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ABSTRACT

We explore the long run impact of the Spanish missions on Native American outcomes in the early 20th century. Native communities who interacted with Spanish missionaries developed into enclaves which blended Catholicism with native culture. Some survived assaults on their property rights by Mexico and the US to persist as reservations into the 20th century. We found that having extensive contact with missions increased the percentage of Native Americans Catholic, decreased crime rates, and increased income from agriculture and overall earnings from wages. Surprisingly, we found no impact on education.

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A online appendix is available at http://www.nber.org/data-appendix/w30255

I. Introduction

The Spanish missions in the present-day states of Arizona, California and New Mexico had in some cases a presence of nearly two and a half centuries. Given the length of time over which Spain ruled Arizona, New Mexico, and California, it is surprising that there has been little systematic work assessing the long run socio-economic impact of the Spanish missions on Native Americans in U.S.[1] We address this gap in the literature by assessing, both qualitatively and quantitatively, the long run impact of the missions on Native American communities. The closest to our work is Waldinger (2017), who estimated the impact of the different types of missionaries on educational outcomes across Mexico in the 21st century. She found that the Franciscans had the largest impact on education, literacy, and percentage Catholic.

Our research seeks to change the way we talk about Spanish missions in US economic history. The role of the Catholic Church and the missions has been vilified to the point that in 2020 California mobs pulled down statues of Franciscans, and an arsonist set fire to Mission San Gabriel in Los Angeles. Catholicism has always had two sides, religion from below as well as rules from above. On the Spanish imperial frontier after 1680, negotiation characterized the relationship between missionary and native communities because that was the means of pulling thousands of native people into Catholicism with minimal military backup. Negotiation created a syncretic form of religion, and it also created congregations with social cohesion. That

[1] There is considerable literature on the impact of missionaries elsewhere: Woodberry (2004), Gallego and Woodberry (2010), and Nunn (2010) find a positive impact of missions in Colonial Africa on education; Bai and Kung (2015) find that missions in China had a positive impact on knowledge diffusion; Nunn (2014) finds a differential effect on education by gender across the Catholic and Protestant missionaries in Africa; Valencia Caicedo (2019) finds positive effects in the 21st century on education, income and health on the indigenous from Jesuit missionaries in Argentina, Brazil and Paraguay; and Bergeron (2020) finds that exposure to missions in Democratic Republic of the Congo led to more acceptance of outsiders as well as the adoption of more universal moral values as opposed to communal moral values. There has been recent work depicting the enslavement of Native peoples (Nunn 2008; Resendez 2016). Slaves did exist in Spanish America, but by mid-16th century **baptized** Native Americans could not be enslaved.

cohesion fostered islands of native cultural and economic survival in the hard times that imperialism brought. Schermerhorn (2019) advises us to ask not what the Catholic hierarchy intended, but rather what Native Americans made of Catholicism.[2]

We view the mission as a Spanish organization with its set of institutions and norms. In our narrative we segment the institutional change into four periods: 1) initial settlement and control by the Spanish from 1598 until 1680 when the Spanish were forced out of New Mexico for 16 years; 2) 1696-1810 when the Spanish and the missions became more accommodative to melding Native American practices with Catholicism; 3) New rules under Mexican occupation from 1821-1848; and 4) 1848-1917 when the U.S. took control over the land in present day AZ, CA and NM.[3]

We test whether the legacy of a mission enhanced the ability of Native Americans on reservations to preserve cultural cohesion and survive economically. We use regression models with data from the Annual Reports of the Commissioner of Indian Affairs in the period 1911 - 1917. We measure community cohesion by looking at crime statistics. We measure cultural persistence by whether marriages are within the native culture. We examine economic well-being with measures of income from crops per capita; overall income per capita; and earnings from work per capita. We measure social advancement through educational attainment. Our results indicate both an economic and statistically significant effect of a Spanish mission legacy on Catholicism, crime rates, income from agriculture and earnings from work per capita, and marriages within the native culture.

[2] Schermerhorn is informed by McNally 2009. See also page 123 where Schermerhorn's informant Tohono O'odham elder Simon Lopez says "Who are you gonna believe: God or I'itoi? …the O'odham say, 'Our Creator,' it's the same thing."
[3] 1811-1820 were years of civil war, as Spain sought to hold on to empire, and emerging republican Mexico fought for independence.

II. Context

In contrast to slaves, baptized native peoples in Spanish society were viewed as tied to the land. Indeed, it was the tie to the land that the Spanish manipulated to pressure people into baptism: the way a native community could retain long-term peaceful ties to its territory was to agree to be baptized into a mission. The Spanish were difficult to dislodge, and furthermore agreeing to baptism would activate the missionary's role as defender of labor and land rights of his congregation against threats of usurpation by military men stationed nearby (Bolton 1917: 46; Duggan 2005: 348; Sheridan 2006: 93).

The Spanish arrived in New Mexico in 1598, Arizona in 1694, and California in 1769. Since the 16th century, Spaniards viewed the Pueblo of New Mexico as an advanced civilization while simultaneously holding other peoples of the Southwest to be uncivilized. The terraced structures and irrigated fields of the peoples of New Mexico impressed incoming Spaniards, and for this reason the Spanish called them 'Pueblos,' meaning 'villages' in Spanish. Mexico and later the U.S. reenforced Spain's special treatment of New Mexico's Pueblo people by securing their rights to land (Warren 1924: 36-38).

IIa. 1598-1680: Catholicism from Above: New Mexico

The motivation of the missionaries was to convert the Native Americans to Catholicism. The motivation of the Spanish civil actors was profit seeking through trade or mining. After Francisco Vázquez de Coronado's 1540-42 expedition to New Mexico in search of minerals, there was a hiatus in explorations of the territory north of present-day Mexico until 1598 when silver miner Juan de Oñate launched an expedition with the intent of settlement. The expedition included 560 individual settlers, and soldiers as well as 8 missionaries (Riley 1999: 40-44).

In 1598, missionaries established in New Mexico the first sustained presence, with the building of a church, San Juan Bautista, on the present day Ohkay Owingeh Pueblo, about 90 miles north of Santa Fe. The Crown was quite supportive of the missionaries and by 1629 New Mexico had 46 Franciscans spread across New Mexico from Senecu in the South to Taos in the North and from El Paso in the East to the Hopi in the West (part of present-day Arizona). Governors brought merchandise to Santa Fe, sending the baptized Pueblo to trade with the Apache, Comanche, and Wichita. At times, the Santa Fe business community captured the unconverted Apache and sold them into slavery to the south.

Resentment against the missionaries, settlers and governors grew over the course of the 17th century. The numerous tribes and their own rivalries prevented any concerted resistance until the 1670s when they organized collectively under the leadership of Popé, a Tewa medicine man who moved to Taos, which had always been an area of resistance. By 1680, 250 missionaries had served in New Mexico since 1598 claiming upwards of 50,000 conversions (Kessell 2002: 102-104).

The Pueblo revolt on August 10, 1680, was masterfully orchestrated. The Native Americans, who always outnumbered the Hispanic residents, overwhelmed the missionaries, and lay populace alike. In six weeks of fighting, after which the Spaniards left New Mexico, the Native Americans killed 21 of 32 missionaries and approximately 380 Spaniards of New Mexico (Kessell 2002: 123). The Spaniards left New Mexico but still retained a presence in El Paso.

IIb. Native American Land Rights Under Spain's Laws of the Indies: 1680 to 1810

After the 1680 revolt, the Spanish did not return for 16 years, and thereafter compromise was a pronounced feature of Spanish relationships with the Native Americans. Traditional religious beliefs co-existed with baptism, "so long as such practice did not interfere with daily

Christian instruction, worship and work" (Kessel 2008: 174). This kind of syncretic religion--blending traditional spirituality and Catholic practice--came to characterize indigenous community throughout the Spanish American world. It also coincides with what the 21st century Tohono O'odham (of Arizona) Felix Antone states: "Although we held on to our cultural values…we also brought in the Christian values that really kind of fit with O'odham values…. We have our culture, but…this way of thinking fits pretty well with our traditional beliefs, our traditional values. And so, we accepted and began to do some of those things that showed our faith in Christianity" (Schermerhorn 2019:132). The implication is a religious practice that melded Catholic rituals onto older spiritual tradition.

The Laws of the Indies, a compilation of edicts published in 1680, stated that in the Spanish legal system, baptized native people could not be enslaved and those who practiced agriculture had rights to land. Missionaries would use it to act as advocates for native land rights, citing Law 9, Title 3, Book 6: "The land that they formerly held is not to be taken from those Indians reduced." "Reduced" refers to the process of *congregación*, so the law meant baptized people practicing Catholic rituals in community had the legal right to hold onto their land. They continued, "[The land] will be preserved just as they had it before, so that they may cultivate it and attempt improvements." Per Law 9, Title 12, Book 4 "No [land] can be given to Spaniards if it damages the Indians, and if given and having caused harm, it must be returned." Finally, Law 46, Title 6, Book 1 guaranteed every 400 Indians a parish with seven leagues (22 sq miles) of land attached to it. In 1687, the King of Spain gave Pueblo Native Americans rights to their land, enjoining settlers to keep a distance of 1,000 varas[4] between Pueblo land and their own.

[4] A vara is roughly equal to a yard.

The Pueblo people already lived in community, which facilitated inculcating new religious rituals.

Beginning in 1691 the Hispanic New Mexicans returned but there were still repeated battles in the mid-1690s until the fighting ended in 1696. By 1696 New Mexico had 13 missionaries but 8 more came in 1697 (Riley 1999: 247). Part of the revolt against Franciscans in 1680 had been due to the missions trying to stamp out Native American religious practices. When they returned, the missionaries became more flexible with respect to allowing conversion but still allowing the Native American religious rituals. This flexibility was the beginning of the building of more durable communities.

In 1691, before the Franciscans returned to New Mexico, the Jesuits established missions in the Pimeria from Guaymas up to Caborca and Nogales, near present-day Arizona. The Jesuit expansion was contemporaneous with silver mines opening between Sinaloa and Sonora (Real de San Juan 1657, Nacosari 1660, Bacanuche 1678, Los Frailes 1683). The Jesuits continued to expand northward along the Santa Cruz River and established two missions, Guevavi/Tumacacori 1691- and San Xavier del Bac near Tucson in 1692 (Bolton 1936, Brenneman 2014). They also established several *visitas* (outlying agricultural stations with a chapel for holding masses). After 1697, Jesuit expansion in Sonora was accompanied on the opposite side of the Gulf of California by expanding Jesuit missions in Baja California. Despite a Native uprising in 1734, the Jesuits held on to Baja California until 1767, when their Order was expelled from the Spanish Empire. Jesuit expulsion also negatively impacted Sonora and Arizona (Kessell 1976: 7 and 2002: 188). After the 1767 expulsion, Franciscans took over Jesuit missions in Sonora, and Franciscans in 1769 also established missions from San Diego to San Francisco. Between 1769 and 1804, the Spanish established 19 missions in Upper California.

How to evangelize among nomadic people was a challenge the 17th century Jesuits initially took on, and they carried their method to Arizona in 1694 and to Baja California in 1697. In a process known as "congregación,' as nomadic peoples converted to Catholicism, they settled in villages next to the mission church, i.e., they were pressured to transform into sedentary people living in community.[5] When such peoples were baptized into a Spanish mission community, they brought the land upon which they ranged with them—and in fact, continued to harvest acorns, pine nuts, sage seeds, agave root, and prickly pear. In Southern California, the people had practiced seasonal migration (a nomadic way of life) as a shrewd adaptation to unpredictable rainfall in an arid region.[6] In Arizona, the Pima and O'odham coupled agriculture practiced along the Gila and Salt Rivers with harvesting of wild mesquite pods; the Pima and O'odham had also grown cotton for centuries. In New Mexico, the Pueblo had always relied upon agriculture.

In Arizona, Jesuits had waited for native people to build a chapel and harvest a first crop prior to establishing a formal mission. In California, missions were initially tiny buildings tolerated by Native Americans inside their territory. When the missionaries and their small guard refused to leave and in addition protected those who accepted baptism, gradually the larger community's tie to the land pressured Native Americans to make peace with the Spanish, which meant to accept baptism (Duggan 2017: 240-242). If a mission was constructed at a border between two ethnic communities, then the resulting *congregación* was multi-ethnic and multi-lingual (Johnson 1997). Thus, the direction of population movement was initially toward the

[5]Living in community created a peer pressure to conform to Catholic ritual and mores that leveraged the power of a missionary who was typically vastly outnumbered. See "'Their Barbaric Liberty:' Social Control and Seasonal Migration: in Duggan 2000: 80-117.

[6] Never baptized into missions, the Yuman peoples on the Colorado River also practiced farming (Jorgensen 1980: 112-13).

center. At the same time, the "mission" expanded in area in the opposite direction away from the initial central church building, to include the lands of those who accepted baptism.

The mission became a sort of estate, with pasture for cattle and sheep, irrigated and non-irrigated fields for grains and legumes. As missions expanded to the size of modern counties, "*asistencias*" were built--chapels with native suburbs--where the missionary might make an appearance once every two weeks and for death-bed confessions. Several reservations that exist in the 21st century are built around former asistencias such as Pala and Santa Ysabel in San Diego County.

Having taken a vow of poverty, missionaries were nonetheless ambitious for power. What made a missionary powerful relative to military command was the personal loyalty and size of his native congregation. Accumulating assets for heirs are what inspired military men and settlers to take land from native communities. Not having heirs made a missionary uniquely motivated to look out for his congregation's interests among Spain's representatives on the frontier.[7] Not money but rather Native allegiance was the key to power for a missionary. Effective compromise was then the path to a missionary's status. Once baptized, native congregations had the missionary as an advocate to limit usurpation of their labor and their land by encroaching settlers or soldiers.

IIc. Deterioration of Native Land Rights Under Mexico, 1811-1848

English-language literature tends to conflate Spanish institutions with Mexican ones, a simple mistake with severe implications for analysis. By 1808, Spain was bankrupt, and Napoleon imprisoned the Spanish king (Marichal 2007). By 1810, Spain ceased to subsidize

[7] A missionary who had offspring was therefore considered a failure by his peers, as was Blas Ordaz at Santa Cruz, who had a family with a native woman at Mission Santa Ines (Geiger 1969: 171-74).

missions or to pay soldiers—not to mention that revolution had broken out from Argentina to Acapulco (Salvucci 2009; Duggan 2016). Mexico declared independence in 1821.

In 1821, the Mexican state was born into debt, so that military pay never rose to its level under Spain. As Stuart Voss bluntly puts it, "With independence…the soldiers were underfed, underclothed, poorly equipped, and were owed large sums of back pay" (1982: 49). Furthermore, independent Mexico leveraged the social status of mixed-race soldiers, and undermined respect for religious missionaries. This volatile combination increased pressure from the troops to break up the communal holdings of mission congregations to distribute the land to these would-be settlers. Missionaries also received little by way of subsidy from independent Mexico and turned to commercial activity to survive. California was particularly successful at this and exported from its Pacific ports leather to New England, tallow to Latin America, and furs to Canton. An ancient route connected Arizona to the port of Guaymas in the Gulf of California, from which merchants traded with South America, and Canton. After independent Mexico opened Guaymas to international trade in 1822, there was a silver boom from mines such as Nacozari which stimulated demand in the region until 1846. In California, missionaries tried to stave off expropriation of mission congregation land by paying local taxes to fund military payroll, but soldiers wanted land.

In 1828 Mexico expelled the Spanish-born. The expulsion hit missionaries particularly hard. Prior to the expulsion, the alignment of missionaries with Native Americanmission communities had kept soldier/settler squatting to a minimum. For example, in California at Mission San Luis Rey, so long as Franciscan Luís Peyrí lead the 3,000 strong congregation, no military man dared settle the communal holdings of the Luiseño. Their land base included 200,000 acres with ranches such as San Mateo, Las Flores, Santa Margarita, San Juan, Pala,

Temecula, San Jacinto, San Marcos, Pamuza, Pauma, Potrero, Agua Hedionda, and Buena Vista (Salomon 2007-08: 357). In 1829, Peyrí learned of the expulsion, and he left the country in 1832. Shortly thereafter, Pio Pico, an Afrolatino man whose brother was in the military, obtained Rancho Santa Margarita, which included over half the land. The congregation was granted Pala as well as Las Flores. Lying as Las Flores did inside the boundaries of Pico's Santa Margarita, the latter eventually swallowed up that native village, leaving only Pala. By the end of the Mexican period 1848, the Luiseño were limited to 49,500 acres at Pala, with 1 additional tiny individual grant that persisted past 1848. Under the US between 1851 and 1874, Luiseño land rights nearly disappeared, but in 1875, a presidential executive order designated Pala as a US reservation which persists today (Moyer 1969: 28, 37, 61, 69, 73, 75, 99; Carrico 1987: 65, 84, 89; Salomon 2007-08; Shipek 1987: 27).

This example from San Luis Rey clarifies how the process of expulsion of the Spanish-born from Mexico facilitated the usurpation of land. In Arizona, the law expelling Spaniards had a similar negative effect on native land rights. For example, at Mission Tumacácori south of Tucson, Franciscan Ramón Liberós had protested the increasing private encroachment by settlers. The O'odham had tilled the fields since time immemorial and were baptized in 1698. In 1807, they had a survey made and received official title from Spain. Yet in 1821, León Herreras had the surveyor Ignacio Elías González help him apply for a grant at the Sonoita portion, which he began occupying in 1825. He argued that "the very ancient pueblo of the Indians [is now] abandoned because of the incursions of the Apaches." Yet it was customary for the community to move into the mountains during troubled times (as 1810-1821 certainly were in Mexico), only to return later. The Tumacácori protested this expropriation with the help of Liberós, but after the missionary was expelled as a Spaniard in 1828, the grant to the private individual was

finalized. By 1841 international merchants at Guaymas had purchased nearly all the land of that O'odham congregation (Sheridan 2006: 94-194).

Even the Pueblos of New Mexico came into increasing conflict with settlers. In 1826, the Pueblo mayor of Pecos, Rafael Aguilar, petitioned Mexican officials to remove Hispanic settlers from encroaching on the four-square leagues that the Spanish Crown had granted to the Pueblo. In 1829, the Pueblo of Pecos won their case and the Mexican state removed settlers. As Flora Seymour writes, "It is undisputed that the Pueblo Indians [of New Mexico] had the status of citizens in the Mexican Republic up to the time of the American occupation in 1846" (1924: 37). Even so, incoming settlers harassed the Pecos to such an extent that they eventually relocated to Jémez Pueblo, in the mountains (Weber 1992: 302-03).

In short, although the language of independent Mexico was to "emancipate Indians," in practice secularization meant pressure to distribute the lands of native people to the underpaid military and other settlers. A few native communities applied for townships on portions of ex-mission lands, using as the basis the stipulation that every 400 baptized people should get 4 leagues of land. Yet Spain's Laws of the Indies were no longer valid in independent Mexico. Mexico not only expropriated lands, but also removed the subsidy for a missionary. In theory, a parish priest who relied upon fees paid by the congregation for baptisms, marriages, and burials would replace the missionary. In practice, native communities stripped of most of their land would not be able to pay fees for service, so secularization tended to reduce the missionaries serving native communities. In California, the San Francisco Bay area at one time held 8 missionaries, but after secularization, one new priest attempted to deliver mass to all the former missions (Bacich 2017: 41). In New Mexico, by 1821 only 23 Franciscan clergy served in New Mexico and the number fell to 9 by 1826 and 5 by 1832 (Weber, 1982:57-59). In Arizona, the

decline in clergy was mostly due to neglect stemming from the inability of the Franciscan community in Mexico to finance more priests.

Despite the decline under Mexico in political protections for the baptized, there was an important stipulation of Mexican land grants: native communities could not be evicted from them (Shipek 1987: 26). For example, native people of ex-mission San Fernando in California retreated to their Rancho El Tejon. In 1843, the land was granted to a military man from San Blas, Ignacio del Valle, and his business partner from the port of Guaymas, José Antonio Aguirre. The grant stipulated: "The owners could not interfere with the Indians in the cultivation of their lands and could not alter the improvements they had made. The owners could not sell, alienate, or place any financial burden upon the land" (Phillips 2004: 9). The stipulation that the land would "belong" to Aguirre and Del Valle, but that they could not sell it, or interfere with the Native Americans already living there, indicates that the property rights granted by the Mexican government were quite different from those of the US legal system.

Unlike California and Arizona, neither the Mexican state nor merchants showed interest in settlement or economic growth in New Mexico. In part this was due to holding onto territory threatened by the U.S. in the East and West. California, Arizona, and Texas also presented more potential economic opportunities.

IId. Deterioration of Native Conditions Under Americans: 1848-1917

In 1848, the US gained control of parts of Arizona, California, and New Mexico. The Gadsden Purchase in 1853 cemented control of Arizona. Because the US was a *de facto* Protestant society, the population had less respect for Catholic missionaries than did Mexicans, so that Native Americans lost effective advocates in this transition. By the Treaty of Guadalupe Hidalgo, the US was to respect extant property rights, which made it difficult for US settlers to

obtain lands if they had previously been held by Mexican ranchers or granted to Native American Catholics. Because Mexico had recognized the land rights of the Pueblo people in New Mexico, in the transition to US rule, Pueblo land rights were confirmed by the US. Yet in general, the U.S. did not recognize Native Americans as having rights of citizens. For example, US law did not recognize native peoples' applications for homesteads. US settlers at times murdered Catholic Native Americans who worked for former Mexicans (Madley: 2016: 124). U.S. officials signed treaties in California, but Congress did not ratify them. Yet even so, in formerly Hispanic areas elites fought alongside Native Catholics to keep reservations local, as opposed to removal to Oklahoma.

III. Missions and Downstream Outcomes: Transmission Mechanisms

Recent scholars have explored the impact of missions on populations two centuries later. The most frequently found long-run impact is on education or more generally human capital (Gallego and Woodberry, 2010; Nunn, 2012; Bai and Kung, 2015; Waldinger, 2017; Valencia Caicedo, 2019; and Jedwab et al., 2021). We want to test for the long-run impact of the Spanish missions on Native Americans in Arizona, California, and New Mexico who lived under the institutional rules of Spain, then Mexico and later the U.S.

In Spanish society, wearing clothing and practicing an agricultural way of life were critical aspects of conversion to Christianity, while literacy was not viewed as necessarily integral to that process, though some young men learned at missions to read, and write, and acquired numeracy (Haas 2011: 151). To the extent that missions fostered education in irrigation construction, tilling skills, and crafts such as smithing, leatherworking, and weaving, we could expect the impact might be long-lasting with parents promoting tilling, husbandry, and craftsmanship for their children and on down through generations.

Missions also gave Native people from disparate communities a common language (Spanish) and experience collaborating with individuals of different tribes or of different bands within tribes. Those who did receive education in reading and writing used their introduction to Western heritage (such as biblical allegories) and institutions to advocate for themselves under the auspices of Mexico and the U.S.; for example, the native community at San Juan Capistrano and the Alcalde Rafael at Pecos both submitted petitions in writing for land during the Mexican process of secularization.

Missions created enclaves of communities with a culture influenced by Native American traditions as well as Catholicism. The experience gave Native American bands familiarity with people from other bands and facilitated communication among the tribes through the Spanish language (particularly in California where there were nearly 100 ethnic enclaves). Rancho Tejón is an example that illustrates Kitenemuk Yokuts, Tataviam, and Chumash leadership collaborating to create a farming community, and to protest at times the treatment by US overseers sent to supervise when the area was turned into a temporary reservation. Many of the men were ex-mission San Fernando, which gave them some common heritage and a common language (in Spanish) (Phillips 2004). Native Americans who had the mission experience had common moral values and biblical imagery that could resonate with the wider Hispanic Catholic community, which could have had beneficial downstream effects.[8] This could make those impacted more willing and better able to organize against U.S. institutional rules, as for example the case that the "mission Indians" of California brought in 1891 to defend their lands.

[8] Bergeron (2020) found that missions during the Colonial period in the Democratic Republic of the Congo led the descendants of those on missions to have larger social networks, greater acceptance of people outside of their social sphere, and acceptance of more universal moral values as opposed to communal moral values.

Given experience with Spanish military and missionary control, tribes may have become better internally organized to preserve their tribal traditions, institutions, norms, and language. This happened early on in 1680 with the Pueblo Revolt in New Mexico in which the Native Americans forced the Spanish and the missionaries to leave New Mexico. The rationale for revolt was partly insistence by the Spanish that the Native Americans abandon many of their religious practices and was instigated by economic exploitation. In the wake of revolt, Franciscans accepted as practicing Catholics people who also respected traditional spiritual ways; furthermore, land was partially redistributed away from settlers and toward Pueblo communities.

We will be able to test directly for whether those tribes impacted by Spanish missions had higher participation in education or were more successful farmers which in turn may have led to higher incomes and/or greater independence. In addition, we can test for whether those with mission contact were more Catholic in the 20th century and had lower crime rates because of more social cohesion. Less easily measurable are the impacts of missions leading directly to more cohesion and protection of a form of religion that blends native practices with familiarity with Western thought and institutions.

IV. Data

We assess the impacts of a mission legacy on Native Americans' outcomes at the superintendency level;[9] superintendencies were geographic areas under the control of

[9] In the Annual Reports of the Commissioner of Indian Affairs, data is reported at the superintendency level. The number of reservations comprising a superintendency varies for each superintendency. A superintendency can be composed of only one reservation, i.e., Navajo School, or by several reservations, i.e., San Carlos School, composed of 7 reservations. Similarly, the number of superintendencies varies for each of our outcomes. In the case of the religiosity and crime outcomes, there are 35 superintendencies in our sample. In the case of schooling, we have 47 superintendencies in our sample. With respect to income, our sample is composed of 51 superintendencies. In terms

superintendents.[10] From Kessell (1976, 2002, 2008) and Milliken 2010 we can code whether a reservation in Arizona, California or New Mexico had significant contact with the missionaries, e.g., baptisms.[11] We can then track the Native Americans to the superintendency where they resided in the period 1911-1917. We use "superintendencies" as a proxy for Native communities—an imperfect substitute because Native people who wanted to assimilate to US society may have left the superintendencies.

We consider a superintendency to have a mission legacy if the reservations belonging to that superintendency had a mission legacy. In most cases, all the reservations that belonged to a superintendency either had or did not have a mission legacy. In three cases, however, there was a mix of reservations with and without mission legacy. In both Camp McDowell and Pima School superintendencies, in Arizona, the Apache reservation was a part of the superintendency. Although the Apache reservation did not have mission legacy, we classify both Camp McDowell and Pima School as having mission legacy since the number of Native Americans from the Apache reservation in both cases was small: 18% in the case of Camp McDowell and 1.1% in the case of Pima School. Hence, 82% of Native Americans in Camp McDowell, and almost 99% of Native Americans in Pima School belonged to reservations with mission legacy. Similarly, in New Mexico, the superintendency Albuquerque Pueblo Day Schools included the Navajo reservation. Although the Navajo reservation did not have mission legacy, we classify Albuquerque Pueblo Day Schools superintendency as having mission legacy since the number of Native Americans from the Navajo reservation in the Albuquerque Pueblo Day Schools

of employment and earnings, our sample has 40 superintendencies. Finally, with respect to blood quantum, our sample is composed of 56 superintendencies.

[10] See https://www.archives.gov/files/research/federal-employees/reference-reports/502-indian-agents.pdf

[11] We also relied on advice from John Kessell.

superintendency was only 4.4%. In other words, 95.6% of Native Americans in Albuquerque Pueblo Day Schools belonged to reservations with mission legacy.

We collected our data from the Annual Reports of the Commissioner of Indian Affairs in the period 1911 - 1917. Using these reports, we obtain data on religiosity (number of Native Americans professing Catholicism), schooling (number of children that attended school), employment (number of Native Americans that had a job), and earnings,[12] income,[13] income from crops, number of crimes, misdemeanors, number of arrests because of drunkenness, demographic information such as the number of people in each superintendency and blood quantum (i.e., number of full blood Native Americans). In addition, we gathered information about superintendencies' total acreage, percentage of unallotted acres, and percentage of irrigated acres to include as control variables. We exclude Texas from this analysis because data are not available at the superintendency level. Importantly, not all outcomes were reported every year, thus, the number of observations for each outcome differs.

Finally, we identified superintendencies composed of tribes that cultivated maize prior to contact with Spaniards based on Jorgensen (1980). Jorgensen (1980) compares Native American communities containing six culture areas: Northwest Coast, California, Southern California, Plateau, Great Basin and Southwest. We use the maize variable, which is "Maize cultivated at time of contact with Europeans", as a control variable in our analyses.

V. Results

As mentioned before, our data are composed of superintendencies in the states of

[12] Earnings refer to the gains from employment.
[13] Income derives from crops; stock sold; native industries, weaving, basketry, etc.; value of timber cut; rations and miscellaneous issues; from individual leases; proceeds from sales of land; interest on trust fund; treaty and agreement obligations; money from proceeds of labor, and miscellaneous.

Arizona, California, and New Mexico. Our data encompass the period 1915 to 1917 for Catholicism; 1911 to 1917 for school attendance and income; 1914 to1917 for employment and earnings; 1915 to 1917 for crime; and 1911 to 1917 for the percentage of the Native Americans listing themselves as "full blood." Full blood meant having only Native American ancestors. The higher percentage of full blood, the greater the likelihood that a community acted as a cultural enclave. Table 1 presents summary statistics for our sample.

Table 1. Summary Statistics

Variables	(1) N	(2) Mean	(3) SD	(4) Min	(5) Max
	Annual Report of the Commissioner of Indian Affairs (1911-1917)				
Mission Legacy	185	0.34	0.48	0	1
Percent Catholic	76	0.24	0.35	0	1
# Children Attend School	204	150	275	0	1,900
Percent employed	102	0.26	0.22	0.01	0.97
Earnings per Capita	102	23	21.70	0.93	89.91
Population	188	1885	2212	42	8,419
Percent Full Blood	189	0.90	0.19	0.16	1
Income Per Capita	200	62.40	45.08	0	257.08
Income from crops per capita	200	15.44	18.85	0	159.80
# Children Eligible for School Attendance	204	528	753	0	4,064
Crimes Per Capita	76	0.001	0.001	0	0.006
Misdemeanors Per Capita	76	0.006	0.014	0	0.085
Drunkenness Per Capita	76	0.003	0.006	0	0.041
Percent Unalloted	189	0.84	0.31	0	1
Percent Irrigated	189	0.05	0.18	0	0.75
Precontact Maize	189	0.63	0.48	0	1

Note. N=Observations, SD=Standard Deviation. Percent Catholic=Number of Catholic/Total Population, Percent Attend School=Percent of Children that go to School/Percent of Children Eligible to School, Percent Employed=Number of individuals employed/Total Population, Income Per Capita=Income/Total Population.

To analyze how missions affected socioeconomic outcomes in the early 20th century, we use a standard regression framework. We estimate the following model:

$$Outcome_{it} = \alpha + \gamma Mission_i + X'_{it}\beta + Z_{st} + \varepsilon_i$$

where $Outcome_{it}$ is a socioeconomic outcome for superintendency i in year t. Our outcome measures include the percentage of Native Americans that were Catholic; the percentage of children that attended school; the percentage of Native Americans that were employed; earnings from work per capita; total and crop income per capita; number of crimes, misdemeanors, and drunkenness per capita; and the percent of full blood Native Americans. $Mission_i$ is a dummy variable taking the value of 1 if tribes in the superintendency had earlier historic contact with missions and 0 otherwise; X_{it} are control variables for superintendency i in year t that include, total population, a dummy variable indicating if superintendencies cultivated maize prior to the Spanish, the share of unallotted land in the superintendency, the share of irrigated land in the superintendency, and in the case of education, the total number of children in school age; Z_{st} is a vector that includes state and year dummies; and ε_i is a random error.

The regression models compare, in each year, socioeconomic outcomes for superintendencies affected by missions, against superintendencies not affected by missions. All models are estimated using heteroskedastic-robust standard errors clustered at the superintendency level.

In Table 2 we present our results for Catholicism. We find that Native American communities self-identified as Catholic long after the Spanish structure imposed the religion. The data suggest that the missions were successful in the long-run in sustaining conversion. According to our results, contact with Missions increased the number of Catholics by 52.1 percentage points. The average percentage Catholic in superintendencies with no mission legacy was 9 percent, thus the effect of the mission legacy was to increase the percentage Catholic by 578 percent.

Table 2. Religiosity

Variables	(1) Percent Catholic
Mission	0.52***
	(0.17)
Population	0.00
	(0.00)
Cultivated Maize	0.12
	(0.10)
Percent Unallotted	-0.17
	(0.29)
Percent Irrigated	-0.08
	(0.07)
California	0.25**
	(0.10)
New Mexico	-0.09
	(0.19)
Constant	0.08
	(0.24)
Year FE	Yes
Observations	73
R-squared	0.59
Years	1915-1917

Note. Heteroskedasticity-robust standard errors clustered at the superintendency level in parentheses. *** p$<$0.01, ** p$<$0.05, * p$<$0.1.

We surmise that the reservations with contact with missions became enclaves of Native culture coupled with Catholicism. Spanish intent was to turn Native Americans into being loyal to Spain, and under Spain missionaries often learned the native languages and accepted an interweaving of aspects of traditional culture. The enclave aspect of mission communities acted as a protective layer for a hybrid of Hispanic/Native culture. The Spanish and the missionaries had to be accommodative to Native American culture to win over to their way of life hundreds of thousands of people, despite a small standing army and even fewer missionaries. The enclave

aspect may have been reinforced in the 1848-1880 period, when Native ex-mission communities were pushed into mountains in California and remained on many Pueblos in AZ and NM. To further analyze this hypothesis, we analyzed the relationship between a mission legacy and the percentage of people who had married other Native Americans through the category 'full blood'. In line with our expectations, missions increased the percentage married to other Native Americans in the superintendency by 27 percent.

Table 3. Full Blood Native Americans

Variables	(1) log(Percent Full Blood)
Mission	0.27**
	(0.10)
log(population)	-0.07**
	(0.04)
Cultivated Maize	0.35**
	(0.15)
Percent Unallotted	0.16
	(0.11)
Percent Irrigated	-0.19*
	(0.11)
California	-0.23
	(0.14)
New Mexico	-0.08
	(0.09)
Constant	0.03
	(0.25)
Year FE	Yes
Observations	179
R-squared	0.49
Years	1911-1917

Note. Heteroskedasticity-robust standard errors clustered at the superintendency level in parentheses. *** p$<$0.01, ** p$<$0.05, * p$<$0.1.

In table 4 below we present the result from educational outcomes, whichindicate that the missions had a positive but not statistically significant impact on percentage of children attending school.

Table 4. Education

Variables	(1) Percent Children School
Mission	0.04
	(0.05)
Population	-0.00
	(0.00)
Number School Age	-0.00
	(0.00)
Cultivated Maize	0.04
	(0.10)
Percent Unallotted	0.02
	(0.05)
Percent Irrigated	0.05
	(0.07)
California	0.05
	(0.10)
New Mexico	0.02
	(0.05)
Constant	-0.02
	(0.11)
Year FE	Yes
Observations	194
R-squared	0.80
Years	1911-1917

Note. Heteroskedasticity-robust standard errors clustered at the superintendency level in parentheses. *** p$<$0.01, ** p$<$0.05, * p$<$0.1.

In Table 5 we present the results of a mission legacy on economic outcomes. We find that missions increased income from crops per capita by $15.92 (column 1), and total income per capita (although not statistically significant, column 2). Since the average income from crops per

capita in superintendencies with no mission legacy was $11.34, the effect of the missions was to increase income from crops per capita by 140 percent. A mission legacy is associated with the successful practice of subsistence agriculture. Ex-mission Native Americans could build low-cost irrigation ditches that worked; and were outstanding sheepshearers and ranchers. In addition, our results indicate that the missions had essentially no effect on income per capita (column 2) and the percentage employed (column 3). However, we find a positive and statistically significant effect on earnings from work per capita (column 4). According to our results, missions increased earnings from work per capita by 70%.

Table 5. Economic

Variables	(1) Income From Crops Per Capita	(2) Income Per Capita	(3) Percent Employed	(4) Log (Earnings Per Capita)
Mission	15.92***	3.08	-0.06	0.70*
	(2.99)	(9.39)	(0.08)	(0.38)
Population	-0.002*	-0.008**	-0.000***	-0.80***
	(0.001)	(0.003)	(0.000)	(0.140)
Precontact Maize	6.71**	55.16***	-0.07	1.67***
	(2.98)	(12.93)	(0.19)	(0.35)
Percent Unallotted	4.35	1.38	0.06	-0.55
	(3.61)	(13.53)	(0.10)	(0.50)
Percent Irrigated	-3.01	-60.56***	-0.10	-0.97
	(12.26)	(20.05)	(0.08)	(0.93)
California	3.87	21.10*	-0.10	0.94***
	(2.55)	(12.04)	(0.19)	(0.27)
New Mexico	11.42**	13.15	0.03	-0.43
	(4.19)	(16.50)	(0.07)	(0.29)
Constant	-3.38	6.30	0.41*	7.32***
	(3.68)	(14.30)	(0.21)	(0.91)
Year FE	Yes	Yes	Yes	Yes
Observations	193	193	98	98
R-squared	0.28	0.40	0.35	0.56
Years	1911-1917	1911-1917	1914-1917	1914-1917

Note. Heteroskedasticity-robust standard errors clustered at the superintendency level in parentheses.
*** p$<$0.01, ** p$<$0.05, * p$<$0.1.

The implication is that on superintendencies with a mission legacy, Native Americans practiced subsistence agriculture and worked part-time for others for a higher wage than non-mission legacy Native Americans. This combination explains why at mission legacy superintendencies, overall income was low (relied upon subsistence agriculture) but also had relatively high earnings from the work when they entered the off-reservation labor market.

Catholicism enforces morality because a community holds its members to certain standards, i.e., self-enforcement. Recent work by Lowe (2021) shows that Christian revivals in Wales in the early 20th century led to a reduction in crimes, especially public crimes, e.g., drunkenness. Lowe argues that the mechanism was likely fear of ostracism by others. Interestingly, when religiosity fell back to pre-revival levels, drunkenness remained lower than pre-revival times.[14] Given that missions led to greater prevalence of Catholicism (see Table 2) in the early 20th we could expect that Native American congregations generated norms against drunkenness and minor crimes. In Table 6 we present results of the effect of missions (a proxy for Catholicism) on crime.

Our results indicate that a mission legacy reduces the percentage of misdemeanors in a Native American community, as well as reducing per capita number of arrests for drunkenness in a superintendency. In superintendencies with no mission legacy, the average number of misdemeanors committed per capita was 0.009 and the average number arrested for drunkenness per capita was 0.004, hence, the effect of a mission legacy was to decrease the number of misdemeanors committed per capita by 55 percent, and the number of arrested for drunkenness per capita by 100 percent.

[14] Lowe examined Protestant revivals, but Catholicism could have had a similar impact.

Table 6. Crime

Variables	(1) Crimes (felonies) Per Capita	(2) Misdemeanors Per Capita	(3 Arrests for Drunkenness Per Capita
Mission	-0.000	-0.005**	-0.004*
	(0.000)	(0.002)	(0.002)
Population	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)
Cultivated Maize	0.001**	0.005	0.008*
	(0.000)	(0.006)	(0.004)
Percent Unallotted	-0.000	0.006	0.001
	(0.000)	(0.004)	(0.003)
Percent Irrigated	-0.001	0.014	0.001
	(0.001)	(0.012)	(0.004)
California	-0.000	-0.001	0.013***
	(0.000)	(0.006)	(0.004)
New Mexico	-0.000	-0.004	0.004*
	(0.000)	(0.006)	(0.002)
Constant	0.000	0.001	-0.005
	(0.000)	(0.006)	(0.005)
Year FE	Yes	Yes	Yes
Observations	73	73	73
R-squared	0.14	0.19	0.39
Years	1915-1917	1915-1917	1915-1917

Note. Heteroskedasticity-robust standard errors clustered at the superintendency level in parentheses. *** p$<$0.01, ** p$<$0.05, * p$<$0.1.

VI. Conclusion

Our research aimed to determine the long-run impact of Spanish missions on the Native Americans residing on reservations in California, Arizona, and New Mexico. Because of their long presence, we expected enduring impacts, even as the communities moved through institutional change from Spanish imperialism to the Mexican state, and then to the United States. For all Native Americans the demographic impact of imperialism was devastating.

Population fell by at least 50%. Deaths were most common from smallpox. Yet the conventional wisdom in much of the Southwest and particularly California is that Native Americans did not survive missions, or that missions did not affect internal beliefs and norms of Native Americans. This view is certainly off base.

In exploring the legacy of a mission on Native American reservations in the early 20th century, one surprise was how much the definition of a "mission" changed over time. After 1680, Spanish institutions gave the Jesuits and Franciscans the power to stand up for baptized communities vis a vis money motivated actors and promoted compromise in religious practice between Native American traditions and Catholic ritual. By 1810, "missions" were not only churches, but large land areas that included a central native village, but also outlying villages near the widespread herds and fields. In 1834, the Mexican state removed land from a "mission," though the churches still stood. Despite the attack on the missions by the Mexicans and later neglect by the U.S., Native communities survived with long lasting impacts on several margins.

Our data indicate that by the early 20th century, Native Americans living on mission-legacy reservations had higher crop income per capita, greater earnings from work per capita, lower crime rates, and a higher percentage of Native Americans identified as Catholic. Some hint of what this meant in practice comes from the 1904 description of a priest arriving at Mission Santa Ines, where he was not sure if there would be any Catholics. "As Holy Week approached an Indian appeared and offered to act as server for the Easter mass," and then on Easter Sunday a Chumash choir appeared to sing. The implication is that the Chumash community of the ex-mission had protected and passed down its religious rituals without the ecclesiastical hierarchy, but that they still considered themselves Catholic (Sandos 2004: 150). In 1935, the Keres forbade the priest sent by the U.S. archdiocese from viewing native ceremonies and refused confession

on the grounds that community secrets might get out, nor did they permit the priest to live in the Pueblo. For years the Keres placed vestments on the altar and performed the mass themselves (Vecsey 1995:18).

It should not be surprising that crops per capita were higher in New Mexico and Arizona, where the Pueblo and O'odham had practiced irrigated cultivation for hundreds of years. Even in California, which did not have the agricultural tradition until mission times, the Native Americans from ex-missions were the premier vaqueros and sheep shearers of their day, raising crops on tiny reservations begrudgingly granted in San Diego county's arid back country. Into the 20th century, this community cohesion and independence would be necessary to battle against assimilationist ideology and to hold on to land and water.

VII. References

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Appendix 1- Contact with Arizona, California, and New Mexico Missions

To determine whether the missions had significant contact with tribes in AZ and NM we relied on the discussion in Kessell (1976; 2002; 2008; and 2012) as well as advice from John Kessell. For NM and AZ, the categorization was relatively straightforward. The Native Americans who practiced settled agriculture (except for the Hopi) had significant contact. For the hunter/gather tribes, e.g., the Navaho and Apache there was little contact with the missions though significant conflict with the Spanish military personnel. The categorization in California was more difficult.

Following is a list of superintendencies affected and not affected by Missions (early 20th Century Data):

Table A1. Superintendencies affected and not affected by Missions

Affected	Not affected
Arizona	
Camp McDowell	Camp Verde
Pima	Colorado River
Salt River	Fort Apache
San Xavier	Fort Mojave
Western Navajo	Havasupai
	Kaibab
	Leupp
	Moqui
	Navajo
	Phoenix
	San Carlos
	Truxton Canon
New Mexico	
Pueblo Day Schools (Albuquereque and Santa Fe)	Jicarilla
Zuni	Mescalero
	Pueblo Bonito
	San Juan
California	
Cahuilla	Bishop
Campo	Digger
Capitan Grande	Fort Bidwell
La Jolla	Fort Yuma
Malki	Greenville
Martinez	Hoopa Valley
Mesa Grande	Independence
Pala	Round Valley
Pechanga	Upper Lake
Rincon	
Soboba	
Volcan	