Discussion Paper Series – CRC TR 224

Discussion Paper No. 603
Project A 02

Religion as Social Insurance: Evidence From the Great Mississippi Flood of 1927

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October 2024

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Support by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) through CRC TR 224 is gratefully acknowledged.

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Rheinische Friedrich-Wilhelms-Universität Bonn - Universität Mannheim

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Abstract

This paper studies the impact of the Great Mississippi Flood of 1927 on religious participation. We find a sharp increase in church membership in flooded areas that persists into modern times. This increase is more pronounced in conservative churches that provided more social insurance to members and had larger social costs to join. Access to alternative forms of insurance reduced the flood's impact on the uptake of church membership, consistent with religious organizations acting as social insurance providers. The flood did not affect families' likelihood of choosing religious names for their children: a more costly measure of religious belief.

Keywords: Conservative religion, Informal Insurance; Club Goods; Economic Hardship
JEL Codes: Z12, H40, D70

*Acknowledgements: We would like to thank Thomas Barnebeck Andersen, Sascha O. Becker, Jeanet Bentzen, Leah Boustan, Stephen Broadberry, Daniel L. Chen, Antonio Ciccone, Carl-Johan Dalgaard, Francesco Drago, Walter Garcia-Fontes, Daniel Hungerman, Nicolai Kaarsen, Erzo F.P. Luttmer, Nathan Nunn, Elias Papaioannou, Paul Sharp, Holger Strulik, Uwe Sunde, Nico Voigtländer, and seminar participants at the Danish Public Choice workshop 2014 (University of Copenhagen), the 5th workshop on Growth, History and Development (University of Southern Denmark), the FRESH meeting at Canterbury (University of Kent), the SAEe 2014 at Palma de Mallorca (Universitat de les Illes Balears), the Historical Economics of Religion Workshop 2015 (Queen's University Belfast), the ASREC Europe 2016 conference (University of Copenhagen), the World Economic History Conference 2018 (Boston) for their helpful comments and suggestions on earlier versions of the paper. Special thanks to David Hacker for sharing his code for identifying religious names in the US census and to Abbie Natkin for outstanding research assistance. Ager gratefully acknowledges financial support from the German Research Foundation (DFG) through CRC TR 224 (Project A02).

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1 Introduction

In the United States, there are striking differences in economic outcomes for more and less religious groups. Figure 1 shows a positive relationship between county-level church members per capita and income per capita today (Panel A). This pattern is clearly reversed when focusing on membership in conservative churches—those having stricter expectations for religious practice for members (Panel B). Nevertheless, stricter denominations were on the rise throughout the 20th century (Kelley, 1986; Iannaccone, 1994; Finke and Stark, 2005). For example, membership in the Southern Baptist Convention in the US South increased from 2.4 million in 1916 to 12.8 million in 1990 (Finke, 1994). Why did individuals join stricter denominations and what contributed to their success over the 20th century in the United States? While most of the existing research on the relationship between religion and economic outcomes has focused on the way religious participation affects economic behavior through beliefs and attitudes (e.g., Becker et al., 2024), this paper provides evidence in support of a growing and influential body of research arguing that economic conditions and incentives affect both the choice to associate with religious groups and the type of religious group that individuals choose to associate with (e.g., Iannaccone, 1998; Iyer, 2016).

We leverage the Great Mississippi Flood of 1927 as a quasi-natural experiment to study how economic hardship affects religious participation. It is considered to be the most destructive flood in U.S. history and affected 170 counties in seven states.[1] The flood drowned 246 people and caused an estimated wealth destruction of $400 million, equivalent to roughly $7 billion today (Hornbeck and Naidu, 2014). This destruction affected about 20 percent of the 4.5 million people living in the flooded areas, with just under 1 million people suffering flood damage to their properties (American National Red Cross, 1929). Comparing flooded to non-flooded counties in the seven affected states, we estimate that church membership per capita increased from 36.1% by 14.5 percentage points between 1926 and 1936—with two-thirds of this increase taking place in conservative churches.[2] The effects of the flood on church membership persisted into modern times. Importantly, we also show that church membership evolved similarly in flooded and non-flooded counties in the decades before the flood occurred, supporting the key identifying assumption in a differences-in-differences

[1]The Great Mississippi Flood of 1927 affected counties in Louisiana, Mississippi, Arkansas, Tennessee, Missouri, Illinois, and Kentucky.

[2]The average church membership rate in the United States was 44.6% in 1926 and 41.6% in 1936 (Azzi and Ehrenberg, 1975).

setting of parallel trends.

What could drive the increase in church membership in the flooded counties? And in which types of churches do we expect to see the largest effects? An influential interdisciplinary literature establishes that most religious groups are faith-based manifestations of social networks that foster mutual help and informal insurance among their members (e.g., Taylor and Chatters, 1988; Stark and Finke, 2000; Graham and Haidt, 2010). The strength of faith-based social networks varies across religious groups.[3] Based on the insights of a club good model of religion, Iannaccone (1992, 1994) argues that stricter churches are more efficient providers of mutual insurance arrangements, as they efficiently counteract free-riding by imposing behavioral restrictions on their members and impose punishments on those who leave (e.g., shunning).[4] While such behavioral restrictions impose additional costs on potential members, joining stricter churches should be more attractive after a negative economic shock because they can provide access to a more generous mutual insurance network. And since strict religious groups require costly behavior modifications, penalize free-riding, and punish members who leave their community, stricter churches should be better at keeping new members.[5] Our findings are consistent with this hypothesis.

We provide three pieces of evidence to support the claim that the economic hardship caused by the Great Mississippi Flood made access to social networks in conservative churches more attractive. First, consistent with anecdotal evidence, we show that the intensity of the flood is highly associated with loss of wealth. Second, the increase in church membership, especially in conservative churches, was more muted in areas with more access to alternative forms of insurance against future income shocks, including both self-insurance (higher pre-flood levels of financial wealth) and formal credit markets (local banks). Other secular insurance options at this time were rare (Valgren, 1928) and flood insurance was not common during this time (White, 1945). The few companies that offered comparable coverage abandoned that business as a result of the 1927 Great

[3]In the United States, there is a clear participation-strictness gradient: there is more participation and larger average contributions of time and money in more theologically conservative churches (e.g., Olson and Perl, 2005).

[4]According to Iannaccone (1992, 1994) stricter religious groups use religious doctrines and behavioral restrictions more intensively to increase participation, since these restrictions work both as an entry fee in screening out non-committed individuals and as a tax on non-group (secular) activities which mitigates problems of adverse selection, free riding, and members leaving the group. See Berman (2000), Abramitzky (2008), Campante and Yanagizawa-Drott (2015), and Choy (2020) for examples.

[5]Kelley (1986) argues in his book *Why Conservative Churches are Growing* that strictness is the main reason why conservative churches are strong.

Mississippi Flood (Parker, 2000, p.413).[6] Third, the effect of the flood on church membership persisted into the modern era. This finding conforms to predictions of the club good model of religion: the increased level of commitment in conservative churches kept members from quitting. It is also consistent with recent studies showing that, historically, insurance-based motives for joining religious communities in the United States had long-lasting effects on religious participation. Examples of this phenomenon include exposure to agricultural production risk (Ager and Ciccone, 2018) and oil discoveries (Ferrara and Testa, 2023).

To study alternative mechanisms, and to explore the robustness of our main result, we digitized and constructed a new panel of church membership covering churches in the Mississippi Delta that belonged to the Southern Baptist Convention, the largest conservative denomination in our sample. These unique data allow us to study the dynamics of church membership by using information on both the reported inflow and stock of members at the church level surrounding the flood, between 1925 and 1935. We confirm the main finding from our county-level analysis and show a surge of new members in conservative churches located in areas more heavily affected by the flood. Furthermore, this analysis reveals that the effect of the flood on church membership grew in the immediate years after the flood, after which membership levels stabilized. We further provide a series of robustness checks to rule out the hypothesis that our estimated effect on church membership at the county level is caused by confounding factors arising from Black out-migration from the flooded areas (Hornbeck and Naidu, 2014). Lastly, we use an index of the religiosity of names from Hacker (1999) to show that exposure to the Mississippi Flood did not affect the religiosity of names chosen by parents for their children born after the flood. Although church membership (and thus greater access to informal insurance networks) increased following the flood, we see no evidence of stronger forms of increased religiosity in the affected households.

Our paper complements recent studies that show that people draw on religious networks to cope with economic risk and turn to religion in time of severe crisis such as natural disasters (e.g., Ager and Ciccone, 2018; Belloc et al., 2016; Bentzen, 2019, 2021). In particular, Hasan et al. (forthcoming) find that church membership played an important role in the economic recovery following the 2005 hurricane season in the southeastern United States. While the hurricanes negatively affected

[6]The National Flood Insurance Program (NFIP) passed in 1968 brought back the market for flood insurance that insurers had retreated from after the 1927 flood.

establishment productivity, counties with higher pre-disaster church membership rates experienced faster recovery over the next five years. In affected counties with higher church membership rates, people were more attached to the local community and entrepreneurial activity increased, which may have facilitated post-disaster recovery. The disaster-mitigating effect of church membership cannot be attributed to specific denominations, but it is generally stronger among Protestants. The authors argue that various aspects of religion promote economic recovery that goes beyond the emotional and social insurance postulated in club good theory. In contrast to Hasan et al. (forthcoming), we focus on an earlier part of the causal chain and show that a major natural disaster can promote the spread of church membership, particularly when aid from other sources may be insufficient. Our results imply that religion is self-reinforcing and facilitates economic recovery from disasters, as those disasters in turn spur the formation of new religious adherents in affected counties. However, the long-run economic impact of increased church membership may depend on the type of religious groups that gained members following the disaster. Our study shows that counties where membership in conservative churches rose sharply due to 1927 flood are poorer today, perhaps due to the high costs associated with non-secular activities in stricter churches.

More generally, our findings speak to a large literature on risk sharing, which suggests at least two complementary reasons for why it was economically valuable to be a member of a strong social network after a massive loss of personal wealth.[7] First, many of the households that lost most of their wealth (in the form of buildings and livestock) after being flooded may have discovered that private (dis)saving was an insufficient instrument to use as insurance against future income shocks (e.g., Besley, 1995). Second, after such a loss of non-monetary wealth, households might have been unable to fulfill the collateral requirement needed for obtaining loans in formal credit markets (e.g., Conning and Udry, 2007). This could have increased the relative benefits of participating in informal credit markets where such collateral requirements are often replaced by social collateral (e.g., Besley and Coate, 1995). More generally, a crucial reason for the existence of informal rural credit and insurance markets is their local nature, which makes it possible to use peer monitoring

[7]See Alderman and Paxson (1994), Townsend (1995), and Dercon (2004) for studies on income risk sharing across households in developing countries or in historical settings (e.g., McClosky, 1976; Richardson, 2005). Such informal risk-sharing mechanisms include implicit insurance provided through family and friend networks (e.g., Rosenzweig and Stark, 1989), self-enforcing mutual-help arrangements (e.g., Kimball, 1988), and informal credits (e.g., Udry, 1994).

and social enforcement mechanisms—often with a religious foundation—to circumvent the market failures that arise from asymmetric information (e.g., Stiglitz, 1990; Arnott and Stiglitz, 1991). In such a scenario, the strict rules that conservative churches impose upon their members to overcome free-rider problems provide members of conservative churches with a comparative advantage in engaging in welfare-improving informal credit and insurance arrangements (Iannaccone, 1992).

Our work also relates to a number of empirical studies documenting how religious participation is affected by the demand for informal insurance within religious groups.[8] Auriol et al. (2020) conduct a field experiment in a Pentecostal church in Ghana to study how church members allocate their money across their church, a secular charity, and a nationwide prayer event. They find that enrollment in formal insurance (specifically with the church as a coordinator) can partially substitute for spiritual-based insurance mechanisms. Chen (2010) provides evidence of the link between participation and informal insurance in the context of Islamic denominations in Indonesia. In the US context, Ager and Ciccone (2018) show that church membership at the end of the 19th century in the US was higher in areas where families faced more overall economic risk, and Ferrara and Testa (2023) find that churches in the US South acted as social insurance providers to mitigate shocks from oil price volatility in oil-abundant counties during the 20th century. Dehejia et al. (2007) find, based on survey data, that individuals who contributed a higher share of income to their religious organizations were better insured against drops in consumption and happiness if hit by an adverse income shock.[9]

The paper is organized as follows. In Section 2, we discuss the data and the econometric model. In Section 3, we present the results on the effect of the Mississippi Flood on religious participation. In Section 4, we discuss why church membership increased after the disaster. In Section 5, we present evidence at the church-level from the Southern Baptist Convention. Section 6 shows whether the increase in church membership persisted into modern times. Section 7 concludes.

[8] A large literature investigates the determinants of religious participation, (e.g., Azzi and Ehrenberg, 1975; Gruber, 2004; Glaeser and Sacerdote, 2008). One important question in this context is how religious attendance depends on income (e.g., McCleary and Barro, 2006; Becker and Woessmann, 2013; Franck and Iannaccone, 2014). More generally, a large strand of literature has demonstrated that religion affects economic development in various ways (e.g., Becker and Woessmann, 2009; Bénabou et al., 2015; Squicciarini, 2020). See Iyer (2016) and Becker et al. (2021, 2024) for recent overviews of this literature.

[9] A related strand of this literature has shown that social services provided by the government crowd out the charitable giving and participation of members in religious organizations (e.g., Gill and Lundsgaarde, 2004; Hungerman, 2005, 2020; Scheve and Stasavage, 2006; Gruber and Hungerman, 2007). See also Chen and Lind (2014) and Huber and Stanig (2011) for political economy implications of this issue.

2 Data and Econometric Model

2.1 Data

The baseline sample for our main analysis spans a total of 637 counties observed in years when key religious membership data are available: 1926 (the year before the flood occurred) and nine years after the flood (in 1936). These counties constitute the seven affected states: Louisiana, Mississippi, Arkansas, Tennessee, Missouri, Illinois, and Kentucky. We use data from the Census Bureau to construct church membership rates at the county level. The Census Bureau collected these data in cooperation with local church officials and published the data in the Census of Religious Bodies in the years 1890, 1906, 1916, 1926, and 1936. These volumes contain detailed county-level information about church membership counts of Christian denominations. We obtain these data from the ICPSR 2896 file (Haines et al., 2010), which also contains county-level population data, and we combine them to measure church membership rates.

While the religious censuses of 1890 to 1926 are considered detailed and reliable, we are aware of some issues about the data from 1936 (Stark, 1992; Finke and Scheitle, 2005; Gruber and Hungerman, 2007). The Bureau of the Census acknowledged that the 1936 records suffered from under-counting, especially in the South and West, due to lower levels of cooperation compared to previous decades (Gruber and Hungerman, 2007). Several congregations of Southern Baptists and the Methodist Episcopal Church (South)—both large denominations in the American South—refused to participate and consequently had fewer reported church members in 1936 compared to 1926 due to under-reporting (Finke and Scheitle, 2005). This could be a potential confounding factor in our analysis if the denomination-specific under-reporting of church members in 1936 is systematically related to the intensity of the 1927 flood. Reassuringly, our main findings are not affected if we exclude members of the Southern Baptist Church and the Methodist Episcopal Church (South)—the main denominations associated with under-reporting—from our county-level analysis. To further alleviate any concerns about under-reporting and to provide more insights about the evolution of membership in strict churches, we implement an annual church-level analysis based on a novel dataset of membership and the number of baptisms in churches belonging to the Southern Baptist Convention in the Mississippi Delta for the period 1925-1935 (see Section 5 and Figure 6).[10]

[10]We are grateful to the Mississippi Baptist Historical Commission who kindly provided photocopies of

As our main source of variation, we use the share of each county flooded ("flood intensity") to measure how each local area was affected by the flood. This measure was constructed in the official report of the relief operations of the American Red Cross (1929). In Figure 2, we show this measure of flood intensity (Panel A) together with our main outcome variable: the change in church membership per capita from 1926 to 1936 (Panel B). Here, we already see a striking pattern: counties with more exposure to the flood also see increases in religious participation. We also collected county-level data from the Mississippi River Flood Control Association (1927) on economic losses and damages from the Great Mississippi Flood of 1927.[11]

When studying the persistence of the effects of the flood across counties, we focus on contemporary church membership for the years 1980 and 1990, which we retrieved from the Association of Religion Data Archives (ARDA). We use survey data from these years, since they are the most recent collection of county-level statistics on religious bodies still reporting membership data and therefore directly comparable to the historical data. Both surveys were conducted by the Association of Statisticians of American Religious Bodies. The 1980 survey includes information on 111 denominations covering 91 percent of the adherents reported in the Yearbook of American and Canadian churches, and the 1990 survey includes information on 132 denominations covering 94.3 percent of the adherents reported in the Yearbook of American and Canadian churches. In contrast to the surveys of 1952 and 1971, both the 1980 and 1990 surveys also contain information on black denominations, which are important in our context (Finke and Scheitle, 2005). The data on county-level income per capita is from the Bureau of Economic Analysis and the data on county-level poverty rates are retrieved from ICPSR 2896 file (Haines et al., 2010). The online data appendix provides a detailed description of the variables used in the empirical analyses. Summary statistics of the main variables of interest are shown in Appendix Table 1.[12]

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the annual reports of baptist congregations in the Mississippi Delta for our sample period.

[11]We prefer the share of each county flooded as the main measure of flood intensity rather than using the resulting economic losses and damages from the flood, since the former measure is based on geographic characteristics and not on counties' pre-flood economic activity.

[12]Note, our results are unaffected if we exclude counties with total church members relative to population above 1 from the analysis or if we topcode this variable at 1.

2.2 Econometric Model

This subsection describes how we use the Great Mississippi Flood of 1927 to measure the effect of economic distress on religious participation. Our econometric model is a differences-in-differences (DD) setting with a continuous measure of treatment intensity. In particular, we compare church membership per capita (and other outcomes) before and after the flood across counties with different flood intensities, measured as the fraction of the county area flooded in 1927. To address the recent concerns of Callaway et al. (2024), we also present our main results using extensive-margin variation of the share of the county flooded. We conduct two robustness tests of this variety, rerunning Table 1 with a dummy for counties at above the 25th percentile of county flooded (7.2% flooded) and above the 75th percentile of county flooded (44% flooded). For both specifications, we find similar levels of statistical significance and similar magnitudes of the effect. Results of these robustness tests can be found in Appendix Tables 2 and 3.

We start our analysis by presenting event-study estimates using the information from all church membership data reported in the Census of Religious Bodies between 1890 and 1936 and church membership data from the Association of Religion Data Archives (ARDA) for 1980 and 1990. The estimation equation for the event study is:

$$M_{ct} = \delta_c + \varphi_{st} + \sum_{j=1890}^{1990} \beta_j \mathit{Flood\ Intensity}_c \times I_t^j + \sum_{j=1890}^{1990} \mathbf{X}_c I_t^j \Gamma_j + \varepsilon_{ct}, \quad (1)$$

where M_{ct} is church membership per capita in county c at time t, and $\mathit{Flood\ Intensity}_c$ is the fraction of county area flooded, which is interacted with a set of time-period fixed effects, where the year before the flood (1926) is used as the omitted reference period. We control for county fixed effects (δ_c) to capture time-invariant factors that affect both church membership and the fraction of each county that was flooded (such as geography); and state-by-time fixed effects (φ_{st}) to capture any time-varying factors at the state level, such as state-wide policy changes. We include county-specific geographical characteristics (i.e., latitude, longitude, cotton and corn suitability, ruggedness, and distance to the Mississippi River) in $\mathbf{X}_c$ and we interact these characteristics with time-period fixed effects. These interacted controls are meant to capture other time-varying events, which are correlated with these local characteristics. We compute standard errors that are Huber robust and clustered at the county level. Following Hornbeck and Naidu (2014), the regressions are weighted by county size.

Our key identifying assumption is that church membership rates in flooded counties would have evolved as in non-flooded counties in the absence of the flood. We provide indirect support for this assumption if $\hat{\beta}_{1890} \approx \hat{\beta}_{1906} \approx \hat{\beta}_{1916} \approx 0$, meaning that religious participation developed the same way in flooded and non-flooded counties up to the flood in 1927. The effect of the flood on church membership is given by $\hat{\beta}_{1936}$, which is the same as the difference-in-difference estimate we would obtain when only including the two time periods 1926 (pre-flood) and 1936 (post-flood). After presenting the event-study estimates, we focus on the simple two-period case.

3 The Effect of the Flood on Religious Participation

3.1 Main Results

Figure 3 displays the estimated coefficients of flood intensity from Equation (1) with their corresponding 95-percent confidence intervals. Reassuringly, the pre-flood estimates are small in magnitude and statistically highly insignificant, which means that pre-flood church membership rates were developing similarly across the counties in the sample. The direct post-flood effect in 1936 is positive and statistically significant at the 1-percent level. The estimated coefficient of 0.15 implies that a fully flooded county experienced an increase in church membership per capita of 15 percentage points from 1926 to 1936 relative to a non-flooded county (from a baseline of 36.1%). The long-run results show statistically significant increases in church membership in 1990 (at a similar level than in 1936 relative to the baseline of 1926) but not in 1980 (see Section 6 for more discussion on the persistence of the effects of the flood on religious participation).

Table 1 reports the two-period difference-in-difference estimates for counties with a differential flood intensity using church members per capita (columns 1-3) and logged total church members (columns 4-6) as the outcome variables.[13] We report the results for total church members to demonstrate that our findings are not simply driven by a denominator effect (i.e., a decreasing population size in the flooded area). We find a strong positive relationship between the flood intensity and the change in church membership between 1926 and 1936, both measured in per

[13]The significance of our estimates remains unchanged when controlling for spatial correlation with Conley standard errors (Conley, 1999). See Appendix Table 5 for those specifications.

capita terms and total members, and that these relationships are largely unaffected by controlling for time-varying effects of being located in a given state and geographical characteristics.[14]

In Figure 4, we report the partial correlation plot for the baseline specification shown in column 3 of Table 1. The plot allows for a visual inspection of our finding and serves to alleviate the concern that major outliers could be driving the results. We find similar results if the two observations located in the Northeast corner and the two observations in Southwest corner are excluded. In addition, Appendix Table 4 demonstrates that the baseline findings are also robust to excluding counties with outcomes in the 1st, 5th, 95th, and 99th percentiles. In the following two subsections, we present a series of robustness checks, mainly illustrating that our results are robust to flood-induced migration and independent of race.

3.2 Flood-Induced Migration

Since the Great Mississippi Flood of 1927 increased Black out-migration from affected counties (Hornbeck and Naidu, 2014), one potential threat to identification is that our observed increase in religious participation is solely a result of a composition effect. This would be the case if people who migrated out of the flooded areas were different in terms of religious participation. We already ruled out that out-migration of non-religious members from flooded counties was the *only* reason why church membership per capita increased, since we documented an increase in total church members in columns 4-6 of Table 1. The populations in flooded and non-flooded counties were even growing at the same rate from 1926 to 1936 (see columns 1-3 of Table 2), implying that on net the population did not decrease in flooded counties compared to non-flooded counties, which provides a reasonable explanation for why we find similar effects using total church membership instead of church membership rates as the dependent variable.[15]

This finding also indicates that out-migration of the Black population, documented by Hornbeck and Naidu (2014), was likely offset by an increase in white (and other non-Black) population in flooded counties.[16] Thus, the increase in total church membership in flooded counties might be a

[14] Results remain unchanged when controlling for initial (1926) church membership rates (or total church members in 1926) interacted with time fixed effects (available from the authors upon request).

[15] Hornbeck and Naidu (2014) (Table 2, columns 5-6) also find no statistically significant differences in total population size between flooded and non-flooded counties.

[16] Anecdotal evidence suggests that Black migration to the North was facilitated by church networks. This would even downward bias our estimate if the migrants were members of a congregation (Sernett, 1997;

result of white in-migration if these migrants were more likely to be church members compared to the average population in the flooded counties. If this was the case, it is important to distinguish between two potential scenarios. The first scenario is that people who moved from adjacent non-flooded counties into flooded counties were mainly church members. In Appendix Table 6, we conduct a placebo test where we assume that *non-flooded* counties no further than 50 (100) km away from the Mississippi River are "treated" by the flood and non-flooded counties that are at least 50 to 100 (100 to 200) km away from the Mississippi River are "control" counties. If this first scenario occurred, we should find significant differences in church membership rates between the placebo "treated" counties and the control counties. However, the result of this placebo test reveals that this was not the case, indicating that in-migration from nearby non-flooded counties to flooded counties is less of a concern in terms of changing religious participation.

The second scenario is that church members and clergymen from outside the sample moved into the flooded counties to help rebuild local congregations. However, as columns 4-7 in Table 2 shows, there was no increase in the number of clergymen in flooded counties relative to non-flooded counties. Overall, churches were known to have played a pivotal role in the ability of newly settled migrants to form well-functioning communities, especially in rural areas (Lewis, 1989; Swierenga, 1997; Roll, 2010). Even to the extent that in-migration of white church members played some role for the observed increase in religious participation in flood counties, it would be still consistent with a social insurance motive of joining religious networks.

3.3 Additional Robustness Tests

Table 3 present additional robustness checks. In columns 1-4 the outcome variable is church members per capita. In column 1, we add logged population over the decade 1920–1930 as an additional control variable to the baseline specification, but the estimated coefficient on the flood variable remains unaffected. Our result is also robust to controlling for logged Black population size over the decade 1920-1930 (column 2) and the 1920 Black population share interacted with the time indicator (column 4). The latter control should capture any differential effect, including induced migration, between blacks and whites from the flood. Column 5 shows that the same conclusion holds if we instead use total church members as the outcome variable and control for the total

Overacker, 1998).

initial (1920) Black population interacted with the time indicator.

Since the baseline sample includes all counties in the seven affected states, one might worry that control counties further away from the Mississippi River might be inherently different compared to the flooded areas close to the river even if we control for a county's distance to the Mississippi River interacted by time. We address this issue in more detail in Table 4, which reports the robustness of our main result when using different sets of control counties. We restrict the control counties to be no further away than 50, 75, or 100 kilometers from the Mississippi River (columns 1-3), or bordering the flooded region (column 4). Reassuringly, we continue to find positive and statistically significant effects.

4 Mechanisms

We have demonstrated that the 1927 flood increased religious participation in flood-affected counties. In this section, we ask *why* church membership rates increased after the disaster. First, we show that a large part of this effect can be attributed to the rise of membership of conservative churches. We argue that economic hardship caused by the flood made access to social networks in conservative churches more attractive. Three pieces of evidence support this claim: First, economic damages and losses were substantially higher in more flooded counties suggesting that the impact of the flood on church membership had an economic foundation.[17] Second, the rise in church membership rates after the flood, especially in conservative churches, was sensitive to whether alternative forms of insurance existed. Third, we find that New Deal spending during the 1930s crowded out church membership in our sample, but only did so for membership in liberal churches. This section concludes with a brief discussion about the existence of complementary mechanisms and to what extent they find support in the empirical analyses we have conducted.

4.1 Access to Formal Financial Markets and Conservative Church Membership

The key mechanism that provides the theoretical foundation for the proposed hypothesis is that access to strong social networks among church members could serve as a substitute for self-insurance

[17] We use the property damage data from the Mississippi River Flood Control Association to show in Appendix Table 7 that the flood variable we use is highly predictive for economic damage.

against income shocks. In this way, we argue that the flood led to higher church membership through its destructive impact on private wealth.

To explore this hypothesis, we rely on the fact that conservative churches have higher degrees of social insurance among members (Olson and Perl, 2005). So, we expect any substitution effects between access to formal credit markets and church membership to be higher for members of conservative churches. Since the Census of Religious Bodies in the United States collected data on church membership by county and denomination, we were able to divide the denominations in our sample into two categories—conservative (often denoted fundamental in the literature) and liberal—following the classification of Smith (1990).[18] Consistent with our hypothesis, and the predictions in Iannaccone (1992) and Berman (2000), the estimates in Table 5 show that the rising membership in conservative churches accounted for roughly two-third of the overall increase in church membership induced by the flood. For example, the baseline estimate for conservative churches, reported in column 3, is 0.10 (standard error = 0.03), while the baseline estimate for liberal churches, reported in column 6, is 0.04 (standard error = 0.02).

In Table 6, we show how formal financial markets and the level of pre-flood wealth mitigated the effect of the flood on religious participation. Since banks are often located in more urban places, we control for the pre-flood urbanization rate (interacted with the time indicator) to avoid capturing potential effects correlated with urbanization (e.g., income and the structure of the economy). Column 1 shows, consistent with substitution between formal financial markets and informal credit provided in churches, that areas with a higher number of banks per capita saw weaker effects of the flood on church membership. The estimated coefficient on the interaction term indicates that a one-standard deviation increase in banks per 1,000 inhabitants in 1926 (where the standard deviation is equal to 0.28) reduces the magnitude of the flood by 11 percentage points. Or put differently, there was no effect of the flood on religious participation in areas with banks per capita in the 75th percentile (see Appendix Tables 9 and 10 to verify this null effect). Columns 3 and 4 show that this mitigating effect was by far most important for conservative churches, consistent with the hypothesis that informal credit was a more important reason for why individuals started to join conservative churches after being flooded. Column 2 of Table 6 shows that a higher level of financial

[18] We used this classification since it more closely matches a larger number of historical denominations than the main alternative classification used in related studies provided by Steensland et al. (2000).

wealth (bank deposits per capita) also diminished the effect of the flood on church membership. While this variable serves to proxy for the ability of the affected families to self-insure consumption against future income shocks, admittedly, this variable is most likely also positively correlated with income level and characteristics associated with income (e.g. profession and years of schooling). This may be one of the reasons why the estimated mitigating effect of financial wealth is not significantly stronger for conservative churches as we expected (see columns 4 and 6). However, the evidence still indicates a substitution effect between the use of private credit markets and church membership.

4.2 Public Relief

We study religious participation in a time period with the New Deal and the associated expansion of government spending during the 1930s. Fishback et al. (2005) argue that areas in the U.S. with major rivers received more relief through the New Deal, and Gruber and Hungerman (2007) show that New Deal spending crowded out church charitable giving. While we control for distance to the Mississippi River interacted with the time indicator, this could confound our findings or interact with them in ways that are informative about the mechanism. Column 1 of Table 7 shows that the estimated effect is almost the same when controlling for New Deal spending, which indicates that New-Deal spending are not closely associated with being flooded or not. Columns 2-4 in Table 7 reveal that New Deal spending diminished the effect of the flood, consistent with the crowding out hypothesis proposed by Hungerman (2005) and that this diminishing effect was only statistically significant for membership of liberal churches. The last finding is consistent with the prediction of Iannaccone (1992) and Berman (2000). In fact these club good theories exactly explain the rise of more strict and conservative churches during the 20th century with its expansion of publicly provided social insurance by their ability to provide mutual help and insurance at a much higher level than liberal churches which makes government social programs much more substitutable for membership in more liberal churches compared to conservative churches.

4.3 Potential Alternative Mechanisms

Psychologists have shown that some individuals use private praying and religious beliefs as a way to cope with adverse life events outside of their control. For example, Pargament (1997) provide examples of studies showing how mental stress from uncontrollable adverse life events may be alleviated by using religious coping. Bentzen (2019) show empirical evidence that supports this hypothesis by documenting that, while church attendance is unaffected, individuals on average intensify their religious beliefs and private prayer after an earthquake.[19] In a related study, Belloc et al. (2016) document that the effect of seismic events retarded the transition of Medieval northern-central Italian cities with bishop seats to communal institutions. Interestingly, both studies find this effect vanishes after around 10 years. Since these related empirical studies show relatively short-lived spikes in religiosity following natural disasters, the existing evidence suggest that the increase in church membership we find 10 and more years after the flood is unlikely to be driven mainly by increased religiosity. But church membership is only one form of religious expression. A distinct (and perhaps, deeper) way to express religious beliefs is through the names parents choose for their children.

4.4 Religious Names

We now investigate the persistence of religious beliefs by examining the prevalence of religious names in the region affected by the flood. This avenue provides a measure of the persistence of religious belief. If the flood-related increase in church membership is due to an increase in religious beliefs, we expect a higher relative fraction of religious names to be an indicator of increased religious belief. However, if the increase in church membership is due to people using it as a form of social insurance after the flood, and did not cause (or come from) a change in beliefs, we would expect to see the fraction of religious names remaining consistent with pre-flood levels. Using data on the names parents used for each birth cohort, as measured in subsequent decennial censuses, we identify the religiosity of names using the classification of Hacker (1999), who uses Young (1910) and Hanks (1991) to find which of those names are "scripture proper names," indicating that those names are of religious (specifically biblical) origin.[20] We use this collection of religious names as our measure of religiosity in this specification.

We first begin by plotting population weighted binscatters of the average fraction of religious

[19] See also Clark and Lelkes (2005), Scheve and Stasavage (2006).

[20] Hacker (1999) begins by standardizing the names found in the 1850 and 1880 IPUMS censuses by addressing diminutives, misspellings, and multiple spellings (for example: Jon, Jonh, and Johnnie standardize to John).

names in a state relative to the average number of religious members per capita in a state before and after the flood (see Appendix Figure 1). We expect these graphs to show a positive relationship – one would expect that as the number of church members per capita increases in a place, so too will the number of religious names. We notice that this is not the case, rather it seems to be an inverted U-shape. However, this seems to be driven by Louisiana (state FIPS 22), which has a relatively high number of religious church members, but relatively low fraction of religious names. We can plot the same weighted binscatters by each of the main Southern states in our sample (Appendix Figure 2) and notice that Louisiana has a clear strongly negative relationship between members per capita and fraction of religious names, while the other states have a positive relationship or weakly negative correlation. We can recreate Appendix Figure 1 but instead plot it for only 6 states, creating a version for the removal of each state in the main Southern sample (Appendix Figure 3). We see that removing Louisiana completely reverses the overall relationship from negative to positive (while removing other states with negative correlations, like Illinois or Missouri, does not reverse the direction). There is no clear explanation as to why the relationship between church members per capita and fraction of religious names is so strongly negative in Louisiana. There are various theories that could potentially explain this relationship, like the strong Spanish and French presence, the role of Black Catholicism, or Creole naming traditions. However, this is beyond the scope of this project. For our analysis of religious names we will present our main results for the restricted sample without Louisiana, but include the same tables in the appendix where we include Louisiana.

We run an event study of the fraction of religious names on the same measure of flood intensity as used in the previous specifications, interacted with the year (with a reference level of 1914). We include state-by-year and county fixed effects, clustering at the county level. We run this regression for both migrants and non-migrants (defined as people born outside the current state of residence), and for both our full and restricted sample (i.e., without Louisiana (or Illinois or Missouri)). Results of the event study are shown in Figure 5, with the dotted line indicating the year of the flood. What we see is in line with our predictions that changes in religious behavior did not persist after the flood. We see that for both migrants and non-migrants, there is no statistically significant change in the fraction of religious names after the flood – if anything there is some evidence of a slight decrease. We see in our restricted sample that removing the states with negative correlations makes the results (which are at similar levels) even more statistically insignificant.

$$N_{ct} = \delta_c + \varphi_{st} + \beta \textit{Flood Intensity} * \text{Post} + \sum_{j=1910}^{1930} \mathbf{X}_c I_t^j \Gamma_j + \varepsilon_{ct}, \tag{2}$$

Equation (2) above (where the fixed effect notation is the same as in Equation 1 and N_{ct} is the fraction of religious names for a birth cohort[21] in a county in a census year) shows the difference-in-differences specification we run to look at the change in religious name prevalence before and after the flood. Table 8 shows the results of estimating equation (2). We can see that neither migrants nor non-migrants saw a statistically significant change in the fraction of religious names in a county. All groups saw a weak decrease in the prevalence of religious names after the flood. This suggests that the effects of the flood on the states as a whole did not persist, and more specifically that any changes in church membership we observe were not necessarily due to a change in religious beliefs, but more likely a desire for informal social insurance.

5 Evidence from the Southern-Baptist Denomination

We now present church-level results using data from the Southern Baptists Convention in the Mississippi delta. This case study provides insights related to the validity of our empirical design and on the mechanisms through which the flood affected church membership. There are three main reasons for focusing on the Southern Baptists denomination. First of all, we were able to retrieve annual church-level data on the number of members and baptisms before and after the flood. Figure 6 displays the location of the churches in the delta and sketches how we have connected them to the flood.[22] Since baptism is the main sacred ritual associated with becoming a member of a church belonging to the Southern Baptist Convention (Gruber and Hungerman, 2007), these data allow us to study the *inflow* of new church members instead of only the stock of members. Secondly, the Southern Baptist Convention is the largest conservative religious body in the U.S. South and thus allows us to obtain additional evidence on how membership in conservative churches were affected during the economic aftermath of the flood. Finally, the geographical coverage of the churches from the Southern Baptist Convention also makes it possible to analyze the effect of the flood at a highly

[21] We use birth cohorts from 1914-1930.

[22] If a church is located in the "flood" (i.e., the shaded area), it belongs to the fully treated group. For the remaining churches, we have calculated nearest distance to the flood area.

disaggregated level.

We focus on the Mississippi delta area since this is a homogeneous region in most dimensions, which should further alleviate the concern that the effects of the flood estimated in the county-level analysis are confounded by time-varying impacts of unobserved characteristics of counties that is correlated with the flood intensity.

The event-study estimation equation is given by:

$$y_{cbt} = \delta_c + \eta_t + \sum_{j=2}^{4} \sum_{i=1}^{4} \beta_{ij} \times I_b^i \times I_t^j + \sum_{j=2}^{4} \mathbf{X}_c I_t^j \Gamma_j + \varepsilon_{ct}, \quad (3)$$

where y_{cbt} denotes the natural log of the outcome of interest (membership or baptisms) for church c located within distance band b from a flooded area during time period t. The annual observations on the number of baptisms and church members between 1925 and 1935 are grouped into four periods, such that we have $t \in \{1, 2, 3, 4\}$ where the pre-flood period $t = 1$ is the reference period (1925-1926), and each of the following period contains three years of observations. Churches are grouped according to five distance bands that corresponds to a church location of 0 km, (0-10] km, (10-20] km, (20-35] km, and 35+ km away from the flood area, where the latter constitutes the reference group. The grouping of churches is measured by the indicator variable I_b^i which equals one if $i = b$ and zero otherwise and the indicator variable I_t^j equals one if $j = t$ and zero otherwise. The parameter of interest, β_{ij} reflects differences in the log changes between the reference period $t = 1$ and the post-flood period: $t + 1$, $t + 2$, and $t + 3$ in the outcome variable between a group of churches that are located within distance band b relative to references group of churches. We control for church fixed effects (δ_c), time fixed effects (η_t), as well as church-specific characteristics ($\mathbf{X}_c$) interacted with time fixed effects.

The event-study estimates for the number of baptisms at the church level are reported in Figure 7. Panel A shows the effects for flooded churches, while Panels B-D show the effects for churches located from 0-10 kilometers to 20-35 kilometers away from the flood area. We see that churches located up to 20 kilometers from the flood experienced an increasing number of people being baptized immediately after the flood in 1927-1929, relative to baptisms in churches located more than 35 kilometers away.[23] The point estimates for all groups become close to zero and statistically

[23]It was not clear from the records the exact date membership was measured and reported and thus unclear

highly insignificant at the end of the study period in 1933-1935, and so the flood only appeared to have caused a temporary increase in the inflow of new church members. In Figure 8, we see that the increase in the number of baptisms in 1927-1929 translates into more church members. However, the number of church members remains higher even during the end of the sample, revealing that the churches were able to maintain the increased uptake of new church members. We conclude from this case study that among churches belonging to the Southern Baptist Convention, the main conservative denomination in the region, the churches closer to the flood experienced a higher inflow of new members. The relative increase in membership in churches closer to flooded areas materialized not in the immediate aftermath of the flood but after 3-5 years and this increase in membership was sustained almost a decade after the flooding took place.

6 Persistence and Non-Persistence

We end our analysis by investigating how persistent church membership was across counties and whether the effect of the flood can still be traced in present-day economic outcomes. We estimate two models:

$$M_{c,1980-1990} = \varphi_s + \rho M_{c,hist} + X_c + \varepsilon_c, \tag{4}$$

$$y_{c1990} = \varphi_s + \beta Flood_c + X_c + \varepsilon_c, \tag{5}$$

where in Equation (4), $M_{c1980-1990}$ denotes the average number of conservative and liberal church members per capita in county c in 1980 and 1990 and $M_{c,hist}$ is the historical equivalent measured in 1936 (we also account for state fixed effects and the the set of geographical baseline controls). In Equation (5), the outcome variable, y_{c1990}, is either ln of income per capita or the poverty rate in county c both measured in 1990. This specification also includes state fixed effects, the baseline controls, and a proxy for county-level income per capita in 1920. Otherwise, the notion follows Equation (1).

The first column of Table 9 shows that an additional conservative (liberal) member per capita in 1936 is associated with more than 0.4 (0.1) of an additional member per capita on average between

whether to categorize observations for 1927 as pre- or post-flood. The main results remain unaffected if 1927 observations are dropped.

1980 and 1990. In addition to controlling for the set of geographical controls used in the previous county-level analyses, in columns 2-3, we now control for logged income per capita in 1920 to capture deep-rooted factors that determine variation in income across the studied counties that are potentially correlated with (conservative) church membership. The estimate in column 2 documents that people living in areas more flooded in 1927 have lower levels of income today. While the above-mentioned club good theories of religious participation could explain this result by the flood-induced rise in membership of conservative churches, there are certainly other complementary factors that play a role for this association (see Hornbeck and Naidu (2014)). The estimate in column 3, where the outcome is the poverty rate in 1990, confirms this conclusion and document that, at least part of the associations between church membership and material prosperity operates through the most severe state of economic hardship, namely poverty.

We derive two main conclusions from these analyses. Firstly, variation across counties in membership of conservative churches shows a higher degree of persistence over time. Lastly, we find that the flood had a long-lasting impact on church membership and that flooded areas are poorer and experience more economic hardship today.

7 Concluding Remarks

A large body of literature on religious participation has proposed the hypothesis that incentives related to mutual help and insurance in religious communities are central determinants of church membership, especially in more conservative churches. However, due to the lack of available data, there is little historical evidence on the role of conservative churches as insurance providers in the United States (Becker et al., 2021). This paper has presented county-level evidence on membership in conservative churches from the Census of Religious Bodies and church-level evidence on baptisms and membership from the Southern Baptist Convention that support this hypothesis in the context of the economic hardship that followed from the Great Mississippi Flood in 1927.

Economic incentives are a key driver for the surge in church membership in the affected areas. Our results indicate that the flood-induced increase in church membership was largely driven by economic losses and damages that people had to bear after that catastrophic event. In the flooded areas, conservative churches gained relative importance and they increased their overall membership rate, which is consistent with the idea that conservative denominations are better able to sustain a higher level of mutual insurance among their members. While joining conservative denominations might be beneficial for individuals in the short run, these community ties may restrict members' mobility and economic opportunities in the long run. In that sense, the behavioral restrictions and sacrifices imposed by stricter religious communities to prevent free-riding and limit the attractiveness for their members to pursue other secular activities could impose a barrier to economic development.

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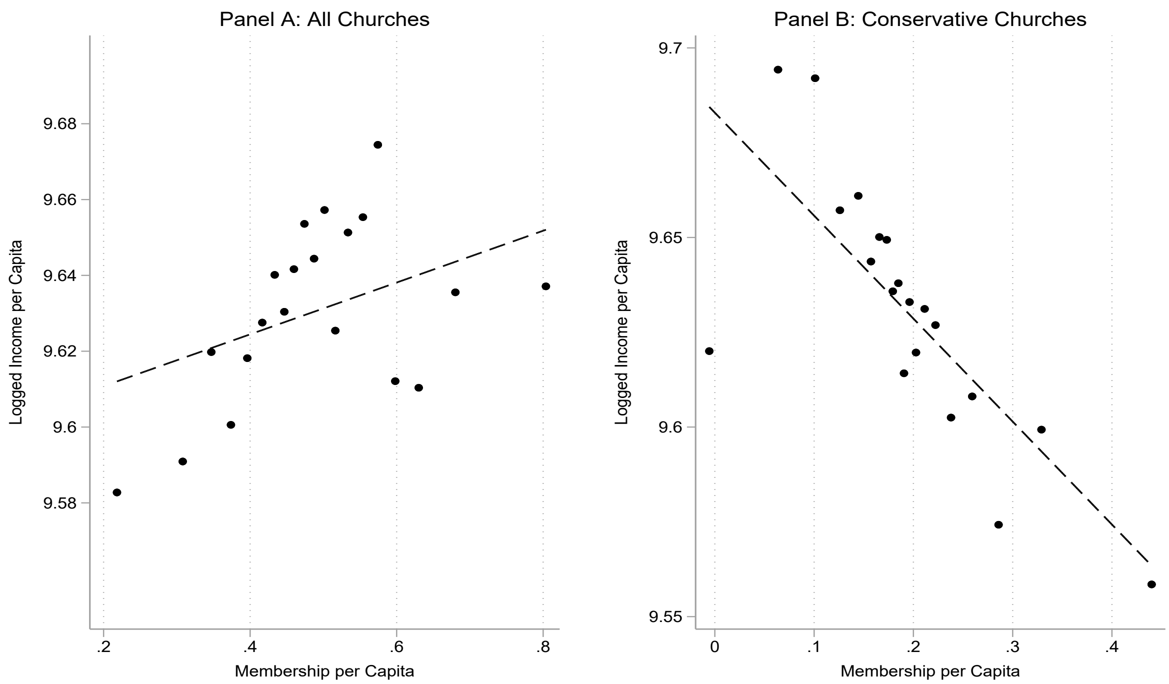
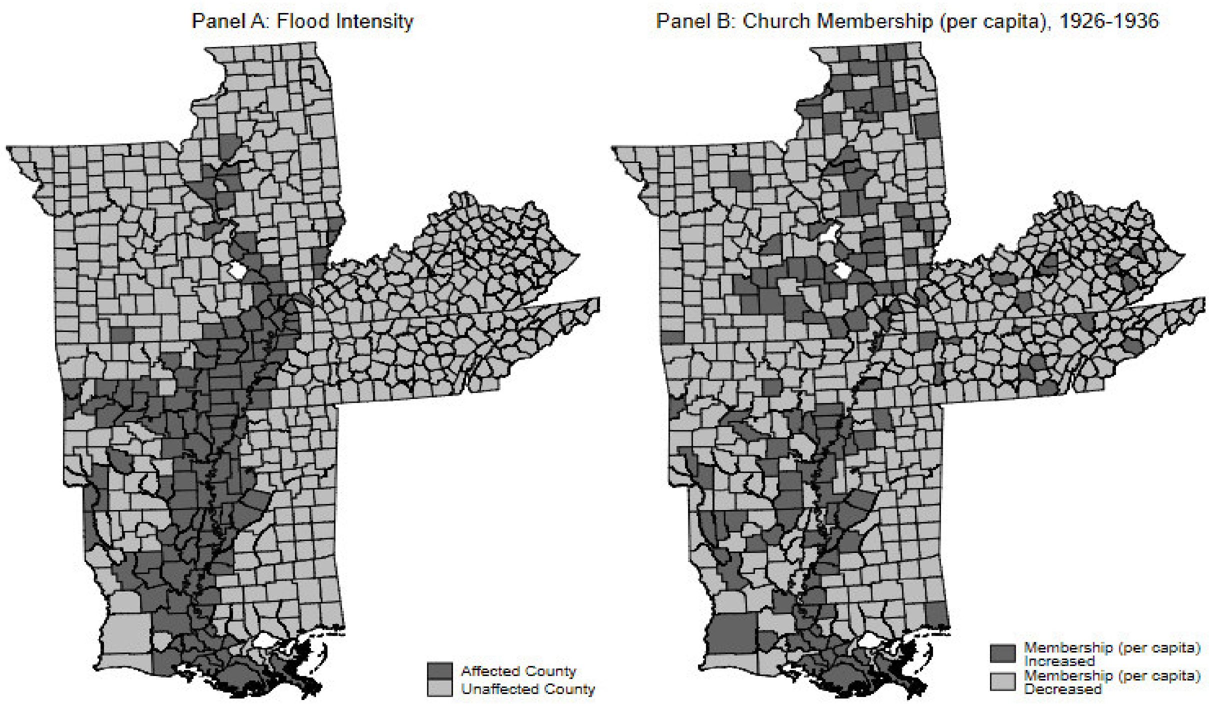
Figure 1: Economic prosperity and church membership in the modern US



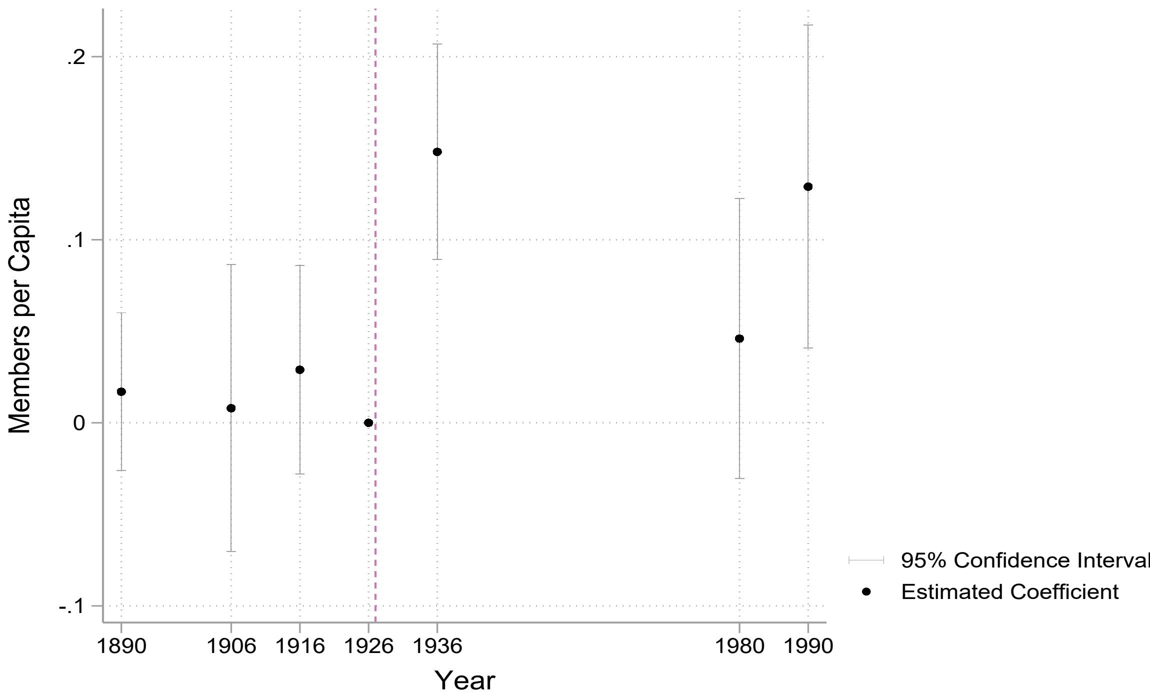
Notes: This figure shows the contemporary relationship between logged income per capita and church membership per capita across countries in the US in 1990, using binned scatter plots. Panel A depicts this relationship for all churches, while Panel B shows it for conservative churches only. (Years: 1990)

Figure 2: Flood intensity and the change in religious participation (1926-1936)



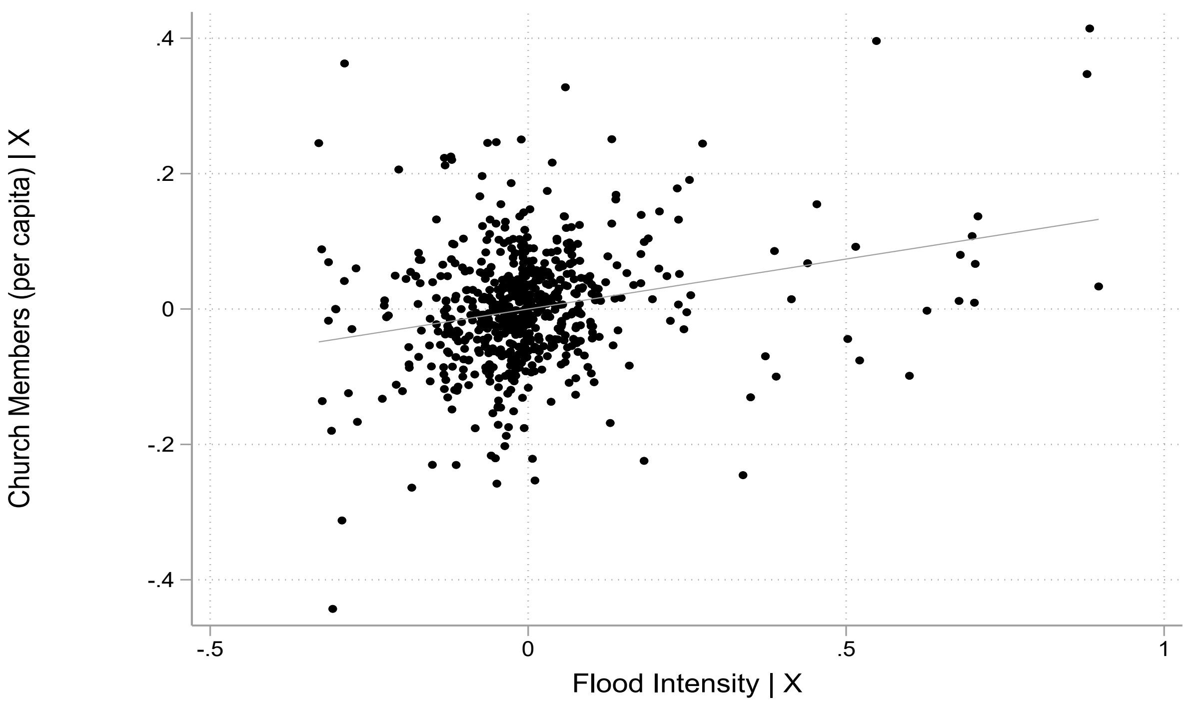
Notes: Panel A shows the local intensity of the Great Mississippi Flood of 1927. The light-grey color marks an unaffected county, while the dark-grey color indicates that the county was affected to some extent. Panel B shows the change in church members per capita from 1926 and 1936, which is our main outcome variable. The sample includes 637 counties of which 131 counties were directly affected by the flood.

Figure 3: Event-study estimates of the flood on religious participation



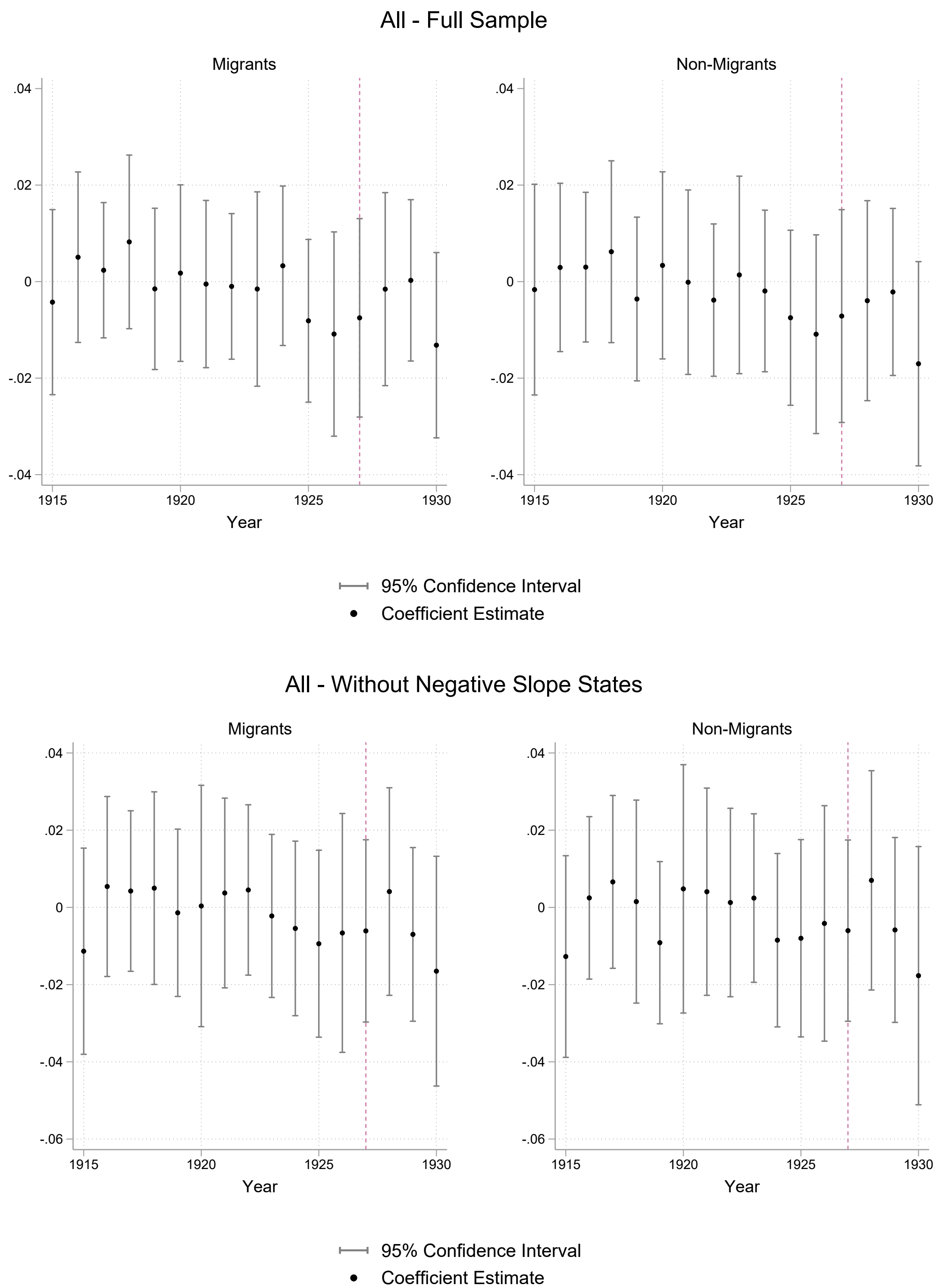
Notes: This figure reports the estimated coefficients on flood intensity from equation (1) for the years 1890, 1906, 1916, 1926, 1936, 1980, and 1990, with 1926 as the omitted reference group. The outcome variable is church membership per capita. The specification also includes county fixed effects, state-by-time fixed effects, and the following geographic characteristics interacted by time fixed effects: latitude, longitude, cotton and corn suitability, ruggedness, and distance to the Mississippi River. The black vertical lines indicate 95-percent confidence bands. Note that the year markers indicate the year of the religious member count, while the per-capita value is calculated out of the population count for the decade (ie. members per capita for 1926 is calculated as religious members in 1926/population in 1920).

Figure 4: Partial correlation plot



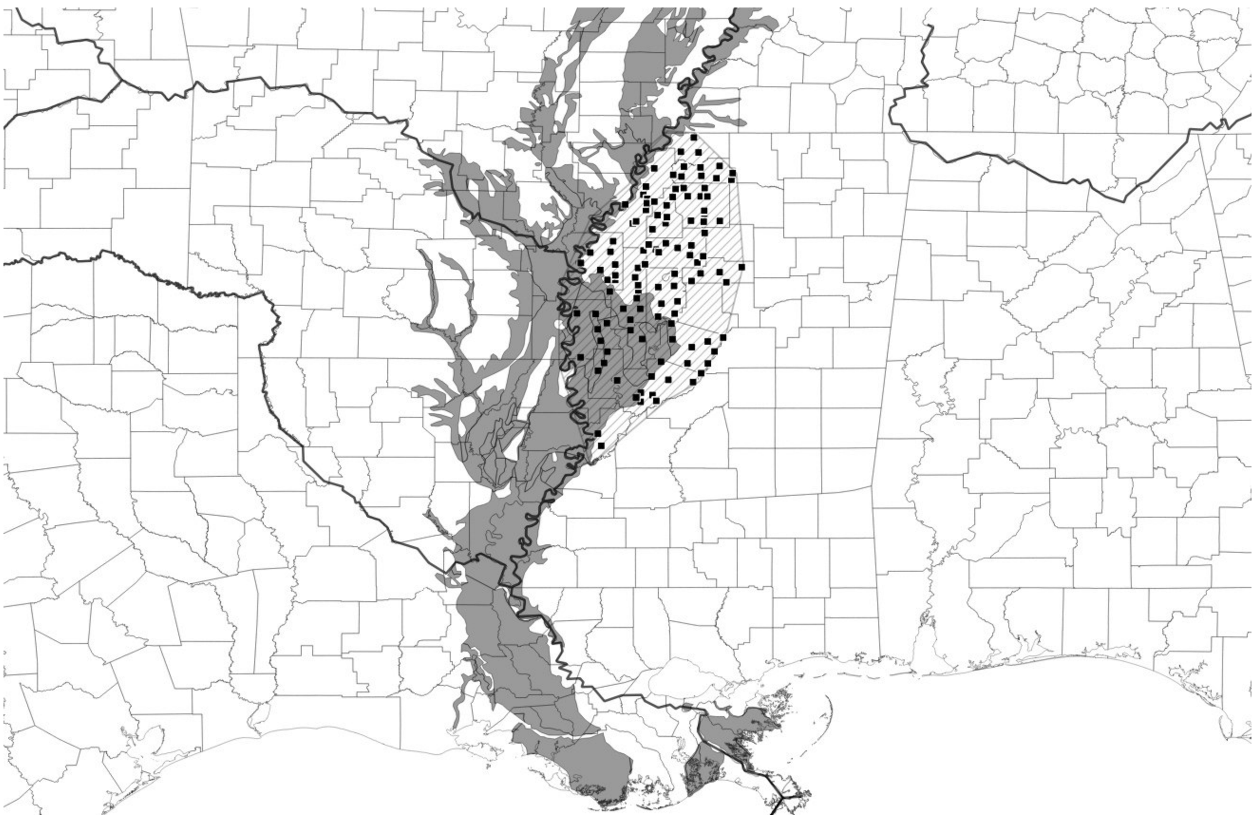
Notes: Coefficient = 0.1476, standard error = 0.038. This figure displays the partial correlation plot of flood intensity for the baseline specification shown in column (3) of Table 1. The outcome variable is church members per capita for the year of the flood. The specification also includes county fixed effects, state-by-time fixed effects, and the following geographic characteristics interacted by time fixed effects: latitude, longitude, cotton and corn suitability, ruggedness, and distance to the Mississippi River. Standard errors are robust and clustered at the county level. (Years: 1890-1930)

Figure 5: Names regression coefficients (all - with/without negative slope states)



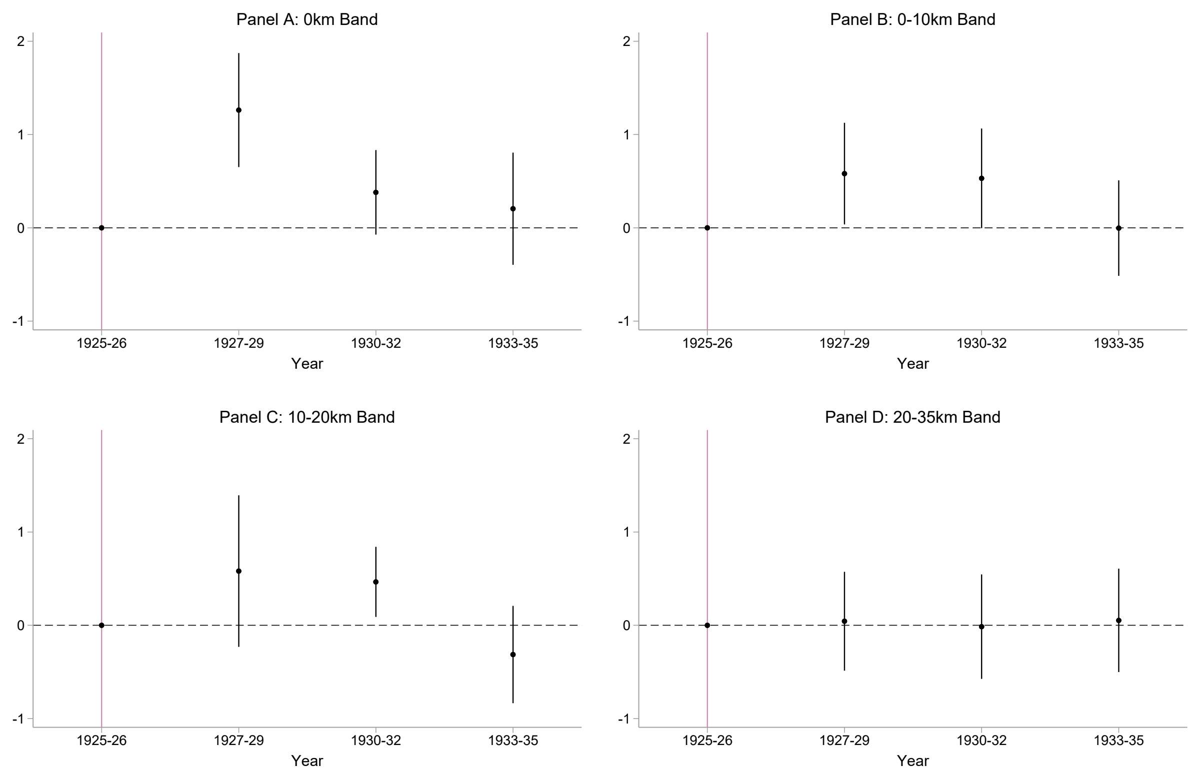
Notes: This figure reports the estimated coefficients from Equation 2. The top panel is for all states in our sample and the bottom panel is for states with a positive correlation between members per capita and fraction of religious names (see Appendix Table 3. Estimates are pegged to the pre-flood average coefficient (-0.0054 for migrants (full sample), 0.0005 for non-migrants (full sample) and -0.01 for migrants (subset), -0.012 for non-migrants (subset)). The outcome variable is the fraction of religious names in a given year. The left figure in each panel represents migrants (those whose current state is different than the one they were born in) and the right figure represents non-migrants. The omitted reference year is 1914. We include state-by-year and state-by-county fixed effects. All regressions include all the baseline controls. Standard errors are clustered at the state-by-county level. (Years: 1915-1930)

Figure 6: Southern-Baptist churches in the Mississippi delta



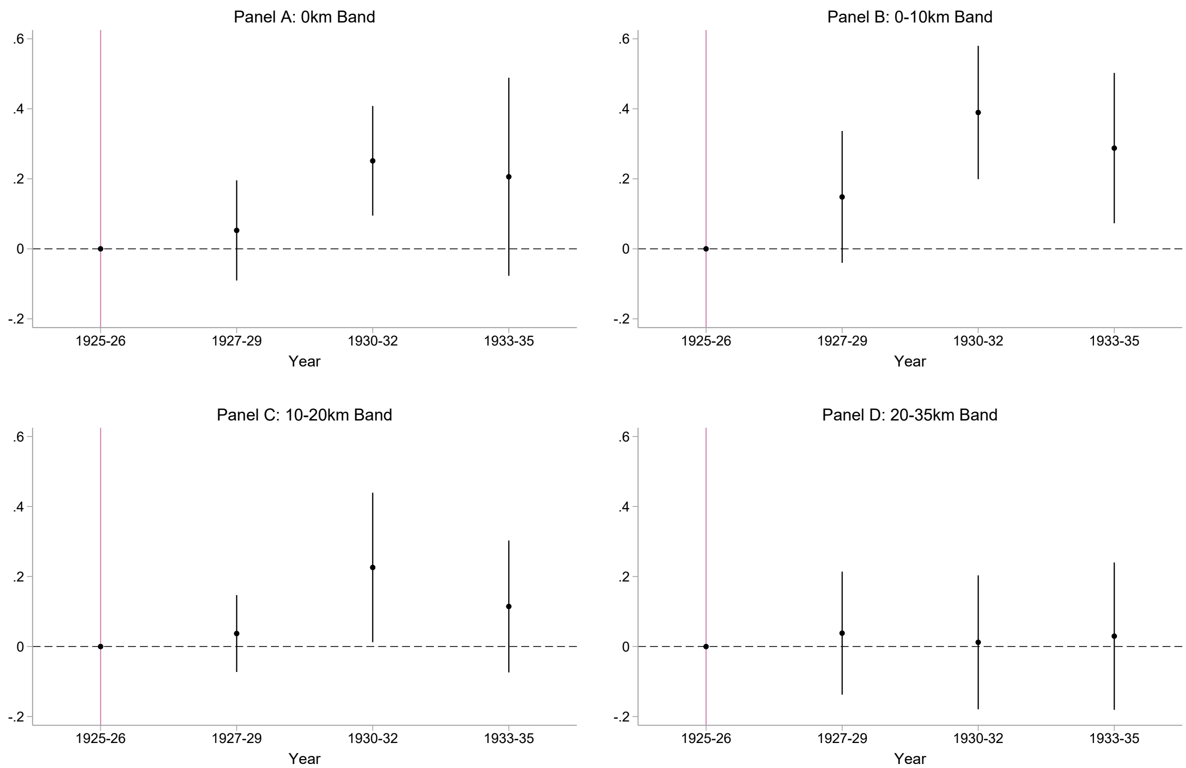
Notes: This maps shows the location of the Southern-Baptist churches as black squares in the Mississippi delta. The flood is depicted as the shaded area.

Figure 7: Event-study estimates for baptisms in the Mississippi delta



Notes: This figure reports the estimated $\beta'_{ji}s$ from Equation (3). The outcome variable is the logged number of baptisms. Panel A includes the group of churches located within the flood. Panel B-C contain churches in bands of 0-10km, 10-20km, and 20-30km away from the flooded area, and churches located more than 35km away from the flood constitute the reference band/group. The omitted comparison time period is 1925-1926. The regression also controls for church and time period fixed effects, as well as the 1925-1926 number of ln baptisms and distance to the Mississippi River, both interacted with time period fixed effects. The black vertical lines indicate 95-percent confidence bands. (Years: 1925-1935)

Figure 8: Event-study estimates for church members in the Mississippi delta



Notes: This figure reports the estimated $\beta'_{ji}s$ from Equation (3). The outcome variable is the logged number of church members. Panel A includes the group of churches located within the flood. Panel B-C contain churches in bands of 0-10km, 10-20km, and 20-30km away from the flooded area, and churches located more than 35km away from the flood constitute the reference band/group. The omitted comparison time period is 1925-1926. The regression also controls for church and time period fixed effects, as well as the 1925-1926 number of ln baptisms and distance to the Mississippi River, both interacted with time period fixed effects. The black vertical lines indicate 95-percent confidence bands. (Years: 1925-1935)

Table 1: Main DD Results for members per capita and log members

	Church Members per Capita			ln(Total Church Members)		
	(1)	(2)	(3)	(4)	(5)	(6)
Flood intensity x *I_post*	0.145***	0.151***	0.148***	0.450***	0.367***	0.293***
	(4.64)	(4.23)	(3.85)	(5.91)	(3.94)	(2.97)
Within R-Squared	0.0842	0.0805	0.0700	0.0976	0.0617	0.0367
Observations	1274	1274	1274	1274	1274	1274
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
State-Time FE	No	Yes	Yes	No	Yes	Yes
Geography-Time FE	No	No	Yes	No	No	Yes

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table reports difference-in-difference estimates of the 1927 flood on religious participation, as measured by church members per capita (columns 1-3) and logged total church members (columns 4-6). Flood intensity is the share of the county that got flooded. I_{post} is a time dummy which is equal to one in 1936. The sample includes a balanced sample of 638 counties observed in 1926 and 1936. All regressions include county and time fixed effects. Except in columns (1) and (4) the specification also includes state-by-time fixed effects. Columns (3) and (6) additionally include latitude, longitude, cotton and corn suitability, ruggedness, and distance to the Mississippi River all interacted with time fixed effects. The regressions are weighted by county size. Standard errors are Huber robust and clustered at the county level and the t-statistics are reported in parentheses. (Years: 1920-1930)

Table 2: Robustness - Migration

	ln(Population)			Clergymen per Capita			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Flood intensity x I_post	-0.003	0.009	-0.027	0.000	0.000	0.000	0.000
	(-0.08)	(0.25)	(-0.68)	(1.49)	(1.43)	(1.45)	(1.57)
Within R-Squared	0.000	0.128	0.137	0.005	0.037	0.038	0.038
Observations	1274	1274	1274	1274	1274	1274	1274
ln(Population) Control	n/a	n/a	n/a	No	Yes	Yes	Yes
ln(Black Population) Control	No	Yes	Yes	No	No	Yes	Yes
Black Share Interaction Control	No	No	Yes	No	No	No	Yes

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table reports robustness checks on migration. The specific outcome variable is indicated in the top row. Flood intensity is the share of the county that got flooded. I_{post} is a time dummy which is equal to one in 1936. All regressions include county, state-time fixed effects, as well as controls for latitude, longitude, cotton and corn suitability, ruggedness, and distance to the Mississippi River all interacted with time fixed effects. All regressions are weighted by county size. Standard errors are Huber robust and clustered at the county level and the t-statistics are reported in parentheses. (Years: 1920-1930)

Table 3: Robustness - Additional Controls

	(1) Members per Capita	(2) Members per Capita	(3) Members per Capita	(4) Members per Capita	(5) ln(Church Members)
Flood intensity x *I_post*	0.147***	0.147***	0.100**	0.093**	0.268***
	(3.95)	(3.85)	(2.42)	(2.38)	(2.74)
Within R-Squared	0.149	0.071	0.105	0.203	0.080
Observations	1274	1274	1274	1274	1274
ln(Population) Control	Yes	No	No	Yes	No
ln(Black Population) Control	No	Yes	No	Yes	No
Black Share Interaction Control	No	No	Yes	Yes	No

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table reports robustness checks on adding extra controls to our main specification. The specific outcome variable is indicated in the top row. Flood intensity is the share of the county that got flooded. I_{post} is a time dummy which is equal to one in 1936. All regressions include county, state-time fixed effects, as well as controls for latitude, longitude, cotton and corn suitability, ruggedness, and distance to the Mississippi River all interacted with time fixed effects. All regressions are weighted by county size. Standard errors are Huber robust and clustered at the county level and the t-statistics are reported in parentheses. (Years: 1920-1930)

Table 4: Robustness Sample Modifications

	(1) Control Counties Within 50km	(2) Control Counties Within 75km	(3) Control Counties Within 100km	(4) Bordering Ccontrol Counties
Flood intensity x I_post	0.0974**	0.124***	0.121***	0.108***
	(2.47)	(3.25)	(3.13)	(3.02)
Within R-Squared	0.0546	0.0767	0.0665	0.0572
Observations	350	422	472	516

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table presents several robustness checks related to the included control counties in the sample. The dependent variable is church members per capita. Flood intensity is the share of the county that got flooded. I_{post} is a time dummy which is equal to one in 1936. All regressions include county, state-time fixed effects, as well as controls for latitude, longitude, cotton and corn suitability, ruggedness, and distance to the Mississippi River all interacted with time fixed effects. All regressions are weighted by county size. Column (1) only includes control counties within 50km of the Mississippi River. This zone is extended to 75km and 100km in columns (2) and (3), respectively. Column (4) only includes control counties bordering the flooded area. Standard errors are Huber robust and clustered at the county level and the t-statistics are reported in parentheses. (Years: 1920-1930)

Table 5: Rise of Fundamentalism

	Conservative Churches			Liberal Churches		
	(1) Members per Capita	(2) Members per Capita	(3) Members per Capita	(4) Members per Capita	(5) Members per Capita	(6) Members per Capita
Flood intensity x *I_post*	0.0984***	0.111***	0.102***	0.0463***	0.0407**	0.0454**
	(3.94)	(3.94)	(3.37)	(2.78)	(2.19)	(2.27)
Within R-Squared	0.0782	0.0857	0.0653	0.0225	0.0148	0.0167
Observations	1274	1274	1274	1274	1274	1274
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
State-Time FE	No	Yes	Yes	No	Yes	Yes
Geography-Time FE	No	No	Yes	No	No	Yes

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table reports members-per-capita effects by church type: conservative (columns 1-3) and liberal (columns 4-6). Flood intensity is the share of the county that got flooded. I_{post} is an indicator equal to one if the period is 1936. The sample includes 638 counties observed in 1926 and 1936. All regressions include county and time fixed effects. Columns 2, 3, 5, and 6 also include state-time fixed effects. Columns 3 and 6 additionally include: latitude, longitude, cotton and corn suitability, ruggedness, and distance to the Mississippi River, all interacted with time fixed effects. All regressions are weighted by county size. Standard errors are Huber robust and clustered at the county level and the t-statistics are reported in parentheses. (Years: 1920-1930)

Table 6: Credit Constraints

	All Churches		Conservative Churches		Liberal Churches	
	(1) Members per Capita	(2) Members per Capita	(3) Members per Capita	(4) Members per Capita	(5) Members per Capita	(6) Members per Capita
Flood intensity x *I_post*	0.263***	0.180***	0.186***	0.100**	0.0769**	0.0794***
	(3.47)	(3.14)	(2.96)	(2.26)	(2.44)	(2.98)
Flood intensity x *I_post* x banks	-0.646**		-0.453**		-0.193	
	(-2.21)		(-1.97)		(-1.55)	
I_post x Share Urban	-0.0350*	-0.0236	0.0164	0.0190	-0.0515***	-0.0428***
	(-1.67)	(-1.22)	(1.25)	(1.55)	(-3.61)	(-2.99)
Flood intensity x *I_post* x deposits		-0.375		0.0381		-0.412**
		(-0.84)		(0.11)		(-2.08)
Within R-Squared	0.0904	0.0758	0.0843	0.0683	0.0451	0.0481
Observations	1274	1274	1274	1274	1274	1274

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table reports members-per-capita effects by church type: all (columns 1 and 2), conservative (columns 3 and 4), and liberal (columns 5 and 6). Flood intensity is the share of the county that got flooded. I_{post} is an indicator equal to one if the period is 1936. "banks" is the number of banks per capita, "deposits" are banks deposits per capita, and "urban" is the initial urbanization rate. The sample includes 638 counties observed in 1926 and 1936. All regressions include all the baseline controls and are weighted by county size. Standard errors are Huber robust and clustered at the county level and the t-statistics are reported in parentheses. (Years: 1920-1930)

Table 7: New Deal Spending

	(1) Church Members per capita	(2) Church Members per capita	(3) Church Members per capita (conservative)	(4) Church Members per capita (liberal)
Flood intensity x I_post	0.142***	0.272***	0.143**	0.129**
	(3.68)	(3.30)	(2.29)	(2.54)
Relief per Capita per 10,000	-2.225**	-1.489	-0.951	-0.540
	(-1.98)	(-1.42)	(-1.51)	(-0.63)
Flood Intensity x I_post x Relief per Capita per 10,000		-25.45*	-8.523	-16.93*
		(-1.93)	(-0.97)	(-1.92)
R-Squared	0.914	0.915	0.896	0.965
Within R-Squared	0.0762	0.0871	0.0712	0.0324
Observations	1274	1274	1274	1274

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table reports members-per-capita effects of New Deal spending, by church type: all (columns 1 and 2), conservative (column 3), and liberal (column 4). Flood intensity is the share of the county that got flooded. I_{post} is an indicator equal to one if the period is 1936. The sample includes 638 counties observed in 1926 and 1936. All regressions include all the baseline controls and are weighted by (the historical) county size. Standard errors are Huber robust and the t-statistics are reported in parentheses. (Years: 1920-1930)

Table 8: Names Difference in Differences - without Louisiana

	(1) Migrants White	(2) Migrants Black	(3) Migrants All	(4) Non-Migrants White	(5) Non-Migrants Black	(6) Non-Migrants All
Post 1927 x Flood Intensity x I_{post}	-0.00782	-0.00612	-0.00469	-0.00821	-0.0119	-0.00336
	(-1.16)	(-0.30)	(-0.90)	(-1.36)	(-0.65)	(-0.66)
R-Squared	0.639	0.312	0.759	0.628	0.328	0.752
Within R-Squared	0.00114	0.0000495	0.000725	0.00112	0.000181	0.000339
Observations	1683	1499	1683	1683	1485	1683

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table reports the effect of the flood on the fraction of religious names by migrant status and race. Flood intensity is the share of the county that got flooded. I_{post} is an indicator equal to one if the period is 1936. We include state-by-year and county fixed effects. All regressions include all the baseline controls and are weighted by (the historical) county size. Standard errors are Huber robust and clustered at the county level and the t-statistics are reported in parentheses. (Years: 1910-1930)

Table 9: Persistence of Religiosity and Economic Outcomes

	(1) Members per Capita	(2) ln(Income per Capita)	(3) Poverty Rate
Conservative 1936	0.434***		
	(7.76)		
Liberal 1936	0.101***		
	(3.36)		
Flood intensity		-0.165***	0.143***
		(-4.17)	(6.88)
R-Squared	0.251	0.401	0.520
Observations	637	619	619

t statistics in parentheses

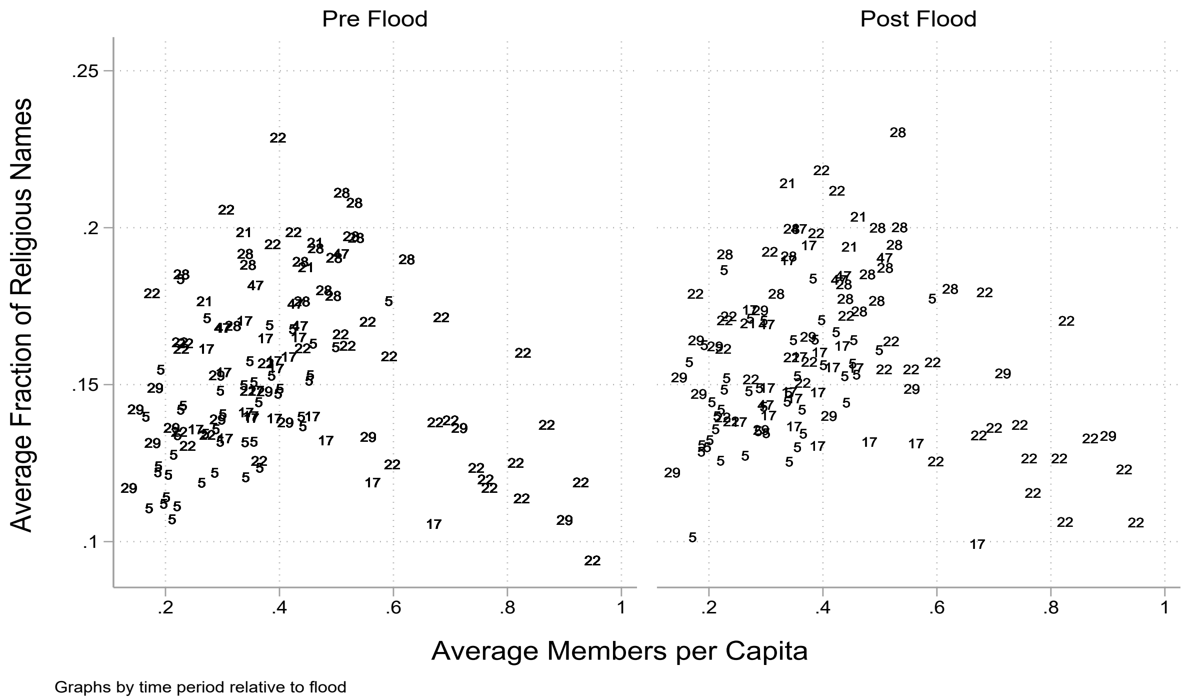
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table reports estimates from Equations (4) and (5). The outcome variables are: average church members (both liberal and conservative) per capita in 1980-1990 (coloumn 1), average logged income per capita in 1980-1990 (column 2) and the average poverty rate in 1980-1990 (column 3). "Conservative 1936" is conservative church members per capita in 1936. "Liberal 1936" is liberal church members per capita in 1936. "Flood intensity" is the 1927 flood. All regressions include all the baseline controls and are weighted by (the historical) county size. Standard errors are Huber robust and the t-statistics are reported in parentheses (Years: 1980-1990)

Online Appendix (not for publication)

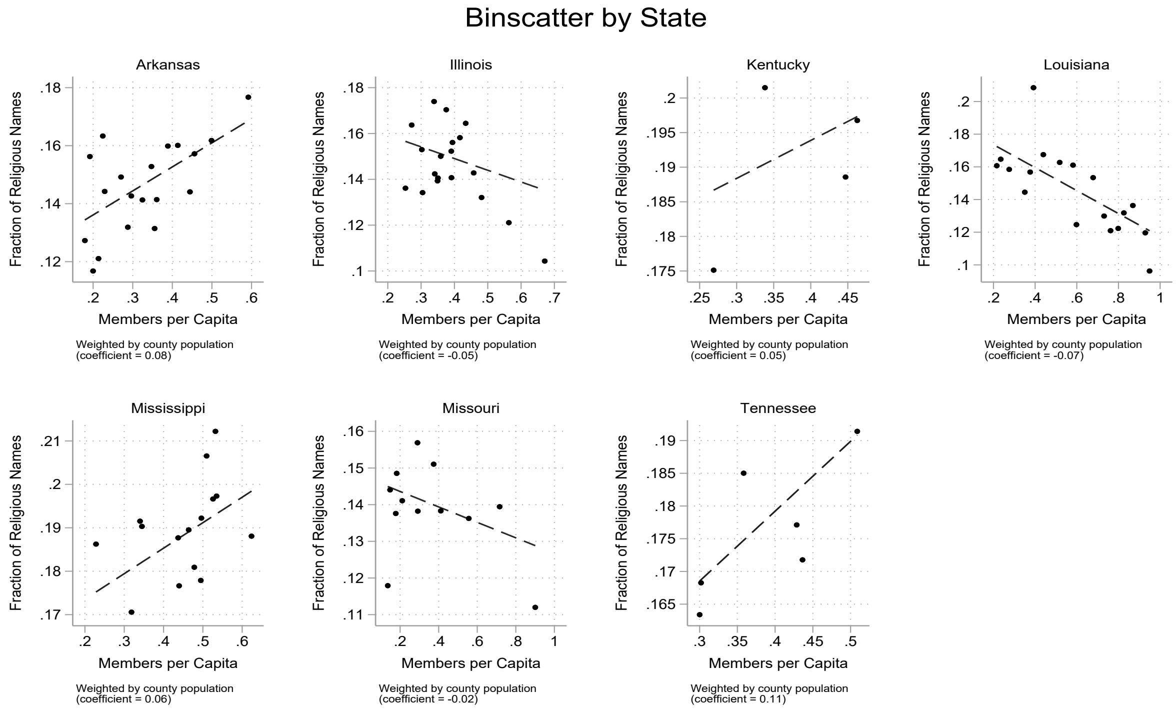
Appendix Tables and Figures

A.1: Fraction of Religious Names vs. Members per Capita



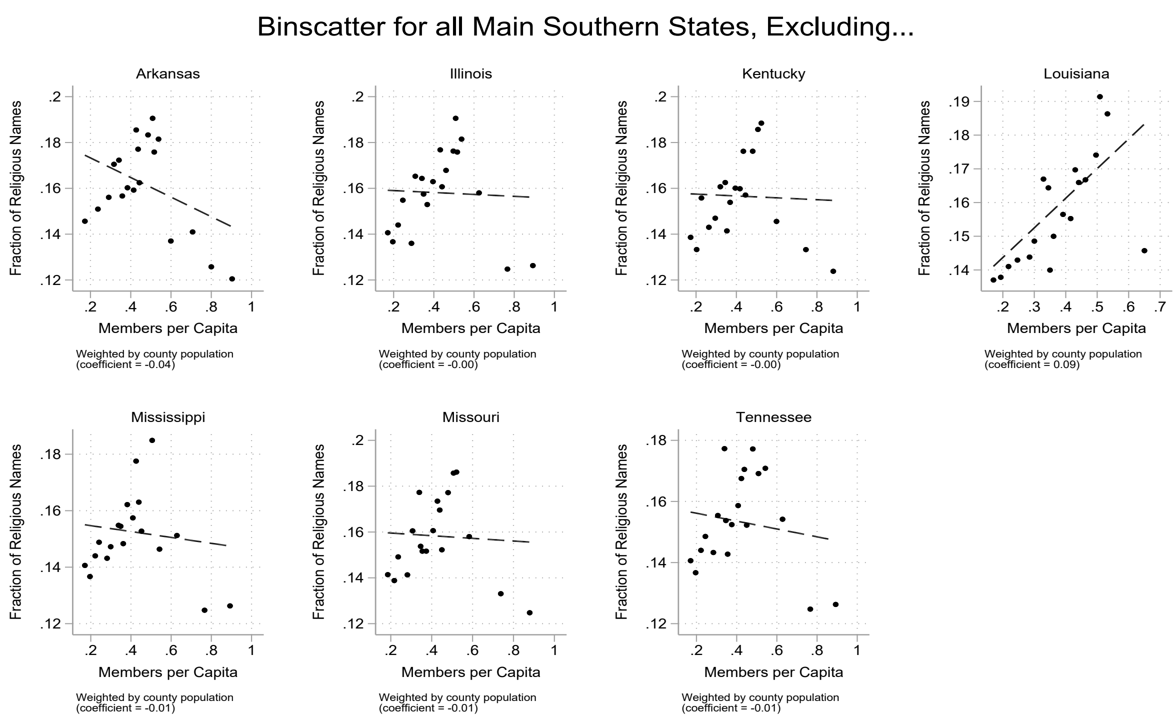
This figure shows a scatterplot of the pre- and post-flood average members per capita vs. the pre- and post-flood average fraction of religious names in a county. Each point represents a county labelled with the FIPS code of the state it is in.

A.2: Religious Names vs. Members per Capita: By State



Population weighted binscatters of members per capita vs. fraction of religious names for the main Southern states in our sample.

A.3: Religious Names vs. Members per Capita: Exclusions By State



Population weighted binscatters of members per capita vs. fraction of religious names for all of the main Southern states in our sample excluding the given state.

A.1: Summary Statistics

VARIABLES	(1) N	(2) mean	(3) sd	(4) max	(5) min	(6) p50
Members per capita	1,274	0.383	0.147	1.108	0.0425	0.375
Cotton suitability (maximum potential yield)	1,274	0.467	0.361	1.327	0	0.391
Corn suitability (maximum potential yield)	1,274	9.448	3.767	15.12	0.384	10.32
Ruggedness (maximum range in altitude)	1,274	203.8	203.5	1,804	34	136
Ruggedness (standard debiation in altitude)	1,274	32.43	35.12	335.0	1.920	22.11
County weight	1,274	431,216	254,730	2.336e+06	67,840	392,320
Latitude of county seat	1,274	35.82	3.141	42.26	29.35	36.18
Longitude of county seat	1,274	89.76	2.964	95.30	81.48	90.16
Flood intensity x I_{post}	1,274	0.0360	0.141	1	0	0
Distance to Mississippi River x After 1930	1,274	91,500	136,622	693,228	0	1,067

This table reports summary statistics for main variables used in the historical analysis: Church members per capita, which is the only variable that is time varying, is the main outcome variable. Flood intensity denotes the share of the county flooded and is the explanatory variable. The remaining variables are controls.

A.2: Extensive Margin - 25% Cutoff

	Church Members per Capita			ln(Total Church Members)		
	(1)	(2)	(3)	(4)	(5)	(6)
25th Percentile Cutoff Dummy	0.0672***	0.0692***	0.0621***	0.206***	0.180***	0.128***
	(5.10)	(4.75)	(3.82)	(6.00)	(4.67)	(3.09)
Within R-Squared	0.0709	0.0655	0.0458	0.0804	0.0576	0.0258
Observations	1274	1274	1274	1274	1274	1274
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
State-Time FE	No	Yes	Yes	No	Yes	Yes
Geography-Time FE	No	No	Yes	No	No	Yes

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table reports difference-in-difference estimates of the 1927 flood on religious participation, as measured by church members per capita (columns 1-3) and logged total church members (columns 4-6). The dependent variable is 1 for counties whose flood intensity is above the 25th percentile (.072). I_{post} is a time dummy which is equal to one in 1936. The sample includes a balanced sample of 638 counties observed in 1926 and 1936. All regressions include county and time fixed effects. Except in columns (1) and (4) the specification also includes state-by-time fixed effects. Columns (3) and (6) additionally include latitude, longitude, cotton and corn suitability, ruggedness, and distance to the Mississippi River all interacted with time fixed effects. The regressions are weighted by county size. Standard errors are Huber robust and clustered at the county level and the t-statistics are reported in parentheses. (Years: 1920-1930)

A.3: Extensive Margin - 75% Cutoff

	Church Members per Capita			ln(Total Church Members)		
	(1)	(2)	(3)	(4)	(5)	(6)
75th Percentile Cutoff Dummy	0.0906***	0.0853***	0.0791***	0.259***	0.174**	0.115
	(3.40)	(2.89)	(2.63)	(4.13)	(2.45)	(1.58)
Within R-Squared	0.0531	0.0436	0.0363	0.0522	0.0236	0.0102
Observations	1274	1274	1274	1274	1274	1274
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
State-Time FE	No	Yes	Yes	No	Yes	Yes
Geography-Time FE	No	No	Yes	No	No	Yes

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table reports difference-in-difference estimates of the 1927 flood on religious participation, as measured by church members per capita (columns 1-3) and logged total church members (columns 4-6). The dependent variable is 1 for counties whose flood intensity is above the 75th percentile (.44). I_{post} is a time dummy which is equal to one in 1936. The sample includes a balanced sample of 638 counties observed in 1926 and 1936. All regressions include county and time fixed effects. Except in columns (1) and (4) the specification also includes state-by-time fixed effects. Columns (3) and (6) additionally include latitude, longitude, cotton and corn suitability, ruggedness, and distance to the Mississippi River all interacted with time fixed effects. The regressions are weighted by county size. Standard errors are Huber robust and clustered at the county level and the t-statistics are reported in parentheses. (Years: 1920-1930)

A.4: Outliers

	(1) 1 & 99 pctile: Church Members per capita	(2) 5 & 95 pctile: Church Members per capita	(3) 1 & 99 pctile: Total Members per capita	(4) 5 & 95 pctile: Total Members per capita
Flood intensity x I_post	0.134***	0.0954**	0.295***	0.331***
	(3.39)	(2.34)	(2.99)	(3.00)
R-Squared	0.375	0.389	0.377	0.391
Observations	1234	1090	1242	1118
Number of FIPS	617	545	621	559

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table reports difference-in-difference estimates of the flood on religious participation, as measured by church members per capita (columns 1-2) and logged total church members (columns 3-4). Flood intensity is the share of the county that got flooded. I^{post} is an indicator equal to one if the period is 1936. The sample includes 638 counties observed in 1926 and 1936. All regressions include all baseline controls, and the regressions are weighted by county size. Columns 1 and 3 excludes counties with outcomes in the 1st and 99 percentiles. Columns 2 and 4 excludes counties with outcomes in the 5th and 95th percentiles. Standard errors, which are Huber robust and clustered at the county level, are reported in parentheses.

A.5: Table 1 with Conley Standard Errors

	Church Members per Capita			ln(Total Church Members)		
	(1)	(2)	(3)	(4)	(5)	(6)
Flood intensity x I_{post}	0.154***	0.151***	0.144***	0.476***	0.374***	0.301***
	(10.43)	(9.60)	(8.81)	(11.29)	(8.45)	(6.58)
R-Squared	0.0787	0.0675	0.0574	0.0911	0.0531	0.0328
Observations	1274	1274	1274	1274	1274	1274
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
State-Time FE	No	Yes	Yes	No	Yes	Yes
Geography-Time FE	No	No	Yes	No	No	Yes

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table reports difference-in-difference estimates of the 1927 flood on religious participation, as measured by church members per capita (columns 1-3) and logged total church members (columns 4-6). Flood intensity is the share of the county that got flooded. I_{post} is a time dummy which is equal to one in 1936. The sample includes a balanced sample of 638 counties observed in 1926 and 1936. All regressions include county and time fixed effects. Except in columns (1) and (4) the specification also includes state-by-time fixed effects. Columns (3) and (6) additionally include latitude, longitude, cotton and corn suitability, ruggedness, and distance to the Mississippi River all interacted with time fixed effects. The regressions are weighted by county size. We include stadard and Spatial (Conley) standard errors (with a cutoff of 200) (Years: 1920-1930)

A.6: Robustness - Proximity to Flood Placebo Test

	Members per Capita	
	(1)	(2)
Potentially Flooded Dummy	0.020	0.034
	(0.66)	(1.54)
R-Squared	0.422	0.336
Observations	88.000	210.000

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table reports robustness checks on a placebo test where we assume that *non-flooded* counties no further than 50 km (column 1) and 100 km away (column 2) from the Mississippi River are "treated" by the flood and non-flooded counties that are at least 50 to 100 km (column 1) or 100 to 200 km (column 2) away from the Mississippi River are "control" counties. All regressions include county, state-time fixed effects, as well as controls for latitude, longitude, cotton and corn suitability, ruggedness, and distance to the Mississippi River all interacted with time fixed effects. All regressions are weighted by county size. Standard errors in parentheses are Huber robust and the t-statistics are clustered at the county level. (Years: 1920-1930)

A.7: MS Flood as Income Shock

	(1) Church Members per capita	(2) Church Members per capita	(3) Damage per capita
Damage per 1000 Inhabitants	0.00426***	0.0117***	
	(4.20)	(4.70)	
Flood intensity x *I_post*			18.08***
			(12.82)
R-Squared	0.913	0.983	0.823
Within R-Squared	0.0607	0.0614	0.313
Observations	1274	1274	1274

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table reports the relationships between the economic damages associated with the flood, religious participation, and the flooded area. The outcome variable is indicated in the top row. "ln damage per capita" is the logged flood costs (in US$). I^{post} is an indicator equal to one if the period is 1936. Flood intensity is the share of the county that got flooded. All regressions include all baseline controls, and the regressions are weighted by county size. Standard errors, which are Huber robust and clustered at the county level, are reported in parentheses.

A.8: Names Difference in Differences - including Louisiana

	(1) Migrants White	(2) Migrants Black	(3) Migrants All	(4) Non-Migrants White	(5) Non-Migrants Black	(6) Non-Migrants All
Post 1927 x Flood Intensity x I_{post}	-0.00279	-0.00446	-0.00563	-0.00673	-0.00847	-0.00771**
	(-0.54)	(-0.41)	(-1.59)	(-1.26)	(-0.83)	(-2.05)
R-Squared	0.639	0.309	0.764	0.612	0.328	0.758
Within R-Squared	0.000214	0.0000527	0.00157	0.00105	0.000184	0.00267
Observations	2227	2043	2227	2227	2029	2227

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table reports the effect of the flood on the fraction of religious names by migrant status and race. Flood intensity is the share of the county that got flooded. I_{post} is an indicator equal to one if the period is 1936. We include state-by-year and state-by-county fixed effects. All regressions include all the baseline controls and are weighted by (the historical) county size. Standard errors are clustered at the state-by-county level. (Years: 1910-1930)

A.9: Credit Constaints - Median Dummies (with flood_treatment interaction)

	All Churches		Conservative Churches		Liberal Churches	
	(1) Members per Capita	(2) Members per Capita	(3) Members per Capita	(4) Members per Capita	(5) Members per Capita	(6) Members per Capita
Flood intensity x *I_post*	0.148***	0.135***	0.107***	0.0822***	0.0410**	0.0522**
	(3.73)	(3.30)	(3.47)	(2.59)	(2.01)	(2.41)
Flood intensity x *I_post* x Banks Median	-0.0649		-0.0876**		0.0227	
	(-0.99)		(-2.13)		(0.57)	
I_post x Share Urban	-0.0314	-0.0329*	0.0182	0.0146	-0.0498***	-0.0477***
	(-1.54)	(-1.66)	(1.42)	(1.17)	(-3.54)	(-3.37)
Flood intensity x *I_post* x Deposits Median		0.0324		0.0633		-0.0306
		(0.43)		(1.14)		(-0.81)
Within R-Squared	0.0747	0.0746	0.0725	0.0764	0.0417	0.0438
Observations	1274	1274	1274	1274	1274	1274

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table reports members-per-capita effects by church type: all (columns 1 and 2), conservative (columns 3 and 4), and liberal (columns 5 and 6). Flood intensity is the share of the county that got flooded. I_{post} is an indicator equal to one if the period is 1936. "banks median" is 1 if the number of banks per capita is greater than the median, "deposits median" is 1 if the number of deposits per capita is greater than the median, and "urban" is the initial urbanization rate. The sample includes 638 counties observed in 1926 and 1936. All regressions include all the baseline controls and are weighted by county size. Standard errors are Huber robust and clustered at the county level, and the t-statistics are reported in parentheses. (Years: 1920-1930)

A.10: Credit Constaints - 75th Pctile Dummies (with flood_treatment interaction)

	All Churches		Conservative Churches		Liberal Churches	
	(1) Members per Capita	(2) Members per Capita	(3) Members per Capita	(4) Members per Capita	(5) Members per Capita	(6) Members per Capita
Flood intensity x *I_post*	0.146***	0.148***	0.104***	0.104***	0.0418**	0.0446**
	(3.76)	(3.67)	(3.44)	(3.27)	(2.08)	(2.14)
Flood intensity x *I_post* x Banks 75th Percentile	-0.157		-0.179*		0.0228	
	(-0.91)		(-1.82)		(0.24)	
I_post x Share Urban	-0.0315	-0.0279	0.0184	0.0196	-0.0500***	-0.0476***
	(-1.55)	(-1.38)	(1.42)	(1.53)	(-3.54)	(-3.32)
Flood intensity x *I_post* x Deposits 75th Percentile		-0.0457		0.00156		-0.0469
		(-0.61)		(0.03)		(-1.35)
Within R-Squared	0.0741	0.0741	0.0697	0.0682	0.0413	0.0427
Observations	1274	1274	1274	1274	1274	1274

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table reports members-per-capita effects by church type: all (columns 1 and 2), conservative (columns 3 and 4), and liberal (columns 5 and 6). Flood intensity is the share of the county that got flooded. I_{post} is an indicator equal to one if the period is 1936. "banks 75th percentile" is 1 if the number of banks per capita is greater than the 75th percentile, "deposits 75th percentile" is 1 if the number of deposits per capita is greater than the 75th percentile, and "urban" is the initial urbanization rate. The sample includes 638 counties observed in 1926 and 1936. All regressions include all the baseline controls and are weighted by county size. Standard errors are Huber robust and clustered at the county level, and the t-statistics are reported in parentheses. (Years: 1920-1930)

Data Appendix

Religion Data

Church Membership: The Census of Religious Bodies collected and published information on church members for the years 1890, 1906, 1916, 1926, and 1936. We use two measures of church membership at the county level: (i) church members per capita (the denominator is the county population of either 1890, 1900, 1910, 1920, or 1930) and (ii) total church members. The Census of the Religious Bodies in 1926 and 1936 also collected information on church members by denomination and race allowing us to construct separate measures of church membership by race (see Table 4). We consider denominations as Black (white) if their members were listed as exclusively Black (white); see the Census of Religious Bodies (Bureau of the Census, Table 33, 1930; 1941) for further details. County-level church membership refers to all religious denominations listed in the Census of Religious Bodies. Source: ICPSR 2896 file (Haines, 2010).

Clergymen: We use the microdata from IPUMS (Ruggles et al., 2010) to obtain a measure of clergymen per capita for the years 1920 and 1930. This variable is constructed as the number of clergymen (IPUMS variable OCC1950 == 9) divided by county population. We refer to the description of the IPUMS variable "OCC1950" for further details.

Denomination Specific Indices: Data for the charity indices are from the Census of Religious Bodies in 1936 and for the network indices from the Census of Religious Bodies in 1926. The classification scheme for the fundamentalist index follows Steensland et al. (2000). We refer to Section 5.2 for further details.

Geography Data

Flood: Flood intensity is based on the official report of the relief operations of the American Red Cross (1929, Appendix Table VI) (1929). Source: Replication files of Hornbeck and Naidu (2014).

Suitability of Cotton and Corn: Data on cotton (corn) suitability come from the FAO (2012), which calculates cotton (corn) suitability as the maximum potential yield of cotton (corn) based on climate, soil type, and ideal growing conditions for cotton (corn); for more information see Hornbeck and Naidu (2014, footnote 22). Source: Replication files of Hornbeck and Naidu (2014).

Distance to the Mississippi River: Distance in meters from the Mississippi River to a county's centroid. The measure is based on the GIS Map of the National Weather Service (Rivers of the US), http://www.nws.noaa.gov/geodata/catalog/hydro/html/rivers.htm.

Longitude and Latitude: Data on the longitude and latitude of each county seat are retrieved from Fishback et al. (2011).

Ruggedness: Measures of counties' ruggedness are based on the USGS National Elevation Dataset (Farr et al., 2007). Like Hornbeck and Naidu (2014), we use the standard deviation in altitude across county points and the maximum range in altitude across county points as proxies for ruggedness. Source: Replication files of Hornbeck and Naidu (2014).

County Level Controls

Damage: County-level data on the economic losses and damages per 1,000 inhabitants from the Great Mississippi Flood of 1927 are from the Mississippi River Flood Control Association (1927). The data are reported as total property damage by county in 1927 US dollars.

New Deal: County-level data on the New Deal spending program (AAA, public works, relief) per capita are from Fishback et al. (2005).

Taxes per Capita: County-level data on per capita tax revenues for the years 1920 and 1930 are from Ramcharan (2010).

Banks: The number of banks at the county level in 1926 are from the FDIC Data on Banks in the United States. Source: ICPSR 7 file (Federal Deposit Insurance Corporation, 2001).

Deposits: Total value of deposits (in thousands of dollars) in 1926 are from the FDIC Data on Banks in the United States. Source: ICPSR 7 file (Federal Deposit Insurance Corporation, 2001).

Fire Insurance: Data on fire insurance are retrieved from the book: Valgren, V. L. (1928, p.4). "Developments and problems in farmers' mutual fire insurance." U.S. Department of Agriculture, Circular No 54.

Retail Sales Data on retail sales are retrieved from Fishback et al. (2011). Documentation is available in the file "Variable names and sources and details.retailsales.xls".