *not* reverse the initial economic backwardness equilibrium. I contend that when implemented, the tax did not reflect the inter-sectoral economic cleavage. The industrial sector never had enough economic leverage to politically confront the landowning elite, and hence, industrialists never posed credible threats to the status quo, relaxing the endogenous incentives to invest in state-making institutions—e.g. the income tax law. The Argentinian case is different. The Granger tests are inconclusive, and no significant results were found, suggesting a weak inter-sectoral cleavage structure.

**Vector Autoregressive Models (VAR) and Impulse Response Analysis (IRF)** Once we have determined the directionality of economic growth changes upon the implementation of the income tax law, but only in countries where the industrial sector was strong enough to challenge the agricultural status quo, it is necessary to establish the inter-sectoral long-run equilibrium. This section tests whether the implementation of the income tax is associated with long-run economic development. Given that the implementation of the income tax had positive spillovers on other state institutions, I expect income taxation to be associated with long-run economic growth. In non-advanced cases, the tests should show null results. For instance, and following Mahoney (2010, 5) again, the implementation of the income tax law should *not* cause long-term economic growth in Guatemala and Nicaragua.

The link between industrial and agricultural growth is an endogenous one.<sup>65</sup> If this endogeneity is not accounted for, the error term and the regressors will be correlated, and so OLS will be inconsistent. Additionally, growth rates are usually integrated. Integrated series are processes whose deviations from the mean tend to persist, cumulating or growing in time. In addition to that, integrated vectors that are mutually endogenous imply a “cointegrated” CI(1) relationship, imposing additional statistical restrictions. While the economic literature generally coincides in that economic growth is an I(1) process and that sectoral development is a CI(1) process, these

Country	Pre/Post Income Tax	Sample	Directionality	chi2	P-value
Chile	Pre	1905 - 1924	Agriculture $\rightarrow$ Industry	3.55	0.47
			Industry $\rightarrow$ Agriculture	12.13	0.02
	Post	1925 - 2009	Agriculture $\rightarrow$ Industry	11.92	0.00
			Industry $\rightarrow$ Agriculture	5.37	0.07
Colombia	Pre	1902 - 1935	Agriculture $\rightarrow$ Industry	4.96	0.03
			Industry $\rightarrow$ Agriculture	10.44	0.00
	Post	1938 - 2009	Agriculture $\rightarrow$ Industry	4.32	0.04
			Industry $\rightarrow$ Agriculture	1.63	0.20
Argentina	Pre	1903 - 1933	Agriculture $\rightarrow$ Industry	4.19	0.12
			Industry $\rightarrow$ Agriculture	.42	0.81
	Post	1937 - 2010	Agriculture $\rightarrow$ Industry	.18	0.91
			Industry $\rightarrow$ Agriculture	1.37	0.50
Mexico	Pre	1902 - 1925	Agriculture $\rightarrow$ Industry	6.17	0.10
			Industry $\rightarrow$ Agriculture	29.71	0.00
	Post	1925 - 2009	Agriculture $\rightarrow$ Industry	8.90	0.06
			Industry $\rightarrow$ Agriculture	4.41	0.35
Nicaragua	Pre	1923 - 1974	Agriculture $\rightarrow$ Industry	.48	0.79
			Industry $\rightarrow$ Agriculture	6.83	0.03
	Post	1977 - 2009	Agriculture $\rightarrow$ Industry	.014	0.91
			Industry $\rightarrow$ Agriculture	4.96	0.03
Guatemala	Pre	1924 - 1963	Agriculture $\rightarrow$ Industry	2.18	0.54
			Industry $\rightarrow$ Agriculture	6.72	0.08
	Post	1966 - 2009	Agriculture $\rightarrow$ Industry	.58	0.45
			Industry $\rightarrow$ Agriculture	6.05	0.01

**Table 1:** *Granger Causality Wald Tests*

are assumptions that should be tested. The first step is to find strong evidence of integration in each of the series. [Table A2](#) shows several unit root tests.<sup>66</sup> The table indicates that all variables, periods, sectors, and countries have  $I(1)$  processes, satisfying one important assumption of  $CI(1)$  vectors. The second step is to find evidence of cointegration.<sup>67</sup> Substantively, cointegration means that there is a long-lasting mutual inter-sectoral economic *dependence*, allowing *both* sectors to grow



in a balanced fashion. Lack of evidence in favor of cointegration, implies economic backwardness between the two sectors. Consequently, I expect to find evidence of cointegration only in “developed” and “semi-developed” cases, as specified in Mahoney (2010, 5).<sup>68</sup>

Following Johansen (1988), Table 2 indicates that all “developed” and “semi-developed” countries have cointegrated series, while “less developed” countries do not have cointegrated series,<sup>69</sup> suggesting that industrialists in “developed” and “semi-developed” countries were strong enough to pose credible threats to agricultural incumbents, challenging the post-colonial institutional order. These higher levels of sectoral contestation, in turn, fostered long-term economic growth via the reversal of backward political institutions. However, in “less developed” countries, industrialization was slow, and as a consequence, their corresponding political elites were too weak to represent any major threat to the *status quo*. Consequently, the political order beneficial for the landed elites remained unchallenged, compromising long-term economic growth.

Following Johansen (1988), I estimate the long-run sectoral relationship using a vector-autoregressive (VAR) approach. One important advantage of this method is that VARs are estimated via MLE, not requiring being specific about the number of cointegrated vectors (as opposed to error correction models).<sup>70</sup> Formally, I fit Equation 1 in differences, one per country, both before and after the income tax law was passed.<sup>71</sup>

$$\begin{aligned}\Delta M_{t_m} &= \alpha_m + \beta_m \Delta M_{t-l} + \beta_m \Delta A_{t-l} + \epsilon_{t_m} \\ \Delta A_{t_a} &= \alpha_a + \beta_a \Delta M_{t-l} + \beta_a \Delta A_{t-l} + \epsilon_{t_a}\end{aligned}\tag{1}$$

Notice that in both lines, the different dependent variables are expressed as a function of the *same* set of lagged independent variables. Since the number of lags  $l$  varies by country *and* time-span (i.e. before/after the income tax law), Equation 1 is in standard form. Table A3 describes the optimal lag structure per each country regression.<sup>72</sup>

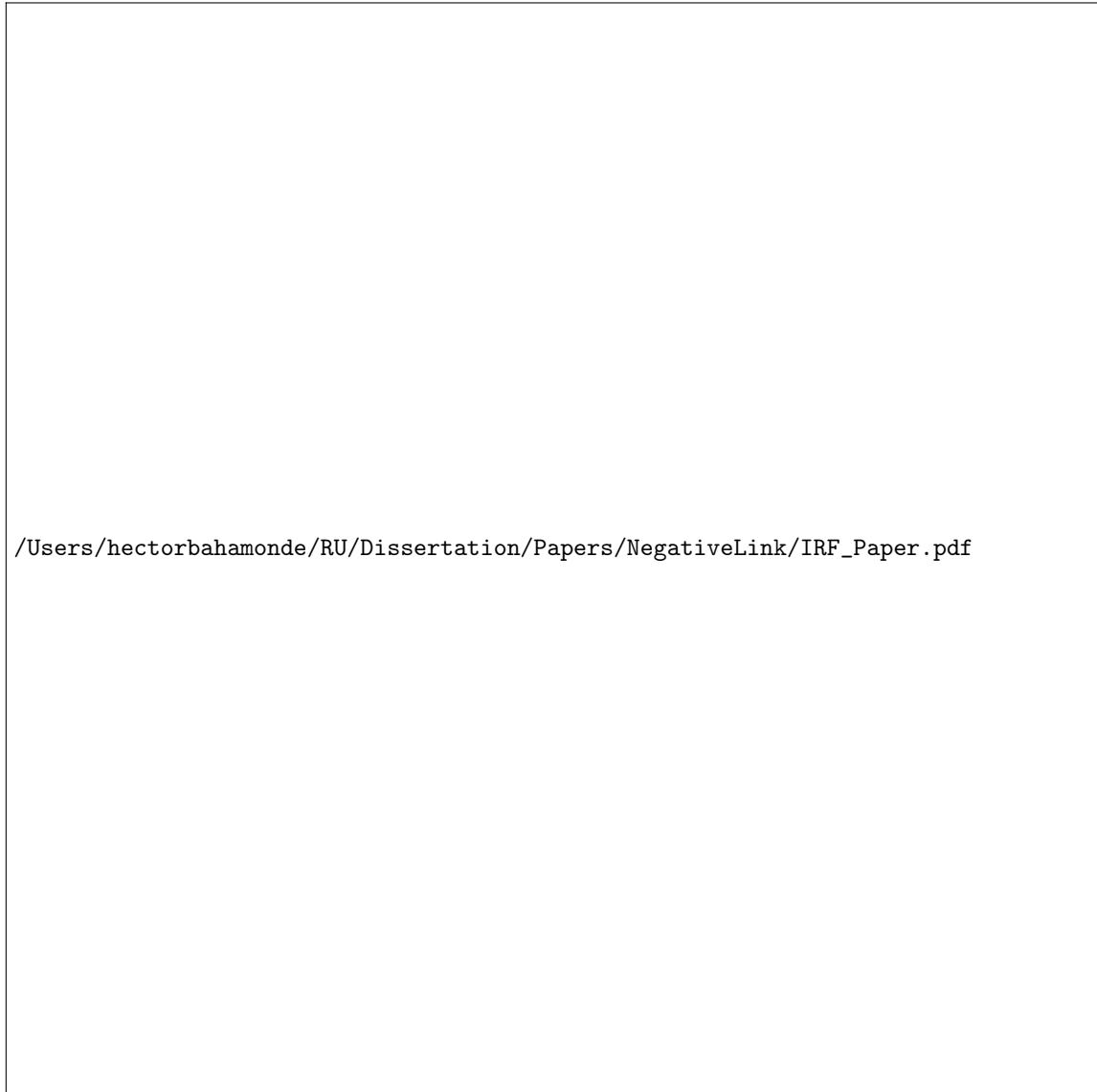
Given that “it is often difficult to draw any conclusions from the large number of coefficient estimates in a VAR system,”<sup>73</sup> econometricians usually turn to the analyses of *impulse response functions* (IRFs), which are derived from VAR analyses.<sup>74</sup> “Impulse responses trace out the response of current and future values of each of the variables to a one-unit increase in the current value of one of the VAR errors.”<sup>75</sup> Figure 3 shows four panels for each of the six countries, one for the response of agriculture to industrial growth (left column), one for the response of industrial growth to agricultural growth (right column), both before (top row) and after (bottom row) the

Country	Number of Cointegrated Vectors (rank)	Restrictions	Lags	Log-Likelihood	Trace
Chile	at least 1	Restricted Constant	5	-1665.9736	0.3799
Argentina	at least 1	Restricted Constant	3	-1802.292	4.7657
Colombia	at least 1	Restricted Trend	2	-1805.6773	10.0076
Mexico	at least 1	Restricted Constant	4	-1978.1322	1.0274
Nicaragua	0	Restricted Constant	2	-1020.221	11.5297
Guatemala	0	Trend	3	-859.2802	16.5493

**Table 2:** *Johansen Tests for Cointegration: Complete Series*

implementation of the income tax. Following the same typology described in Mahoney (2010, 5), I expect the income tax to reverse the traditional institutional order—and be associated with a path of long-run economic growth—only in politically “developed” countries. Lack of sustained balanced economic growth upon the implementation of the income tax indicates that this institution did not emerge out of the sectoral cleavage, leaving the colonial backwards economic order unaltered. The X-axis is expressed in years. The Y-axis is *not* growth, but response to equilibrium. That is, the reaction of one sector once the other one is shocked.<sup>76</sup>

Figure 3 suggests that all “developed” countries switched from unbalanced to balanced growth after implementing the income tax law. For example, a shock to industrial growth in Chile, before the implementation of the tax law, had a positive and increasing effect on agriculture. However, after the income tax is adopted, a shock on industry has a negligible effect on agricultural output. This suggests that political institutions before the tax was implemented were oriented to channel most economic resources in a way that advantaged the agricultural sector (and the landed elites). This equilibrium is reversed after the income tax law is implemented, one of long-term balanced economic growth. Colombia and Mexico show similar patterns. While the analyses on the Argentinean case suggest that there is a long-term inter-sectoral relationship (Table 2), according to Figure 3 and Table 1, this relationship is weak, indicating weak inter-sectoral complementarity. Nicaragua and Guatemala are the prototypical backward cases. Their economies were designed to develop the agricultural sector completely at expenses of the industrial sector. This goes in line with the null findings of cointegration in Table 2, and Granger-causality tests in Table 1. In these cases, the effect of a shock to agricultural output on industrial output is zero, both before and after the implementation of the income tax law, suggesting a situation of unbalanced economic growth, unbalancing also the development of agricultural political elites relative to the development of industrial elites. In



**Figure 3:** *VAR Impulse Response Functions: Sectoral Responses to Each Other's Growths*

both cases, the implementation of the income tax did not reverse the institutional order that was permitting unbalanced growth. The lack of sectoral challenges left the traditional institutional order unaltered, preserving the political advantages the landowning elites had enjoyed since colonial times.

## V. DISCUSSION

Since colonial times, agriculturalists had been the hegemonic group protected by persistent backwards institutions. However, the emergence of the industrial sector imposed tight constraints on the way politics was run by the incumbent landowning class. The emergence of the industrial sector lowered the levels of inter-sectoral inequality, making possible higher levels of inter-sectoral contestation, forcing industrial and agricultural political elites to make institutional agreements. I identify one such compromise, the implementation of the income tax. Leveraging the Chilean case, I explain how, and why, the tax was relevant for industrial expansion. The crux of the argument explains how the context in which countries implemented the income tax law was a critical juncture promoting or undermining long-term economic and political development. When the implementation of the income tax reflected the foundational sectoral economic cleavage, the tax expanded the overall state capacities, crystallizing a series of reforms that replaced the backwards institutional order, and fostering long-term balanced economic growth. In turn, balanced growth reinforced sectoral interdependence, precluding sectoral dominance of either political elite. Using time-series econometric methods, I find that when the sectoral cleavage was strong (cointegration), the income tax law promoted long-term economic growth (VAR models and IRF analyses).

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## VI. APPENDIX

Country	Available Data	Year Income Tax	Law	Source
Chile	1900 - 2009	1924	<i>Ley 3996</i>	Mamalakis (1976, 20) and <a href="#">LeyChile.Cl</a> (official)
Colombia	1900 - 2009	1935	<i>Ley 78</i>	Figueroa (2008, 9)
Argentina	1900 - 2010	1933	<i>Ley 11682</i>	<a href="#">Infoleg.Gob.Ar</a> (official)
Mexico	1900 - 2009	1925	<i>Ley de Impuesto sobre la Renta</i>	Unda (2017, 8)
Nicaragua	1920 - 2009	1974	<i>Ley 662</i>	<a href="#">Legislacion.Asamblea.Gob.Ni</a> (official)
Guatemala	1920 - 2009	1963	<i>Decreto 1559</i>	Instituto Centroamericano de Estudios Fiscales (2007, 165)

**Table A1:** *Sample, Data Available and Year the Income Tax was Implemented*

Country	Time Frame	Sector	Augmented Dickey-Fuller	Phillips-Perron	KPSS	Conclusion
Chile	Pre	Agriculture	-1.185 (0.68)	-1.241 (0.66)	.107 <sup>†</sup>	I(1)
		Industry	2.310 (0.99)	2.556 (0.99)	.113 <sup>†</sup>	I(1)
	Post	Agriculture	4.557 (1.00)	5.40 (1.00)	.289	I(1)
		Industry	0.908 (0.99)	1.458 (0.99)	.249	I(1)
	All	Agriculture	5.521 (1.00)	6.722 (1.00)	.31	I(1)
		Industry	1.582 (0.99)	2.305 (0.99)	.314	I(1)
	Pre	Agriculture	2.709 (0.99)	2.414 (0.99)	.204	I(1)
		Industry	2.103 (0.99)	3.257 (1.00)	.183	I(1)
	Post	Agriculture	2.392 (0.99)	3.156 (1.00)	.282	I(1)
		Industry	0.520 (0.98)	1.044 (0.99)	.241	I(1)
Colombia	All	Agriculture	4.256 (1.00)	5.893 (1.00)	.372	I(1)
		Industry	1.674 (0.99)	2.707 (0.99)	.374	I(1)
	Pre	Agriculture	-0.849 (0.80)	-1.201 (0.67)	.0801 <sup>†</sup>	I(1)
		Industry	-0.495 (0.89)	-0.378 (0.91)	.115 <sup>†</sup>	I(1)
	Post	Agriculture	1.197 (0.99)	1.093 (0.99)	.277	I(1)
		Industry	0.228 (0.97)	0.381 (0.98)	.0901 <sup>†</sup>	I(1)
	All	Agriculture	1.484 (0.99)	1.401 (0.99)	.332	I(1)
		Industry	1.007 (0.99)	1.237 (0.99)	.183	I(1)
	Pre	Agriculture	-3.073 (0.03)	-3.146 (0.02)	.156 <sup>†</sup>	Stationary
		Industry	1.575 (0.99)	1.422 (0.99)	.171 <sup>†</sup>	I(1)
Mexico	Post	Agriculture	1.961 (0.99)	2.064 (0.99)	.161 <sup>†</sup>	I(1)
		Industry	0.169 (0.97)	1.120 (0.99)	.313 <sup>†</sup>	I(1)
	All	Agriculture	3.431 (1.00)	3.607 (1.00)	.341	I(1)
		Industry	0.672 (0.98)	2.020 (0.99)	.367	I(1)
	Pre	Agriculture	2.473 (0.99)	2.355 (0.99)	.25	I(1)
		Industry	4.958 (1.00)	9.100 (1.00)	.244	I(1)
	Post	Agriculture	-0.154 (0.94)	0.154 (0.97)	.2	I(1)
		Industry	-1.237 (0.6577)	-1.176 (0.68)	.189	I(1)
	All	Agriculture	0.636 (0.99)	0.759 (0.99)	.116 <sup>†</sup>	I(1)
		Industry	-0.164 (0.94)	-0.090 (0.95)	.123	I(1)
Nicaragua	Pre	Agriculture	-0.393 (0.91)	-0.343 (0.92)	.0639 <sup>†</sup>	I(1)
		Industry	1.358 (0.99)	1.704 (0.99)	.199	I(1)
	Post	Agriculture	1.786 (0.99)	1.965 (0.99)	.162	I(1)
		Industry	-0.998 (0.75)	-1.352 (0.61)	.0915 <sup>†</sup>	I(1)
	All	Agriculture	3.349 (1.00)	3.714 (1.00)	.321	I(1)
		Industry	0.413 (0.98)	0.017 (0.96)	.288	I(1)
Guatemala	Pre	Agriculture	-0.393 (0.91)	-0.343 (0.92)	.0639 <sup>†</sup>	I(1)
		Industry	1.358 (0.99)	1.704 (0.99)	.199	I(1)
	Post	Agriculture	1.786 (0.99)	1.965 (0.99)	.162	I(1)
		Industry	-0.998 (0.75)	-1.352 (0.61)	.0915 <sup>†</sup>	I(1)
	All	Agriculture	3.349 (1.00)	3.714 (1.00)	.321	I(1)
		Industry	0.413 (0.98)	0.017 (0.96)	.288	I(1)

**Table A2:** *Unit Root Tests for Agricultural and Industrial Growth*

Country	Time Frame	Number of Lags	LM	Normally Tests			Stability Condition
				<i>Jarque-Bera</i>	<i>Skewness</i>	<i>Kurtosis</i>	
Chile	Pre	4	✓	✓	✓	✓	✓
	Post	2	✓	✓ <sup>-</sup>	✓ <sup>-</sup>	✓ <sup>-</sup>	✓
Colombia	Pre	1	✓ <sup>-</sup>	✗	✗	✗	✓
	Post	1	✓	✓ <sup>-</sup>	✓ <sup>-</sup>	✓ <sup>-</sup>	✓
Argentina	Pre	2	✓ <sup>-</sup>	✓	✓	✓	✓
	Post	2	✓	✓ <sup>-</sup>	✓	✓ <sup>-</sup>	✓
Mexico	Pre	3	✓ <sup>-</sup>	✓ <sup>-</sup>	✓ <sup>-</sup>	✓ <sup>-</sup>	✓ <sup>-</sup>
	Post	4	✓ <sup>-</sup>	✓ <sup>-</sup>	✓	✓ <sup>-</sup>	✓
Nicaragua	Pre	2	✓	✓ <sup>-</sup>	✓ <sup>-</sup>	✓ <sup>-</sup>	✓
	Post	1	✓	✓ <sup>-</sup>	✓ <sup>-</sup>	✓ <sup>-</sup>	✓
Guatemala	Pre	3	✓	✗	✓ <sup>-</sup>	✓ <sup>-</sup>	✓
	Post	1	✓ <sup>-</sup>	✓ <sup>-</sup>	✓ <sup>-</sup>	✓ <sup>-</sup>	✓

**Table A3:** *Lag Length and Post-Estimation Results*



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