Discussion Papers
Department of Economics
University of Copenhagen

No. 14-29

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Philipp Ager, Casper Worm Hansen and Lars Lønstrup

Øster Farimagsgade 5, Building 26, DK-1353 Copenhagen K., Denmark
Tel.: +45 35 32 30 01 – Fax: +45 35 32 30 00
http://www.econ.ku.dk

ISSN: 1601-2461 (E)

Church Membership and Social Insurance: Evidence from the American South*

Philipp Ager Casper Worm Hansen[†] Lars Lønstrup[‡]

Abstract

We examine the effect of increased demand for social insurance on church membership. Our empirical strategy exploits the differential impact of the Great Mississippi Flood of 1927 across counties to identify a shock to the demand for social insurance. We find that flooded counties experienced a significant increase in church membership. Consistent with economic theories about determinants of membership of religious organizations, our result suggests that local churches provided ex-post insurance for the needy and in return gained new members.

Keywords: Religion; Informal Insurance; Club Goods, Natural Disasters.

JEL codes: D70; E20; H40

***Acknowledgements:** We would like to thank Thomas Barnebeck Andersen, Stephen Broadberry, Meltem Daysal, Peter Sandholt Jensen, Nicolai Kaarsen, Paul Sharp, Holger Strulik, Mircea Trandafir, 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) and the FRESH meeting at Canterbury (University of Kent) for their helpful comments and suggestions.

[†]Hansen is affiliated with the Department of Economics, University of Copenhagen. Contact: casper.worm.hansen@econ.ku.dk

[‡]Ager and Lønstrup are affiliated with the Department of Business and Economics, University of Southern Denmark. Contact: Ager: phag@sam.sdu.dk; Lønstrup: loe@sam.sdu.dk.

1 Introduction

A growing number of economists have started to investigate the determinants of participation in religious organizations.[1] Since religious organizations are heavily engaged in providing social insurance and charity, the theoretical economics literature considers religious organizations as clubs and regards their provision of social insurance as an important determinant of religious participation (Iannaccone 1992; Berman, 2000; Abramitzky, 2008).[2] These theories predict that increased demand for social insurance leads to increased participation in religious organizations.

This paper provides evidence in line with the prediction from these theories using the Great Mississippi Flood of 1927 as a quasi-natural experiment. We consider the impact from the 1927 Mississippi flood as an exogenous shock to the demand for social insurance of the affected people in the flooded counties.[3] With a total estimated loss of $124 million (about 1.7 billion in 2013 US dollars)[4] in crops and live stock, 41,000 buildings destroyed and more than 180,000 damaged, and 930,000 persons residing in the 170 flood affected counties, the Great Mississippi Flood of 1927 is regarded as the most destructive river flood in the history of the United States (American National Red Cross, 1929).[5]

Our main finding is that flooded counties experienced a statistically significant increase in church membership relative to non-flooded counties between 1926 and 1936. Specifically, exploiting time variation due to the Great Mississippi Flood of 1927 together with cross-sectional variation in the share of the county flooded within the same state, we show that the flood caused a 16 percentage point increase in church membership rates and a 32 percent increase in the number of church members. We document that these results are not driven by any differences in pre-existing trends in church membership rates between flooded and non-flooded counties.

We are able to rule out potential alternative explanations that could confound the interpretation of our findings. Most importantly, we address the concern that the observed pattern

[1] See, for example, Dehejia, De Leire and Luttmer (2007), Chen (2010), and Ager and Ciccone (2014).

[2] For studies on the role religious organizations play as providers of social support and charity, see Moberg (1984), Cnaan and Boddie (2002), and McCleary and Barro (2006a) for example.

[3] Flood insurance was not common at this time (White, 1945) and the few companies that offered such coverage abandoned that business as a result of the 1927 Mississippi flood (Parker, 2000, p.413).

[4] For the transformation to current US dollars we refer to http://www.measuringworth.com/.

[5] The 170 affected counties are located across seven states: Louisiana, Mississippi, Arkansas, Tennessee, Missouri, Illinois, and Kentucky.

in church membership could be driven by flood-induced migration. This a valid concern as Hornbeck and Naidu (2014) show that the degree of flooding increased out-migration of the black population across the affected counties. If black emigrants were less likely to be church members than the average individual, we would observe an increase in church membership rates even if churches would have not gained any new members. Reassuringly, we are able to rule out this explanation and other potential effects of flood-induced migration that could potentially confound our result. We further show that our finding is not driven by public relief programs such as the New Deal, local redistribution or counties' economic performance.

The second contribution of this paper is to present empirical evidence on the mechanism that can explain the increase in church membership after individuals experienced economic distress. Throughout the first half of the 20th century, religious organizations and not the government acted as main provider of social services in the United States (Gruber and Hungerman, 2007). For example, the Presbyterian Church in the United States (PCUS) spent in the 1920s, on average, around \$6.50 per member and year on benevolences (Weber, 1927, p.141). In 1936, religious organizations spent alone over \$16 million (about 270 million in 2013 US dollars)[6] for local relief and charity (Bureau of the Census, 1941). As churches in the United States required financial support from their members finance social services, membership was not costless.[7]

In this context, a strand of theoretical research argues that religious organizations are efficient providers of social insurance as they effectively counteract free-riding by enforcing group values of altruism and encouraging charitable giving (Iannaccone, 1992; Berman, 2000; Abramitzky 2008). In line with this theoretical literature, Chen (2010) shows that economic distress induced by the Indonesian financial crisis between 1997 and 1998 led to increased religious intensity of government employees compared to wetland farmers as they were more affected by the financial crisis. This finding suggests that religious organizations provide ex-post insurance when group identity and thereby religious intensity is strong enough to prevent members from free riding.[8]

An implication of Chen's finding is that religious organizations with more charity related

[6] For the transformation to current US dollars we refer to http://www.measuringworth.com/.

[7] Indeed, church members donated a significant part of their disposable income to their congregation. For example, church member giving as a proportion of disposable income ranged between 3 to 3.5 percent in the 1920s (Ronsvalle and Ronsvalle, 1999, Figure 2.1).

[8] Chen (2010, p. 307) defines ex post insurance as "insurance after some but not all information is revealed".

spendings require a higher degree of group identity to maintain fiscal sustainability. Hence, if ex-post insurance is an important determinant of church membership, then churches with a higher degree of charity related spending should gain relatively more members after the flood. We use this prediction to provide evidence of such an ex-post insurance effect in the market for church membership. Our empirical evidence indicates that denominations with a higher share of charitable spending before the flood experienced a significant increase in their membership rates after the flood in the affected counties. In particular, we find that the positive effect of the flood on church membership works only through an increase in members of denominations with a higher pre-flood level of charity spending.

This finding is consistent with the above mentioned theories where demand and supply of ex-post insurance are important determinants of church membership. On the demand side, people are attracted to churches where they can get (more) help. On the supply side, the finding suggests that the denominations, where social insurance was an important part of the membership, viewed the flood as an opportunity to attract new members and thereby future contributions to the church. That the local churches indeed actively responded to the consequences of the flood is also mentioned in Daniel (1977, p 168): "Evangelical preachers, like home demonstration agents, treated the massive relief camps as missionary fields ripe unto the harvest."

2 Related Literature

Our paper is most closely related to the literature that emphasizes the role of charity and insurance in religious organizations. On the theoretical side, economists often regard religious organzations as clubs that efficiently provide club goods to their members, such as mutual insurance (Iannaccone, 1992; Berman, 2000; Abramitzky, 2008). In line with these theories, recent empirical research has shown that religious organizations, at least partially, insure their individuals against economic risk. For example, Deheja, DeLeire and Luttmer (2007) find that involvement with religious organisations help individuals to better insure their happiness and consumption against income shocks.[9] Chen (2010) further provides evidence that religious insti-

[9] A separate literature has pointed out that there exist, in general, a positive correlation between religious participation and subjective well-being (e.g., Ellison, 1991; Diener et al., 1999; Luttmer, 2005). For example,

tutions facilitate consumption smoothing as they mitigated the spread of consumption shocks among villagers during the 1997-1998 Indonesian financial crisis. Interestingly, he also finds that religious intensity increased more in less religious households as a response to economic distress which is in line with our findings on the extensive margin that religious membership increased after the flood in the affected counties.

This paper shares the main theoretical motivation with Chen (2010) by relating the increased membership rate of religious organizations after economic distress to the role that these organizations play as providers of ex-post insurance. However, our empirical analysis differs from the work of Chen (2010) in three important dimensions: (i) We focus on the extensive margin of religious participation (i.e., whether individuals join a religious organization) rather than on whether individuals increase participation in certain religious activities (Koran study and Islamic school attendance);[10] (ii) we examine the effect in another country (the United States), during a different time period, at the county level rather than at the household level; and (iii) we focus on a different religion (Christian denominations).

Our work relates also to Ager and Ciccone (2014), who study the link between exposure to economic risk and religious membership. They argue that the value of insurance provided by local religious organizations is greater in societies exposed to greater common economic risk. Using rainfall risk as a source of common economic risk in the nineteenth-century United States they find that the size of religious communities is larger in counties that were subject to greater rainfall risk.[11] While Ager and Ciccone (2014) examine the link between religious membership and economic risk in an ex-ante insurance framework, we show that a large economic shock – Mississippi flood – affects the equilibrium of the market for religion by increasing demand for ex-post insurance supplied by Christian denominations in the United States.

A large strand of literature has investigated other forms of informal (or social) insurance

religion might function as a buffer against adverse life events (see, e.g., Pargament, 1997; Clark and Lelkes, 2005; Bentzen, 2013).

[10] There is also a large literature on the determinants of religious attendance, see, e.g., Azzi and Ehrenberg (1975), Iannaccone (1998), Gruber (2004, 2005), McCleary and Barro (2006a), and Glaeser and Sacerdote (2008). One important question in this context is how religiosity responds to income, see, e.g., McCleary and Barro (2006b), Becker and Woessmann (2013), and Franck and Iannaccone (2014).

[11] Since the empirical evidence suggests a positive link between religiosity and risk aversion at the individual level (e.g., Miller and Hoffman, 1995; Diaz, 2000; Hillary and Hui, 2009), the link between individual risk aversion and religiosity could influence the decision of religious organizations to provide informal insurance.

that are designed to buffer individuals' exposure to economic risk when formal insurance markets are absent or incomplete. There is considerable evidence that households in developing countries partially share income risk (e.g., Alderman and Paxson, 1994; Townsend, 1995; Dercon, 2004). Such informal risk sharing mechanisms range from implicit insurance provided through family and friend networks (e.g., Rosenzweig and Stark, 1989; Fafchamps and Lund, 2003), fragmentation of land holdings (e.g., McCloskey, 1976, Morduch, 1990), self-enforcing mutual-help arrangements (e.g., Kimball, 1988; Ligon, Thomas and Worrall, 2000) to informal credits (e.g., Rosenzweig, 1988; Udry, 1994). Our analysis together with Deheja, DeLeire and Luttmer (2007), Chen (2010), and Ager and Ciccone (2014) complement this literature in providing evidence that religious organizations offer an insurance function to their members.

A number of papers have studied whether social services provided by the government crowds-out religious charitable spending. Evidence from cross-national studies indicate that increases in government welfare spending are associated with a decline of religious participation and, hence, pointing to a substitution effect between church charitable spending and government expenditure for welfare service (e.g., Gill and Lundsgaarde, 2004; Scheve and Stasavage, 2006).[12] For the United States, Hungerman (2005) finds that a cutback of welfare services to non-US citizens in 1996 increased charitable church spending and member donations of Presbyterian congregations. Gruber and Hungerman (2007) show that local New Deal spending crowded out church charitable activities during the 1930s. As a robustness check, we show that the increase in church membership rates in the flooded relative to non-flooded counties are unaffected by public relief programs such as the New Deal or local public redistribution.

Finally, in terms of the empirical strategy, our paper relates to Hornbeck and Naidu (2014) by using variation across counties in the impact of the Mississippi Flood in 1927 (i.e., a continuous measure of the intensity of treatment). Our study differs from theirs by considering a larger sample including all flooded counties in the seven affected states and by focusing on the economic determinants of religious activity, whereas they study the effect of the flood on black outmigration and subsequent agricultural development in the American South.

[12] Related to this literature is also Chen and Lind's (2014) finding that participants of religious organizations with greater within-group giving are more against the welfare state.

3 Data and Empirical Strategy

3.1 Data

This section describes the data used to assess the impact of the 1927 Mississippi flood on church membership. The baseline sample spans a total of 638 counties observed between 1926 and 1936. These counties constitute the seven affected states: Louisiana, Mississippi, Arkansas, Tennessee, Missouri, Illinois, and Kentucky.[13] We use data from the Bureau of the Census to construct measures of church members per capita (i.e., church membership rates) and the total number of church members.

The data for church membership were not part of the regular census, instead they were collected in corporation with local church officials and published in the Census of Religious Bodies. These volumes contain detailed county-level information about church membership of Christian denominations for the years 1890, 1906, 1916, 1926, and 1936. County-level church membership, which refers to all religious denominations listed in the Census of Religious Bodies, and population data are retrieved from the ICPSR 2896 file (Haines, 2010).

While the religious censuses of 1890 to 1926 are considered to be detailed and highly reliable, there are general concerns about the quality of the 1936 data (Stark, 1992; Finke and Scheitle, 2005; Gruber and Hungerman, 2007). The Bureau of the Census acknowledged that the 1936 records suffered from undercounting – 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) – two large denominations in the South – refused to participate and had consequently lower membership rates in 1936 compared to 1926 due to underreporting (Finke and Scheitle, 2005). However, to confound our results the underreporting of church membership in 1936 needs to be systematically related to the Mississippi flood of 1927. 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 underreporting) from our analysis.[14]

[13] Our sample is an extension of Hornbeck and Naidu (2014), who consider 163 counties in four out of the seven affected states (Louisiana, Mississippi, Arkansas and Tennessee). Our results are robust to restricting the sample to these 163 counties (these are available upon request).

[14] These results are available from the authors upon request.

The flood-induced shock is captured by the share of each county flooded; our measure of flood intensity (see Figure 1). The blue shaded areas indicate the sample region of flooded counties in the seven affected states. Flood intensity is based on a map, which was compiled and printed by the US Coast and Geodetic Survey (1927).[15] Figure 1 shows that counties closer to the Mississippi River were generally more affected by the flood (in terms of their flooded area).

The empirical analysis also includes the following county specific geographical controls: latitude, longitude, cotton and corn suitability, measures of counties' ruggedness, and their distance to the Mississippi River. In the data appendix we provide a detailed description of all variables used in the empirical analysis. Descriptive statistics of the main variables of interest are shown in Table 1.

[Table 1 about here]

[Figure 1 about here]

3.2 Empirical strategy

This section describes the empirical strategy employed to identify the average effect of the Great Mississippi Flood of 1927 on church membership. In comparing outcomes before and after the flood across counties with different flood intensities (measured as the fraction of county area flooded in 1927), our empirical framework follows a differences-in-differences (DD) strategy.

The baseline estimation equation is:

$$M_{ct} = \alpha + \beta \ Flood_c \times I_t^{post} + \mathbf{X}_c \mathbf{I}_t^{post} \Gamma + \delta_c + \varphi_{st} + \varepsilon_{ct}, \quad (1)$$

where M_{ct} denotes the church membership rate or the logarithm of total church membership in county c at time t; $Flood_c$ is the fraction of the county area flooded; I_t^{post} is an indicator variable that equals one in the post-treatment period (i.e., $t = 1936$) and zero in the pre-treatment period (i.e., $t = 1926$). We also control non-parametrically for county fixed effects

[15] We retrieved the flood data from the replication files of Hornbeck and Naidu (2014).

(δ_c) to capture time-invariant factors that affect both church membership and the fraction of county area flooded, such as geography, and state-by-time fixed effects (φ_{st}) to capture time-varying factors at the state level, such as state-wide economic policy changes. $\mathbf{X}_c\mathbf{I}_t^{post}$ denotes a set of county-specific geographical characteristics (i.e., latitude, longitude, cotton and corn suitability, ruggedness, distance to the Mississippi River) interacted with the time indicator. We compute standard errors that are Huber robust and clustered at the county level. This type of clustering allows the residuals to be arbitrarily serially correlated within counties. Following Hornbeck and Naidu (2014), the regressions are weighted by county size.[16]

4 Results

4.1 Flexible results

Before reporting the results from estimating equation (1), we test the key identifying assumption in the DD strategy of identical (conditional) pre-trends between treatment and control counties using a flexible model that takes the following form:

$$M_{ct} = \sum_{j=1906}^{1936} \beta_j \; Flood_c \times I_t^j + \sum_{j=1906}^{1936} \mathbf{X}_c I_t^j \Gamma_j + \delta_c + \tau_t + \varphi_{st} + \varepsilon_{ct}, \tag{2}$$

where the main difference to estimating equation (1) is that $Flood_c$ and $\mathbf{X}_c$ are interacted with a full set of year fixed effects, $\sum_{j=1906}^{1936} I_t^j$. The sample length is now extended to 1890–1936. Since 1890 is the (omitted) year of comparison, the estimated β_j's denote the effect of the flood on the outcomes (M_{ct}) for every year relative to 1890. A test of the DD identifying assumption is that the coefficients in the pre-treatment periods are zero, i.e., in 1926 and before, implying that there should only be an effect of the flood in the post-treatment period (the year 1936) (i.e., $\hat{\beta}_{1906} \approx \hat{\beta}_{1916} \approx \hat{\beta}_{1926} \approx 0$ and $\hat{\beta}_{1936} \neq 0$).

Table 2 presents the results from estimating equation (2). Columns (1)–(3) show the estimates for church membership rates, while columns (4)–(6) report the estimates for the log of total number of church members. It turns out that there are positive and statistically significant effects in the pre-treatment periods in column (1), where we only control for county and year

[16] The unweighted estimates give rise to the same conclusions and are available from the authors upon request.

fixed effects. Thus, in this simple specification, there are pre-existing trends in the evolution of church membership rates which are systematically related to the future shock intensity. However, once we control for state-by-time fixed effects in column (2), the positive effects in the pre-treatment periods disappear. Yet, there is a positive and statistically significant effect for the post-treatment period at the 1-percent level, which means that flooded counties experienced an increase in church membership rates relative to non-flooded counties after 1927.

Column (3) reports estimates from a specification that controls for the set of geographic variables (latitude, longitude, cotton and corn suitability, ruggedness, and distance to the Mississippi River) interacted by the set of year fixed effects. As seen from Figure 2, which visualizes the estimates from this specification, there are no significant differences in pre-trends between treatment and control counties related to the future flood share. We reach the same conclusion when looking at the estimates for the log of total church members in columns (4)–(6): The key assumption in the DD framework that treatment and control counties follow common conditional pre-trends is not violated. The finding on total church membership suggests that compositional effects related to population size do not drive our results.

Overall, the results from the flexible specification indicate that there are no significant pre-trends between treatment and control counties once we account in the regression analysis for state-by-time fixed effects. When adding these controls, a clear positive effect of flooding on church membership (in total and per capita terms) emerges after the flood in 1927.

[Table 2 about here]

[Figure 2 about here]

4.2 Main DD results

In this section we discuss the estimates from the DD specification of equation (1) using 1926 as pre-treatment period and 1936 as post-treatment period.[17] Table 3 reports the DD estimates. Column (1) shows a positive and statistically significant association between flooded counties and church membership rates after controlling for county and year fixed effects. The point

[17] In general, we obtain similar results when including more pretreatment years as in the flexible specification of equation (2). These result are available from the authors upon request.

estimate implies that flooded counties experienced a 15.3 percentage points increase of church membership rates.

One concern is that the flood correlates with some general changes in church membership rates at the state level during the observed period. It is also plausible that the impact of geographical characteristics on church membership rates may have changed over time, e.g. if the diffusion of congregations from north to south along rivers increased during the considered period. As seen from columns (2) and (3), our result is robust to controlling for state-by-time fixed effects and the set of geographical variables interacted with time. For our baseline specification, reported in column (3), we find that there is a positive and highly statistically significant effect of the flood on church membership rates after controlling for state-by-time fixed effects and the set of geographic controls interacted with time. The point estimate, $\hat{\beta} = 0.16$ (standard error = 0.031), is strikingly similar to the estimate reported in column (1). Figure 3 plots the partial relationship between $Flood_c \times I_t^{post}$ and church membership rates from column (3). This scatter plot allows for visual inspection of our baseline specification and demonstrates that our main result is not driven by outlier counties.[18]

[Figure 3 about here]

Columns (4)–(6) document the effects of the flood on total church membership. In column (6) – our baseline specification – we find a positive and statistically significant association between flooded counties and total church membership at the 1-percent level. The point estimate implies that flooded counties experienced a 32 percent increase in total church membership. We note that it is not surprising that we obtain similar result for both outcome variables as flooded and non-flooded counties follow the same population growth paths (see Figure 4).[19]

[Table 3 about here]

[18] We also checked, and confirmed, that this finding is robust to controlling for county-specific linear time trends. In order to estimate a model with county-specific trends at least 3 periods are needed. Thus, we extended the sample to include one or two more years in the pre-treatment period and then estimated the model with these trends. These results are available upon request from the authors.

[19] Figure 4 is also in line with Hornbeck and Naidu (2014), who find no statistically significant effect of the flood on population size.

[Figure 4 about here]

4.3 Robustness

This section shows that our findings are not driven by flood-induced migration, county's economic performance, and public relief programs such as the New Deal and local public redistribution.

4.3.1 Flood-induced Migration

A potential issue with our empirical analysis is whether the flood triggered migration of individuals who had different church membership rates than the rest of the population. Since Hornbeck and Naidu's (2014) find flood-induced black outmigration, one might argue that this imposes a thread to our identification strategy if black emigrants were not representative in terms of church membership rates. Our estimate would be upward biased if church membership rates of black emigrants were below average. This is, however, unlikely to be the case since the historical narrative suggests that black migration to the North was to a large extent facilitated by religious networks (e.g. Sernett, 1997; Overacker, 1998). If anything, black migrants were more likely to be church members than the average individual staying in the flooded areas.[20]

Yet, even if we would assume that all (black) emigrants were not church members this composition effect cannot explain the positive effect of the flood on total church membership. Figure 5 shows that total church membership increased in flooded areas implying that there is a positive effect regardless of any upward bias on the estimated effect of the flood on church membership rates caused by outmigration of (black) non-church members in flooded areas. The similar average population growth paths in flooded and non-flooded counties during the period of interest (see Figure 4) reveal why we find similar effects using either total church membership or church membership rates as dependent variable. Hence, we conclude that flood-

[20]For example Sernett (1997, p. 76-77) writes: "In some instances ministers arrived in the North with enough members of their old congregations to immediately organize a church. The Rev. R.H. Harmon brought twenty-eight members of his congregation from Mississippi to Chicago. He told a Defender reporter: I am working at my trade. I have saved enough to bring my wife and four children and some of my congregation. We are here for keeps."

induced outmigration is unlikely to explain our finding.

Another concern is whether the increase in total church membership in flooded counties is caused by flood-induced migration of church members from non-flooded into flooded counties. As Figure 5 shows, this is unlikely to be the case, since the evolution of total church membership in the non-flooded sample follows the same trend as the rest of the US South. A last concern about migration is if church members from all over the US migrated into the flooded counties (for example to help the people in need there). If the decision to migrate is affected by transportation costs, and these are increasing in distance to the flooded areas, we would expect to see more church members coming from counties close to the flooded region, i.e. the non-flooded counties in our sample. Since these counties have a similar trend in church membership as the rest of the US South, the data do not support this explanation. In addition, if the migration of church members to the flooded counties was organized by religious organizations to help the people in need, we would also expect to see an increase in the number of clergymen in the flooded counties. As shown in Column (1) of Table 4, this was not the case. Hence, we conclude that the data do not favor any explanation that could lead to an upward bias of our results due to flood-induced migration into the affected counties.

Columns (2)-(7) of Table 4 present further robustness checks. In columns (2)-(4) the outcome variable is church membership per capita. In column (2), we add to the benchmark specification (i.e., column (3) of Table 3) counties' population size as further control variable. As expected, the estimated coefficient on the fraction of county land flooded remains quantitatively and qualitatively unaffected. Columns (3)-(4) control for initial (1920) black population and the initial (1920) black population as a share of the total population interacted with the time indicator, respectively. This should capture any differential effect, including induced migration, between blacks and whites from the flood. The estimated coefficient on the fraction of county land flooded remains positive and statistically significant at the 1 percent level although the coefficient in column (4) becomes somewhat smaller. Column (5) shows that our finding for total church membership is robust to controlling for initial (1920) black population interacted with the time indicator. In the two final columns, we only exploit variation in church membership rates within purely white and black denominations. Importantly, the flood had a positive and statistically significant effect for both specifications indicating that our main result is not driven by race-specific denominations. Overall, our presented evidence suggests that our baseline finding cannot be explained by flood-induced migration or other changes in the composition of the population.

[Table 4 about here]

4.3.2 Economic Performance

Table 5 checks whether our baseline result is related to counties' economic performance. Columns (1)–(3) show that the baseline estimate is robust to controlling for value added per capita in the agricultural and manufacturing sector. Columns (4)–(6) report estimates where we exploit variation in value added per capita before the flood interacted with the time indicator. In this way, we control for initial variation in the level of economic development, which might be related to the 1927 Mississippi flood and changes in church membership rates. The estimated coefficient on the fraction of county land flooded is almost the same as in the baseline specification. These findings are consistent with two strands of literature. Most studies that examine the impact of natural disasters on the economy do not find any significant effects on GDP per capita (see e.g. Loayza et al., 2012), and a recent study by Becker and Woessmann (2013) shows that income growth does not explain changes in religious participation measured by church attendance. In conclusion, our baseline estimate of the flood is stable in magnitude and significance when accounting for counties' economic performance.

[Table 5 about here]

4.3.3 Public Relief and Redistribution

Since we compare church membership between 1926 and 1936, our period includes the government spending expansion under the New Deal during the 1930s. This is a potential threat to identification as Fishback et al. (2005) argue that counties in the US with major rivers received more relief through the New Deal. Moreover, Gruber and Hungerman (2007) find that the New Deal crowded-out church charitable spending of six large Christian denominations in the 1930s. To address this concern, we include in columns (1)-(4) of Table 6 controls for the 1930s New

Deal program spending interacted with the time indicator. We find that the effect of the flood on church membership rates remains positive and statistically significant at the 1-percent level. Thus, at least in the short run, the effect of the flood on church membership rates was not mitigated by the New Deal spending program.[21] In column (5) we add per capita tax revenues in 1926 at the county level interacted with the time indicator as a further control variable to our benchmark specification. Per capita tax revenues at the county level are intended to serve as a proxy of local redistribution (Ramcharan, 2010). Reassuringly, our coefficient of interest remains unaffected and statistically significant at the 1-percent level. Moreover, it is noteworthy that the estimate on the tax-interaction variable is negative and statistically significant, implying that counties with higher levels of initial public redistribution experienced greater decreases in the number church members per capita. Overall, the results presented in Table 6 show that our results are robust to public relief spending (i.e. the New Deal) and local redistribution of income through county level taxes.

[Table 6 about here]

5 Ex-post insurance mechanism

This section provides evidence consistent with the literature that considers the insurance provision of religious organizations as an important determinant of religious membership (e.g. Iannaccone 1992; Berman, 2000; Chen, 2010). In particular, we consider whether denominations with a higher share of charitable spending experienced an increase in membership rates during the 1926-1936 period in the affected counties. In addition to church benevolent activities, we evaluate the effects of help distributed by the Red Cross measured as the number of affected people *not cared for* by the Red Cross.

In column (1) of Table 7, we construct a so-called "charity index" to control for the level of

[21]However, our finding does not rule out that the New Deal spending crowded out charity spendings of churches and thus ultimately lowered church membership rates in the long run.

church charitable spending. We construct the index as follows:

$$Charity\ index_{ct} = \sum_{d=1}^{D} \phi_{ct}^{d} \times C_{1926}^{d}, \tag{3}$$

where ϕ_{ct}^{d} is the per capita share of denomination d in county c at time t, and C_{1926}^{d} is denomination specific charitable spending per member in 1926. The index increases if denominations with a higher level of pre-flood charitable spending experienced a relative increase in church membership rates over time.

Column (1) of Table 7 shows that conditionally on the charity index, the effect of the flood is $\hat{\beta} = 0.08$ (standard error = 0.02). Compared to the baseline estimate, we find that the charity index reduces the point estimate by about 50 percent, suggesting that the flood increased the number of church members in denominations with a high level of pre-flood charitable spending. In column (2), we augment the model by including the interaction of the flood-shock variable and the charity index. We find that the main effect of the flood becomes statistically insignificant, while the new interaction term is positive and statistically significant at the 1-percent level. Our result suggests that the effect of the flood on church membership rates is increasing in the charity index, and that in the case of no charity, the flood has no effect on church membership. In column (3), we demonstrate that controlling for the number of people not cared for by the Red Cross also reduces the estimate on the effect of the flood.[22] This result indicates that more individuals used church membership as a way to obtain help when there was a lack of alternative options (in our case help provided by the Red Cross). Column (4) confirms our previous findings when controlling for the charity index and the number of people not cared for by the Red Cross at the same time, suggesting that the positive effect of the flood on church membership works only through an increase in members of denominations with a higher pre-flood level of charity spending.

In general, we regard the findings of Table 7 as suggestive evidence that people in flooded counties demanded insurance from religious organizations and joined in turn, especially when denominations were considered to spend more on benevolent activities or when alternatives, such as Red Cross flood relief efforts, were missing.

[22] The variable *non-cared population* is the number of people affected by the flood minus the number of people cared for by the Red Cross.

[Table 7 about here]

6 Concluding remarks

This paper demonstrates that counties affected by the Great Mississippi Flood of 1927 experienced a significant increase in church membership relative to non-flooded counties during the subsequent decade. In our empirical setting we exploited time variation due to the 1927 Mississippi flood together with cross-sectional variation in the share of the county flooded within the same state. We find that flooded counties experienced a 16 percentage point increase in church membership rates and a 32 percent increase in total church membership relative to non-flooded counties.

Based on economic theories on the determinants of membership of religious organizations, we interpret the effect of the flood as a shock to the demand for help and social insurance. Our empirical evidence on the ex-post insurance mechanism supports the view of religious organizations as insurance providers. These findings may have implications for future research as it helps to improve the understanding of the role that religious organizations play for the positive correlation between measures of religion in society and material well-being (Barro and McCleary, 2003).

Data Appendix

Church Membership	1890-1936	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) total number of church members and (ii) church membership per capita (the denominator is either the county population of 1890, 1900, 1910, 1920, or 1930). The Census of the Religious Bodies in 1926 and 1936 collected also 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). County-level church membership refers to all religious denomination listed in the Census of Religious Bodies. These data and the county-level population (total and black) are retrieved from the ICPSR 2896 file (Haines, 2010).
Clergymen	1920-1930	We use the microdata from IPUMS (Ruggles et al., 2010) to obtain a measure of clergymen per capita. 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.
Flood	1927	Flood intensity is based on a map, which was compiled and printed by the US Coast and Geodetic Survey (1927). We retrieved the flood data from the replication files of Hornbeck and Naidu (2014).
Value Added	1920-1930	Value added is calculated as the sum of value added in the manufacturing and agricultural sector in per capita terms at the county level. Value added in manufacturing is calculated as manufacturing output minus the cost of materials. Value added in agriculture is calculated as agricultural output minus the expenditure for fertilizer and feed. County-level data are retrieved from the ICPSR file 2896 (Haines, 2010) and for the United States Censuses of Agriculture in 1930 from Michael Haines.

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, e.g., Hornbeck and Naidu (2014, footnote 22). The county-level data are retrieved from the 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). As 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. The county-level data are retrieved from the replication files of Hornbeck and Naidu (2014).
New Deal	1936	County-level data on the new deal spending program (AAA, public works, relief) per capita are from Fishback et al. (2005).
Taxes per Capita	1920-1930	County-level data on per capita tax revenues are from Ramcharan (2010).
Charity Index	1926-1936	For 1926, the Census of Religious Bodies lists benevolent spending by denomination (Bureau of the Census, Table 15, 1930). We calculate benevolent spendings per member by aggregating the single denominations into the following meta-denominations: Baptists, Mennonites, Conservatives, Jewish, Episcopal, Lutherans, Mormons, Presbyterians, Congregationalists, Reformed, Catholics, Disciples of Christ, and Methodists. For the classification see the ICPSR 4296 codebook of Myron P. Gutmann.
Non-Cared Population	1936	The share of population not cared for by the Red Cross out of the total population affected. The data are from the American National Red Cross (1929).

References

[1] Abramitzky, R. (2008), "The limits of equality: Insights from the Israeli kibbutz", *The Quarterly Journal of Economics*, **123**, 1111-1159.

[2] Ager, P. and Ciccone, A. (2014), "Rainfall Risk and Religious Membership in the Late Nineteenth-Century United States" (Mimeo, University of Mannheim).

[3] Alderman, H. and Paxson, C. H. (1994), "Do the Poor Insure? A Synthesis of the Literature on Risk and Consumption in Developing Countries", in Bacha, E.L. (ed.), *Economics in a Changing World, Vol. 4, Development, Trade, and Environment* (MacMillan, UK).

[4] American National Red Cross (1929). *The Mississippi valley flood disaster of 1927; official report of the relief operations* (Washington, D.C.: The American National Red Cross).

[5] Azzi, C. and Ehrenberg, R. G. (1975), "Household Allocation of Time and Church Attendance", *The Journal of Political Economy*, **83**, 27–56.

[6] Barro, R. J. and McCleary, R. M. (2003). "Religion and Economic Growth Across Countries", *American Sociological Review*, **68**, 760–781.

[7] Becker, S. O. and Woessmann, L. (2013), "Not the Opium of the People: Income and Secularization in a Panel of Prussian Counties", *American Economic Review, Papers and Proceedings*, **103**, 539–544.

[8] Bentzen, J. (2013), "Origins of Religiousness: The Role of Natural Disasters" (Discussion Paper, Number 13-02. Department of Economics, University of Copenhagen).

[9] Berman, E. (2000), "Sect, subsidy and sacrifice: an economist's view of Ultra-Orthodox Jews", *Quarterly Journal of Economics*, **115**, 905–953.

[10] Bureau of the Census (1930). *Religious Bodies: 1926, Volume I, Summary and Detailed Tables* (Washington D.C., United States Government Printing Office).

[11] Bureau of the Census (1941), *Religious Bodies: 1936, Volume I, Summary and Detailed Tables* (Washington D.C., United States Government Printing Office).

[12] Chen, D. L. (2010), "Club Goods and Group Identity: Evidence from Islamic Resurgence during the Indonesian Financial Crisis", *Journal of Political Economy*, **118**, 300–354.

[13] Chen D. L. and Lind, J. (2014), "The Political Economy of Beliefs: Why Fiscal and Social Conservatives/Liberals Come Hand-in-Hand" (Mimeo, ETH Zurich).

[14] Clark, A. and Lelkes, O. (2005), "Deliver us from evil: religion as insurance" (Mimeo, Paris-Jourdan Sciences Economiques).

[15] Cnaan, R. A. and Boddie, S. C. (2002), *The invisible caring hand: American congregations and the provision of welfare* (New York: New York University Press).

[16] Daniel, P. (1977), *Deep'n as it come: The 1927 Mississippi River flood* (New York: Oxford University Press).

[17] Dehejia, R., DeLeire, T. and Luttmer, E. F. P. (2007), "Insuring consumption and happiness through religious organizations", *Journal of Public Economics*, **91**, 259–279.

[18] Dercon, S. (2004), "Risk, Insurance, and Poverty: A Review", in Dercon, S. (ed.), *Insurance Against Poverty* (Oxford University Press, UK).

[19] Diaz, J. D. (2000), "Religion and Gambling in Sin-City: A Statistical Analysis of the Relationship Between Religion and Gambling Patterns in Las Vegas residents", *Social Science Journal*, **37**, 453–458.

[20] Diener, E., Suh, E. M., Lucas, R. E. and Smith, H. L. (1999), "Subjective well-being: three decades of progress", *Psychological Bulletin*, **125**, 276-303.

[21] Ellison, C. G. (1991), "Religious involvement and subjective well-being", *Journal of Health and Social Behavior*, **32**, 80–99.

[22] Fafchamps, M. and Lund, S. (2003), "Risk-sharing networks in rural Philippines", *Journal of Development Economics*, **71**, 261–287.

[23] FAO (2012). *Global Agro-Ecological Zones* (GAEZ v3.0). IIASA, Laxenburg, Austria and FAO, Rome.

[24] Farr, T. G., et al. (2007). "The Shuttle Radar Topography Mission", *Reviews of Geophysics*, **45**, RG2004.

[25] Finke, R. and Scheitle, C. P. (2005), "Accounting for the Uncounted: Computing Correctives for the 2000 RCMS Data", *Review of Religious Research*, **47**, 5–22.

[26] Fishback P. V., Horrace, W. and Kantor, S. (2005), "The Impact of New Deal Expenditures on Local Economic Activity: An Examination of Retail Sales, 1929-1939", *Journal of Economic History*, **65**, 36–71.

[27] Fishback, P. V., Troesken W., Kollmann T., Haines, M., Rhode, P. W. and Thomasson, M. (2011), "Information and the impact of climate and weather on mortality rates during the Great Depression", in *The Economics of Climate Change: Adaptations Past and Present*, University of Chicago Press, 131–167.

[28] Franck, R. and Iannaccone, L. R. (2014), "Religious Decline in the 20th Century West: Testing Alternative Explanations?", *Public Choice*, **159**, 385–414.

[29] Gill, A. and Lundsgaarde, E. (2004), "State Welfare Spending and Religiosity A Cross-National Analysis", *Rationality and Society*, **16**, 399–436.

[30] Glaeser, E. L. and Sacerdote, B. I. (2008), "Education and Religion", *Journal of Human Capital*, **2**, 188-215.

[31] Gruber, J. H. (2004), "Pay or pray? The impact of charitable subsidies on religious attendance", *Journal of Public Economics*, **88**, 2635–2655.

[32] Gruber, J. H. (2005), "Religious Market Structure, Religious Participation and Outcomes: Is Religion Good for You?", *The B.E. Journal of Economic Analysis & Policy*, **5**, Article 5.

[33] Gruber, J. H. and Hungerman, D. M. (2007), "Faith-Based Charity and Crowd-out during the Great Depression", *Journal of Public Economics*, **91**, 1043–1069.

[34] Haines, M. R. and Inter-university Consortium for Political and Social Research (2010), *Historical, Demographic, Economic, and Social Data: The United States, 1790-2002.*

ICPSR02896-v3. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2010-05-21. http://doi.org/10.3886/ICPSR02896.v3

[35] Hilary, G. and Hui, K. W. (2009), "Does religion matter in corporate decision making in America?", *Journal of Financial Economics*, **93**, 455–473.

[36] Hornbeck, R. and Naidu, S. (2014), "When the Levee Breaks: Black Migration and Economic Development in the American South", *American Economic Review*, **104**, 963–990.

[37] Hungerman, D. M. (2005), "Are Church and State Substitutes? Evidence from the 1996 Welfare Reform", *Journal of Public Economics*, **89**, 2245–2267.

[38] Iannaccone, L. R. (1992), "Sacrifice and stigma: reducing free-riding in cults, communes, and other collectives", *The Journal of Political Economy*, **100**, 271–291.

[39] Iannaccone, L. R. (1998), "Introduction to the Economics of Religion", *Journal of Economic Literature*, **36**, 1465–1495.

[40] Kimball, M. S. (1988), "Farmers« Cooperatives as Behavior toward Risk", *American Economic Review*, **78**, 224–232.

[41] Ligon, E., Thomas, J. P. and Worrall, J. (2000), "Mutual Insurance, Individual Savings, and Limited Commitment", *Review of Economic Dynamics*, **3**, 216–246.

[42] Loayza, N. V., Olaberria, E., Rigolini, J. and Christiaensen, L. (2012), "Natural disasters and growth: Going beyond the averages", *World Development*, **40**, 1317–1336.

[43] Luttmer, E. (2005), "Neighbors as Negatives: Relative Earnings and Well-Being", *The Quarterly Journal of Economics*, **120**, 963–1002.

[44] McCleary, R. M. and Barro, R. J. (2006a), "Religion and Economy", *Journal of Economic Perspectives*, **20**, 49–72.

[45] McCleary, R. M. and Barro, R. J. (2006b). "Religion and Political Economy in an International Panel", *Journal for the Scientific Study of Religion*, **45**, 149–175.

[46] McClosky, D. (1976), "English Open Fields as Behavior towards Risk", *Researches in Economic History*, **1**, 121–154.

[47] Miller, A. S. and Hoffman, J. P. (1995), "Risk and Religion: An Explanation of Gender Differences in Religiosity", *Journal for the Scientific Study of Religion*, **34**, 63–75.

[48] Moberg, D. O. (1984), *The church as a social institution: The sociology of American religion* (Baker Book House, 2nd edition).

[49] Morduch, J. (1990), "Risk, Production and Saving: Theory and evidence from Indian households" (Mimeo, Harvard University).

[50] Overacker, I. (1998), *The African American Church Community in Rochester, New York, 1900-1940* (University of Rochester, USA).

[51] Pargament, K. I. (1997), *The Psychology of Religion and Coping* (Guilford Press, USA).

[52] Parker, D. J. (2000), *Floods. Vol. 1* (New York: Routledge).

[53] Ramcharan, R. (2010), "Inequality and Redistribution: Evidence from U.S. Counties and States, 1890–1930", *The Review of Economics and Statistics*, **92**, 729–744.

[54] Ronsvalle, J. and Ronsvalle, S. (1999), "Basic Trends in Religious Giving 1921-1995", in Chaves, M. and S. L. Miller (eds.) *Financing American Religion* (Walnut Creek, CA: Alta Mira Press).

[55] Rosenzweig, M. R. (1988), "Risk, Implicit Contracts, and the Family in Rural Areas of Low Income Countries", *The Economic Journal*, **98**, 1148–1170.

[56] Rosenzweig, M. R. and Stark, O. (1989), "Consumption Smoothing, Migration, and Marriage: Evidence from Rural India", {The Journal of Political Economy, **97**, 905-926.

[57] Ruggles, S., Alexander, T., Flood, S., Genadek, G., Schroeder, M. B., Trampe, B., Vick, R., and King, M. (2010). *Integrated public use microdata series*, current population survey: Version 3.0.[machine-readable database].

[58] Scheve, K. and Stasavage, D. (2006), "Religion and preferences for social insurance", *Quarterly Journal of Political Science*, **1**, 255–286.

[59] Sernett, M. C. (1997), *Bound For the Promised Land: African American Religion and the Great Migration* (Durham, NC: Duke University Press).

[60] Stark, R. (1992), "The Reliability of Historical United States Census Data on Religion", *Sociological Analysis*, **53**, 91–95.

[61] Townsend, R. M. (1995), "Consumption Insurance: An Evaluation of Risk Bearing Systems in Low-Income Economies", *Journal of Economic Perspectives*, **9**, 83-102.

[62] Udry, C. (1994), "Risk and insurance in a rural credit market: an empirical investigation in northern Nigeria", *Review of Economic Studies*, **61**, 251–269.

[63] US Coast and Geodetic Survey (1927), *Mississippi River Flood of 1927*, Records of the Coast and Geodetic Survey, RG 23. www.archives.gov/global-pages/larger-image.html?i=/publications/prologue/2007/spring/images/coast-miss-flood-l.jpg.

[64] Weber, H. C. (1927), *Presbyterian statistics through one hundred years, 1826-1926: tabulated, visualized and interpreted* (Philadelphia: The General council, Presbyterian church in the U.S.A.).

[65] White, G. F. (1945), *Human Adjustment to Floods: A Geographical Approach to the Flood Problem in the United States* (Chicago: University of Chicago Press).

Figure 1: *The sample of flooded and non-flooded counties*

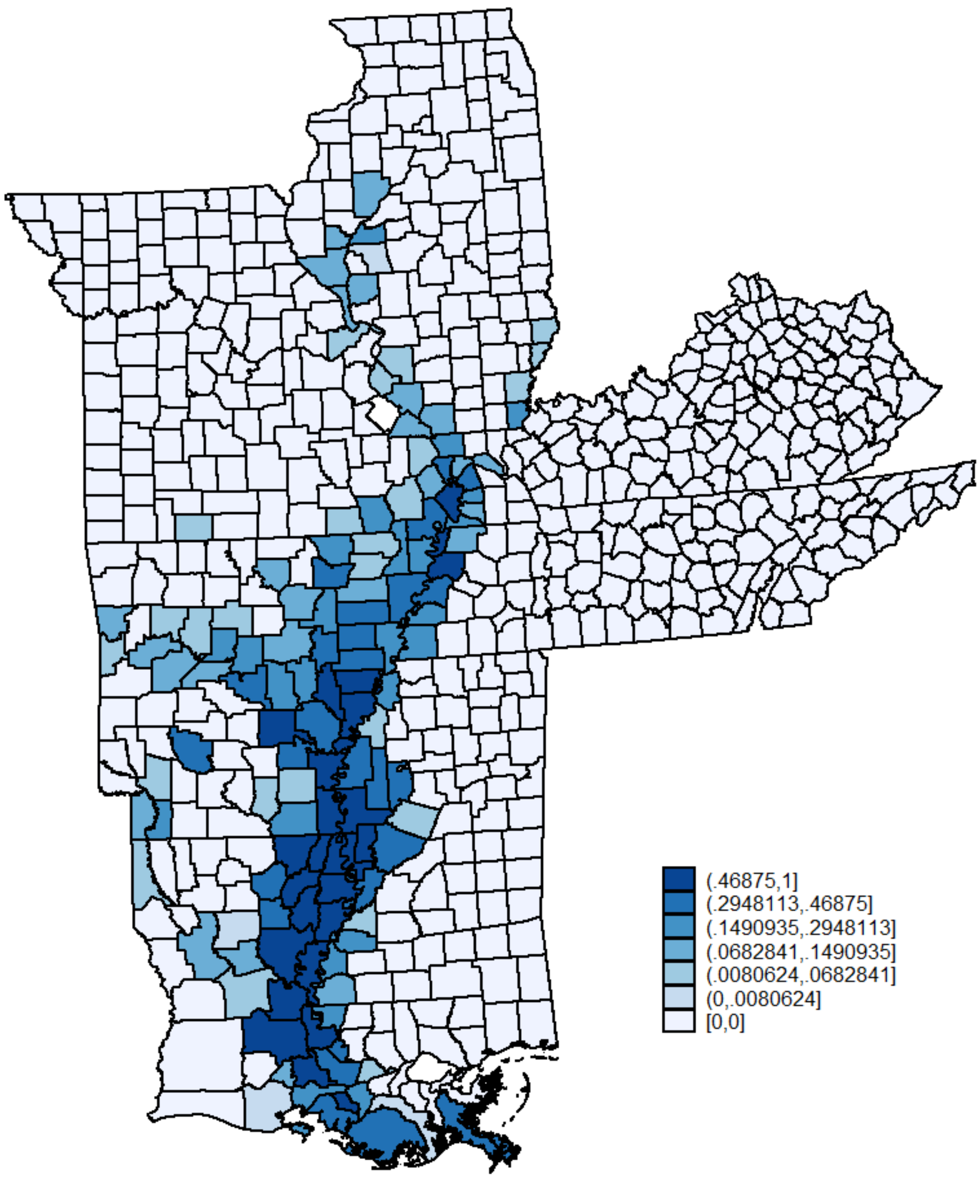
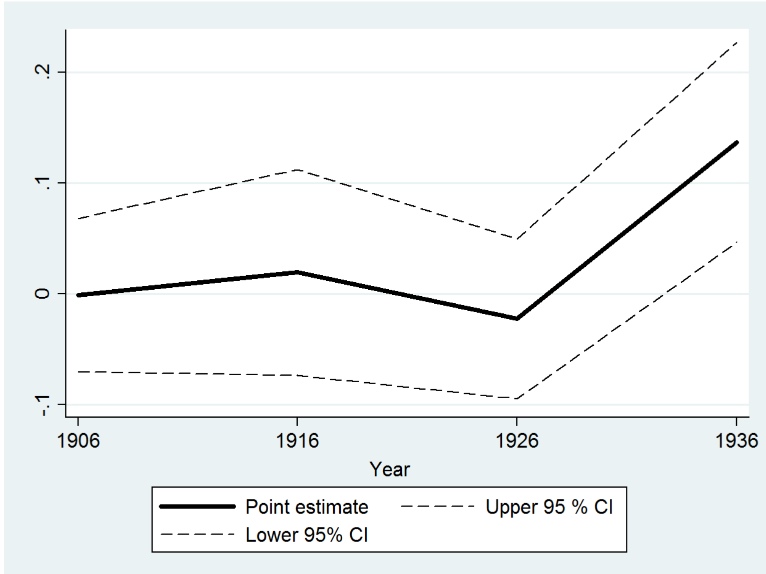
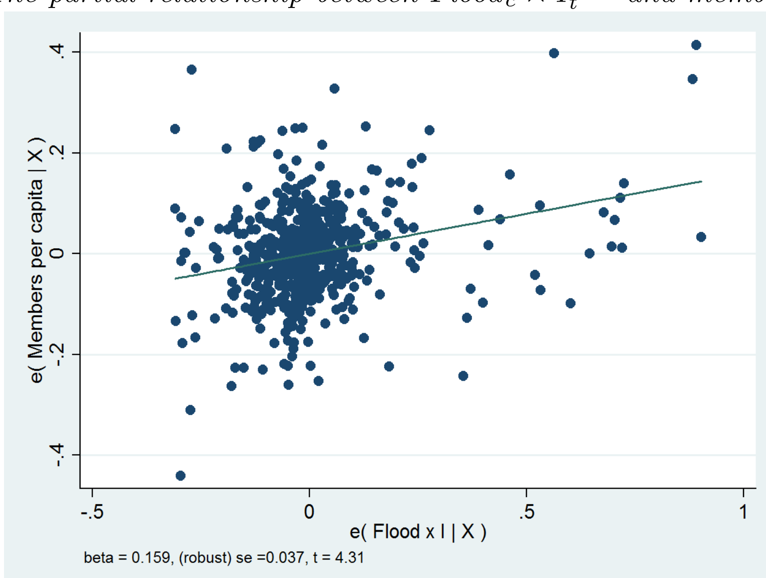


Figure 2: *The relationship between the flood share and members per capita*



Notes: The point estimates and 95% CIs are from column 3 of Table 2.

Figure 3: *The partial relationship between* $Flood_c \times I_t^{post}$ *and members per capita*



Notes: The partial correlation plot is from column 3 of Table 3

Figure 4: *Evolution of ln Population in fooded and non-fooded counties over time*

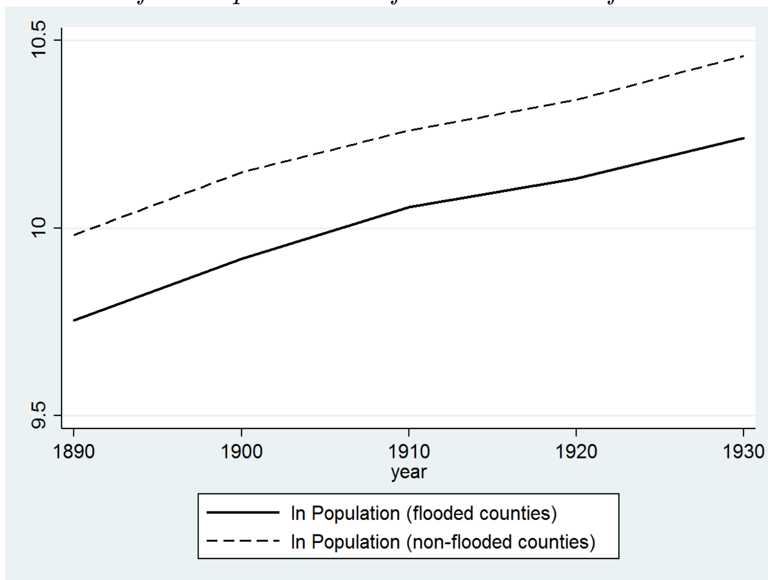


Figure 5: *Evolution of ln Church Membership in fooded and non-fooded counties over time*

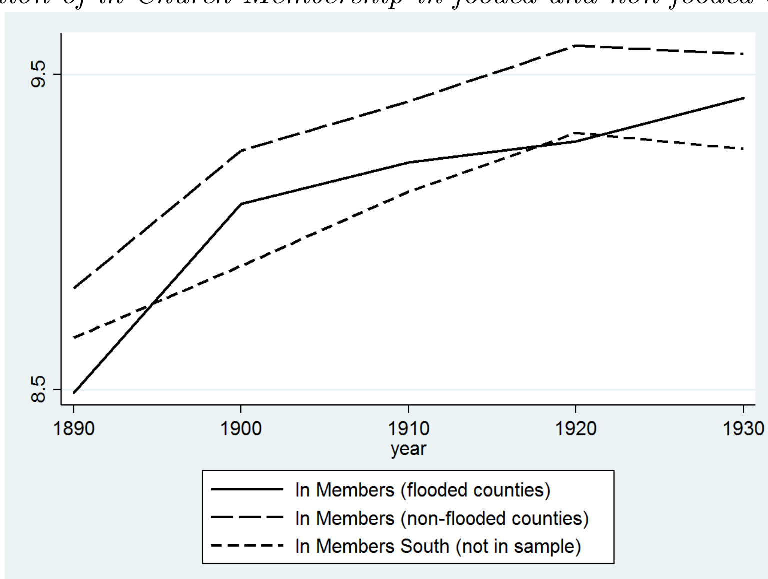


Table 1—Summary Statistics

Variables:	(1) N	(2) mean	(3) sd	(4) min	(5) max
Members p.c.	1,276	0.380	0.145	0.0425	1.108
Log members	1,276	8.960	0.905	5.753	14.53
Flood × I^{post}	1,276	0.0345	0.136	0	1
Controls ($\times I^{post}$)**:**					
Distance MS	1,276	92,028	137,500	0	693,228
Corn suitability	1,276	4.732	5.435	0	15.12
Cotton suitability	1,276	0.237	0.349	0	1.327
Latitude	1,276	17.97	18.10	0	42.26
Longitude	1,276	44.87	44.93	0	95.30
Altitude range	1,276	102.6	177.8	0	1,804
Altitude std	1,276	16.38	30.00	0	335.0
Number of counties	638	638	638	638	638

The table reports summary statistics for the variables used in the baseline DD specification: years 1926 and 1936 (Table 3). Notice that the geographical (cross-sectional) variables are interacted with the time indicator.

Table 2—Flexible Estimates: The Flood-Membership Relation by Year, 1890-1936

	Dependent variable:					
	church members p.c.			log church members		
	(1)	(2)	(3)	(4)	(5)	(6)
Flood × 1906	0.107***	0.0458	-0.00101	0.369***	0.159	0.0968
	(0.0308)	(0.0352)	(0.0352)	(0.0970)	(0.127)	(0.119)
Flood × 1916	0.0701**	0.0483	0.0194	0.395***	0.145	0.0575
	(0.0342)	(0.0513)	(0.0473)	(0.145)	(0.192)	(0.181)
Flood × 1926	0.0428	0.00555	-0.0224	0.428***	0.106	0.0239
	(0.0290)	(0.0357)	(0.0367)	(0.125)	(0.161)	(0.150)
Flood × 1936	0.196***	0.169***	0.137***	0.895***	0.507**	0.344*
	(0.0407)	(0.0437)	(0.0459)	(0.155)	(0.199)	(0.194)
Controls ($\times I^{post}$):						
Latitude	No	No	Yes	No	No	Yes
Longitude	No	No	Yes	No	No	Yes
Cotton suitability	No	No	Yes	No	No	Yes
Corn suitability	No	No	Yes	No	No	Yes
Ruggedness	No	No	Yes	No	No	Yes
Distance MS	No	No	Yes	No	No	Yes
Year FE	Yes	No	No	Yes	No	No
State-by-year FE	No	Yes	Yes	No	Yes	Yes
Observations	3,185	3,185	3,185	3,185	3,185	3,185
Counties	638	638	638	638	638	638

Notes: The unit of observation is at the county-level over the period 1890-1936 (every tenth year). The estimates are relative to 1890. The table reports LS estimates weighted by county size. All regression include county fixed effects. In columns (1)-(3), the outcome variable is church members per capita (i.e., church membership rate). In columns (4)-(6), the outcome variable is log total church members. Flood is the share of the county flooded, I^{post} is the time indicator which equals zero in 1890-1926 and one in 1936. We refer to the data appendix for further details. Constants are not reported. Standard errors are clustered at the county level.
*** p<0.01, ** p<0.05, * p<0.1.

Table 3—Baseline DD Estimates: The Effect of the Flood on Membership

	Dependent variable:					
	church members p.c.			log church members		
	(1)	(2)	(3)	(4)	(5)	(6)
Flood × I^{post}	0.153***	0.163***	0.159***	0.467***	0.401***	0.320***
	(0.0309)	(0.0343)	(0.0368)	(0.0760)	(0.0868)	(0.0931)
Controls (×I^{post}):						
Latitude	No	No	Yes	No	No	Yes
Longitude	No	No	Yes	No	No	Yes
Cotton suitability	No	No	Yes	No	No	Yes
Corn suitability	No	No	Yes	No	No	Yes
Ruggedness	No	No	Yes	No	No	Yes
Distance MS	No	No	Yes	No	No	Yes
Year FE	Yes	No	No	Yes	No	No
State-by-year FE	No	Yes	Yes	No	Yes	Yes
Observations	1,276	1,276	1,276	1,276	1,276	1,276
Counties	638	638	638	638	638	638

Notes: The unit of observation is at the county-level over the period 1926-1936. The table reports LS estimates weighted by county size. All regression include county fixed effects. In columns (1)-(3), the outcome variable is church members per capita (i.e., church membership rate). In columns (4)-(6), the outcome variable is log total church members. Flood is the share of the county flooded, I^{post} is the time indicator which equals zero in 1926 and one in 1936. We refer to the data appendix for further details. Constants are not reported. Standard errors are clustered at the county level.
*** p<0.01, ** p<0.05, * p<0.1.

Table 4—Robustness to Migration

	Dependent variable:						
	clergy-men	church members p.c.			log church members	white members p.c.	black members p.c.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Flood × I^{post}	0.000200	0.160***	0.159***	0.111***	0.294***	0.0638**	0.0391***
	(0.000634)	(0.0352)	(0.0367)	(0.0405)	(0.0924)	(0.0291)	(0.0109)
Population	No	Yes	No	No	No	No	No
Black population	No	No	Yes	No	No	No	No
Black $share_{26}$ × I^{post}	No	No	No	Yes	No	No	No
Black $population_{26}$ × I^{post}	No	No	No	No	Yes	No	No
Baseline controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,276	1,276	1,276	1,276	1,276	1,276	1,276
Counties	638	638	638	638	638	638	638

Notes: The unit of observation is at the county-level over the period 1926-1936. The table reports LS estimates weighted by county size. All regression include county fixed effects. In column (1), the outcome variable is the number of clergymen per capita. In columns (2)-(4), the outcome variable is church members per capita (i.e., church membership rate). In column (5), the outcome variable is log total members. In columns (6) and (7), the outcome variable is white and black church member per capita, respectively. Flood is the share of the county flooded, I^{post} is the time indicator which equals zero in 1926 and one in 1936. Population is the log total population, Black population is the log total black population, Black share is the black population share (out of the total population) in 1926. Black $population_{26}$ is the log black population in 1926. The baseline controls are: latitude, longitude, cotton and corn suitability, ruggedness, distance to MS, and state-by-year fixed effect. We refer to the data appendix for further details. Constants are not reported. Standard errors are clustered at the county level.

*** p<0.01, ** p<0.05, * p<0.1.

Table 5—Robustness to Income

	Dependent variable is church members p.c.					
	(1)	(2)	(3)	(4)	(5)	(6)
Flood × I^{post}	0.161***	0.160***	0.163***	0.155***	0.156***	0.158***
	(0.0366)	(0.0370)	(0.0367)	(0.0366)	(0.0375)	(0.0372)
Agriculture VA/capita	Yes	No	No	No	No	No
Manufacture VA/capita	No	Yes	No	No	No	No
GDP/capita	No	No	Yes	No	No	No
$\times I^{post}$:						
Agriculture VA/capita$_{26}$	No	No	No	Yes	No	No
Manufacture VA/capita$_{26}$	No	No	No	No	Yes	No
GDP/capita$_{26}$	No	No	No	No	No	Yes
Baseline controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,276	1,276	1,276	1,276	1,276	1,276
Counties	638	638	638	638	638	638

Notes: The unit of observation is at the county-level over the period 1926-1936. The table reports LS estimates weighted by county size. All regression include county fixed effect. The outcome variable is church members per capita (i.e., church membership rate). Flood is the share of the county flooded, I^{post} is the time indicator which equals zero in 1926 and one in 1936. Agriculture VA/capita is log agricultural value added per capita, Manufacture VA/capita is log manufacture value added per capita, and GDP per capita is log GDP per capita. Agriculture VA/capita$_{26}$ is log agricultural value added per capita in 1926, and the remaining interactions are constructed in a similar way. The baseline controls are: latitude, longitude, cotton and corn suitability, ruggedness, distance to MS, and state-by-year fixed effect. We refer to the data appendix for further details. Constants are not reported. Standard errors are clustered at the county level.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 6: Robustness to the New Deal and Redistribution

	Dependent variable is church members p.c.				
	(1)	(2)	(3)	(4)	(5)
Flood × I^{post}	0.157***	0.159***	0.151***	0.148***	0.153***
	(0.0372)	(0.0374)	(0.0369)	(0.0375)	(0.0352)
Controls (×I^{post})**:**					
Relief/capita	Yes	No	No	Yes	No
Public works/capita	No	Yes	No	Yes	No
AAA spendings/capita	No	No	Yes	Yes	No
Taxes/capita$_{26}$	No	No	No	No	Yes
Baseline controls	Yes	Yes	Yes	Yes	Yes
Observations	1,275	1,273	1,272	1,270	1,274
Counties	638	638	638	638	638

Notes: The unit of observation is at the county-level over the period 1926-1936. The table reports LS estimates weighted by county size. All regression include county fixed effect. The outcome variable is church members per capita (i.e., church membership rate). Flood is the share of the county flooded, I^{post} is the time indicator which equals zero in 1926 and one in 1936. The New Deal variables are: log relief per capita, log public works per capita, and log AAA spendings per capita. Taxes p.c.$_{26}$ is the log total taxes per capita in 1926 . The baseline controls are: latitude, longitude, cotton and corn suitability, ruggedness, distance to MS, and state-by-year fixed effect. We refer to the data appendix for further details. Constants are not reported. Standard errors are clustered at the county level.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 7: Church Membership and Ex-post Insurance

	Dependent variable is church members p.c.			
	(1)	(2)	(3)	(4)
Flood × I^{post}	0.0794***	-0.0453	0.119***	-0.0662
	(0.0178)	(0.0397)	(0.0447)	(0.0421)
Charity index	0.268***	0.258***		0.253***
	(0.0193)	(0.0202)		(0.0207)
Flood × I^{post} × Charity index		0.124***		0.125***
		(0.0414)		(0.0419)
Non-cared population × I^{post}			0.00501**	0.00286**
			(0.00214)	(0.00122)
Baseline controls	Yes	Yes	Yes	Yes
Observations	1,276	1,276	1,256	1,256
Counties	638	638	638	638

Notes: The unit of observation is US county over the period 1926-1936. The table reports LS estimates weighted by county size. All regression include county fixed effect. The outcome variable is church members per capita (i.e., church membership rate). Flood is the share of the county flooded, I^{post} is the time indicator which equals zero in 1926 and one in 1936. For the construction of the Charity index see Section 5. Non-cared population is the log population affected by the flood but not cared for by the Red Cross. The baseline controls are: latitude, longitude, cotton and corn suitability, ruggedness, distance to MS, and state-by-year fixed effect. We refer to the data appendix for further details. Constants are not reported. Standard errors are clustered at the county level.
*** p<0.01, ** p<0.05, * p<0.1.