Religious Festivals and Long-Run Economic Development: Evidence from Catholic Saint-Day Celebrations in Mexico*

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Abstract: Religious festivals are important in the lives of many. The poor are no exception, and have been documented to devote nontrivial shares of their income to festivals. Do religious festivals have economic and social consequences? We examine Catholic saint-day festivals in Mexico, exploiting two features of the setting: (i) festival dates across the calendar and were determined in the early history of towns during conquest, and (ii) there is considerable variation in the intra-annual timing of the main agricultural seasons. We compare municipalities where festivals overlap with planting or harvest to municipalities where they do not overlap to examine the impacts of festivals on economic development and social outcomes in the long-run. We find that having festivals that overlap with planting season is associated with significantly worse development outcomes. A likely mechanism is that festival spending reduces agricultural investment in the planting season by liquidity-constrained households.

Keywords: Religion, Economic Development, Mexico, Catholicism, Liquidity Constraints

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1. Introduction

A well-established fact in developed economics is that, across many developing countries, people living under $1 a day tend to spend large amounts of their monthly incomes on religious festivals. For example, individuals living with less than $1 a day in Udaipur, India, spend 14 percent of their monthly budgets on festivals, while individuals in Morocco living under $1 a day spend 10 percent of their budget on festivals (Banerjee and Duflo, 2011).[1] Given the important and prevalent role these festival expenditures play in the lives of the poor, scholars have debated whether these religious festivals are beneficial or detrimental for long-run growth. On the one hand, religious festivals may be improve development if higher expenditures lead to larger festivals that create more social capital and ultimately spur more economic growth (Putnam, 2000; McCleary and Barro, 2006). On the other hand, high levels of religious festival expenditures may be detrimental to long-run economic growth, as resources that might be used for long-run investments (whether private or public) are consumed instead (Barro and McCleary, 2003).[2]

While understanding the effect of religious festivals is an important topic for understanding differences in economic development today, well-identified, causal estimates of the impact of religious practices have been difficult to obtain. This is because religious festivals they are not assigned exogenously across individuals or geographic areas. The timing and scale of religious festivals may could be directly affected by economic development itself, or by other omitted variables that jointly affect development and features of festivals. Additionally, religious festivals often affect an entire country at once, making it difficult to generate within-country evidence on how the timing of festivals relative to other investment opportunities matters for economic development. Both these challenges have led to a lack of causal, within-country evidence of the impact of religious festivals on long-run economic development.

In this paper, we make progress on a piece of the puzzle of religion's impact on society, by investigating the impact of a particular religious practice in Mexico: Catholic saint-day festivals. In Mexico and many other Roman Catholic countries, towns and cities celebrate the "saint's day" of a particular saint or other holy figure that has been historically associated with the town. Hundreds of such celebrated figures have their "saint's day" festivals on dates all throughout the

[1] Data is from (Banerjee and Duflo, 2011) and is available at: www.pooreconomics.com.

[2] Additionally, most developing countries had religious festivals imposed on them during their histories rather than maintaining the ability to continue to celebrate local religious traditions (Henrich, 2017). This could imply that some countries might have had festivals imposed on them that could be detrimental for development.

calendar year, on dates set by the Catholic hierarchy in the Vatican.[3] In Mexico and most of Latin America, patron saints were typically established at the time of a town's founding by Spanish colonizers, often centuries ago, and remained set thereafter. These saint-day celebrations are typically local public holidays, and involve substantial financial expenditures by local governments as well as households.

To examine how religious festivals affect economic development, our analysis combines two features of the setting. First, festival dates vary greatly within Mexico and were determined in the early history of towns during Spanish conquest when knowledge of local characteristics of each town was minimal. This provides plausibly exogenous variation in festival dates across Mexico. Second, the intra-annual timing of the main agricultural planting and harvest times varies tremendously across Mexico.[4] This means that, for some municipalities, the saint-day festival overlaps with the planting or harvest season, whereas in other municipalities there is no such overlap.

We exploit this variation in festival timing and compare municipalities where the festival overlaps with the main crop's planting and harvest season to municipalities where they do not overlap to examine the impacts on economic development and social outcomes. By examining both planting and harvest seasons, this setting allows us to test different arguments for how religious festivals affect development. Specifically, by analyzing festivals that overlap with the planting season – a time when liquidity constraints for rural households are high – we explore the standard argument that festivals can crowd out longer-horizon investments and thereby reduce growth. Conversely, by examining festivals that overlap with the harvest season – a time when liquidity constraints for rural households are less binding – we can explore the counter-argument that festivals may lead to increases in social capital and be, on net, beneficial to development, even though they may crowd out other investments.

To conduct our analysis, we collected data from archival sources and from interviews with municipality governments to determine the saint-day festival date for the main town in each municipality in Mexico. The data was in part available on an online data source, the Encyclopedia of Municipalities in Mexico. These data were incomplete, however, and were supplemented

[3]For example, towns whose patron saint is St. Arcadius (in Spanish, *Arcadio*) have their festival on January 12, while those with St. Fructus (in Spanish, *Fructuoso*) as their patron celebrate on October 25.

[4]For example, in the state of Aguascalientes, the largest amount of agricultural income occurs in October, while in Nayarit, April is the month with the highest agricultural income.

with data from online searches and by directly contacting the municipalities in question. We combine this data with estimates on the optimal planting and harvest date for crops across Mexico provided by the FAO GAEZ data to create measures of whether festivals overlap with planting or harvest. These measures are based on agro-climatic models and are therefore exogenous to decisions made by households today. We then use numerous data sources from the Mexican government to explore municipality-level development outcomes in the present day.

The main identification assumption of our cross-sectional analysis is that the overlap of a town's festival date and the timing of its agricultural seasons is exogenous. Note that this is a different and more plausible assumption compared to assuming festival dates are exogenous. While the history of saint day festival selection in Mexico that is consistent with this assumption, we present a number of empirical tests to examine whether this assumption is plausible, particularly after controlling for state fixed effects and exploiting only cross-town variation within Mexican states. First, we demonstrate the municipalities in Mexico are not more or less likely to have festivals overlap with planting nor harvest compared to no overlap. Second, we show that municipalities where festivals do in fact overlap with planting or harvest are similar (on important characteristics that may affect development) to municipalities without such overlap. These tests provide evidence that the overlap between a town's festival date and the timing of its agricultural season is exogenous and can be used to examine the impacts of festival timing on economic development.

The first hypothesis we examine is whether towns whose festivals occur during planning months, compared to towns whose festivals happen in months where little agricultural investment is required, have worse development outcomes in the long-run. Using Census data, we first construct an index of economic development based on all relevant variables in the Census as our main outcome of interest in order to avoid data mining concerns. We find strong evidence that municipalities that have the festival overlap with planting seasons have worse development outcomes. In contrast, we find some evidence that municipalities that have the festival overlap with harvest seasons have better development outcomes. We then show explore how the timing of the festivals matters vis-a-vis planing, and find that the largest estimated negative effect of festivals overlapping with planting occurs when the festival overlaps with the planting month, and find smaller negative effects for other months near planting. These results are consistent with the hypotheses that festivals can crowd out investments when they overlap with planting season.

To establish the mechanisms of our main results, we conduct a number of empirical tests using data from Agricultural Census of Mexico and household expenditure data from the Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH). Consistent with the idea that festivals crowd out investment during planting, we find that municipalities were festivals overlap with planting are significantly more likely to say that a lack of money is a problem for them in agricultural production.[5] We then use publicly-available household-level datasets rich information on spending across different categories. We explore whether there is heterogeneity in expenditure categories depending on whether or not the municipality of the household has a festival that overlaps with planting/harvest.[6]

Finally, we explore how festivals overlapping with planting/harvest affects social capital. To explore this, we use detailed survey data from the Americasbarometer from 2004 to 2014 and examine differences in trust and group membership. Interestingly, we find that municipalities where festivals overlap with planting have higher levels of interpersonal trust and higher community group participation rates, despite the differences in economic development. This social capital effect offers a potential explanation as to why some festivals continue to overlap with planting and persist in spite of the differences in development.

The paper contributes to several literatures. First, we contribute to the literature on the impact of religion on economic development (see McCleary and Barro (2006, 2019) for reviews). Early papers in this literature compared differences in religion across countries and found a negative correlation between religious behavior (e.g., attendance at religious services) and economic growth and income (Barro and McCleary, 2003). Recent work has focused on specific cases of religious celebration and exploited differences across countries and time to explore short-run and causal impacts of religion on development. In a seminal paper, Campante and Yanagizawa-Drott (2015) exploit exogenous differences in the length of Ramadan fasting across countries and time due to the rotating Islamic calendar. They find that longer Ramadan fasting has significant short-run negative impacts on economic growth in Muslim countries. Our paper builds on this newer literature which focuses on specific cases of religious celebrations (e.g. Mexican Catholic Saint Day festivals) to generate causal evidence (by exploiting the exogenous overlap between festivals and agricultural seasons). We also contribute to this literature by examining a setting

[5] We do not find significant differences in the amount of land used for agriculture today.

[6] A subset of expenditures include the date of expenditure; we plan to examine how expenditures change around festival dates in the future.

that allows to examine within-country differences in religious festivals and present evidence of the long-run effects of these practices.

Second, we contribute to the large social science literature on the social capital impacts of religious practice on social capital. Many papers have found that religious practice is associated with social capital benefits (Putnam, 2000; Deaton and Stone, 2003; Lim and Putnam, 2010). These social capital benefits of religion are often cited as a potential reason for their persistence despite their effects on economic growth (Bentzen, 2019). In fact, Campante and Yanagizawa-Drott (2015) also find that longer Ramadan fasting has positive impact on subjective well-being despite the negative effects on economic growth. We contribute to this literature by examining within-country differences in the effect of festivals on social capital to provide a possible explanation to the puzzle within development economics of individuals have such high religious expenditures even when cash constrained and present evidence that it may be related to social capital benefits (Banerjee and Duflo, 2011).

Finally, we contribute to the literature on the comparative development of Latin America (Engerman and Sokoloff, 2002). Scholars have posited many reasons for Latin America's relatively poor long-run development path, including differences in factor endowments (Engerman and Sokoloff, 2002); the prevalence of colonial extractive institutions (Acemoglu et al., 2001; Acemoglu and Robinson, 2012; Dell, 2010); the high incidence of disease and use of labor coercion during Spanish colonial rule (Sellers and Alix-Garcia, 2018); and the negative consequences of the dismantling of local pre-colonial institutions (Diaz-Cayeros, 2011; Diaz-Cayeros and Jha, 2016). However, while Catholic religion a central part of many people's lives in Latin America, the consequences of this religion being imposed on Latin America remain understudied.[7]

The paper is organized as follows. Section 2 provides background on Catholic Saint Day Festivals in Mexico, how they were chosen, and their cultural and economic importance. Section 3 describes the data, and Section 4 describes the empirical strategy and tests the main identifying assumptions. Section 5 presents that main results by analyzing differences in economic development between municipalities where festivals overlap with planting/harvest to those with no overlap. Section 6 examines the mechanisms for the results using Agricultural Census and household expenditure data. Section 7 explores the impact of festivals on social capital. Section 8

[7] An important exception to this is the growing literature on the impact of missionary presence on human capital and development within Latin America (Valencia Caicedo, 2019; Waldinger, 2017).

concludes.

2. Background on Saint Day Festivals in Mexico

2.1. Catholic Saint Days

Patron saint day festivals are yearly celebrations that occur in Catholic countries, especially those influenced by Spanish culture. A saint day festival is usually dedicated to a saint or virgin who was determined to be the patron of a given locality. Hundreds of such celebrated saints have their "saint's day" festivals on dates all throughout the calendar year, on dates set by the Catholic hierarchy in the Vatican.These saint-day celebrations are typically local public holidays, and involve substantial financial expenditures by local governments as well as households.

In the Catholic church, the veneration of the saints is a practice authorized by the Council of Nicaea (787 A.D.). According to the church, the saints are believed to protect people and, by extension, their communities. The patron saint is the protector chosen by a town or locality, whether a saint or one of the complementary denominations to the Virgin Mary or Jesus. In many Catholic countries, the name of the patron saint became part of the name of the town.

2.2. Selection of Saints

In Spain, patron saints were chosen voluntarily by communities to provide for the protection of a community and the individual members of that community. Saints were often chosen to ward off ill fortune, or as a thank you to a specific saint for their given protection. Many thought that by celebrating a saint by making promises to the saint, they would be appeased and their fortunes would improve (Ragon, 2002). These practices of patron saints were historical in origin but are still practiced in many European countries.

In Mexico and most of Latin America, patron saints were typically established at the time of a town's founding by Spanish colonizers, often centuries ago, and remained set thereafter. In Mexico, there were three main ways patron saints were chosen by Spanish colonizers to represent communities in Mexico: military conquest dates, similarities between saint and community characteristics, and similarities between saints and indigenous god characteristics. Initially, many patron saints were assigned by the Spanish following military victories that prompted the choice of the first patron saints (Ragon, 2002). For example, the first patron saint of Mexico was

Saint Hippolytus because his feast day fell on the same day the last defenders of Tenochtitlan surrendered.[8] In fact, the names of many cities in Mexico are based on the saint whose feast was celebrated on the day the Spanish first visited or created a certain city (Ragon, 2002).

When patron saints were not chosen based on military conquest and colonial settlement, they were sometimes chosen based on similarity to already worshiped indigenous gods. This was especially common among friar communities outside of central Mexico. In the friars' attempts to convert the population to Catholicism, the Spanish took advantage of the similarities between the indigenous gods and the Spanish practice of patron saints. Therefore many original saints were chosen for the community in an attempt to convert the population by granting them a patron saint that most resembled their god (Nutini, 1976). Catholic Saints however were not chosen based on the dates of the celebration but rather based on structural, functional, or symbolic similarities between indigenous gods and Catholic saints (Nutini, 1968).[9]

Third, in communities where neither military conquest or indigenous gods were responsible for patron saint choices, saints were most often assigned a patron saint based on salient characteristics of their community and particular functions of saints (Ragon, 2002). For example, the patron saint of cooks, San Pascual Bailon, is celebrated in Puebla, a region known for its cuisine. Saint Gregory was chosen for his well known ability to ward off grasshoppers after parts of Mexico suffered a large grasshopper plague (Brewster, 1904).

Similarly, as the Church became more powerful in Mexico, some communities that had not adopted patron saints were coerced to. They thus adopted patron saints associated with higher levels of devotion because they did not want to be perceived as lacking loyalty to the church (Ragon, 2002). For instance, Saint Francis Xavier is a popular saint in Mexico as he is "figure of the Catholic Reformation [and] he could comfortably serve as a model of virtue" (Nutini, 1968).

Finally, are also some cases where saints were chosen at random. Oral histories suggest that saint names were physically pulled out of a bowl, or the like. For these communities did not want to choose the saints, they wanted the saints to choose them instead. This was seen as a manifestation of supernatural will (Ragon, 2002). Villa de Carreon, now Atlixco, is the most well

[8]Characteristics of the military actions undertaken during conquest also played a role in choosing their patron saints. For example, the Archangel Michael of Puebla – known for conquering Satan and defending Christianity in Catholic lore – was selected in some localities where the first Spanish colonizers likened themselves to the Archangel for their conquesting of Indigenous cultures.

[9]As an example, the village of San Juan Tianguismanalco was originally associated with the cult of the god *Tezcatlipoca*. Upon the arrival of the friars, the village was assigned the patron saint Saint John the Apostle given that both Saint John the Apostle and Tezcatlipoca represented youth. (Nutini 1976, 1980).

known example of this. The village, facing a plague in 1580, held a community gathering and pulled Saint Felix's name from an urn. However, the story goes that the community did not believe that he could protect them in the case of a plague and thus pulled again but that his name was pulled three times. Thus, unable to negate the idea that Saint Felix chose them, the village named Saint Felix its patron saint in hopes of protection (Ragon, 2002).

2.3. Changing of Saints

Historically, there are cases when communities did change their patron saints. Because patron saints were celebrated to create stability, cohesion, and durability of a community, a community would change its saint or add a saint only if it encountered something drastic. Floods, fires, and earthquakes were common catalysts for new saints: many large Mexican cities chose saints that protected themselves against these natural disasters. Additionally, saints such as Saint Francis Xavier were chosen by their reputations in protecting people (Ragon, 2002).

Nevertheless, in these cases, when a community chose a new patron saint they often did not eliminate the celebration of their old one. Municipalities such as San Luis Potosi, Mexico City, or Puebla had at times up to 9, 13, and 17 patron saints, respectively (Ragon, 2002). However, after a period of time, many places did not have the community funds to host more than a few festivals and thus had to drop a saint that was no longer offering them protection or the protection they needed.

2.4. Cultural and Economic Importance of Saint Days

In many ways, saint days are essentially thought of as a contract: the city keeps up its end by celebrating the saint, and the saint keeps up their end in protection (Ragon, 2002). Saints are associated with individuals and various social groups, including villages and towns, and their fiestas are days set aside to not only celebrate their protection but to thank them and please them as well.

Saint day fiestas often begin and close with a mass in the saint's honor.[10] These involve concerts, fireworks, food stands, and music for many days. Many cost over $10,000 per commu-

[10]Thus if there was a change in saints, a patron saint might have failed in their ability to protect the people, a new catastrophe arose that the community desired protection from, or the locals found it a miracle their community survived a certain event - and if a patron saint's feast day fell on the day of a miracle, they would accredit that saint and revere them through fiestas.

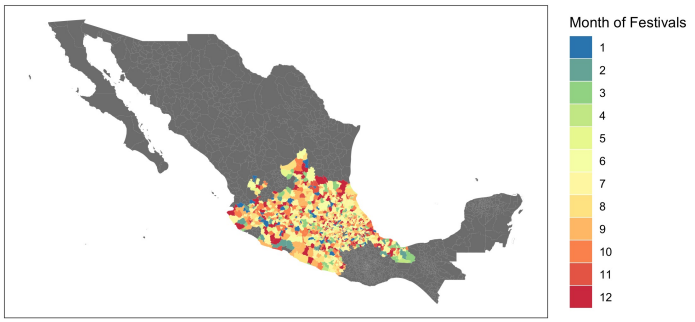
nity, and the community contributes help as well. Historically, communities rotated the largest expenditures across households using the *Mayordomia* system, whereby *Mayordomia* households were responsible for organizing and planning the celebrations for the year. Today, the festivals involve large government expenditures as well.[11]

3. Data

3.1. Data Sources on Saint Day Festivals

We collected data from archival sources and interviews with municipality governments to determine the saint-day festival date for each municipality in Mexico. The data was in part available on an online data source, the *Encyclopedia of Municipalities in Mexico*. These data were incomplete, however, and were supplemented with data from (i) online searches and (ii) by directly contacting the municipalities in question. For our dataset, we focus on *New Spain* region of Mexico. This was the main administrative unit during early colonial history and was the first part of Mexico that was conquered (providing the most plausibly exogenous festival dates). Figure 1 presents a map of festival month dates across Mexican municipalities.

Figure 1: Map of Saints Days - *New Spain* Region of Mexico



3.2. Data on Crop Planting and Harvest Dates (FAO)

Data on the optimal planting and harvest dates for a number of crops are constructed based on data from the Global Agro-Ecological Zones (GAEZ) project from the Food and Agriculture Organization (FAO). The GAEZ data provides global estimates for crop growth cycles and crop yields for a number of crops at a global grid-cell level (where each grid is 5′ × 5′, or approximately

[11] These saint day celebrations are also prevalent throughout Latin America even today. For instance, in Puerto Rico, festivals often last nine days.

100 km^2). For each crop, the GAEZ data supplies the estimates on crop growth cycles and yields under two possible sources of water – rain-fed or irrigation – and under three alternative levels of inputs – low, medium, and high. For each input-water-crop combination, the GAEZ data offers estimates under conditions that are potentially unaffected by human intervention, and under conditions that could potentially reflect human intervention. The estimates incorporate the effect of moisture and temperature on the growth of the crop, the disease environment, as well as climatic-related pest, "workability", and disease constraints. The estimates used in the analysis in this paper for the planting and harvest dates are based on the agro-climatic growth cycles under rain-fed agriculture and low levels of inputs. We use these restrictions to remove potential concerns that the irrigation method and level of agricultural inputs reflect endogenous choices that could be potentially correlated with economic development.

The analysis in the paper focuses at first on the planting and harvest cycle for maize, as maize is and has historically been the most important crop across Mexico for agriculture. Figure 2 presents a map of the optimal maize planting month across Mexico according to the GAEZ estimates. Figure 3 presents a map of the length of the growth cycle for maize across Mexico according to the GAEZ estimates. The maps highlight the large amount of variation across Mexico in the optimal planting and harvest dates for Maize.

We use the GAEZ data to construct the optimal planting date for each municipality by taking the average estimated planting date within grid cells in a municipality. Similarly, we construct the optimal harvest dates across Mexican municipalities by taking the average estimated optimal planting date and adding the average number of days until harvest from the GAEZ estimates for grid cells within each municipality. We then use the data on festival data across Mexican municipalities detailed in Section 3.1 to construct measures of how much the timing of the saints day festival celebration in each municipality overlaps with the planting and harvest dates. Figure 4 presents a map of the overlap (in days) between the saint day festival and maize planting and Figure 5 presents a map of the overlap (in days) between the saint day festival and maize harvest.

We also use data on the potential caloric yield for crops across Mexico using the Caloric Suitability Index (CSI) measures developed by Galor and Ozak (2016). The CSI measures calculate the potential caloric yield per hectare per year under rain-fed agriculture and low level of inputs for a variety of crops. The CSI is meant to ensure comparability in the measures of crop yields

Figure 2: Map of Optimal Maize Planting Date (FAO data)

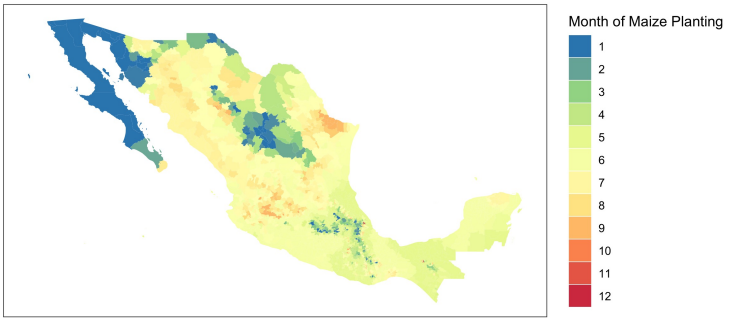


Figure 3: Map of Maize Growth Cycle Date (FAO data)

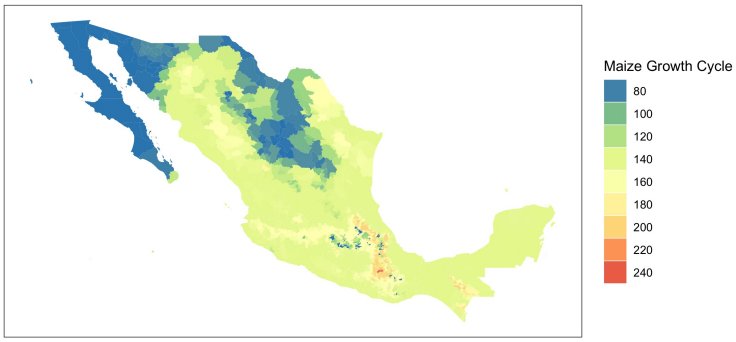


Figure 4: Map of Overlap Between Festival and Optimal Planting Date

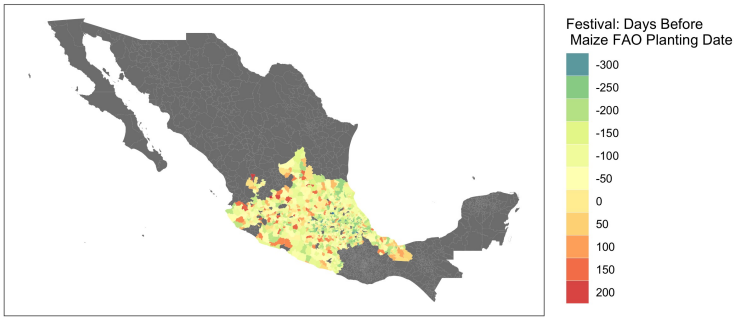
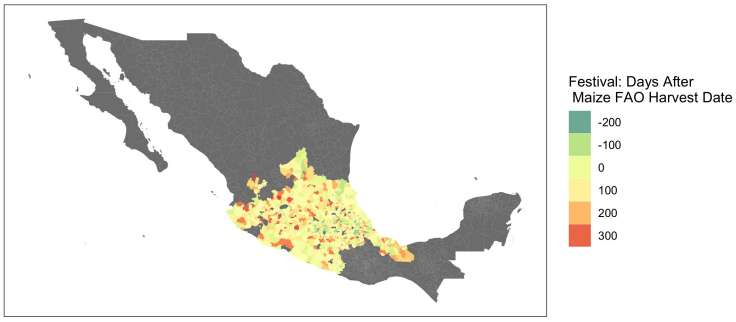


Figure 5: Map of Overlap Between Festival and Optimal Harvest Date



across space by capturing the nutritional differences across crops. We use the CSI data to determine the optimal planting and harvest date for the highest caloric-yielding crop in each municipality (instead of only examining maize crop cycles) as robustness check on the impact of festivals overlapping with the agricultural season. Interestingly, the highest caloric-yielding crop across Mexico tends to be maize according to the CSI measure (for crops where we have both CSI estimates and GAEZ growth cycle estimates). This is the case for 73.15% of municipalities. The other max CSI crops across Mexico are: foxtail millet (9.93% of municipalities), wetland rice (8.38%), wheat (5.25%), and groundnuts (0.53%).[12]

3.3. Data Sources for Development Outcomes

3.3.1. Census Data

We use municipality-level data from the 2010 *Censo de Población y Vivienda* (Population Census henceforth) from Mexico's National Institute of Statistics and Geography (INEGI).[13] This census interviewed over 106 million households across Mexico about their economic well-being, labor supply, asset ownership, and education. We also use municipality-level data on agricultural production from the 2007 *Censo Agrícola, Ganadero y Forestal 2007* (Agricultural Census henceforth). This census includes information on amount of land cultivated, production, and main problems faced by agricultural producers in each municipality.

3.4. Data on Additional Covariates

3.4.1. Geographic Data

We use a number of GIS and satellite datasets aside from the FAO GAEZ dataset described in Section 3.2. We use temperature and precipitation data from Global Climate Database (Hijmans et al., 2005) and land suitability measures using data from the Atlas of the Biosphere (Ramankutty et al., 2002). We combine these datasets with the administrative shape file of municipality boundaries for the 2010 population census from the geo-statistics division of INEGI to construct municipality-level covariates. Additionally, we use the municipality shape file to construct mu-

[12]Maize and groundnuts are crops native to the Americas. Foxtail millet, wetland rice, and wheat are not native to the Americas pre-1500 CE.

[13]For more information on this census, see INEGI documentation.

nicipality area and municipality-centroid latitude and longitude. We describe these geographic datasets and variables in more detail in Appendix A.

3.4.2. *Historical Data*

We use historical measures of population density and climate from Sellers and Alix-Garcia (2018). The population measures during the colonial era were digitized from Gerhard (1993a,b). This source contains various data on the colonial governorships of New Spain, including records from Spanish administrators on the number of individuals paying tribute to the Spanish Crown.[14] Population measures for 1900 is from Mexican Historical Archive of Localities (AHL), maintained by INGEI. Measures of drought severity during the colonial era are for 1545 and 1570 from the *North American Drought Atlas* (Cook and Krusic, 2004). These measures are important predictors of the dramatic decline in tributary population during the early colonial era and subsequent development (Sellers and Alix-Garcia, 2018).

4. Empirical Strategy

4.1. Estimating Equation

In order to examine the economic effects of festival celebrations overlapping with planting and harvest seasons, we estimate the following empirical specification:

$$y_m = \alpha_{s(m)} + \beta\, \textit{Festival: Same Month as Planting}_m + \gamma\, \textit{Festival: Same Month as Harvest}_m + \mathbf{X}_m^{'}\mathbf{B} + \epsilon_m \quad (1)$$

where m indexes municipalities in Mexico; y_m is our outcome of interest; $s(m)$ is a function mapping municipalities to states in Mexico; $\alpha_{s(m)}$ represent state fixed effects to account for all time-invariant differences across states, such as geography or cultural factors that do not vary over time; *Festival: Same Month as Planting*$_m$ is an indicator variable equal to 1 if the saints day festival in municipality m occurs within 0 to 30 days before planting; *Festival: Same Month as Harvest*$_m$ is an indicator variable equal to 1 if the saints day festival in municipality m occurs within 0 to 30

[14] Unfortunately, there are no other proxies for population for the colonial era. For the tribute data, certain groups – such as indigenous nobility and the clergy – were except. See Sellers and Alix-Garcia (2018) on how the tributary data is converted to population measures.

days after harvest; $\mathbf{X}_m$ is a vector of geographic, climatic, and historical controls for municipality m; and ϵ_m is the error term of municipality m.

The coefficients of interest are β and γ, the effects of having festivals overlap with planting and harvest, respectively. Based on the social science literature on the economic impacts of religious celebrations, we hypothesize that $\beta < 0$; that is, having saints day festival expenditures occur in periods when they may crowd out other long term investments and liquidity is low is associated with worse development outcomes. We hypothesize that $\gamma > \beta$ and $\gamma > 0$; that is, even though the festival expenditures could crowd out other investments, the festivals might also lead to more economic development as (i) liquidity is higher and festival expenditures are less likely to crowd out other investment, and (ii) the timing allows for larger and better festivals which might increase social capital and spur development.

The main identifying assumption needed to interpret β and γ as the causal impacts of having festivals overlap with planting and harvest is that $E[\epsilon_m | \textit{Festival: Same Month as Planting}_m, \textit{Festival: Same Month as Harvest}_m] = E[\epsilon_m] = 0$. That is, whether a municipality's saints day festival overlaps planting or harvest is exogenous to features of the municipality that could also affect economic development. We provide a number of empirical tests in the following section to examine whether this identifying assumption is a valid assumption. However, the measures we use for both festival dates and crop growth cycles also increase confidence that the independent variables of interest are unlikely to be endogenous. First, for festival dates, instead of using the date when the municipality actually celebrates the saint, we use the official patron saint holy date defined on the Roman Catholic Church's calendar for a municipalities patron saint (see Section 3.1). Second, for agricultural seasons, we use estimates from the FAO GAEZ data based on geographic and climate characteristics rather than the dates when households in a municipality perform planting and harvesting, which might be endogenous to levels of economic development. Therefore, using these measures for festivals and agricultural seasons increases confidence that the timing between festivals and the agricultural season is plausibly exogenous to other important characteristics that might affect development.[15]

[15] Additionally, section 2 provides qualitative historical evidence that saints day festival dates were often chosen due to plausibly exogenous reasons such as the date of conquest and similarities in features between a saint and local gods (but importantly, not on the basis of overlap with agricultural planting or harvest seasons).

4.2. Testing Identifying Assumptions

One concern with estimating equation (1) is that perhaps saint day festivals were strategically assigned by the Spanish colonizers to avoid the agricultural season in some municipalities, but not in others.[16] This strategic assignment would imply that it would be less likely that municipalities have festivals that coincide with planting or harvest compared to other months. We can test whether municipalities are less likely to have festival days that coincide with planting and harvest months in the data by estimating the following relationship:

$$\textit{Festival Month}_{mt} = \beta\, \textit{Planting Month}_{mt} + \gamma\, \textit{Harvest Month}_{mt} + \alpha_{s(m)} + \theta_t + \epsilon_{mt} \tag{2}$$

where m indexes municipalities in Mexico and t indexes months of the year; *Festival Month*$_{mt}$ is an indicator variable equal to 1 if the festival for a municipality occurs in that month; *Planting Month*$_{mt}$ is an indicator variable equal to 1 if the optimal maize planting month for a municipality using FAO GAEZ data occurs in that month; *Harvest Month*$_{mt}$ is an indicator variable equal to 1 if the optimal maize harvest month for a municipality using FAO GAEZ data occurs in that month; $\alpha_{s(m)}$ represent state fixed effects; θ_t represent month-of-the-year fixed effects to account for all time-invariant differences across months in the popularity of a saint (for instance, to account for if saints are more likely to have saint days in December according to the Roman Catholic Calendar); and ϵ_{mt} is the error term of municipality m for month t. We cluster standard errors by municipality. If saints day festivals were strategically assigned by the Spanish colonizers in order to avoid the agricultural season, then we would expect that $\beta \neq 0$ and/or $\gamma \neq 0$. However, if the saint day festivals were assigned not taking into account the timing of the agricultural season, then we would expect that $\beta = 0$ and $\gamma = 0$.

Table 1 presents the estimates for equation 2 examining the planting ad harvest months for maize, the main staple crop in Mexico. The estimates suggest that there is no evidence that festivals are more or less likely to overlap with planting or harvest months. Instead, the estimates suggests that festival dates occur throughout the calendar in a way that is consistent with festival days not being assigned strategically to avoid or coincide with planting and harvest. This is

[16] For instance, in more populous municipalities, perhaps the Spanish avoided selecting patron saints that would coincide with planting seasons. This would imply that municipalities that happen to have festival coincide with planting or harvest may be less developed today due to omitted variables (e.g. less populous to begin with) rather than the festival directly.

consistent with the idea that the interaction between festival days and planting or harvest is exogenous.

Table 1: Relationship Between Festival, Maize Planting, and Maize Harvest Months

	Dependent Variable: *Festival Month*		
	(1)	(2)	(3)
Maize Planting Month	-0.00312	-0.0118	-0.0119
	(0.0088)	(0.0095)	(0.0096)
Maize Harvest Month	-0.00139	-0.0162	-0.0160
	(0.0088)	(0.010)	(0.010)
Month Fixed Effects	N	Y	Y
State Fixed Effects	N	N	Y
Observations	13,848	13,848	13,848
Clusters	1154	1154	1154
Mean Dep. Var.	0.0833	0.0833	0.0833

Notes: Observations are at the municipality-month level. Standard errors are clustered at the municipality level. *Festival Month* is an indicator variable equal to 1 if the festival occurs in that month. *Maize Planting Month* is an indicator variable equal to 1 if the optimal maize planting month occurs in that month. *Maize Harvest Month* is an indicator variable equal to 1 if the optimal maize harvest month occurs in that month. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

A second concern with equation (1) is that if festivals were assigned exogenously depending on characteristics that might matter for economic development – such as geography and climate – then municipalities that happen to have festivals coincide with planting or harvest would not be comparable to municipalities were this is not the case. If this were the case, then the estimates from equation (1) for our independent variables of interest would not be causal and would instead be capturing impacts of these other differences between municipalities.

To examine whether this is the case, we estimate equation (1) where the outcome y_m represents a series of important geographic, climatic, and historical characteristics that might affect development. Table 2 presents the estimates for this exercise. The estimates suggest that municipalities that happen to have festivals coincide with planting or harvest are not significantly different than municipalities where this not the case for a number of characteristics that are potentially important for economic development. The findings provide additional suggestive evidence that festivals

that overlap with planting or harvest were not assigned based on endogenous characteristics of municipalities and are consistent with the identifying assumption of equation (1).

Table 2: Differences Between Municipalities by Whether Festivals Overlap with Planting or Harvest Months

	Festival: No Overlap with Planting or Harvest		*Festival: Same Month as Maize Planting*		*Festival: Same Month as Maize Harvest*		*T-Test Difference in Means*		
	Obs.	Mean/SE	Obs.	Mean/SE	Obs.	Mean/SE	(1)-(2)	(1)-(3)	(2)-(3)
Average Rainfall	958	91.635 (1.359)	63	94.610 (6.788)	119	87.238 (3.728)	-2.976	4.397	7.372
Average Temperature	958	18.969 (0.131)	63	19.182 (0.484)	119	19.066 (0.398)	-0.213	-0.097	0.117
Land Suitability	958	0.868 (0.005)	63	0.861 (0.024)	119	0.864 (0.013)	0.007	0.004	-0.003
Maize Suitability	958	4.927 (0.049)	63	4.952 (0.181)	119	4.491 (0.137)	-0.025	0.435***	0.461*
Area	958	437.7 (18.9)	63	520.5 (107.4)	119	460.8 (61.6)	-82.8	-23.0	59.7
Longitude	958	-99.28 (0.07)	63	-99.02 (0.28)	119	-99.2 (0.15)	-0.261	-0.065	0.196
Latitude	958	19.64 (0.04)	63	19.59 (0.17)	119	19.46 (0.107)	0.042	0.177	0.135
Drought in 1545	917	-3.245 (0.018)	58	-3.185 (0.083)	117	-3.277 (0.046)	-0.060	0.032	0.092
Drought in 1570	808	-5.026 (0.042)	48	-5.133 (0.207)	102	-4.796 (0.103)	0.107*	-0.230	-0.337
Ln(Dist. to Mexico City)	808	5.059 (0.027)	48	5.099 (0.102)	102	4.829 (0.086)	-0.040	0.231	0.271

Notes: The value displayed for t-tests are the differences in the means across the groups. Standard errors are clustered at the Mexican municipality level. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level. See Data Appendix for more information on variables. *Festival: Same Month as Maize Planting* is an indicator variable equal to 1 if the saint day festival in a municipality occurs during the same month as the optimal maize planting month for that municipality using FAO GAEZ data. *Festival: Same Month as Maize Harvest* is an indicator variable equal to 1 if the saint day festival in a municipality occurs during the same month as the optimal maize harvest month for that municipality using FAO GAEZ data..

5. Results: Differences in Development

5.1. Differences in Development

This section presents the results examining whether having saint day festivals overlap with planting and/or harvest seasons leads to differences in economic development in Mexico. We use data from the 2010 population census to estimate equation (1). To discipline the analysis and avoid data mining concerns and specification search concerns for multiple outcomes, we first construct an index of economic development using all questions in the census related to economic development within a municipality. We construct the index as the first principal component of these measures of development, and explain the measures used in more detail in Appendix A.

Table 3 presents the estimates for equation (1) for the index of economic development as the dependent variable. Column (1) does not include state fixed effects and columns (2)-(4) include state fixed effects, which is our preferred specification as explained in Section sec:empirics. Columns (3) and (4) include additional geographic controls and historical controls, respectively. The results presented in Table 3 show that having a festival overlap with maize planting is associated with significantly lower levels of economic development. Interestingly, the results also suggest that having a festival overlap with maize harvest is not associated with lower levels of development and instead find weak evidence that it is associated with higher levels of development. The results for planting suggest that having a poorly timed festival can lead to lower levels of economic development, potentially because the festivals crowd out additional investment (something we examine in Section 6).[17]

We also construct two additional indexes to examine the development results. We construct (i) an index of education and literacy, and (ii) an index of asset ownership using all variables from the economic development index related to these outcomes (detailed in Appendix A). Table 4 presents the results for estimating equation (1) for the education index while Table 5 presents the results for estimating (1) for the asset ownership index. We find that having festivals overlap with planting is associated with significantly worse education outcomes. We do not find strong evidence for differences in asset ownership depending on whether or not the festival overlaps with planting. We also find weak evidence that having the festival overlap with harvest leads

[17]We present the estimates for each of the components of the index in Figures A2 and A3 (for planting and harvest overlap, respectively) in the Appendix for completeness.

Table 3: Development and Festival Overlap with Maize Planting and Harvest Months

	Dependent Variable:			
	Index of Economic Development			
	(1)	(2)	(3)	(4)
Festival: Same Month as Maize Planting	-1.404***	-0.923**	-0.925**	-1.030***
	(0.495)	(0.399)	(0.369)	(0.378)
Festival: Same Month as Maize Harvest	0.645*	0.620**	0.398	0.332
	(0.374)	(0.299)	(0.275)	(0.260)
State Fixed Effects	N	Y	Y	Y
Geography Controls	N	N	Y	Y
Colonial Controls	N	N	N	Y
Observations	1,154	1,154	1,154	1,154
Clusters	1154	1154	1154	1154
Mean Dep. Var.	0.625	0.625	0.625	0.625

Notes: Data is from the 2010 Mexico Population Census. Observations are municipalities in Mexico. Standard errors are clustered at the municipality level. *Index of Economic Development* is the first principal component index for a number of development outcomes in the census for a municipality (see Data Appendix). *Festival: Same Month as Maize Planting* is an indicator variable equal to 1 if the saint day festival in a municipality occurs during the same month as the optimal maize planting month for that municipality using FAO GAEZ data. *Festival: Same Month as Maize Harvest* is an indicator variable equal to 1 if the saint day festival in a municipality occurs during the same month as the optimal maize harvest month for that municipality using FAO GAEZ data. *Geography Controls* includes mean temperature, mean precipitation, mean land suitability, the surface area, centroid latitude, centroid longitude and mean maize suitability for the municipality. *Colonial Controls* includes drought intensity in 1545, drought intensity in 1570, and the log distance from Mexico City using data from Sellers and Alix-Garcia (2018). * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

to higher education levels and asset ownership. The results seem to suggest that differences in economic development due to differences in the timing of saint day festivals are due more to differences in educational investment rather than asset ownership differences, consistent with festival crowding out educational expenditures. We return to examining mechanisms more in Section 6.[18]

Table 4: Education and Festival Overlap with Maize Planting and Harvest Months

	Dependent Variable:			
	Index of Education Outcomes			
	(1)	(2)	(3)	(4)
Festival: Same Month as Maize Planting	-1.254***	-0.911***	-0.906***	-0.964***
	(0.375)	(0.307)	(0.283)	(0.288)
Festival: Same Month as Maize Harvest	0.679**	0.533**	0.369*	0.322
	(0.277)	(0.217)	(0.214)	(0.206)
State Fixed Effects	N	Y	Y	Y
Geography Controls	N	N	Y	Y
Colonial Controls	N	N	N	Y
Observations	1,154	1,154	1,154	1,154
Clusters	1154	1154	1154	1154
Mean Dep. Var.	0.297	0.297	0.297	0.297

Notes: Data is from the 2010 Mexico Population Census. Observations are municipalities in Mexico. Standard errors are clustered at the municipality level. *Index of Education Outcomes* is the first principal component index for a number of education outcomes in the census for a municipality (see Data Appendix). *Festival: Same Month as Maize Planting* is an indicator variable equal to 1 if the saint day festival in a municipality occurs during the same month as the optimal maize planting month for that municipality using FAO GAEZ data. *Festival: Same Month as Maize Harvest* is an indicator variable equal to 1 if the saint day festival in a municipality occurs during the same month as the optimal maize harvest month for that municipality using FAO GAEZ data. *Geography Controls* includes mean temperature, mean precipitation, mean land suitability, the surface area, centroid latitude, centroid longitude and mean maize suitability for the municipality. *Colonial Controls* includes drought intensity in 1545, drought intensity in 1570 and the log distance from Mexico City using data from Sellers and Alix-Garcia (2018). * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

[18]Similar to the economic development index, we present the estimates for each of the components of the index in Figures A4– A7 in the Appendix for completeness.

Table 5: Asset Ownership and Festival Overlap with Maize Planting and Harvest Months

	Dependent Variable:			
	Index of Asset Ownership			
	(1)	(2)	(3)	(4)
Festival: Same Month as Maize Planting	-0.533	-0.240	-0.225	-0.307
	(0.325)	(0.271)	(0.242)	(0.244)
Festival: Same Month as Maize Harvest	0.0911	0.218	0.0697	0.0281
	(0.255)	(0.210)	(0.181)	(0.169)
State Fixed Effects	N	Y	Y	Y
Geography Controls	N	N	Y	Y
Colonial Controls	N	N	N	Y
Observations	1,154	1,154	1,154	1,154
Clusters	1154	1154	1154	1154
Mean Dep. Var.	0.450	0.450	0.450	0.450

Notes: Data is from the 2010 Mexico Population Census. Observations are municipalities in Mexico. Standard errors are clustered at the municipality level. *Index of Asset Ownership* is the first principal component index for a number of asset ownership questions from the census for a municipality (see Data Appendix). *Festival: Same Month as Maize Planting* is an indicator variable equal to 1 if the saint day festival in a municipality occurs during the same month as the optimal maize planting month for that municipality using FAO GAEZ data. *Festival: Same Month as Maize Harvest* is an indicator variable equal to 1 if the saint day festival in a municipality occurs during the same month as the optimal maize harvest month for that municipality using FAO GAEZ data. *Geography Controls* includes mean temperature, mean precipitation, mean land suitability, the surface area, centroid latitude, centroid longitude and mean maize suitability for the municipality. *Colonial Controls* includes drought intensity in 1545, drought intensity in 1570, and the log distance from Mexico City using data from Sellers and Alix-Garcia (2018). * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

5.2. *Falsification Exercise*

In this section, we explore the development results further by conducting a falsification exercise. In equation (1) and Section 4 we hypothesize that having a festival overlap with planting may lead to lower long-run development (due to festival expenditures crowding out of investments during low liquidity times). This argument implies that we should see the largest estimated effect when the festival overlaps with the planting month, and smaller negative effects for other months near planting (i.e. 1 month before, 1 month after, 2 months away, etc.). This provides a natural falsification exercise where we examine festivals that occur in month leading up and following planting season but do not coincide with planting season. To conduct this exercise we estimate the following specification:

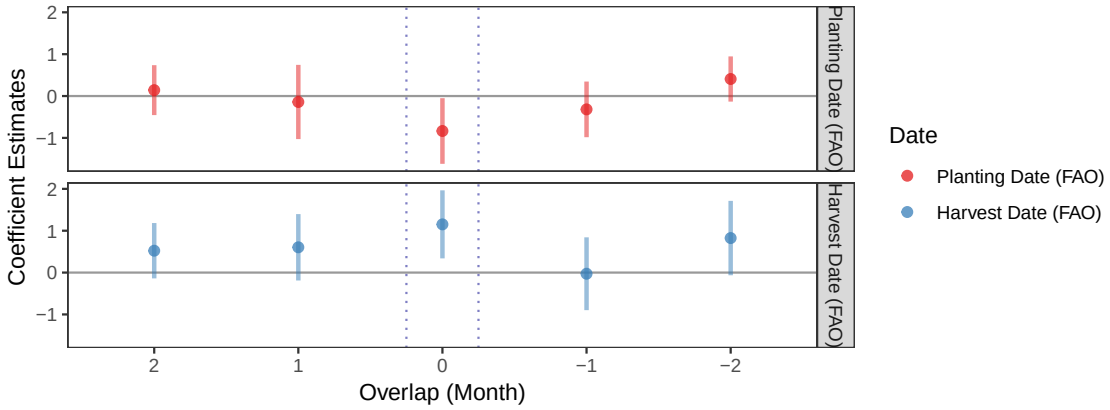
$$y_m = \alpha_{s(m)} + \sum_{i=-2}^{2} \beta_i \textit{ Festival: } i \textit{ Months from Planting}_m + \sum_{j=-2}^{2} \gamma_j \textit{ Festival: } j \textit{ Months from Harvest}_m + \mathbf{X}_m^{'}\mathbf{B} + \epsilon_m \quad (3)$$

where our coefficients of interest are β_i and γ_j, the effect of festivals occurring i months from planting or harvest; and other variables are defined as before in equation (1).

Figure 6 presents these estimates of interest from estimating equation (efeq:falsification) on the index of economic development used in Table 3. The estimates are consistent with the hypothesis from Section 4; namely, the largest estimated effect occurs when the festival overlaps with the planting month, and smaller negative effects for other months near planting or harvest. These results are consistent with the hypotheses that festivals can crowd out investments when they overlap with planting season.[19]

[19]This timing of the effects highlighted in Figure 6 also provides additional evidence that the results presented in Table 3 are due to the overlap between festivals and planting and are not capturing some other difference between municipalities with/without this overlap that is not related to the festivals themselves.

Figure 6: Falsification Exercise Examining Placebo Months



5.3. *Using Maximum Calorie Crop instead of Only Maize*

As explained in Section 3.2, we also consider an alternative measure of how festivals overlap with agricultural seasons. Specifically, instead of examining only maize planting and harvest, we use data from Galor and Ozak (2016) on the Caloric Suitability Index (CSI) for each crop within each municipality to construct measures of the overlap between the festival date and the optimal planting/harvest date of the maximum CSI crop for each municipality.[20] This provides an additional check on the results presented above by considering a measure that examines a larger set of crops compared to just maize.

Table 6 presents the estimates for estimating equation (1) for the index of economic development using the overlap between festival month and optimal planting and harvest months for the maximum CSI crop. The results are similar to the results presented in Table 3 and show that having the festival overlap with planting is associated with significant decreases in economic development.[21] We also replicate the falsification analysis in section 5.2 using this measure as well and present the results in Figure A8. We find that the effect of the overlap between the festival and max csi crop seasons is largest exactly when the festival overlaps with the planting month. These results confirm the findings from the previous section and show that the results are robust to considering alternative crop calendars.

[20] Note: the crop calendar data is from the FAO GAEZ data.

[21] Appendix Table A1 presents the equivalent balance table as in Table 2 and shows the municipalities where the festival overlaps with the max csi crop's planting or harvest months are similar on important observables as well.

Table 6: Development and Festival Overlap with Maximum CSI Crops Planting and Harvest Months

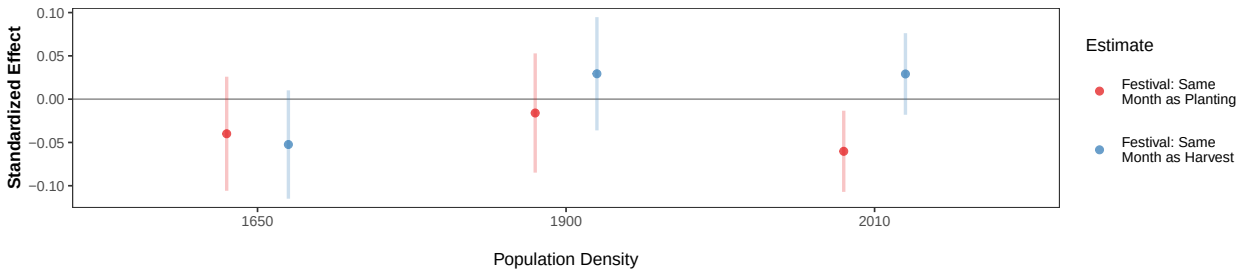
	Dependent Variable:			
	Index of Economic Development			
	(1)	(2)	(3)	(4)
Festival: Same Month as Max CSI Planting	-0.991**	-0.668*	-0.814***	-0.827***
	(0.406)	(0.354)	(0.294)	(0.289)
Festival: Same Month as Max CSI Harvest	0.270	0.507*	0.455*	0.419
	(0.350)	(0.289)	(0.276)	(0.264)
State Fixed Effects	N	Y	Y	Y
Geography Controls	N	N	Y	Y
Colonial Controls	N	N	N	Y
Observations	1,153	1,153	1,153	1,153
R-squared	0.004	0.357	0.447	0.470
Clusters	1153	1153	1153	1153
Mean Dep. Var.	0.624	0.624	0.624	0.624

Notes: Data is from the 2010 Mexico Population Census. Observations are municipalities in Mexico. Standard errors are clustered at the municipality level. *Index of Economic Development* is the first principal component index for a number of development outcomes in the census for a municipality (see Data Appendix). *Festival: Same Month as Mac CSI Planting* is an indicator variable equal to 1 if the saint day festival in a municipality occurs during the same month as the optimal planting month for the maximum CSI crop for a municipality using CSI data from Galor and Ozak (2016). *Festival: Same Month as Max CSI Harvest* is an indicator variable equal to 1 if the saint day festival in a municipality occurs during the same month as the optimal harvest month for the maximum CSI Crop for that municipality. *Geography Controls* includes mean temperature, mean precipitation, mean land suitability, the surface area, centroid latitude, centroid longitude and mean maize suitability for the municipality. *Colonial Controls* includes drought intensity in 1545, drought intensity in 1570, and the log distance from Mexico City using data from Sellers and Alix-Garcia (2018). * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

5.4. Development Across Time

The results so far highlight that festivals overlapping with planting season is associated with worse development outcomes. However, an open question is when did these differences in development emerge? To explore this, we then use historical measures of economic development across municipalities of Mexico from Sellers and Alix-Garcia (2018) to explore at what point in time did the effects of festivals overlapping with planting/harvest emerge. We use data on population density across municipalities in Mexico in 1650, 1900, and today, and plot the coefficients for the effect of festivals overlapping with planting and harvest on these measures in Figure 7.

Figure 7: Effect of Festivals Across Time - Coefficient Plot for Population Density Measures



We find that having festivals overlap with planting is associated with lower population density across time; but, the results are not statistically significant and not precisely estimated pre-1900. Interestingly, we find a "reversal of fortune" for harvest overlap post-Spanish rule: places that had festivals overlap with harvest were historically less developed during Spanish rule, but have since then become more developed. The results suggest that festivals have had long-lasting effects on the development trajectories of Mexican municipalities.

6. Mechanisms

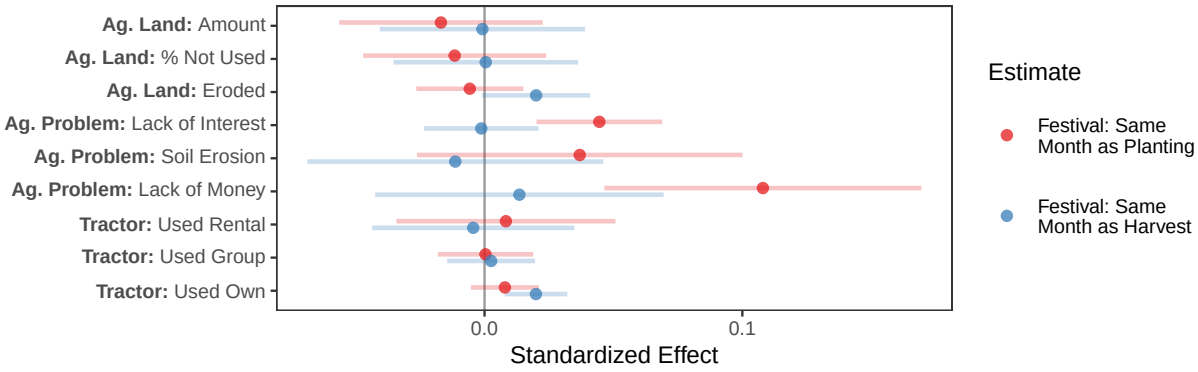
The results so far establish that festivals overlapping with planting leads to lower development outcomes in the long-run. However, an open question is what is the mechanism behind this finding. We argue that these differences emerge because festivals that overlap with the planting season occur at a time when liquidity constraints for rural households are high and so the festivals crowd out longer-horizon investments and thereby reduce growth. Conversely, festivals that overlap with the harvest season – a time when liquidity constraints for rural households are less

binding – may lead to increases in social capital and be, on net, beneficial to development, even though they may crowd out other investments. To explore the mechanisms for these hypotheses, we conduct a number of empirical tests using data from Agricultural Census of Mexico and household expenditure data from the Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH).

6.1. Agricultural Outcomes

We use data from the 2007 Census of Agriculture from Mexico to examine the impacts of festivals on economic outcomes. We explore differences in the problems faced by producers, amount of land use, and (basic) input use. We present and plot the coefficients for the effect of festivals overlapping with planting and harvest on these agricultural outcomes in Figure 8.

Figure 8: Effect of Festivals on Agricultural Outcomes - Coefficient Plot



Consistent with the idea that festivals crowd out investment during planting, we find that municipalities were festivals overlap with planting are significantly more likely to say that a lack of money is a problem for them in agricultural production. We do not find significant differences in the amount of land used for agriculture today.

7. Social Capital and Festivals

We now explore how festivals overlapping with planting/harvest affects social capital. To examine this, we use detailed survey data from the Americasbarometer from 2004 to 2014 and examine differences in trust and group membership. We use the following questions: for trust, we use the question that asks respondents "How trusting are you of others?" as a measure of

interpersonal trust. For group membership, the surveys as a series of attendance question for different community groups by asking "Do you attend meetings for the following groups?". We create an index for the membership question for the groups in surveys as the share of groups a respondent participates in for the following groups: community help, religious, parent, business, sports.

Table 7 presents the estimates for how festivals overlapping with planting/harvest affects interpersonal trust, while Table 8 presents the estimates for differences in community group participation. Interestingly, we find that municipalities where festivals overlap with planting have higher levels of interpersonal trust and higher community group participation rates, despite the differences in economic development. This social capital effect offers a potential explanation as to why some festivals continue to overlap with planting and persist in spite of the differences in development.

Table 7: Interpersonal Trust and Festival Overlap with Maize Planting and Harvest Months

	Dependent Variable:			
	Inter-Personal Trust			
	(1)	(2)	(3)	(4)
Festival: Same Month as Maize Planting	0.437***	0.530***	0.773***	0.675***
	(0.0563)	(0.0961)	(0.121)	(0.132)
Festival: Same Month as Maize Harvest	-0.0842	-0.0366	-0.0252	-0.00573
	(0.0600)	(0.0610)	(0.0541)	(0.0541)
State Fixed Effects	N	Y	Y	Y
Geography Controls	N	N	Y	Y
Colonial Controls	N	N	N	Y
Observations	4,681	4,681	4,681	4,681
Clusters	94	94	94	94
Mean Dep. Var.	2.716	2.716	2.716	2.716

Notes: Data is from the Americas Barometer (LAPOP) data. Observations are individuals in municipalities in Mexico. Standard errors are clustered at the municipality level. *Inter-personal Trust* is a 1-4 categorical variable that measures how much interpersonal trust an individual reports, ranging from 1="Not Trusting" to 4="Very Trusting". *Festival: Same Month as Maize Planting* is an indicator variable equal to 1 if the saint day festival in a municipality occurs during the same month as the optimal maize planting month for that municipality using FAO GAEZ data. *Festival: Same Month as Maize Harvest* is an indicator variable equal to 1 if the saint day festival in a municipality occurs during the same month as the optimal maize harvest month for that municipality using FAO GAEZ data. *Geography Controls* includes mean temperature, mean precipitation, mean land suitability, the surface area, centroid latitude, centroid longitude and mean maize suitability for the municipality. *Colonial Controls* includes drought intensity in 1545, drought intensity in 1570, and the log distance from Mexico City using data from Sellers and Alix-Garcia (2018). * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table 8: Community Group Attendance and Festival Overlap with Maize Planting and Harvest Months

	Dependent Variable:			
	Meetings Index			
	(1)	(2)	(3)	(4)
Festival: Same Month as Maize Planting	0.501*	0.484*	0.453**	0.462*
	(0.275)	(0.273)	(0.225)	(0.259)
Festival: Same Month as Maize Harvest	-0.0403	-0.0645	-0.118*	-0.124*
	(0.0520)	(0.0662)	(0.0668)	(0.0681)
State Fixed Effects	N	Y	Y	Y
Geography Controls	N	N	Y	Y
Colonial Controls	N	N	N	Y
Observations	4,734	4,734	4,734	4,734
Clusters	94	94	94	94
Mean Dep. Var.	-0.00365	-0.00365	-0.00365	-0.00365

Notes: Data is from the Americas Barometer (LAPOP) data. Observations are individuals in municipalities in Mexico. Standard errors are clustered at the municipality level. *Meetings Index* is the first principal component on whether an individual reports attending: religious meetings, community help meetings, school parent meetings, business meetings, or sports meetings. *Festival: Same Month as Maize Planting* is an indicator variable equal to 1 if the saint day festival in a municipality occurs during the same month as the optimal maize planting month for that municipality using FAO GAEZ data. *Festival: Same Month as Maize Harvest* is an indicator variable equal to 1 if the saint day festival in a municipality occurs during the same month as the optimal maize harvest month for that municipality using FAO GAEZ data. *Geography Controls* includes mean temperature, mean precipitation, mean land suitability, the surface area, centroid latitude, centroid longitude and mean maize suitability for the municipality. *Colonial Controls* includes drought intensity in 1545, drought intensity in 1570, and the log distance from Mexico City using data from Sellers and Alix-Garcia (2018). * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

8. Conclusion

In this paper, we examine whether religious festivals improve or hamper development by examining Catholic saint-day festivals in Mexico. To do so, we create a dataset of festival dates across Mexico using archival sources supplemented by interviews with municipal governments. For our empirical approach, we exploit variation in the timing of festival dates and agricultural seasons across Mexico.

We find that having festivals that overlap with planting is associated with significantly worse development outcomes in the long-run. We argue that this is because festival expenditures crowding-out investment. However, festivals overlapping with planting is associated with higher social capital; this finding possibly explains why the festivals have persisted in spite of the effects on development. These results have implications for development policy broadly, as festival expenditures are a common and sizable feature of the lives of the poor.

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Appendix for

Religious Practice and Long-Run Economic Development: Evidence from Catholic Saint-Day Celebrations in Mexico

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26 February 2020

Contents

Appendix A Data Appendix **2**

A.1 Geographic Data and Variables 2

A.2 Mexico Census Data and Indexes 3

Appendix B Additional Figures **3**

B.1 Estimates for Index Components 3

Appendix C Additional Tables **5**

Appendix A. Data Appendix

A.1. Geographic Data and Variables

- **Precipitation and Temperature:** Precipitation and temperature data is provided by the Global Climate Database created by Hijmans et al. (2005) and available at http://www.worldclim.org/. This data provides monthly average rainfall in millimeters. We calculate the average rainfall for each month in each municipality and average this over the twelve months to obtain our yearly precipitation measure in millimeters of rainfall per year. Similarly, we calculate the average temperature for each month in each municipality and average this over the twelve months to obtain our yearly temperature measure in centigrades.

- **Land Suitability:** Land suitability is the soil component of the land quality index created by the Atlas of the Biosphere available at http://www.sage.wisc.edu/iamdata/ used in Michalopoulos (2012) and Ramankutty et al. (2002). This data uses soil characteristics (namely soil carbon density and the acidity or alkalinity of soil) and combines them using the best functional form to match known actual cropland area and interpolates this measure to be available for most of the world at the 0.5 degree in latitude by longitude level. This measure is normalized to be between 0 and 1, where higher values indicate higher soil suitability for agriculture.

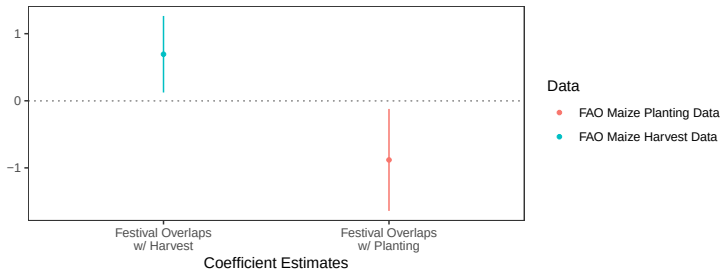
A.2. Mexico Census Data and Indexes

- **Population Census:** We use municipality-level data from the 2010 *Censo de Población y Vivienda* produced by Mexico's National Institute of Statistics and Geography (INEGI). For more information on this census, see INEGI documentation at https://www.inegi.org.mx/programas/ccpv/2010/. This census interviewed over 106 million households across Mexico about their economic well-being, labor supply, asset ownership, and education. We construct an index of economic development using all questions in the census related to economic development within a municipality. We construct the index as the first principal component of these measures of development. Figure A2 presents the components of this index. The index includes all questions on educational attainment, workforce participation, literacy, asset and ownership.

- **Agriculatural Census:** We use municipality-level data on agricultural production from the 2007 *Censo Agrícola, Ganadero y Forestal 2007* (Agricultural Census henceforth). For more information on this census, see INEGI documentation at https://www.inegi.org.mx/programas/cagf/2007/. This census includes information on amount of land cultivated, production, and main problems faced by agricultural producers in each municipality.

Appendix B. Additional Figures

Figure A1: Differences in Development by Festival Timing



B.1. Estimates for Index Components

Figure A2: Estimates for Economic Development Index Components - Festival and Planting Overlap

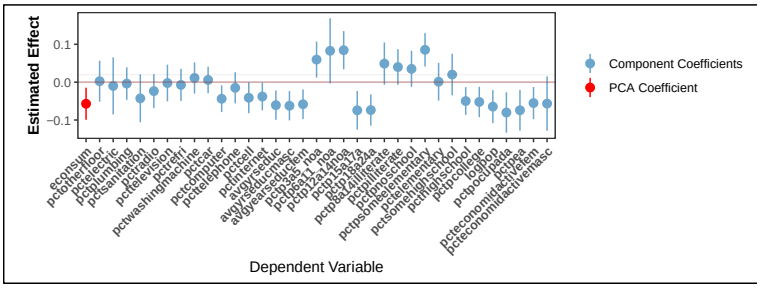


Figure A3: Estimates for Economic Development Index Components - Festival and Harvest Overlap

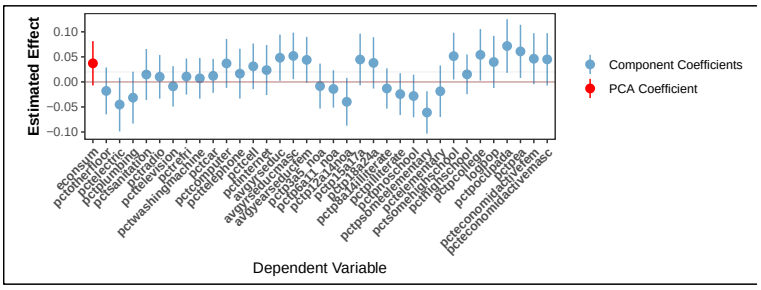


Figure A4: Estimates for Education Index Components - Festival and Planting Overlap

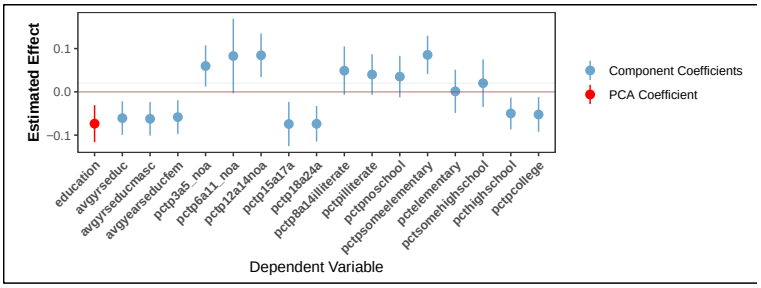


Figure A5: Estimates for Education Index Components - Festival and Harvest Overlap

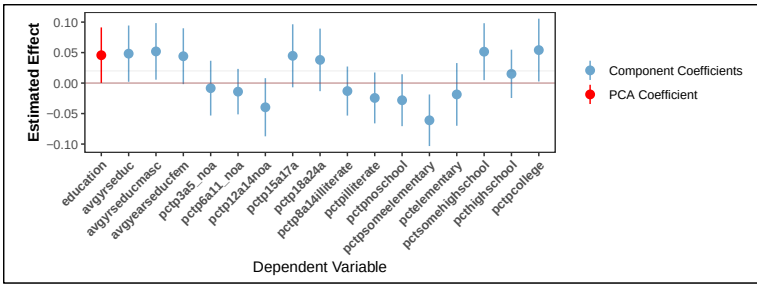


Figure A6: Estimates for Asset Ownership Index Components - Festival and Planting Overlap

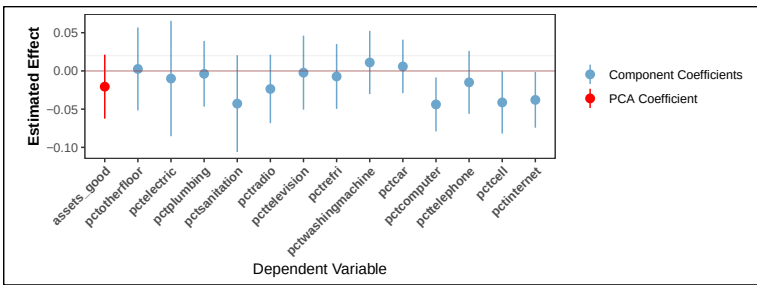


Figure A7: Estimates for Asset Ownership Index Components - Festival and Harvest Overlap

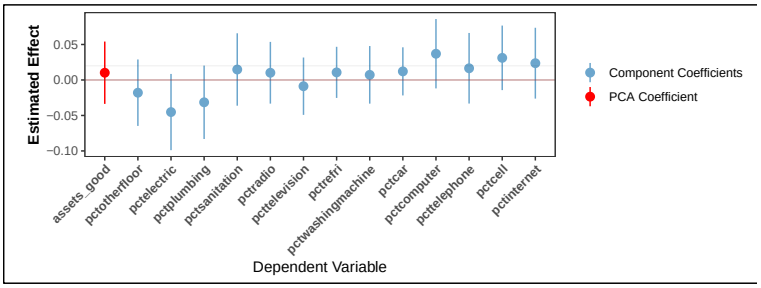
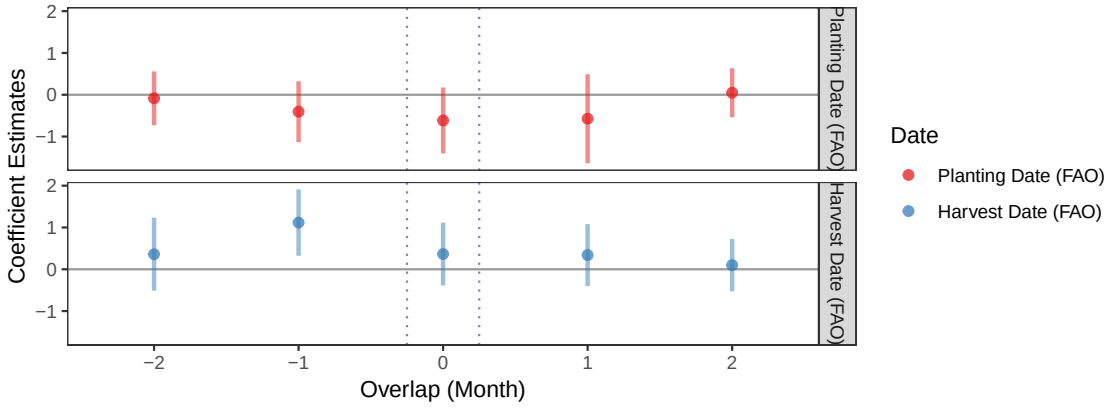


Figure A8: Falsification Exercise Examining Placebo Month Overlaps for Max CSI Crop



Appendix C. Additional Tables

Table A1: Differences Between Municipalities by Whether Months Overlap with Max CVSI Planting or Harvest Months

	Festival: No Overlap with Max CSI Crop Planting or Harvest		*Festival: Same Month as Max CSI Crop Planting*		*Festival: Same Month as Max CSI Crop Harvest*		*T-Test Difference in Means*		
	Obs.	Mean/SE	Obs.	Mean/SE	Obs.	Mean/SE	(1)-(2)	(1)-(3)	(2)-(3)
Average Rainfall	977	91.345 (1.339)	57	95.792 (7.361)	119	87.238 (3.728)	-4.446	4.107	8.554
Average Temperature	977	18.971 (0.130)	57	19.246 (0.500)	119	19.066 (0.398)	-0.275	-0.094	0.180
Land Suitability	977	0.868 (0.005)	57	0.856 (0.026)	119	0.864 (0.013)	0.012	0.004	-0.007
Area	977	435.939 (18.562)	57	547.817 (117.264)	119	460.752 (61.552)	-111.877	-24.812	87.065
Longitude	977	-99.280 (0.070)	57	-99.056 (0.308)	119	-99.216 (0.154)	-0.224	-0.065	0.159
Latitude	977	19.634 (0.037)	57	19.549 (0.182)	119	19.459 (0.107)	0.085	0.175	0.090
Drought in 1545	935	-3.246 (0.018)	52	-3.202 (0.090)	117	-3.277 (0.046)	-0.044	0.031	0.074
Drought in 1570	824	-5.024 (0.042)	43	-5.144 (0.226)	102	-4.796 (0.103)	0.120	-0.228	-0.348
Ln(Dist. to Mexico City)	824	5.057 (0.027)	43	5.141 (0.107)	102	4.829 (0.086)	-0.084	0.228	0.312

Notes: The value displayed for t-tests are the differences in the means across the groups. Standard errors are clustered at the Mexican municipality level. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level. See Data Appendix for more information on variables. *Festival: Same Month as Maize Planting* is an indicator variable equal to 1 if the saint day festival in a municipality occurs during the same month as the optimal maize planting month for that municipality using FAO GAEZ data. *Festival: Same Month as Maize Harvest* is an indicator variable equal to 1 if the saint day festival in a municipality occurs during the same month as the optimal maize harvest month for that municipality using FAO GAEZ data..