

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

HÉCTOR BAHAMONDE, PHD

\*Postdoctoral Fellow • Center For Inter-American Policy & Research • Tulane University

e: [BahamondeH@gmail.com](mailto:BahamondeH@gmail.com)

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

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## Abstract

I argue that 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 (rooted in the secular structural transformation), the tax expanded the overall state capacities, crystallizing a series of reforms that replaced the backwards institutional order, fostering long-term sectoral balanced economic growth. In turn, balanced growth promoted higher levels of sectoral equality precluding sectoral dominance of either political elite.

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## I. SECTORAL CONFLICTS AND DEVELOPMENT

*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 political and economic development is vast. Without trying to survey all of it, there seems to be an agreement in that strong institutions cause better economic performance. For example North [1990, 3] asserts that the idea that “institutions affect the performance of economies is hardly controversial.” However, most explanations focus property rights protection,<sup>1</sup> and regime type. I find that a limitation since authoritarian regimes with little or no respect for property rights grow at levels that sometimes even surpass democratic countries. While I still think that institutions matter for economic growth, this paper seeks to contribute to the literature by emphasizing the role of sectoral conflicts on political *and* economic development. I build on the *fiscal sociology* paradigm to argue that fiscal institutions, which are the engine of state-*making*, are product of a sectoral conflict. Borrowing from the *dual sector* model, I document how the secular structural transformation (the gradual emergence of the industrial sector) fostered the reversal of the backward institutional order implemented since colonial times, producing long-term balanced economic growth. I exploit sectoral outputs from 1900 to 2009 to proxy the emergence of the industrial sector in a number of Latin American countries,<sup>2</sup> vector autoregressive models (VAR), Granger-causality tests, impulse response functions (IRFs) and the Chilean case to illustrate the causal mechanisms. The results amply suggest that the context in which countries implemented the income tax law was a critical juncture, promoting or undermining long-term economic and political development.

I argue that 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 between the industrial and agricultural sectors, the tax expanded the overall state capacities, crystallizing a series of reforms that replaced the backwards institutional order, fostering long-term sectoral balanced economic growth. In turn, balanced economic growth promoted political development by fostering an economy structured in a way where the industrial and the agricultural sectors were mutually dependent. Balanced economic growth was important for political development because each of the

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<sup>1</sup>Johnson and Koyama [2016].

<sup>2</sup>The actual data availability might vary by case.

corresponding political arms representing these sectors had the same military resources and similar access to other bargaining assets, fostering in this way inter-elite cooperation and institutional investments. However, when the tax was implemented in contexts when the sectoral conflict was weak (because the industrial was not strong enough to pose credible threats to the landed elites), the post-colonial institutional order was left unaltered, preserving the political advantages the landowning elites enjoyed since colonial times. Elsewhere I have argued that the rise of the industrial sector accelerated the implementation of the income tax law,<sup>3</sup> causing a long-lasting positive impact on state capacities.<sup>4</sup> In this paper I study how the implementation of the income tax in cases of high sectoral conflict set states in a path of political development causing long-term *modern* (i.e. ‘balanced’) economic growth (see Figure 1). Importantly, since the economy alters the balance of political power, this theory is relevant also for explaining political development too (circular arrows at the end of the causal chain). The crux of the argument is that the economic structural transformation characterized by “a secular decline of agriculture and substantial expansion of manufacturing”<sup>5</sup> imposed tight constraints on the way politics was run by the incumbent landowning class, rising levels of sectoral conflicts. I focus on one particular conflict, direct taxation.

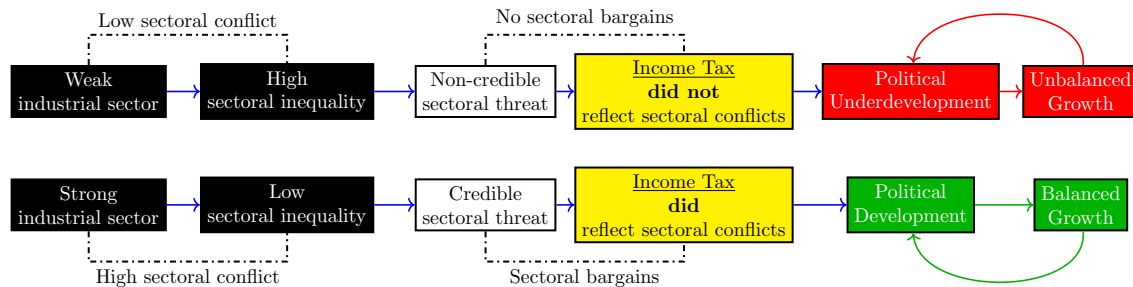


Figure 1: Causal Mechanism

The sectoral conflicts has its origins in how elites invested in different assets have different views on taxation. Since taxation affects landowners and industrialists in different ways,<sup>6</sup> economic elites are divided on their preferences towards fiscal policies.<sup>7</sup> Agriculturalists typically resist taxation as land fixity increases the risk premium of their main asset.<sup>8</sup> In contrast, industrialists’ preferences toward taxation are more elastic as capital can be reinvested in nontaxable sectors.<sup>9</sup> However, this

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

<sup>4</sup>Bahamonde [2017b].

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

<sup>6</sup>Acemoglu and Robinson [2009, 289].

<sup>7</sup>See for example Llavador and Oxoby [2005].

<sup>8</sup>Robinson [2006, 512].

<sup>9</sup>Hirschman [1970] and Ronald Rogowski in Drake and McCubbins [1998, ch. 4]. However, see Bates and Lien [1985, 15].

political-economy cleavage is more likely to resolve in favor of direct taxation when income inequality among the elites is low.<sup>10</sup> Particularly, given the initial advantage of the landowning elites, post-colonial landowners were very effective resisting direct taxation. However, the emergence of a strong industrial class put heavier pressures for centralization and investments in public goods. Beramendi et al. [2016, 18] explain 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.” Additionally, lower levels of inter-elite economic inequality implied similar degrees of military capabilities.<sup>11</sup> In these circumstances war was most likely to exhaust all existent assets without producing positive outcomes for either sector,<sup>12</sup> putting then pressures to reach agreements rather than engaging in armed conflicts. I identify one such agreement, the implementation of the income tax. Strong industrial sectors were able to pose credible threats, making the implementation of the income tax more likely.

Empirically, I find that in cases where the income tax was introduced in reaction to the emergence of a strong industrial sector there was a reversal of the backwards institutional order inherited in colonial times. Particularly, in these cases the income tax is associated with long-run balanced economic growth, ‘balancing’ the relative power of their corresponding political elites. Moreover, the implementation of the income tax law in these cases was product of a sectoral compromise between the two groups, promoting quasi-voluntary sectoral compliance with the new tax. Given the importance of the income tax for state-making, the incorporation of both sectoral interests promoted economic and political development. However, when the elite structure was weak, the income tax did not reflect the sectoral cleavage but other factors. As I explain later, the implementation of the income tax law in Chile responded to endogenous domestic pressures, particularly when there were lower levels of inter-sectoral inequality, securing the inclusion of both groups in the design and implementation of the income tax law. The Chilean internal revenue service is among the finest tax institutions in Latin America. However, Guatemala imposed the income tax law in 1963, and by 1967 the national income tax office employed 194 people, and only 9 of whom had graduated from college.<sup>13</sup> While Guatemala did implement the tax, the institution did not reflect the preferences of the both sectors. In fact, the law responded to exogenous factors. Particularly, the law was imposed by the US-backed dictator Colonel Enrique Peralta Azurdia, bypassing the inter-sectoral economic cleavage (because there was no cleavage). As industrialists were too weak, landowners were never challenged and there were less pressures to implement an income tax, crystallizing the backwards

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<sup>10</sup>Tani [1966, 157] explains that the absence of “wealth groups” makes passing an income tax law easier.

<sup>11</sup>Boix [2015].

<sup>12</sup>Richard Salvucci in Uribe-Uran [2001, 48].

<sup>13</sup>Di John [2006, 5].

institutional order inherited in colonial times. Consequently, the income tax is a necessary but not sufficient cause of development as it required the presence of high sectoral conflicts to cause economic development.<sup>14</sup>

The political development literature has traditionally focused on socio-economic cleavages and potential alliances between a *homogeneous* ruling elite and politically excluded segments of the society, traditionally peasants or other disenfranchised groups such as 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>15</sup> In this paper I focus on political divisions *among* the elite. The elite-sector approach is hardly new. Just to mention some examples, 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 is associated with inter-elite conflicts, particularly between the landed elite and the industrial elite. While political economists have already recognized the relevance of sectoral conflicts or the role of the structure of the economy on the political structure, the focus has been most of the times on democratic development. Using the same sectoral approach as a starting point, this paper stresses how structural conflicts are associated with institutional *and* economic development.

Next *section* explains the dual sector theory, focusing on how balanced growth happens and why it is important for political development. Then I provide some historical *context* presenting the Chilean case to illustrate the theory. Using the fiscal sociology paradigm, I pay especial attention to how the series of inter-elite bargains that surrounded the implementation of the income tax fostered institutional development and state-making. Next, I present econometric *evidence*, putting especial attention to the relationship between institutional development, particularly, fiscal expansion and long-term balanced economic growth. Lastly, I provide some final *comments*.

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<sup>14</sup>Similarly, Johnson and Koyama [2017] find that the link between state capacities and economic growth is conditional on several factors (population size, culture, population homo(hetero)geneity, among others). However, in my account, the role of the income tax is conditioned on the degree of intersectoral conflicts, which I measure via the size of the industrial sector.

<sup>15</sup>For example, Acemoglu and Robinson [2009, 293] explain that ‘all members of the elite have identical endowments so there is no heterogeneity among the elites.’ However, later in the book (p. 289) they briefly consider preferences over democracy of industrialists and agriculturalists. An alternative to the ‘bargaining’ model is the ‘compelling’ model proposed by Boucyannis [2015].

## 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>16</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>17</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 eventually surpassing the agricultural sector. 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 applications and extensions of the dual sector 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>18</sup> And while dichotomizing the entire economy in just two sectors might sound as too much of an oversimplification,<sup>19</sup> I follow

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<sup>16</sup>Gollin et al. [2002, 160].

<sup>17</sup>Jorgenson [1961, 311]. Importantly, I follow Kuznets [1967, 87] in that “mining is combined with [...] industry because of the large scale of its productive unit, its close connection with manufacturing, and the distinctive trend in its share in product and resources.” Similarly, Debowicz and Segal [2014, 237] includes mining within the industrial sector.

<sup>18</sup>Kelley et al. [1972, 8].

<sup>19</sup>This is a stylized theory. Of course, in reality, there are other economic activities such as logging, mining and others. Given its dependence on capital, mining has always been considered industrial. The Chilean case illustrates

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>20</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>21</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>22</sup>

Economic development depends on the emergence of the industrial sector which in turn depends on the development of a productive agricultural sector.<sup>23</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>24</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>25</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>26</sup> The political correlate of the inter-sectoral dependence proposed in this framework is that a weak inter-sectoral structure will truncate the emergence of a strong political challenger (industrialists) able to contest the landed elites. I contend that inter-elite contestation is important for 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.

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this.

<sup>20</sup>Emphasis is mine.

<sup>21</sup>Streeten [1959, 169]. Emphasis is mine.

<sup>22</sup>Galenson [1963, 506-507, 513] and Baer and Herve [1966, 95-96].

<sup>23</sup>Johnston and Mellor [1961, 567] argue that this process “seems to be a necessary condition for cumulative and self-sustaining growth.”

<sup>24</sup>Emphasis is mine.

<sup>25</sup>Emphasis is mine.

<sup>26</sup>In fact Landon-Lane and Robertson [2003, 2] find that an important source of growth in developing economies is “derived through the reallocation of resources [particularly] by drawing labour moving out of traditional sector employment into the modern sector.”

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>27</sup> Technologies such as “crop rotation, pest control, seed breeding [and] fertilizer use [represent] the major potential source of agricultural labor productivity,”<sup>28</sup> increasing also “non-agricultural value added per worker.”<sup>29</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>30</sup> In fact, Serrano and Pinilla [2016] find that in Latin America there has been a declining role of agricultural exports as industrialization levels have increased.

Surplus of labor naturally leads to a reallocation of redundant workers into the industrial sector, which is the crux of economic development.<sup>31</sup> Nurkse [1953] in fact argues that development *means* to employ the surplus labor.<sup>32</sup> The literature coincides in that the ‘natural’ role of the agricultural sector is to provide labor to the industrial sector.<sup>33</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>34</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 means *redundant labor force*.<sup>35</sup> In fact, Nurske [1961, 225] points out that the concept “is commonly used to denote all types of rural unemployment.”<sup>36</sup>

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<sup>27</sup>Kelley et al. [1972, 133].

<sup>28</sup>Ranis and Fei [1964, 62].

<sup>29</sup>McArthur and McCord [2017].

<sup>30</sup>Johnston and Mellor [1961, 571] and Johnston [1951, 507-508]. Similarly Caselli [2005, 723] explains that poorer economies have inefficient agricultural sectors which at the same time are the mayor source of employment.

<sup>31</sup>Ranis and Fei [1964, 7] and Leibenstein [1957b, 51].

<sup>32</sup>Similarly, Matsuyama [1991, 621-622] points out that “[i]ndustrialization [*consists of*] a shift of resources from agriculture to manufacturing.”

<sup>33</sup>Ranis and Fei [1964, 114] argue that “labor reallocation [...] is the *inevitable* and *natural* consequence of the continuous expansion of agricultural labor productivity.” Emphases are mine.

<sup>34</sup>Emphasis is mine.

<sup>35</sup>See Ranis and Fei [1964, 203] and Jorgenson [1967, 289].

<sup>36</sup>Or as Leibenstein [1957a, 102-103] puts it, “where the existing labor supply could cultivate more land without loss of efficiency.” In any case, Sen [1966] explains that a number of important predictions made by the dual sector



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>37</sup> “It is *self-evident* that without increasing food output, the capitalist sector must remain in a stationary state.”<sup>38</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.”

I argue that balanced economic growth is important for political development because it fosters a *level* ‘playing’ political field. When the economy is structured in a way where both sectors are mutually dependent, each sector’s corresponding political arm has the same military resources and similar access to other bargaining assets that foster inter-elite cooperation. As the next section explains, the relatively higher dependence the industrial sector has on public infrastructure promoted the implementation of the income tax. Following the fiscal sociology paradigm I contend that the tax was a *state-making* institution, particularly when the preferences of both elites were incorporated into this institution important for state-building. However, *unbalanced* economic growth promoted an *uneveled* ‘playing’ political field. Following the inertia of post-colonial institutions, unbalanced growth helped with the persistence of the advantaged position of the landed elites. The income tax when implemented did not necessarily reflect the foundational sectoral-economic cleavage, and the needs of having an efficient income tax were low. Since industrial elites were too weak to pose credible threats to agricultural incumbents, the equilibrium was to rely on import taxes, compromising both state expansion in the long-run and long-term economic growth.

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

Historically, agriculturalists 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>39</sup> Collier and Collier [2002, 106] argue that the “national government was dominated by [...] owners of large agricultural holdings.”<sup>40</sup> Similarly, while Zeitlin [1984, 13] explains that “landowners controlled both the vote and the labor power of the agrarian

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model do not need this assumption to hold for the model to work. On a separate note, Ranis and Fei [1964, 99], Skott and Larudee [1998, 280] and Fields [2004, 730] argue that a pool of *redundant* agricultural workers (a ‘reserve army’) is what prevents a rise in industrial wages.

<sup>37</sup>See Jorgenson [1961, 312] and Ranis and Fei [1964, 157].

<sup>38</sup>Ohkawa [1961, 21]. Emphasis is mine.

<sup>39</sup>This idea also applies for Mexico. “The principal source of [Mexico’s] wealth was not its mines, Humboldt noted, but agriculture.” Amaral and Doringo, in Uribe-Uran [2001, 13].

<sup>40</sup>See also McBride [1936, 15] who argues 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.”

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>41</sup>

Historians still debate whether agriculturalists and industrialists comprised two *different* elites. Some claim that this dualism is incorrect.<sup>42</sup> They argue that since landowners also invested in industry,<sup>43</sup> there was a blurry class division between the mining, banking and agricultural sectors.<sup>44</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 suggest that there was indeed a structural fracture between the two sectors. Particularly, there were certain practices that masked sectoral dualism. For example, it was common that industrialists invested in real state. 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>45</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 that while there were some instances where there were mixed investments, ‘the combined ownership of capital and landed property was a distinctive quality of *certain* [elites] actors,’<sup>46</sup> consequently an exception rather than the rule. There were also other instances where miners invested in banking. However, Segall [1953] argues that Chilean bankers, after the crisis of the mining sector around the 1870s 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>47</sup> In this paper I find strong evidence, both historical and econometric, in favor of a dual economy. The nature of the main factors of production of agriculturalists and industrialists (land v. capital), in addition to their preferences over direct taxation, produced in Chile a strong economic and political cleavage that could have hardly translated into a strong unified elite with scattered investments. I find little evidence in this paper in favor of the conventional wisdom, namely, that the elites in Chile had one single fracture, particularly, regarding the role of the state versus the catholic church on society.

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<sup>41</sup>Bauer [2008, 45].

<sup>42</sup>See for example Mamalakis [1976, 125].

<sup>43</sup>Kirsch [1977, 57, 95] who cites Bauer [2008]. See also Coatsworth and Williamson [2002, 23] argue that “[t]he only landowners that mattered in 19th century Latin American politics were those for whom land represented but one asset in a much broader portfolio.” In the same vein, Bauer [2008, 180] argues that “[m]iners and merchants bought haciendas but landowners in turn invested in banks, insurance companies, commercial firms and the incipient industrial sector.”

<sup>44</sup>Bauer [2008, 30, 44, 94, 108].

<sup>45</sup>Emphases are mine.

<sup>46</sup>Emphasis is mine.

<sup>47</sup>Emphasis is mine.

Agricultural hegemony promoted biased public investments. For instance, the existent public infrastructure mostly benefited the agricultural sector.<sup>48</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 elites access to similar military capacities. For instance, 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. For example, there were a number of *aborted* coups in 1907, 1912, 1915 and 1919,<sup>49</sup> suggesting an equilibrium where no elite had more capacities than the other elite. 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 of 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>50</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).

Unlike other ‘regular’ state institutions, taxing incomes *made* the state.<sup>51</sup> It was the very practice of this technology what gave the state the big push to be able to continue the reproduction of its power. Fiscal sociologists have argued for a long time that the endogenous development of taxation capacities *diffuses* to other state institutions via spillovers. Musgrave [1992, 99] argues that since taxation (especially of incomes) requires such a high degree of state penetration, *public finances offer the key for a theory of state-making*. In fact, I find elsewhere that the implementation of the income tax law in Chile increased state-capacities overtime.<sup>52</sup> Here I contend that the income tax was an institution that contributed to develop state institutions. In turn, these institutions fostered long-term economic growth. Importantly, the structure of the process of economic expansion

<sup>48</sup>Zeitlin [1984, 41] explains that “the Montt regime did invest in the construction of Chile’s railways but only in the Central Valley and south-central zones [b]ut there was no public investment [...] in railroads built in the Norte Chico mining provinces.”

<sup>49</sup>Collier and Collier [2002, 109].

<sup>50</sup>Carmenza Gallo, in Brautigam et al. [2008, 165]. Emphases are mine.

<sup>51</sup>Indirect taxes are easier to levy (Krasner [1985, 46], Bertola and Ocampo [2012, 132]), and hence this kind of revenue is generally considered “unearned income” (Moore [2004b, 304]) or “easy-to-collect source of revenues” (Coatsworth and Williamson [2002, 10]). Given the relatively lower costs states have to incur to collect them, indirect taxes have a very low impact on state-building (Moore [2004a, 14]). In fact, when early Latin American states depended heavily on trade taxes, the state apparatus tended to be less developed (Campbell [1993, 177]).

<sup>52</sup>Bahamonde [2017b].

followed a balanced pattern, leveling the economic *and* political power of both elites in the long-run. This argument goes in line with Kurtz [2013, 86], in that state expansion in Chile was ‘understood as nonthreatening to the fundamental material interests of nearly all politically relevant fragments of the upper class,’ fostering in turn higher levels of political development.

#### 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 Wößmann [2006, 212]

**Granger-causality Tests** The theory should pass a number of tests. Before the emergence of the industrial economic sector and their corresponding political elites, the landowning elites enjoyed the advantages of the post-colonial order, generating economic growth in a way that mostly benefited the agricultural sector. However, in cases where the industrial sector was strong enough to pose credible threats to the political system controlled by the landed elites, we should see a reversal of the political order. Institutional change is depicted with the implementation of the income tax law, which was particularly important for industrial development. As the Chilean case illustrates, industrial elites were willing to implement an income tax on themselves in exchange of the delivery of local public goods and access to state politics. In this section I show evidence of how the incorporation of the industrial elites changed the institutional order, fostering economic growth of *both* sectors (balanced growth). Empirically, in the first set of cases we should see that the agricultural sector grew *at expenses* of the industrial sector *both before and after* of the implementation of the income tax. However, in the second set of cases 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, in these countries the industrial sector did not grow *at*



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

expenses 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>53</sup>

I utilize the **MOxLAD** data, particularly the *agriculture value-added* and *manufacturing value-added* variables.<sup>54</sup> The dataset spans from as early as 1900 to as late as 2009.<sup>55</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>56</sup> Following **Mahoney [2010, 5]** I consider two ‘advanced’ economy countries (Chile and Argentina), two ‘intermediate’

<sup>53</sup>Lutkepohl [2006, 42] explains that if some variable  $X$  forecasts variable  $Y$  (and not vice versa),  $X$  is said to ‘Granger-cause’  $Y$ . According to Granger [1980, 349], this concept of ‘causation’ is based on the idea “that the future cannot cause the past.” See also Durr [1992, 197] for a similar definition. Both Beck [1992, 241] and Angrist and Pischke [2008, 237] Granger-causality is not really *causal*.

<sup>54</sup>The former measures “the output of the sector net of intermediate inputs and includes the cultivation of crops, livestock production, hunting, forestry and fishing.” The later “[r]eports the output of the sector net of intermediate inputs.”

<sup>55</sup>According to Astorga et al. [2005, 790], this dataset provides extended *comparable* sectoral value-added series in constant purchasing power parity prices.

<sup>56</sup>Some countries implemented some kind of income tax before, however these laws lacked enforcement, they were weak or not at all followed. In **Table A1** in the Appendix section I establish the year that the literature seems to agree for when the law was implemented and properly enforced.

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. I expect *advanced* countries to have *balanced* economic growth *after* the implementation of the income tax, and *less advanced* countries to have *unbalanced* economic growth *both* before *and* after the implementation of the tax (null results in favor of a reversal in sectoral Granger-causation).

In **Table 1** I test for Granger-causality both prior and after the implementation of the income tax law.<sup>57</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 economic backwardness 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>58</sup> These results suggest that the implementation of the income tax was associated 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 expenses of the modern 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>59</sup> In Nicaragua and Guatemala, however, the tests suggest the exact opposite (all p-values are significant at the .05 level).<sup>60</sup> The implementation of the income tax in these countries did *not* reverse the initial economic backwardness equilibrium. I contend that when implemented, the tax did not reflect the inter-sectoral economic cleavage proper of contested political economies. 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 institutions. 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

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<sup>57</sup>Specifically, the tests were computed after estimating the reduced form VAR specified in **Equation 1**.

<sup>58</sup>Except for the Mexico after the implementation of the income tax (p-value = .06).

<sup>59</sup>See especially next **section**.

<sup>60</sup>Except for the pre income tax period test of Guatemala, which is significant at the .1 level.

Country	Pre/Post Income Tax	Sample	Directionality	chi2	P-value
Chile	Pre	1905 - 1924	Agriculture → Industry	3.55	0.47
			Industry → Agriculture	12.13	0.02
	Post	1928 - 2009	Agriculture → Industry	11.92	0.00
			Industry → Agriculture	5.37	0.07
Colombia	Pre	1902 - 1935	Agriculture → Industry	4.96	0.03
			Industry → Agriculture	10.44	0.00
	Post	1938 - 2009	Agriculture → Industry	4.32	0.04
			Industry → Agriculture	1.63	0.20
Argentina	Pre	1903 - 1933	Agriculture → Industry	4.19	0.12
			Industry → Agriculture	.42	0.81
	Post	1937 - 2010	Agriculture → Industry	.18	0.91
			Industry → Agriculture	1.37	0.50
Mexico	Pre	1902 - 1965	Agriculture → Industry	.73	0.39
			Industry → Agriculture	11.57	0.00
	Post	1969 - 2009	Agriculture → Industry	5.56	0.06
			Industry → Agriculture	1.32	0.52
Nicaragua	Pre	1923 - 1974	Agriculture → Industry	.48	0.79
			Industry → Agriculture	6.83	0.03
	Post	1977 - 2009	Agriculture → Industry	.014	0.91
			Industry → Agriculture	4.96	0.03
Guatemala	Pre	1924 - 1963	Agriculture → Industry	2.18	0.54
			Industry → Agriculture	6.72	0.08
	Post	1966 - 2009	Agriculture → Industry	.58	0.45
			Industry → Agriculture	6.05	0.01

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

income tax law 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 economic equilibrium. This section tests whether the implementation of the income tax is associated with long-run economic development, and how/if this relationship is associated with fiscal expansion. Given that the implementation of the income tax reflected a number of inter-elite political compromises, I expect this institution to have caused deeper state development, fostering long-run economic growth. In non-advanced cases, the tests should show null results.

The study of the sectoral component of economic growth is an endogenous one.<sup>61</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 (like industrial and agricultural growth) 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 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>62</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>63</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 a relationship of economic backwardness between the two sectors. Consequently, I expect to find evidence of cointegration only in 'developed' cases.<sup>64</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>65</sup> suggesting that industrialists in 'developed' and 'semi-developed' countries were able to pose enough credible threats to agricultural incumbents, challenging the post-colonial institutional order and causing long-term economic growth. Less developed countries in turn lacked of an economic/political sectoral-based conflict, and consequently the political order beneficial for the landed elites remained unchallenged, compromising long-term economic growth.

To estimate the relationship of long-run inter-sectoral economic growth I use the vector-autoregressive (VAR) approach specified in [Johansen \[1988\]](#) which is estimated via MLE and not requiring the specification of the number of cointegrated vectors (as opposed to error correction models).<sup>66</sup> Formally, I fit [Equation 1](#) in differences, one per country, both before and after the income tax law was passed.<sup>67</sup>

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<sup>61</sup>[Tiffin and Dawson \[2003, 33\]](#).

<sup>62</sup>I show the test statistic and its associated MacKinnon approximate p-value in parenthesis for the ADF and Phillips-Perron tests. Both trend and drift were tested in all tests, when applicable. As I did not find any differences, I show the test statistic with no trend nor drift and one lag. The lags in the KPSS test were selected via an automatic procedure. "+" indicates that the test is barely significant or non-significant.

<sup>63</sup>I use VAR regressions, which do not necessarily need cointegrated vectors (see [Box-Steffensmeier et al. \[2014, 161, 164\]](#)). Cointegration, however, is important from a substantive standpoint in this paper.

<sup>64</sup>Given that the maximum number of cointegrated vectors in bivariate cointegrated series is 1, I only test for the minimum number of cointegrated relationships. See [Box-Steffensmeier et al. \[2014, 165\]](#).

<sup>65</sup>Since I am interested in the long-run equilibrium, I do not split the sample before and after the implementation of the income tax.

<sup>66</sup>[Box-Steffensmeier et al. \[2014, 164\]](#).

<sup>67</sup>For simplicity, the VAR equation is in reduced form.



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*

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

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>68</sup>

Given that “it is often difficult to draw any conclusions from the large number of coefficient estimates in a VAR system,”<sup>69</sup> econometricians usually turn to the analyses of *impulse response functions* (IRFs), which are derived from VAR analyses.<sup>70</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>71</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 implementation of the income tax. 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,

<sup>68</sup>The next information criteria were used to determine the appropriate lag length: final prediction error, AIC, Schwarz’s Bayesian information criterion, Hannan and Quinn criterion as well as the corresponding likelihood-ratio test statistics. The same criteria are used to compute the optimal lag length in Table 2. The table also shows a summary of different post-estimation tests when the optimum lag length specified in the table was used. A check mark indicates that the tests was passed successfully, a check-minus mark indicates that the test was passed somewhat successfully, and a cross mark denotes failure to reject specification problems. Detailed results are available upon request.

<sup>69</sup>Lütkepohl and Krätzig [2004, 159].

<sup>70</sup>The raw VAR regression tables are available upon requests.

<sup>71</sup>Stock and Watson [2001, 106]. See also Lütkepohl [2005, 51].



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

but response to equilibrium. That is, the reaction of one sector once the other one is shocked.<sup>72</sup>

Figure 3 suggests that all ‘developed’ countries switched from an economic backwardness equilibrium to a modern economic growth strategy after the income tax was implemented, indicating a change in the institutional order. For example, a shock to industrial growth in Chile before the tax has 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 the political institutions before the tax were oriented to channel all economic resources in a way that advantaged the agricultural sector and the landed elites. This equilibrium is reversed after the income tax law, one that 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

<sup>72</sup>That is why the “shape of the [IRFs] indicate [...] the dynamic responses of the variables [and since the variables] are  $I(0)$  the impulse responses [...] should converge to zero” (Enders [2014, 364]).

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 both cases the implementation of the income tax did not reverse the initial economic backwardness equilibrium because when implemented, it did not reflect the inter-sectoral cleavage (because there was no cleavage). The lack of sectoral challenges and compromises left the traditional institutional order unaltered, preserving the political advantages the landowning elites enjoyed since colonial times.

## V. DISCUSSION

Since colonial times agriculturalists had been a hegemonic group protected by the persistence of backwards institutions. This institutional unbalance promoted unbalanced economic growth. 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, fostering long-term balanced/modern economic growth. In turn, balanced growth reinforced sectoral inter-dependence, precluding sectoral dominance of either political elite.

The Chilean case suggests that these compromises took place during the formative years of the state and during a period of structural indetermination, where neither elites had a clear economic, military, and political advantage. Industrial elites accepted to be income taxed in exchange of implementing public goods delivered at the local level. Public infrastructure was key for their continuous expansion. As others have argued, industrial elites preferred to impose the income tax on themselves rather than imposing trade taxes. In turn, and according to fiscal sociologists, the implementation of this institution was key for political development. 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). Balanced economic growth was important for political development. I explain how balanced growth secured egalitarian political conditions between the two elites.

..... **Word count: 9,827** .....

## VI. APPENDIX

Country	Available Data	Year Income Tax	Law	Source
Chile	1900 - 2009	1924	<i>Ley 3996</i>	Mamalakís [1976, 20] and LeyChile.Cl (official)
Colombia	1900 - 2009	1935	<i>Ley 78</i>	Figueroa [2008, 9]
Argentina	1900 - 2010	1933	<i>Ley 11682</i>	Infoleg.Gob.Ar (official)
Mexico	1900 - 2009	1965	<i>Ley de Impuesto sobre la Renta</i>	Díaz González [2013, 130-133] and Diario Oficial (official)
Nicaragua	1920 - 2009	1974	<i>Ley 662</i>	Legislacion.Asamblea.Gob.Ni (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)
Colombia	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)
	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)
Argentina	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)
Mexico	Pre	Agriculture	4.601 (1.00)	5.552 (1.00)	.288	I(1)
		Industry	5.803 (1.00)	10.776 (1.00)	.29	I(1)
	Post	Agriculture	0.599 (0.9876)	0.497 (0.99)	.109 <sup>†</sup>	I(1)
		Industry	-1.255 (0.65)	-0.982 (0.76)	.113 <sup>†</sup>	I(1)
	All	Agriculture	3.431 (1.00)	3.607 (1.00)	.341	I(1)
		Industry	0.672 (0.99)	2.020 (0.99)	.367	I(1)
Nicaragua	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)
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
				Jarque-Bera	Skewness	Kurtosis	
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	✓	✓	✓	✓	✓
	Post	2	✓	✓ <sup>-</sup>	✓	✓ <sup>-</sup>	✓
Mexico	Pre	1	✓	✓ <sup>-</sup>	✓ <sup>-</sup>	✓ <sup>-</sup>	✓
	Post	2	✓	✓	✓	✓	✓
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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