

Joining the Revolution: Trade Shocks and Elite Support for Revolutionary Movements*

Daniel Baquero-Mendez[†] Ivan San Miguel[‡]

September 3, 2026

Preliminary Draft.

Abstract

Economic elites who are excluded from political power, despite holding substantial economic resources, often mobilize against incumbent regimes. Under what conditions do such elites emerge, and when do they mobilize? We argue that a shock can open a gap between an elite group's economic power and its political access even when it creates no new class or sector, so long as the shock's gains accrue disproportionately to elites who are already excluded from political power. This gap gives outsider elites both the incentive and the resources to challenge the incumbent, and it gives them a claim on the coalition that succeeds it. We test this argument using the Mexican Revolution. We build a shift-share variable that combines changes in American commodity demand during the Second Industrial Revolution with agricultural endowments across Mexican municipalities to measure the intensity of a commodity boom in Mexican agriculture. Trade shock intensity strongly predicts elite revolutionary participation in municipalities where local elites had been excluded from political power before the Revolution, but shows no association with participation where local elites retained political access. We also show that this alignment shapes post-revolutionary policy: revolutionary governments redistributed significantly less land in regions where pro-revolution elites were concentrated.

*We thank Zuhad Hai, Gwyneth McClendon, Jan Pierskalla, Eric San Miguel, Shanker Satyanath, Emily Sellars, and Pablo Querubín, for their helpful comments and feedback. We would also like to thank the participants in the III Congreso Anual de Economía at Universidad San Francisco de Quito, APSA 2025, as well as participants in the *Empires, States, and the Making of Power* Mini-Conference at MPSA-2026.

[†]Department of Politics, New York University. E-mail: daniel.baquero@nyu.edu

[‡]Department of Politics, New York University. E-mail: ivan.sanmiguel@nyu.edu

1 Introduction

Outsider elites, economically powerful groups excluded from political power, frequently anchor revolutions and regime transitions ([Albertus and Menaldo, 2018](#); [Ansell and Samuels, 2014](#)). The standard explanation for their emergence points to industrialization: as new sectors and asset classes develop, they produce elites whose interests diverge from the incumbent coalition and who lack a foothold in existing institutions ([Moore, 1966](#); [Ansell and Samuels, 2014](#); [Beramendi et al., 2019](#); [Lizzeri and Persico, 2004](#)). This account, however, says little about elites who do not owe their rise to a new sector at all. Economic shocks can also shift power within an already-existing elite, elevating some members over others without altering the underlying economic structure. When does this kind of internal reshuffling, rather than the birth of a new class, produce a challenger elite willing to break with the incumbent?

We answer this question by identifying two conditions under which a shock turns an economic windfall into a political challenge. Politically excluded members of the elite must already lack access to the offices and institutions that authoritarian incumbents use to distribute protection and favor ([Svolik, 2012](#); [Magaloni, 2008](#)), and the shock must enrich them disproportionately relative to elites who retain that access ([Acemoglu et al., 2005](#)). Together, these conditions open a gap between what excluded elites control economically and what they can secure politically. That gap raises the price of staying out of power and hands outsider elites the resources to organize, finance, and sustain a challenge to the incumbent ([Ansell and Samuels, 2010](#); [Dasgupta, 2018](#)). Incumbents can try to close the gap through incorporation, offering outsider elites durable access to office in exchange for political support ([Gandhi and Przeworski, 2006](#)). Such a promise only holds if the incumbent has reason to keep it later, and a shock that fades removes that reason: once outsider elites no longer control unusual wealth, the incumbent has little left to lose by pushing them back out ([Boix and Svolik, 2013](#); [Magaloni, 2008](#)). Outsider elites who foresee this have little reason to wait, and instead have an incentive to convert their present wealth into political standing before it disappears.

Joining an anti-incumbent coalition carries a second payoff beyond removing the old

regime. Elites who help bring down the incumbent might secure a seat in the coalition that replaces it, and that seat could give them a say in how the new government allocates the costs of political change (Dell, 2012; Albertus et al., 2016; Albertus, 2015). We therefore expect successor governments to redistribute less intensely in places where elites were more likely to join the anti-incumbent coalition than in places where elites remained loyal to the old regime. Political alignment before turnover, not just the scale of reform, should shape who bears its costs.

We test this argument in the context of Mexico under Porfirio Díaz, a conservative autocrat who ruled the country from 1876 to 1910, and who was deposed by the onset of the Mexican Revolution. This setting exhibits both conditions the argument requires. First, Díaz centralized political power unevenly across the country: he installed outsider governors with no ties to local elites in some states, while local elites in other states kept their political access, producing sharp, geographically identifiable variation in political exclusion (Balmori et al., 1984). Second, a boom in American demand for Mexican agricultural commodities during the Second Industrial Revolution raised the value of export-suitable land regardless of whether local elites held political access (Kuntz Ficker, 2007), so its gains also accrued to elites who were already excluded from power. Mexican economic elites split sharply along regional lines in their support for the ensuing Revolution, with some leading revolutionary armies and others opposing the uprising outright (Camp, 1991).

To measure the trade shock, we build a shift-share variable that combines changes in American demand for fourteen agricultural commodities between 1877 and 1910 with municipality-level agricultural suitability, capturing the intensity of the shock across Mexican municipalities. To identify elite revolutionary participation, we draw on more than 5,000 biographical entries from the Historical and Biographical Dictionary of the Mexican Revolution (INEHRM, 1994), the most comprehensive biographical source for the period. We use an LLM to code each entry for revolutionary alignment, occupation, and municipality of birth. We then classify an individual as an elite revolutionary if the entry indicates support

for the Revolution and an asset-intensive occupation, such as landowner, merchant, banker, or industrialist, and match each elite revolutionary to their municipality of birth. Finally, we measure political exclusion using whether Díaz had installed an outsider governor in a state before the Revolution, since outsider governors typically lacked ties to local elites and displaced them from political office.

Consistent with our argument, shock intensity strongly predicts elite revolutionary participation in municipalities located in states with outsider governors, but shows no association with participation in states where local elites retained political access. In states with outsider governors, a one standard deviation increase in shock intensity raises the probability that a municipality produced at least one elite revolutionary leader by 5 percentage points, about 140 percent of the dependent variable’s mean. This pattern holds across alternative measures of elite participation and after accounting for geographic and economic controls, indicating that political exclusion, rather than the shock alone, drives elite mobilization.

Land reform outcomes follow the same coalitional logic. Revolutionary governments redistributed more than half of Mexico’s national territory over the twentieth century, but local elites who joined the revolutionary coalition retained substantial influence over how reform was implemented in their regions ([Meyer, 1976](#); [Albertus et al., 2016](#)). We find that in states where local elites had been part of the old ruling coalition, and therefore had not joined the Revolution, land reform targeted municipalities highly suitable for export crops, the most valuable agricultural land. In states where local elites had been excluded from the old regime, and therefore joined the Revolution in larger numbers, this relationship between export suitability and land reform intensity disappears. Revolutionary governments, in other words, protected the assets of elites who backed the Revolution while directing redistribution toward the land of elites who had not.

This paper speaks to a broad literature on the determinants of regime change and democratization. Early accounts treated economic elites as core supporters of authoritarian rule, invested in protecting property and blocking redistribution ([Acemoglu and Robinson,](#)

2005; Boix, 2003). More recent work qualifies this view, showing that politically excluded elites often push for regime change instead, because economic development and industrialization create new elite groups with insecure property rights (Ansell and Samuels, 2014; Albertus and Menaldo, 2018) and different policy preferences (Beramendi et al., 2019; Lizzeri and Persico, 2004) relative to incumbent elites. This paper extends that account in two ways. First, while existing work centers on industrialization as the source of new outsider elites, we show that a shock can open the same gap between economic power and political access within an already-existing elite, without creating any new class or sector. Second, we challenge the view that elite-led transitions foreclose substantial redistribution (Albertus and Menaldo, 2018; Ansell and Samuels, 2014). Successor governments can redistribute extensively while still protecting the assets of the outsider elites who joined the challenge, directing the costs of reform instead toward elites who remained loyal to the old regime.

2 Main Argument

Traditional accounts treat economic elites as a relatively cohesive group that supports authoritarian rule to protect property and limit redistribution (Acemoglu and Robinson, 2005; Boix, 2003). More recent work shows that economically ascendant but politically excluded groups may instead seek political change (Ansell and Samuels, 2010, 2014; Albertus and Menaldo, 2018). Most of this work focuses on the role of economically well-off groups that emerged from industrialization, including the bourgeoisie, educated professionals, and skilled industrial workers (Moore, 1966; Ansell and Samuels, 2014). Relative to incumbent elites, these groups own different types of assets, such as financial or human capital instead of land (Ansell and Samuels, 2014; Llavador and Oxoby, 2005), hold different policy preferences (Beramendi et al., 2019), and lack representation in existing political institutions (Lizzeri and Persico, 2004; Ansell and Samuels, 2014). For these reasons, such groups have a strong interest in challenging incumbent elites. Yet economic shocks can also redistribute resources

among members of an existing elite without creating new classes. Existing work offers less guidance on when such shocks lead some beneficiaries to mobilize against the incumbent while others continue to support it.

We argue that even a shock that leaves the underlying economic structure intact, creating no new classes or sectors, can widen the mismatch between economic and political power within an existing elite when two conditions hold. First, a pre-existing political division must leave some members of the economic elite without political access. This division may follow regional, ethnic, religious, or other lines. By political access, we mean the ability to hold public office, influence government decisions, or rely on officials to protect economic interests, benefits that authoritarian incumbents distribute through their ruling coalitions (Svolik, 2012; Magaloni, 2008). Second, the shock's gains must accrue disproportionately to excluded elites, significantly increasing the economic resources they control. Externally driven increases in demand can produce this pattern by raising the returns to particular products and economically empowering elites positioned to produce them (Acemoglu et al., 2005). When both conditions hold, the shock widens the mismatch between what these elites control economically and their influence over government.

In the short term, this widening mismatch raises the costs of remaining excluded because government decisions that these elites cannot influence now affect more valuable assets. Economic empowerment also gives them greater means to mobilize: greater income and more valuable assets can provide them with resources to organize supporters, finance political activity, and bear the costs of challenging an incumbent (Ansell and Samuels, 2010; Dasgupta, 2018). In the longer term, supporting an anti-regime coalition may give them influence within the successor government and allow them to shape subsequent reforms. Whether excluded elites mobilize, however, also depends on whether the incumbent offers them meaningful incorporation.

Incorporation provides an alternative to anti-regime mobilization. Incumbents can offer policy concessions, rents, offices, or access to institutions in exchange for political support

(Gandhi and Przeworski, 2006). Meaningful incorporation, however, requires the incumbent to grant outsiders durable access to office and influence. Uncertainty about the shock’s duration may make such a promise difficult to sustain. If the economic gains dissipate, for instance because they stem from a temporary price shock, the outsiders’ leverage may weaken, giving the incumbent an incentive to withdraw their political access or restore the privileges of established allies (Boix and Svolik, 2013; Magaloni, 2008). Anticipating this possibility, excluded elites may reject temporary concessions that increase their wealth without securing lasting political influence.

Where the incumbent cannot credibly guarantee durable incorporation, excluded elites may seek regime change to convert their current resources into political influence before their economic leverage weakens (Acemoglu and Robinson, 2005). To build a broad anti-incumbent coalition, they may offer policy concessions to non-elite groups (Ansell and Samuels, 2010). Their resources, including money, organization, and leadership, make them valuable coalitional partners for non-elite supporters (Ansell and Samuels, 2014; Albertus and Menaldo, 2018). Participation therefore offers excluded elites an immediate route out of political exclusion and a prospective position within the coalition that governs after turnover.

H1: *Externally driven economic gains should increase anti-regime mobilization among politically excluded elites, but not among politically included elites.*

Post-turnover redistribution can serve two related political purposes: incorporating non-elite supporters and managing relations with economic elites. Governments may redistribute land to pacify insurgent areas, extend political control, and make beneficiaries dependent on state-controlled resources (Dell, 2012; Albertus et al., 2016). The extent and targets of redistribution may also reflect the political strength of different elite groups and their relationship to the new governing coalition (Albertus and Menaldo, 2014, 2018; Albertus, 2015). Consistent with this coalitional logic, elites who contribute to regime change may receive economic benefits from the resulting government (Naidu et al., 2021). Together, these findings suggest that redistribution may reward allies while imposing greater costs on groups

associated with the former regime. Existing work, however, does not explain how economic elites' alignment before turnover shapes the allocation of redistributive costs afterward.

Building on these findings, we argue that the resources and leadership excluded elites contribute to an anti-regime coalition may give them influence within the coalition that succeeds the incumbent. Such participation does not guarantee lasting influence because governing responsibilities can change the incentives of former opposition partners after turnover (Grodsky, 2012). If excluded elites retain influence, however, the successor government may redistribute land to incorporate non-elite supporters while limiting the costs imposed on the assets or regions of its elite allies (Dell, 2012; Albertus et al., 2016). It may instead direct greater costs toward landed elites associated with the former regime (Albertus, 2015). Because our argument expects economically empowered excluded elites to be more likely to join the anti-regime coalition, economically valuable areas associated with those elites should receive greater protection after turnover than comparable areas associated with the former ruling coalition. Elite participation may therefore shape who bears the costs of redistribution rather than simply reducing its overall extent.

H2: *After political turnover, economically valuable areas associated with elites excluded by the former regime should experience less redistribution than comparable areas associated with elites included in its ruling coalition.*

Because the analysis observes regional patterns of land reform rather than the ownership of individual assets, it evaluates whether redistribution followed the expected coalitional pattern but cannot show that individual participants protected their own property.

3 Historical Context

Following its independence from Spain in 1821, Mexico experienced several decades of political instability. The economic costs of the decade-long war of independence, the wartime expansion of local governments' fiscal and military responsibilities (such as tax collection and

the organization of local militias), and the post-independence expulsion of Spanish-born officials severely weakened the state capacity of the national government (Guerra, 1988). As central authority weakened, political power fragmented into *de facto* autonomous sub-national polities, which allowed local elites, such as large landowners and local military leaders, to administer their states with a high degree of autonomy *vis-à-vis* the national government. Throughout this period, most states were governed by regional strongmen with deep ties to local elite networks (Haber et al., 2003).

In this context, General Porfirio Díaz took power through a rebellion in 1876. At the time, Díaz’s ascent to power seemed unremarkable: presidential turnovers through rebellion were common, and few presidents remained in office for long. However, Díaz went on to dominate Mexican politics for over 30 years, and his tenure (the *Porfiriato* henceforth) marked the first period of sustained political stability and economic growth since independence. Moreover, although Díaz took office in a context where political power was highly fragmented and his rebellion had relied on a coalition of regional strongmen, he gradually centralized political power in the national government, and the presidency, throughout his tenure. The rest of this section discusses the three changes that are central to the paper: the export-based economic expansion of the *Porfiriato*, the process of political centralization that resulted in the political exclusion of the local elite of several regions, and the post-revolutionary land reform program.

3.1 Economic Change During the Díaz Regime

The six decades between the start of the war of independence and the *Porfiriato* were marked by economic decline. Early into Díaz’s tenure, the Mexican economy partially recovered thanks to increased political stability, the gradual reduction of internal tolls and trade barriers, and the privatization of communal and idle lands. However, growth remained slow, as the country’s small internal market and scarce capital were major hurdles to sustained growth (Kuntz Ficker, 2012). This situation changed towards the end of the 19th Century,

when increased economic integration with the United States and surging commodity demand from industrialized nations provided Mexican producers with both a major source of capital and a rapidly growing market for their agricultural commodities. Over the second half of the *Porfiriato*, the country thus underwent a period of rapid export-based growth in which export-oriented sectors became the most dynamic parts of the economy (Kuntz Ficker, 2001).

Two developments underpinned this export-based expansion. First, although the Mexican economy had been largely isolated from international markets when Díaz took office, the construction of Mexico's railway network (financed by foreign investors) and the westward expansion of the American rail network substantially decreased transportation costs between the two countries, which allowed bilateral trade to expand significantly over the following decades (Haber et al., 2003). Second, this increased economic integration coincided with the Second Industrial Revolution, a period when technological innovation, economic growth, and rising wages in industrialized nations, particularly the United States, substantially reshaped foreign demand for Mexican agricultural commodities. For instance, the emergence of the automotive industry in the late 19th Century led to a drastic increase in American rubber imports (Frank and Musacchio, 2006). Likewise, the development of mechanical reaper-binders caused a surge in demand for fiber crops that could be used to make binder twine (Evans, 2007). Additionally, rising wages in America increased demand for consumption goods such as coffee (Topik, 2006).

These conditions caused a commodity boom in Mexican agriculture. Historically, Mexican agricultural exports had been concentrated in a few niche tropical commodities, such as vanilla and logwood, that played a marginal role in the Mexican economy. As foreign demand for new cash crops such as henequen and rubber surged, the basket of Mexican agricultural exports became much more diverse, and the total value of Mexican exports increased from under 30 million dollars in 1870 to over 150 million dollars in 1910 (Kuntz Ficker, 2007). The boom particularly benefited regions that were highly suitable for producing these export crops. Despite this significant economic growth, by the end of the *Porfiriato* Mexico remained

an overwhelmingly agrarian and rural country ([Keesing, 1969](#)). More importantly, most of the economic gains from the boom were captured by local elites: land ownership in *Porfirian* Mexico was highly concentrated, and agricultural wages remained relatively low throughout the period. Moreover, in southern Mexico, laborers were often tied to large estates through coercive institutions such as debt bondage ([Katz, 1974](#)).

3.2 Political Centralization Under Díaz

When Díaz took office in 1876, the federal government was weak. He therefore initially ruled the country through coalitions that granted state governments and the regional strongmen who led them substantial autonomy in exchange for their political support ([Haber et al., 2003](#)). Since most regional strongmen had strong kinship, social, and business ties to their states' local elites, these arrangements gave local elites substantial influence over governance and local political positions. Moreover, strong economic and social ties between governors and local elites incentivized governors to protect them from federal predation ([Tinker Salas, 1997](#)). Crucially, governors' military experience, the strong backing of their elite networks, and the federal government's weakness meant governors could credibly threaten to rebel, giving them powerful leverage to influence national policy ([Haber et al., 2003](#)).

Over time, however, two developments eroded the autonomy of state governments. First, the federal government's capacity to project force throughout the national territory increased substantially. The continuous placement of loyalist military officers allowed Díaz to consolidate control over the historically fractious federal army, while the expansion of the railroad network extended the state's reach into previously remote regions ([Katz, 1991](#)). As a result, governors could no longer credibly threaten to rebel. Second, state governments were weakened by the retirement or death of the regional strongmen who had held governorships in the early years of the regime, and by the conflicts that often followed as local elite factions competed over control of the governorship ([Knight, 1986](#)). In several states, Díaz exploited these moments of weakness to install loyalist governors through electoral fraud. Loyalist

governors had a markedly different profile from the regional strongmen they often replaced: they were generally professional politicians who had built their careers in other states and thus lacked ties to the local elites of the states they governed. Their arrival was typically followed by a purge in which local elites were removed from local political positions and replaced with officials from other parts of the country (Balmori et al., 1984).

Political exclusion produced tangible costs for regional elites. Governors were highly influential in the selection of district prefects (*jefes políticos*),¹ powerful officials responsible for law enforcement, the organization of local elections, the collection of local taxes, and the administration of the military draft. In practice, prefects operated with wide discretion: they could, for example, arbitrarily raise or lower a firm's tax burden (Falcón, 1988). Traditionally, most prefects came from local elite networks, ensuring district prefectures aligned with elite interests (Tinker Salas, 1997). Under outsider governors, however, this pattern broke down: lacking ties to established families, such governors staffed prefectures with outsiders of their own (Knight, 1986). For regional elites, the security of their property and profits now hinged on the goodwill of officials they had no hand in selecting. Indeed, regional elites left behind a voluminous trail of complaints over prefects' arbitrary conduct (Wasserman, 1984).

The process of political centralization, however, was not uniformly successful throughout the country. In a few states, regional strongmen survived through Díaz's tenure. For instance, Díaz never placed an outsider governor in the state of Tlaxcala, where Próspero Cahuantzi, a military veteran and regional strongman, held the governorship for over 25 years. In other states, where local elites were both cohesive—such that there was no intra-elite conflict for Díaz to exploit—and sufficiently compliant, Díaz generally left locally rooted governors in office (Knight, 1986). Thus, the process of political centralization generated stark geographic variation in the extent to which local elites remained politically powerful in the late Díaz regime. In states governed by Díaz loyalists, local elites were systematically excluded from political positions, which were instead held by outsiders unwilling to protect

¹In most states district prefects were directly appointed by the governor. In other states the governor selected prefects from a slate of candidates (Falcón, 1988).

them from predation by the federal government. By contrast, in states that had resisted centralization, local elites remained politically influential.

Together, the export-based expansion of the late *Porfiriato* and the centralization of political power meant that, in export-oriented regions governed by loyalist governors, many elite families found themselves economically ascendant yet excluded from political power for the first time in decades. The port of Guaymas, in the northern state of Sonora, illustrates this combination. Before the boom, Guaymas was a remote and economically marginal port. However, the lands around Guaymas are highly suitable for chickpea production, a crop that became increasingly demanded by American consumers at the turn of the century ([Aguilar Camín, 2017](#)). The chickpea boom transformed agriculture in Guaymas, as previously marginal farms became highly lucrative estates, and it enriched Guaymas' elite families, who became some of Northern Mexico's wealthiest families. Despite their increased prosperity, however, Guaymas' elites had been politically marginalized by Díaz's capture of Sonora's state government: three loyalist governors, Luis E. Torres, Ramón Corral, and Rafael Izábal, controlled the governorship from 1879 until 1911 ([Balmori et al., 1984](#); [Tinker Salas, 1997](#)), leaving even the wealthiest local landowners with little say in state affairs.

The experience of the Maytorena family, Guaymas' most prominent landowners, illustrates how even Sonora's wealthiest families were adversely affected by the federal government's encroachment on the state government. In the pre-Díaz period, the Maytorenas had kinship ties to strongman Ignacio Pesqueira, who dominated state politics for almost two decades ([Alarcón Menchaca, 2004](#)). However, their political influence waned after Torres became governor ([Aguilar Camín, 2017](#)). In the following decades, family patriarch José María Maytorena Goycochea repeatedly challenged the pro-Díaz state authorities by running against them in Sonora's gubernatorial elections. However, given the strength of the state's pro-Díaz political machine, Maytorena's efforts were unsuccessful ([Alarcón Menchaca, 2004](#)).

By 1910, in regions controlled by Díaz loyalists, regional elites had grown increasingly frustrated with their loss of political influence. Political exclusion also carried concrete eco-

conomic costs for marginalized elites. The Maytorenas, like most landed elites in Guaymas, were highly dependent on indigenous Yaqui labor for their estates. However, the pro-Díaz state government forcibly displaced thousands of Yaqui laborers to distant plantations in the south, where they were used as slave labor in henequen estates. This policy caused severe labor shortages in Guaymas' estates. When José María Maytorena protested this policy, the federal government retaliated by withdrawing the military forces that had protected the Maytorenas' hacienda ([Tinker Salas, 1997](#)).

In this context, Francisco Madero—a wealthy landowner from the state of Coahuila—challenged Porfirio Díaz in the 1910 presidential election. Like Guaymas' Maytorena family, the Maderos were a prominent family that had seen their political influence erode under Díaz. While the family had held the state's governorship in the 1880s, it was permanently sidelined from political office after a Díaz loyalist—José María Garza Galán—won the 1886 gubernatorial election unopposed, following an intense pressure campaign by the federal government that deterred local elites from the race ([Tovar Mota and Vázquez Valenzuela, 2024](#)).

Despite their political exclusion, the Maderos greatly benefited from the concurrent expansion of international trade: they controlled several export-oriented estates that produced rubber and cattle for American markets. By 1910, the Maderos were among the wealthiest families in Mexico ([Tutino, 1986](#)). Unsurprisingly, Madero's call for democratic elections drew enthusiastic support from many of these wealthy but politically marginalized elites, who viewed his movement as an opportunity to regain their lost influence.

Sonora was no exception. José María Maytorena Tapia—the son and heir of the Maytorena patriarch—established a local pro-Madero committee in Guaymas during the 1910 campaign ([Aguilar Camín, 2017](#)). Although the Maytorenas had been politically sidelined for years, they remained economically powerful thanks to the booming export economy. This combination of deep grievances and ample resources meant the family had both the motivation and the means to actively support Madero's uprising.

After the Díaz regime committed electoral fraud in the presidential election, Madero launched a rebellion against the regime. The politically excluded local elites who had supported his presidential campaign became some of his core supporters during the rebellion. For instance, José María Maytorena Tapia joined Madero’s uprising and became his main military commander in the state of Sonora ([Aguilar Camín, 2017](#)). Simultaneously, Madero recognized that toppling Díaz would require broader support beyond disgruntled landowning families. In order to rally peasant groups—many of whom had endured severe hardships under Díaz’s policies of land concentration—he promised to enact a moderate land reform program. Although limited in scope, these pledges resonated with peasant communities ([Knight, 1986](#)). The alliance of dissatisfied, emerging elites and peasant movements thus formed a potent coalition that successfully overthrew Díaz. However, Madero’s victory was followed by a decade-long civil war between numerous revolutionary armies and conservative counter-revolutionary forces ([Aguilar Camín and Meyer, 1993](#)).

3.3 Post-revolutionary period and land reform

Pro-revolution elites remained central actors throughout the civil war and in shaping the post-revolutionary state: their financial resources, networks of local influence, and administrative skills gave them significant influence over the formation of new institutions once the fighting subsided ([Knight, 1986](#)). Ultimately, their participation in the revolutionary coalition contributed to the creation of a unified revolutionary party, the Institutional Revolutionary Party (PRI), which incorporated the main factions that had supported the Mexican Revolution². The PRI went on to rule Mexico for the rest of the 20th Century, which ensured that the interests of these elites continued to influence national policy during the post-revolutionary period.

Following the revolution, the national government implemented a land reform program

²The party has operated under three names since its founding. Established in 1929 as the National Revolutionary Party (*Partido Nacional Revolucionario*, PNR), it was renamed the Party of the Mexican Revolution (*Partido de la Revolución Mexicana*, PRM) in 1938. In 1946, it adopted its current name. To avoid confusion across its historical iterations, this text refers to the party uniformly as the PRI.

that sought to reduce rural unrest by rewarding the peasant factions that had supported the revolution and to undermine the power of anti-revolutionary local elites (Albertus, 2015; Albertus et al., 2016). Although land reform was initially modest in the 1920s, the presidency of Lázaro Cárdenas (1934–1940), a leftist general with strong support among peasant groups, marked a notable increase in the intensity of land reform (Sanderson, 1984). By the 1990s, when the land reform program was officially terminated, the PRI had redistributed more than 50% of the national territory (Assies, 2008).

While post-revolutionary land reform was extensive, the program’s design gave elites within the ruling coalition substantial discretion over its intensity at the local level. In principle, the constitution established ownership limits for private agricultural estates and allowed peasant communities to petition for land, either by proving prior ownership over an estate’s lands or by demonstrating that they lacked sufficient land³. Nevertheless, every land grant had to be approved by the state’s governor and the president, which allowed elites within the ruling coalition to influence the intensity of land redistribution at the local level (Sanderson, 1984; Albertus et al., 2016). Thus, pockets of substantial land inequality remained in regions where major landlords were allied with the revolutionary government (Sanderson, 1984; Albertus et al., 2016).

4 Data

4.1 Revolutionary Elites

To identify pro-revolution economic elites, we draw on the *Historical and Biographical Dictionary of the Mexican Revolution* (INEHRM, 1994), the most comprehensive biographical source for the period. Its over 5,000 entries, compiled by local historians across eight volumes, provide unparalleled coverage of regionally significant actors often omitted from national

³Historically, peasant towns held communal ownership rights over large parts of rural Mexico. While the abolition of communal property in the 19th Century allowed landed elites to acquire much of the agricultural land previously held by towns, the post-revolutionary land reform program allowed peasants to reclaim ownership over these lands by presenting colonial property titles (Kourí, 2004; Assies, 2008).

sources.

We use an LLM (ChatGPT) to analyze each biographical entry and code three key variables:

1. Revolutionary alignment (i.e., whether the individual supported the revolution).
2. Municipality of birth.
3. Occupational background.

We define elite revolutionaries as revolution-supporting individuals with asset-intensive occupations—specifically *hacendados* (large estate owners), merchants, property owners, landlords, bankers, financiers, or industrialists. We then match each elite revolutionary to a municipality using their place of birth.

4.2 Political Exclusion

As previous sections discussed, there was substantial regional heterogeneity in the extent to which local economic elites held political influence depending on whether Díaz had succeeded in placing loyalist governors. Loyalist governors were often outsiders with few connections to local economic elites (Haber et al., 2003). To capture this heterogeneity, we use the *Historical and Biographical Dictionary of the Mexican Revolution* (INEHRM, 1994) to identify which states had an outsider governor at the onset of the Mexican Revolution. We define an outsider governor as one who held political positions in a different state before becoming governor⁴. We then create a state-level political exclusion binary variable that equals 1 for states that had an outsider governor at the onset of the Revolution (1910)⁵.

⁴For instance, a politician who served as senator for state A before becoming governor of state B.

⁵According to this criterion, we classify eight states and territories as having outsider governors: Chiapas, Chihuahua, Guanajuato, Jalisco, Nayarit, Quintana Roo, Sonora, and Oaxaca.

4.3 Shock Intensity

We build a municipality-level index that captures demand-driven, exogenous variation in the impact of economic integration with the United States, Mexico’s main trading partner⁶. Our exposure index $Shock_m$ is a shift-share variable that combines two components:

1. **Commodity-specific shifts** ($\Delta(M)_{j,US,1910-1877}$): The change in U.S. imports of agricultural commodity j between 1877 (the start of Porfirio Díaz’s regime) and 1910 (the Revolution’s outbreak), excluding trade with Mexico.
2. **Municipality-specific weights**: The agricultural suitability of municipality m for commodity j , normalized by Mexico’s national average suitability for j .

We implement the index for the fourteen crops for which both inputs are available—US import values in 1877 and 1910 and municipality-level agroclimatic suitability.⁷ Formally, the trade shock index for municipality m is defined as:

$$Shock_m = \sum_{j=1}^J \log(\Delta M_{j,US,1910-1877}) \times \frac{Suitability_{m,j}}{Suitability_j}$$

In this index, $\Delta M_{j,US,1910-1877}$ measures the change in U.S. imports of commodity j from global suppliers other than Mexico during 1877–1910. This exclusion ensures that shifts reflect American demand-supply dynamics rather than endogenous changes tied to Mexico⁸.

⁶In 1910, trade with the US accounted for over 70% of Mexican exports and over 50% of imports (Kuntz Ficker, 2007).

⁷The crops are barley, cocoa, coffee, cotton, maize, oats, rice, wheat, potato, tobacco, chickpea, henequen, sugar, and rubber. In 1910, US imports of these crops from Mexico totaled \$24,459,604—about 83% of Mexico’s agricultural exports to its main trading partners (Kuntz Ficker, 2001).

⁸Alternatively, we can create a trade shock index that is based on the realized shifts in Mexican agricultural exports to the U.S., and use our plausibly-exogenous index as an instrument. More specifically, we can define

$$Realized Shock_m = \sum_{j=1}^J \log(\Delta(M)_{j,US-MX,1910-1877}) \times \frac{Suitability_{m,j}}{Suitability_j}$$

Where $\Delta(M)_{j,US-MX,1910-1877}$ indicates the change in American imports from Mexico of commodity j . We can then use our original $Shock_m$ variable as an instrument for $Realized Shock_m$ in a 2SLS specification. While our core specifications use our plausibly exogenous $Shock_m$ variable directly, an instrumental variables approach yields a strong first stage and consistent results.

Our data on U.S. imports come from the U.S. Bureau of Statistics’ annual reports on the foreign commerce and navigation of the United States for fiscal years 1877 and 1910 (U.S. Department of the Treasury, Bureau of Statistics, 1877; U.S. Department of Commerce and Labor, Bureau of Statistics, 1910).

$Suitability_{m,j}$ denotes municipality m ’s baseline agro-climatic suitability for commodity j , and $\overline{Suitability_j}$ denotes Mexico’s average national suitability for commodity j . To estimate municipal-level agro-climatic suitability, we primarily used the Food and Agriculture Organization’s (FAO) crop suitability rasters where available. All suitability estimates assume low-input, rain-fed agricultural conditions and rely on pre-1960 historical climate data to capture plausibly exogenous geographic variation. For henequen (*Agave sisalana*)—where FAO rasters were unavailable—we derived suitability scores using the *Recocrop* package (Hijmans and Manners, 2022) and the *Agave sisalana* crop requirements from FAO’s *ECOCROP* database.

Intuitively, the index takes on high values when a municipality was positively affected by U.S. demand shocks. For example, consider a simple scenario where a municipality’s geographic endowment makes it highly suitable for growing commodity j , and American demand for this commodity increases substantially during this period. In that case, the change in American net imports of commodity j ($\Delta M_{j,US,1910-1877}$) will be positive, while the municipality-level weight $\frac{Suitability_{m,j}}{\overline{Suitability_j}}$ will be positive and large. By contrast, consider the case in which a municipality is only suitable for producing a commodity k that the US increasingly exports. In this case, $\Delta M_{k,US,1910-1877}$ will be negative (since American exports of commodity k are growing) and the municipality-level weight will be positive and large $\frac{Suitability_{m,k}}{\overline{Suitability_k}}$, so the index will take on a low negative value.

5 Empirical Strategy

5.1 Identification

Exploiting international trade for identification creates potential issues. In principle, negatively (positively) affected elites could have preemptively mobilized to oppose (support) economic integration. However, our shock index exploits two sources of exogenous variation in the effect of trade: changes in American imports of agricultural commodities, and geographic variation in land suitability for each commodity in Mexico.

On the one hand, in the latter part of the 19th Century, the United States experienced a period of rapid industrialization, economic growth and technological change. This transformation substantially altered the profile of American agricultural trade through two plausibly exogenous mechanisms. First, technological innovation in the U.S. substantially increased demand for agricultural commodities that were used as inputs in new industrial processes. For instance, as mentioned previously, innovations in industrial agriculture increased demand for fiber crops that could be used to manufacture binder twine ([Evans, 2007](#)). Likewise, the invention of pneumatic tires and the development of America’s automotive industry caused a large increase in American rubber imports ([Frank and Musacchio, 2006](#)). Second, economic growth and rising wages in the U.S. drastically increased demand for imported consumption goods such as coffee ([Topik, 2006](#)).

These two processes—technological innovation and changing consumption patterns caused by economic growth in the U.S.—occurred largely independently of events in Mexico, and they substantially altered the profile of agricultural trade between Mexico and America. When Díaz took office in 1877, the total value of international trade between both countries was less than 12 million dollars, and Mexican exports were heavily concentrated in a few niche commodities such as logwood and vanilla ([Kuntz Ficker, 2007](#)). By the early 20th Century, however, American demand for agricultural products such as henequen, rubber, and coffee had soared, and these products became the dominant Mexican exports ([Kuntz Ficker, 2007](#)).

On the other hand, these plausibly exogenous shifts in American demand are weighted by each municipality’s agro-climatic suitability for each agricultural commodity. Using each municipality’s agro-climatic suitability offers two advantages. First, we do not have data on municipality-level agricultural production for this period. Second, and more importantly, production choices are an endogenous decision since landlords can strategically switch their production towards lucrative export commodities. In contrast, each municipality’s agro-climatic suitability is a fixed characteristic that local elites cannot change.

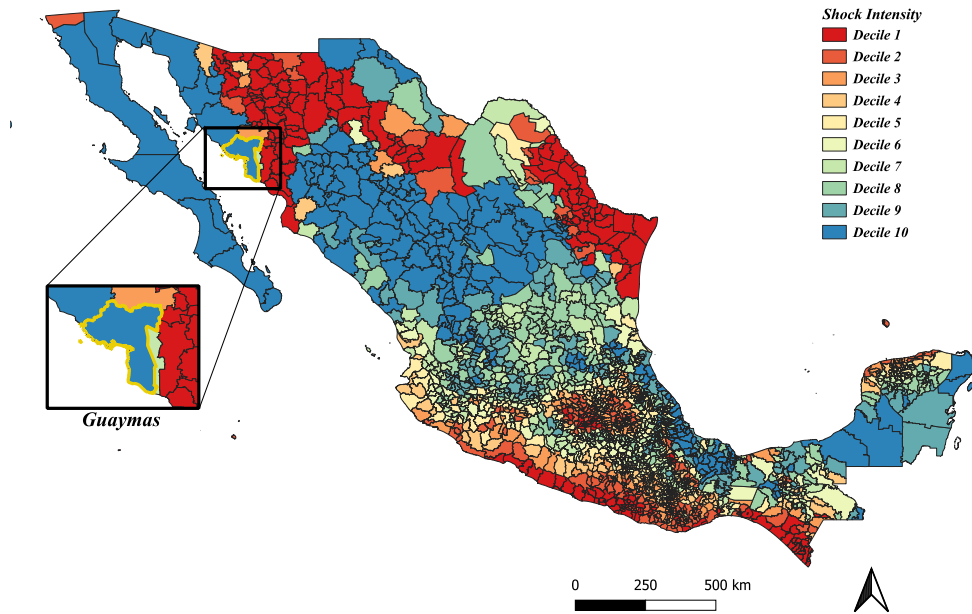


Figure 1: Shock Intensity Controlling for Geographic Characteristics (altitude, longitude, latitude, terrain ruggedness, annual precipitation, and temperature)

5.1.1 Validation

For our index to be valid, changes in U.S. agricultural imports from the world (excluding trade with Mexico) must strongly correlate with changes in U.S. imports from Mexico—a condition satisfied when Mexican export fluctuations are primarily driven by American demand. Table 1 shows that this is the case: the commodity-level shift in Mexican agricultural exports to

the U.S. is strongly correlated with shifts in U.S. agricultural imports from other countries ($\Delta M_{j,US,1910-1877}$).

Table 1: Correlation between commodity-level shifts in American agricultural imports from the rest of the world and shifts in Mexican agricultural exports to the U.S.

	<i>Dependent variable (value in dollars):</i>
	Δ Mexican exports to U.S. (1910-1877)
Δ U.S. imports from other countries (1910-1877)	0.129*** (0.032)
Agricultural Commodities	14
R ²	0.573
Adjusted R ²	0.538

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Heteroskedasticity-robust standard errors in parentheses.

5.2 Empirical Model

According to hypothesis H1, we should observe a higher incidence of revolutionary elites in regions where local elites experienced substantial economic gains from the commodities shock, but were excluded from local political office. To test this hypothesis, we run the following municipality-level specification:

$$Elite\ Revolutionaries_m = \beta_1 Shock_m + \beta_2 (Shock_m \times Exclusion_s) + \alpha_1 (\sum X_m) + \alpha_2 (\sum X_m \times Exclusion_s) + \mu_s + \epsilon_m \quad (1)$$

Where $Elite\ Revolutionaries_m$ is a binary variable that measures the presence of an elite revolutionary leader in municipality m (extensive margin), or the number of elite revolutionary leaders in the municipality (intensive margin). $Shock_m$ is our measure of the trade shock intensity in municipality m . μ_s denotes state-level fixed effects, and X_m is a set of municipality-level geographic and demographic control variables⁹. Since the exposure shares

⁹Our demographic controls come from the 1900 Mexican census. The authors thank Pablo Querubín for sharing these data.

of our $Shock_m$ index do not necessarily add up to one, we follow standard practice and include the incomplete weight control in all specifications¹⁰.

Moreover, we can use our $Shock_m$ index to evaluate whether the revolutionary governments redistributed less land in municipalities with a strong presence of elite revolutionaries. We measure land reform intensity using Sanderson (2013)’s municipality-level panel of redistributed hectares:

$$Land\ Reform_m = \beta_1 Shock_m + \beta_2 (Shock_m \times Exclusion_s) + \alpha_1 (\sum X_m) + \alpha_2 (\sum X_m \times Exclusion_s) + \mu_s + \epsilon_m \quad (2)$$

Where $Land\ Reform_m$ is the (log) number of hectares of land redistributed in municipality m between 1917 and 1976. The following section presents the results of our empirical analysis.

6 Results

Table 2 reports estimates from Model (1). Our dependent variable equals one if the municipality had at least one elite revolutionary leader (i.e., the extensive margin). In every specification, we standardize $Shock_m$ —subtracting its sample mean and dividing by its sample standard deviation—so that each reported coefficient represents the change in the dependent variable associated with a one standard deviation increase in shock intensity. In this specification $\beta_1 + \beta_2$ reflects the effect of the shock index in states with politically excluded elites (states with outsider governors), whereas β_1 reflects the effect of shock intensity in states where elites were part of the regime’s ruling coalition (states with local governors). Column (1) shows a positive and statistically significant relationship between the trade shock index and the presence of elite revolutionary leaders in states governed by Díaz loyalists (outsider

¹⁰In our shift-share index, the exposure weights $\frac{Suitability_{m,j}}{Suitability_j}$ do not add up to one. In such cases, it is important to control for the sum of exposure weights $(\sum_j \frac{Suitability_{m,j}}{Suitability_j})$ since municipalities that are suitable for growing many commodities would systematically get a high $Shock_m$ value. See Borusyak et al. (2025) for a more thorough discussion on the importance of controlling for incomplete weights in shift-share designs.

governors): in these states, a one standard deviation increase in shock intensity is associated with a 4.4 percentage point increase in the probability that a municipality has an elite revolutionary leader ($\beta_1 + \beta_2$).

This effect is substantively important as it corresponds to around 116% of the mean of the dependent variable. However, consistent with our expectations, the trade shock index shows no significant association with the presence of revolutionary elites in states with local governors—where local elites retained political access (β_1). Column (2) adds geographic controls: altitude, longitude, latitude, terrain ruggedness, annual precipitation, and average temperature. The same pattern emerges: in states where local elites were politically excluded, the shock index remains strongly associated with the presence of elite revolutionaries, but this effect is absent in states where economic elites were politically represented.

One potential concern is that our measure of elite revolutionaries does not account for the total size of the local economic elite. If positively shocked municipalities were more economically developed by 1910, then the larger size of their elite populations could explain our results mechanically. However, two findings suggest that this alternative explanation is unlikely. First, if the shock primarily operates through elite population size, it would increase the presence of revolutionary elites in both outsider- and insider-governed states (as the positive shock should increase the size of the economic elite in both regions). However, the effect appears only under outsider governors, indicating that political exclusion is a crucial factor.

Second, column (3) introduces controls from the 1900 census for economic development (log population, urbanization, literacy, agricultural/manufacturing employment share, and public-sector employment). Even after including these controls, the trade shock effect persists in states with outsider governors, but remains absent elsewhere. As column (3) indicates, in states with outsider governors, a one standard deviation increase in shock intensity is associated with a 5.2 percentage point increase in the probability that the municipality produced an elite revolutionary leader ($\beta_1 + \beta_2$). It is worth noting that this is a particularly

stringent specification, as it shows that intensely shocked municipalities were more likely to have at least one elite revolutionary leader even when compared to municipalities with a similar level of economic development in the same state. However, in states where local elites were politically included (states with local governors), the intensity of the shock is not significantly correlated with the presence of elite revolutionary leaders (β_1). Figure 2 illustrates these findings by plotting the estimated marginal effect of the shock index in states with an outsider governor ($\beta_1 + \beta_2$) and an insider governor (β_1) in each specification. Section B of the online appendix shows that our results are robust when we construct the shock using changes in U.S. imports from Mexico.

Table 2: Effect of Trade Shock Index on the Presence (0-1) of an Elite Revolutionary per Municipality

	(1)	(2)	(3)
<i>Shock Index_m</i> (β_1)	0.00002 (0.014)	-0.0117 (0.015)	-0.0119 (0.015)
<i>Shock Index_m × Outsider Governor_s</i> (β_2)	0.0443** (0.022)	0.0585** (0.023)	0.0635** (0.026)
$\beta_1 + \beta_2$	0.044*** (0.017)	0.047** (0.017)	0.052** (0.021)
State Fixed Effects	✓	✓	✓
Geographic Controls		✓	✓
Demographic and Economic Controls			✓
Mean	0.0377	0.0377	0.0377
Municipalities	2369	2369	2044
R2	0.0460	0.0537	0.165

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Heteroskedasticity-robust standard errors in parentheses.

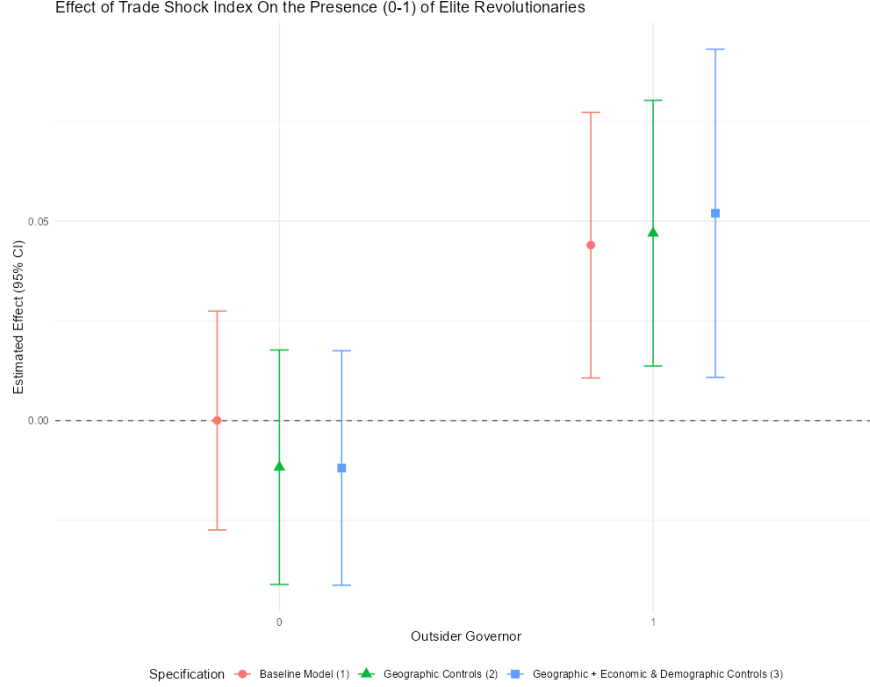


Figure 2: Estimated Effect of the Trade Shock Index in States With Outsider ($\beta_1 + \beta_2$) and Insider (β_1) Governors, Extensive Margin

6.1 Robustness Checks

As shown in Table 3, our results remain largely unchanged when we use a dependent variable that counts the number of elite revolutionary leaders from each municipality (i.e., the intensive margin). These results are consistent with our previous findings. In all specifications, our trade shock index is strongly correlated with the number of elite revolutionary leaders in municipalities in states with outsider governors. However, this association is absent in regions where local elites retained political influence. Figure 3 displays the marginal effects of shock intensity in states with politically excluded (*Outsider Governor* = 1) and included (*Outsider Governor* = 0) elites. Section C in the paper’s online appendix shows that our findings persist if we use negative binomial models.

Table 3: Effect of Trade Shock Index on the Number of Elite Revolutionaries per Municipality (Intensive Margin)

	(1)	(2)	(3)
$Shock Index_m (\beta_1)$	0.009 (0.020)	-0.008 (0.020)	-0.016 (0.022)
$Shock Index_m \times Outsider Governor_s (\beta_2)$	0.0894* (0.048)	0.108** (0.047)	0.144** (0.058)
$\beta_1 + \beta_2$	0.098** (0.043)	0.099** (0.042)	0.127** (0.054)
State Fixed Effects	✓	✓	✓
Geographic Controls		✓	✓
Demographic and Economic Controls			✓
Mean	0.0554	0.0554	0.0554
Municipalities	2369	2369	2044
R2	0.0499	0.0612	0.218

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Heteroskedasticity-robust standard errors in parentheses.

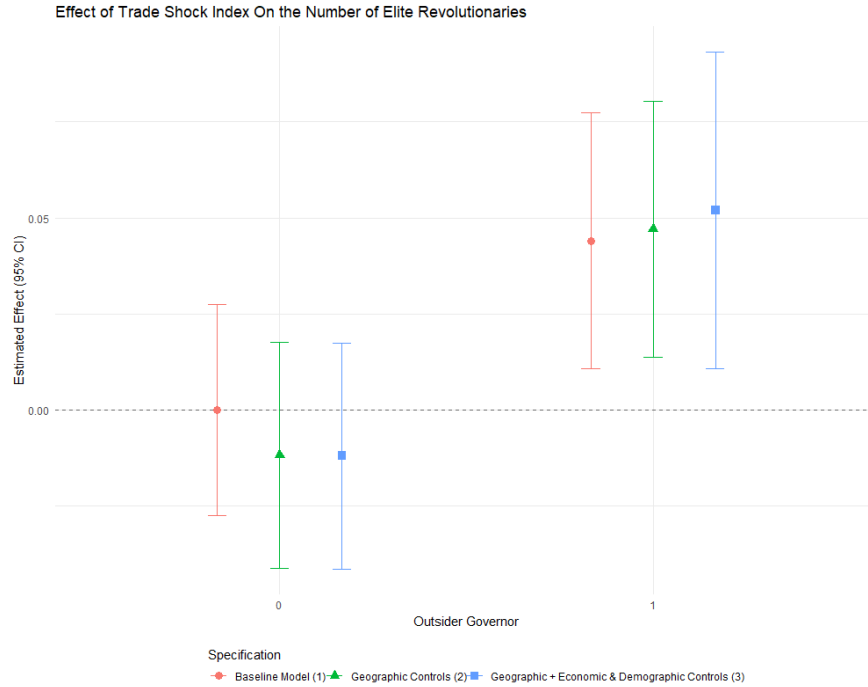


Figure 3: Estimated Effect of the Trade Shock Index in States With Outsider ($\beta_1 + \beta_2$) and Insider (β_1) Governors, Intensive Margin

6.1.1 Spatial Autocorrelation

As Figure 1 shows, neighboring municipalities generally have similar shock intensity values because they have similar geographic endowments. Thus, a major concern is that there is substantial spatial autocorrelation in the shock intensity variable, which may lead us to underestimate standard errors. To address this, we re-estimate our core specification assuming spatial autocorrelation in the errors of municipalities that are within 100 km of each other¹¹. More specifically, we use the *acreg* Stata package to estimate Conley spatial HAC standard errors. As Table 4 shows, our findings are robust to this adjustment. Moreover, Section E of the paper’s online appendix shows that our core results are also robust to clustering standard errors at the state level.

Table 4: Effect of Trade Shock Index on the Presence (0-1) of an Elite Revolutionary per Municipality

	(1)	(2)	(3)
<i>Shock Index_m</i> (β_1)	0.00002 (0.011)	-0.0117 (0.014)	-0.0119 (0.008)
<i>Shock Index_m × Outsider Governor_s</i> (β_2)	0.0443* (0.024)	0.0585*** (0.018)	0.0635** (0.028)
$\beta_1 + \beta_2$	0.044** (0.022)	0.047** (0.021)	0.052** (0.026)
State Fixed Effects	✓	✓	✓
Geographic Controls		✓	✓
Demographic and Economic Controls			✓
Mean	0.0377	0.0377	0.0377
Municipalities	2369	2369	2044
R2	0.0460	0.0537	0.165

*Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Standard errors allowing municipal correlation within 100 km (Conley, spatial-HAC) appear in parentheses.*

6.1.2 Alternative Shock Specification

Our results are robust to defining the shift in American imports of commodity j as the percentage change in imports of commodity j between 1877 and 1910. More formally, we

¹¹Our results remain robust when the distance cutoff is set to 50, 150, 200, or 500 km.

define $Ratio Shock_m = \sum_{j=1}^J (\frac{M_{j,US,1910} - M_{j,US,1877}}{M_{j,US,1877}} \times 100) \times \frac{Suitability_{m,j}}{Suitability_j}$. Section D in the online appendix reports the results of running this specification.

6.2 Land Reform

Our final set of results examines whether the participation of economic elites in the Mexican Revolution shaped the implementation of post-revolutionary land reform. Recent accounts of elite-led regime change argue that such transitions are unlikely to produce substantial redistribution ([Albertus and Menaldo, 2018](#); [Ansell and Samuels, 2014](#)). This view, however, assumes that the government chooses a single level of redistribution that affects all economic elites (or all elites in a given sector) roughly equally. Yet the implementation of redistributive policies is often highly discretionary, and such discretion allows a governing coalition to redistribute extensively while directing the costs of reform away from the regions and assets of its elite allies. The Mexican case illustrates this possibility. Although members of the economic elite played a significant role in the Revolution, the post-revolutionary governments implemented a radical land reform program that redistributed around half of the country's territory. At the same time, every land grant required the approval of the state governor and the president ([Sanderson, 1984](#)), which gave the elites within the governing coalition substantial control over where, and how intensely, land was redistributed.

We measure land reform intensity as the (log of) total hectares redistributed in each municipality between 1917 and 1976¹². We then regress this variable on the same interaction between shock intensity and political exclusion that we use in our main results, which isolates plausibly exogenous variation that produced elite revolutionaries. Specifically, we estimate the following model:

$$Land Reform_m = \beta_1 Shock_m + \beta_2 (Shock_m \times Exclusion_s) + \alpha_1 (\sum X_m) + \alpha_2 (\sum X_m \times Exclusion_s) + \mu_s + \epsilon_m \quad (2)$$

¹²We estimate this variable using [Sanderson \(2013\)](#)'s dataset on land grants.

Where $Land\ Reform_m$ is the (log) number of hectares redistributed in municipality m between 1917 and 1976, and the remaining terms are defined as in Model (1). In addition to the baseline geographic and economic controls, all specifications control for the municipality’s (log) total area¹³.

Table 5 reports the model’s estimates.¹⁴ The results show two patterns. First, in states where local elites had retained political power (and thus generally did not support the Revolution), land reform intensity is strongly correlated with a municipality’s potential for valuable export-oriented production. This association is captured by β_1 , which is positive and highly significant in all specifications: in these states, a one standard deviation increase in shock intensity is associated with approximately a 77 percent increase in the number of hectares redistributed (column 3). In other words, in these states there was significantly more land reform in municipalities that were better endowed for growing booming export crops, which were the most dynamic and lucrative form of agricultural production at the time (Kuntz Ficker, 2007). Because of their economic power, local elites who had not supported the Revolution were potential—and in some regions overt—opponents of the new revolutionary government. In this sense, our findings suggest that the revolutionary government strategically used land reform to confiscate and redistribute these elites’ most valuable assets and reduce their power.¹⁵

Second, this pattern is absent in states where local elites were politically excluded before the Revolution, and where elite participation in the Revolution was consequently much higher. In these states, high-value, export-oriented land was not redistributed at a higher rate than less valuable land: a municipality’s shock intensity does not predict land

¹³We use this approach instead of using the share of municipal area redistributed because the share is very noisy for small municipalities. Nevertheless, Table 7 in Appendix G shows that this section’s findings are robust to using the share redistributed as the dependent variable. Table 8 in Appendix H shows that our findings are also robust to using an unlogged version of the dependent variable.

¹⁴Our results are similar when we focus on redistributive grants of irrigated lands, which were the most productive lands and the core of elite-owned agricultural estates (Garfias, 2018). Section F of the online appendix shows that, in states with insider governors, shock intensity is significantly correlated with the number of irrigated hectares redistributed, whereas no such association exists in states with outsider governors.

¹⁵This interpretation is consistent with Garfias (2018), who finds that revolutionary leaders exploited periods of elite weakness caused by commodity price shocks to seize the lands of local elites.

redistribution once geographic controls are included ($\beta_1 + \beta_2$ is not statistically different from zero in columns 2 and 3). While only suggestive, this asymmetry is consistent with the argument that land reform was strategically implemented to confiscate the most valuable assets of elites who were not part of the revolutionary ruling coalition (and thus constituted potential rivals to the new regime), while sparing the assets of aligned local elites.

Table 5: Effect of Trade Shock Index on Land Reform, Log Hectares (1917-1976)

	<i>Log Redistributed Hectares</i>		
	(1)	(2)	(3)
<i>Shock Index_m</i> (β_1)	0.457*** (0.165)	0.891*** (0.188)	0.768*** (0.195)
<i>Shock Index_m × Outsider Governor_s</i> (β_2)	0.252 (0.237)	-0.759*** (0.258)	-0.636** (0.261)
$\beta_1 + \beta_2$	0.710*** (0.170)	0.132 (0.177)	0.132 (0.174)
State Fixed Effects	✓	✓	✓
Geographic Controls		✓	✓
Demographic and Economic Controls			✓
Mean	7.20	7.20	7.20
Municipalities	2369	2369	2044
R2	0.581	0.619	0.673

*Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Heteroskedasticity-robust standard errors in parentheses. Each specification also controls for the municipality's log surface area.*

7 Discussion and Final Remarks

Recent research argues that successful anti-regime mobilization typically requires support from politically excluded economic elites—groups whose substantial economic resources and lack of political influence provide them with both incentives to challenge the regime and capacity to do so (Ansell and Samuels, 2014; Albertus and Menaldo, 2018). Understanding the origins of such outsider elites is therefore critical for explaining revolutions and democratic transitions. We argue that positive external trade shocks—particularly export booms—constitute a key mechanism for their emergence. Crucially, since external demand shocks are largely outside the control of incumbent elites, international trade can empower politically excluded groups and thus enable them to mobilize against the regime.

In this paper, we examine how trade shocks shaped elite anti-regime mobilization in the Mexican Revolution by leveraging the surge in American agricultural imports during the Second Industrial Revolution. We exploit detailed biographical data on over 5,000 prominent revolutionary figures to identify and geolocate members of the economic elite who supported the revolution. Using a shift-share variable, we demonstrate that the intensity of a municipality’s trade shock strongly predicts the presence of elites who supported the revolution in regions where economic elites were politically excluded before the revolution. However, no such relationship exists in states where local elites were part of the ruling coalition. This underscores the importance of political exclusion as a crucial moderating variable. Previous research on anti-regime elite mobilization has primarily focused on elite fragmentation driven by industrialization. Our findings extend this work by showing that international trade shocks can also generate elites that are economically empowered yet politically excluded. Our analysis also underscores how revolutionary elites influence post-revolutionary policymaking. Following successful revolutions, newly empowered outsider elites gain substantial political influence to design redistributive policies. In Mexico, our results suggest that revolutionary governments strategically targeted economically valuable lands, such as land suitable for export crops, when these lands were owned by anti-revolutionary elites while

sparing high-value assets in regions with pro-revolutionary economic elites.

This paper contributes to research on elite-led revolutions and democratization by identifying external trade shocks as a catalyst for revolutionary elite mobilization. Furthermore, we demonstrate that the geographic origins of these elites critically shape post-revolution redistribution patterns. Future work should examine how such elites establish their influence during democratic transitions. Ultimately, our findings reveal a critical vulnerability of authoritarian regimes: their integration into global markets can inadvertently empower the coalitions that dismantle them.

References

- Acemoglu, D., Johnson, S., and Robinson, J. (2005). The rise of europe: Atlantic trade, institutional change, and economic growth. *American economic review*, 95(3):546–579.
- Acemoglu, D. and Robinson, J. A. (2005). *Economic Origins of Dictatorship and Democracy*. Cambridge University Press.
- Aguilar Camín, H. (2017). *La frontera nómada: Sonora y la Revolución mexicana*. Historia. Fondo de Cultura Económica, Ciudad de México.
- Aguilar Camín, H. and Meyer, L. (1993). *In the Shadow of the Mexican Revolution: Contemporary Mexican History, 1910–1989*. LLILAS Translations from Latin America Series. Copublished with The Teresa Lozano Long Institute of Latin American Studies, University of Texas at Austin.
- Alarcón Menchaca, L. (2004). *José María Maytorena: una biografía política*. Tesis de doctorado en historia, Universidad Iberoamericana, México, D.F. Directora: Jane Dale Lloyd.
- Albertus, M. (2015). *Autocracy and Redistribution: The Politics of Land Reform*. Cambridge Studies in Comparative Politics. Cambridge University Press.
- Albertus, M., Diaz-Cayeros, A., Magaloni, B., and Weingast, B. R. (2016). Authoritarian survival and poverty traps: Land reform in mexico. *World Development*, 77:154–170.
- Albertus, M. and Menaldo, V. (2014). Gaming democracy: Elite dominance during transition and the prospects for redistribution. *British Journal of Political Science*, 44(3):575–603.
- Albertus, M. and Menaldo, V. (2018). *Authoritarianism and the Elite Origins of Democracy*. Cambridge University Press.
- Ansell, B. and Samuels, D. (2010). Inequality and democratization: A contractarian approach. *Comparative Political Studies*, 43(12):1543–1574.

- Ansell, B. W. and Samuels, D. J. (2014). *Inequality and Democratization: An Elite-Competition Approach*. Cambridge Studies in Comparative Politics. Cambridge University Press.
- Assies, W. (2008). Land tenure and tenure regimes in Mexico: An overview. *Journal of Agrarian Change*, 8(1):33–63.
- Balmori, D., Voss, S., and Wortman, M. (1984). *Notable Family Networks in Latin America*. University of Chicago Press.
- Beramendi, P., Dincecco, M., and Rogers, M. (2019). Intra-elite competition and long-run fiscal development. *The Journal of Politics*, 81(1):49–65.
- Boix, C. (2003). *Democracy and Redistribution*. Cambridge University Press.
- Boix, C. and Svolik, M. W. (2013). The foundations of limited authoritarian government: Institutions, commitment, and power-sharing in dictatorships. *The Journal of Politics*, 75(2):300–316.
- Borusyak, K., Hull, P., and Jaravel, X. (2025). A practical guide to shift-share instruments. *Journal of Economic Perspectives*, 39(1):181–204.
- Camp, R. A. (1991). *Mexican Political Biographies, 1884–1934*. University of Texas Press.
- Dasgupta, A. (2018). Technological change and political turnover: The democratizing effects of the green revolution in india. *American Political Science Review*, 112(4):918–938.
- Dell, M. (2012). Path dependence in development: Evidence from the mexican revolution. Working Paper.
- Evans, S. (2007). *Bound in twine : the history and ecology of the henequen-wheat complex for Mexico and the American and Canadian Plains, 1880-1950*. Texas A&M environmental history series ; no. 21. Texas A&M University Press, College Station, 1st ed. edition.

- Falcón, R. (1988). La desaparición de jefes políticos en Coahuila. Una paradoja porfirista. *Historia Mexicana*, 37(3):423–467.
- Frank, Z. and Musacchio, A. (2006). The international rubber market, 1870-1930. In Topik, S., Marichal, C., and Frank, Z., editors, *From Silver to Cocaine: Latin American Commodity Chains and the Building of the World Economy, 1500-2000*, pages 271–299. Duke University Press.
- Gandhi, J. and Przeworski, A. (2006). Cooperation, cooptation, and rebellion under dictatorships. *Economics & politics*, 18(1):1–26.
- Garfias, F. (2018). Elite competition and state capacity development: Theory and evidence from post-revolutionary mexico. *American Political Science Review*, 112(2):339–357.
- Grodsky, B. K. (2012). *Social movements and the new state: The fate of pro-democracy organizations when democracy is won*. Stanford University Press.
- Guerra, F.-X. (1988). *México: del Antiguo Régimen a la Revolución*. Fondo de Cultura Económica, Mexico City. 2 vols.
- Haber, S., Razo, A., and Maurer, N. (2003). *The Politics of Property Rights: Political Instability, Credible Commitments, and Economic Growth in Mexico, 1876–1929*. Political Economy of Institutions and Decisions. Cambridge University Press.
- Hijmans, R. J. and Manners, R. (2022). *Recocrop: Estimating Environmental Suitability for Plants*. R package version 0.4-1.
- INEHRM (1994). *Diccionario histórico y biográfico de la revolución mexicana*. Instituto Nacional de Estudios Históricos de la Revolución Mexicana, Distrito Federal, México, 2a ed. edition. 8 volúmenes. Incluye bibliografía e índice.
- Katz, F. (1974). Labor conditions on haciendas in Porfirian Mexico: Some trends and tendencies. *Hispanic American Historical Review*, 54(1):1–47.

- Katz, F. (1991). The liberal republic and the porfiriato, 1867–1910. In Bethell, L., editor, *Mexico since Independence*, pages 49–124. Cambridge University Press, Cambridge.
- Keesing, D. B. (1969). Structural change early in development: Mexico’s changing industrial and occupational structure from 1895 to 1950. *Journal of Economic History*, 29(4):716–738.
- Knight, A. (1986). *The Mexican Revolution*. Cambridge Latin American studies ; 54-55. Cambridge University Press, Cambridge [Cambridgeshire] ;.
- Kourí, E. (2004). *A Pueblo Divided: Business, Property, and Community in Papantla, Mexico*. Stanford University Press, Stanford.
- Kuntz Ficker, S. (2001). El comercio exterior durante la década revolucionaria: un acercamiento preliminar. *Política y Cultura*, (16):235–273. Otoño.
- Kuntz Ficker, S. (2007). *EL PATRÓN DEL COMERCIO: PAÍSES Y PRODUCTOS*, pages 141–178. El Colegio de Mexico, 1 edition.
- Kuntz Ficker, S. (2012). De las reformas liberales a la Gran Depresión, 1856–1929. In Kuntz Ficker, S., editor, *Historia mínima de la economía mexicana, 1519–2010*, pages 148–231. El Colegio de México, Mexico City.
- Lizzeri, A. and Persico, N. (2004). Why did the elites extend the suffrage? democracy and the scope of government, with an application to britain’s “age of reform”. *The Quarterly Journal of Economics*, 119(2):707–765.
- Llavador, H. and Oxoby, R. J. (2005). Partisan competition, growth, and the franchise. *The Quarterly Journal of Economics*, 120(3):1155–1189.
- Magaloni, B. (2008). Credible power-sharing and the longevity of authoritarian rule. *Comparative political studies*, 41(4-5):715–741.

- Meyer, J. A. (1976). *The Cristero Rebellion: The Mexican People Between Church and State 1926–1929*. Cambridge Latin American Studies. Cambridge University Press.
- Moore, Jr., B. (1966). *Social Origins of Dictatorship and Democracy: Lord and Peasant in the Making of the Modern World*. Beacon Press.
- Naidu, S., Robinson, J. A., and Young, L. E. (2021). Social origins of dictatorships: Elite networks and political transitions in haiti. *American Political Science Review*, 115(3):900–916.
- Sanderson, S. R. W. (1984). *Land Reform in Mexico: 1910–1980*. Academic Press.
- Sanderson, S. W. (2013). Land reform in Mexico 1910–1976. Inter-university Consortium for Political and Social Research (ICPSR 34388). Dataset.
- Svolik, M. W. (2012). *The politics of authoritarian rule*. Cambridge University Press.
- Tinker Salas, M. (1997). *In the Shadow of the Eagles: Sonora and the Transformation of the Border During the Porfiriato*. University of California Press, Berkeley, CA.
- Topik, S. (2006). The world coffee market in the eighteenth and nineteenth centuries, from colonial to national regimes. In Topik, S., Marichal, C., and Frank, Z., editors, *From Silver to Cocaine: Latin American Commodity Chains and the Building of the World Economy, 1500–2000*, pages 118–148. Duke University Press.
- Tovar Mota, V. and Vázquez Valenzuela, D. A. (2024). Hombres necesarios, coaliciones débiles. la tensión entre el centro y las facciones coahuilenses durante la gubernatura de José María Garza Galán, 1886–1893. In Gantús, F. and Salmerón Castro, A., editors, *Un siglo de tensiones: gobiernos generales y fuerzas regionales: dinámicas políticas en el México del siglo XIX*. Instituto de Investigaciones Dr. José María Luis Mora.
- Tutino, J. (1986). *Toward Insurrection: Provincial Elites, Political Conspiracies, and Drought, 1808–1810*, pages 99–137. Princeton University Press.

U.S. Department of Commerce and Labor, Bureau of Statistics (1910). *Foreign Commerce and Navigation of the United States for the Fiscal Year Ending June 30, 1910*. Government Printing Office, Washington, D.C.

U.S. Department of the Treasury, Bureau of Statistics (1877). *Foreign Commerce and Navigation of the United States for the Fiscal Year Ending June 30, 1877*. Government Printing Office, Washington, D.C.

Wasserman, M. (1984). *Capitalists, Caciques, and Revolution: The Native Elite and Foreign Enterprise in Chihuahua, Mexico, 1854–1911*. University of North Carolina Press, Chapel Hill.

Online Appendix

Joining the Revolution: Trade Shocks and Elite Support for Revolutionary Movements

A Descriptive Statistics

Table 1: Descriptive Statistics

Variable	Mean	SD	N
<i>Normalized Shock Index_m</i>	0.00	1.00	2369
<i>Outsider Governor_s</i>	0.43	0.49	2369
<i>Number of elite revolutionaries_m</i>	0.06	0.34	2369
<i>Elite revolutionary presence (0, 1)_m</i>	0.04	0.20	2369
<i>Average terrain slope_m (degrees)</i>	4.65	3.49	2369
<i>Average altitude_m (meters)</i>	1384.09	816.18	2369
<i>Longitude_m (degrees)</i>	-98.72	4.29	2369
<i>Latitude_m (degrees)</i>	20.00	3.33	2369
<i>Average yearly precipitation (millimeters)</i>	1038.73	557.85	2369
<i>Average yearly temperature (Celsius)</i>	19.97	3.90	2369
<i>Population 1900 (log)_m</i>	8.16	1.08	2044
<i>Literacy rate (1900)</i>	11.77	8.66	2044
<i>Percentage working age in manufacturing_m</i>	0.24	1.20	2044
<i>Percentage working age in agriculture_m</i>	49.30	11.53	2044
<i>Urbanization rate</i>	12.59	28.34	2044
<i>Sum of suitability weights</i>	13.00	8.67	2369
<i>Number of bureaucrats</i>	10.47	37.22	2044
<i>Log redistributed hectares (1917 – 1976)_m</i>	7.20	4.09	2369
<i>Redistributed km² (1917 – 1976)_m</i>	283.99	1129.07	2369

B Realized Shift in American Imports from Mexico

In this specification, instead of using the change in American imports from the rest of the world, we use the realized change in American imports from Mexico to build the shift-share variable. More specifically, we define

$$\sum_{j=1}^J \log(\Delta(M)_{j,US-MX,1910-1877}) \times \frac{Suitability_{m,j}}{Suitability_j}$$

Table 2: Effect of Trade Shock Index on the Presence (0-1) of an Elite Revolutionary per Municipality

	(1)	(2)	(3)
<i>Shock Index_m</i> (β_1)	0.00131 (0.015)	-0.0118 (0.017)	-0.0130 (0.017)
<i>Shock Index_m × Outsider Governor_s</i> (β_2)	0.0472* (0.025)	0.0696** (0.027)	0.0729** (0.031)
$\beta_1 + \beta_2$	0.048** (0.020)	0.057*** (0.021)	0.060** (0.026)
State Fixed Effects	✓	✓	✓
Geographic Controls		✓	✓
Demographic and Economic Controls			✓
Mean	0.0377	0.0377	0.0377
Municipalities	2369	2369	2044
R2	0.0457	0.0522	0.160

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Heteroskedasticity-robust standard errors in parentheses.

C Negative Binomial Model

Table 3: Effect of Trade Shock Index on the Number of Elite Revolutionaries per Municipality, Negative Binomial Models (Intensive Margin)

	(1)	(2)	(3)
$Shock\ Index_m\ (\beta_1)$	0.153 (0.286)	-0.473 (0.386)	-0.369 (0.562)
$Shock\ Index_m \times Outsider\ Governor_s\ (\beta_2)$	0.629* (0.358)	1.386*** (0.449)	0.826 (0.609)
$\beta_1 + \beta_2$	0.781*** (0.212)	0.913*** (0.226)	0.457** (0.229)
State Fixed Effects	✓	✓	✓
Geographic Controls		✓	✓
Demographic and Economic Controls			✓
Mean	0.0554	0.0554	0.0554
Municipalities	2369	2369	2044

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

D Alternative Functional Specification

D.0.1 Ratio Shock Index

Table 4: Effect of Trade Shock Index on the Presence (0-1) of an Elite Revolutionary per Municipality

	(1)	(2)	(3)
<i>Ratio Shock Index_m</i> (β_1)	-0.00652 (0.011)	-0.0257* (0.013)	-0.0311** (0.015)
<i>Ratio Shock Index_m × Outsider Governor_s</i> (β_2)	0.0331* (0.018)	0.0711*** (0.021)	0.0677*** (0.022)
$\beta_1 + \beta_2$	0.026* (0.014)	0.046*** (0.016)	0.037** (0.016)
State Fixed Effects	✓	✓	✓
Geographic Controls		✓	✓
Demographic and Economic Controls			✓
Mean	0.0377	0.0377	0.0377
Municipalities	2369	2369	2044
R2	0.0440	0.0538	0.163

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Heteroskedasticity-robust standard errors in parentheses.

E Standard errors clustered at the state level

Table 5: Effect of Trade Shock Index on the Presence (0-1) of an Elite Revolutionary per Municipality

	(1)	(2)	(3)
<i>Shock Index_m</i> (β_1)	0.00002 (0.012)	-0.0117 (0.013)	-0.0119 (0.013)
<i>Shock Index_m × Outsider Governor_s</i> (β_2)	0.0443** (0.022)	0.0585** (0.026)	0.0635** (0.024)
$\beta_1 + \beta_2$	0.044*** (0.018)	0.047** (0.022)	0.052** (0.020)
State Fixed Effects	✓	✓	✓
Geographic Controls		✓	✓
Demographic and Economic Controls			✓
Mean	0.0377	0.0377	0.0377
Municipalities	2369	2369	2044
R2	0.0460	0.0537	0.165

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Cluster-robust standard errors (state level) in parentheses.

F Land Reform of Irrigated Land

In this specification, the dependent variable is the log of the number of hectares of irrigated land redistributed in each municipality between 1917 and 1976 (Sanderson, 2013). As in Table 5, each specification controls for the municipality's log surface area.

Table 6: Effect of Trade Shock Index on Land Reform of Irrigated Land, Log Hectares (1917-1976)

	<i>Log Redistributed Irrigated Hectares</i>		
	(1)	(2)	(3)
<i>Shock Index_m</i> (β_1)	0.604*** (0.178)	0.878*** (0.200)	0.764*** (0.210)
<i>Shock Index_m × Outsider Governor_s</i> (β_2)	0.156 (0.247)	-0.591** (0.269)	-0.755** (0.298)
$\beta_1 + \beta_2$	0.759*** (0.170)	0.287 (0.179)	0.009 (0.212)
State Fixed Effects	✓	✓	✓
Geographic Controls		✓	✓
Demographic and Economic Controls			✓
Mean	2.63	2.63	2.63
Municipalities	2369	2369	2044
R2	0.379	0.423	0.465

*Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Heteroskedasticity-robust standard errors in parentheses. Each specification also controls for the municipality's log surface area.*

G Land Reform as a Share of Municipal Area

Table 7: Effect of Trade Shock Index on Land Reform, Share of Municipal Area Redistributed (1917-1976)

	<i>Share of Municipal Area Redistributed (%)</i>		
	(1)	(2)	(3)
<i>Shock Index_m</i> (β_1)	3.825** (1.494)	8.556*** (1.436)	6.927*** (1.513)
<i>Shock Index_m × Outsider Governor_s</i> (β_2)	3.962* (2.245)	-6.784*** (2.276)	-5.223** (2.540)
$\beta_1 + \beta_2$	7.787*** (1.675)	1.772 (1.766)	1.705 (2.040)
State Fixed Effects	✓	✓	✓
Geographic Controls		✓	✓
Demographic and Economic Controls			✓
Mean	33.71	33.71	33.71
Municipalities	2369	2369	2044
R2	0.149	0.222	0.307

*Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Heteroskedasticity-robust standard errors in parentheses. Each specification also controls for the municipality's log surface area.*

H Land Reform, Unlogged Hectares

Table 8: Effect of Trade Shock Index on Land Reform, Hectares (1917-1976)

	<i>Redistributed Hectares</i>		
	(1)	(2)	(3)
<i>Shock Index_m</i> (β_1)	23153.9** (9870.3)	26707.8*** (9739.8)	23594.2*** (5280.2)
<i>Shock Index_m × Outsider Governor_s</i> (β_2)	-16851.5 (11604.9)	-20444.0* (11527.5)	-13713.8 (9322.4)
$\beta_1 + \beta_2$	6302.4 (6103.3)	6263.7 (6166.0)	9880.4 (7682.8)
State Fixed Effects	✓	✓	✓
Geographic Controls		✓	✓
Demographic and Economic Controls			✓
Mean	28398.7	28398.7	28398.7
Municipalities	2369	2369	2044
R2	0.474	0.482	0.822

*Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Heteroskedasticity-robust standard errors in parentheses. Each specification also controls for the municipality's log surface area.*