Research Paper

Is religion an inferior good? Evidence from fluctuations in housing wealth ☆

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ABSTRACT

An increase in local house prices in the US is associated with a decrease in the time homeowners spend on religious activities compared to renters. Notably, this effect is not observed in volunteering and civic activities. The decline in religious activities is more pronounced for credit-constrained households. The main result is attributed to a wealth effect, whereby activities that have an inferior-good component decline with housing wealth, and to a substitution effect whereby the attractiveness of activities linked to the residential asset increases during housing booms.

1. Introduction

Since the seminal works of Weber (1905) and Durkheim (1912), the question of whether religious and spiritual activities decline with economic development has been actively debated in sociology and economics. The main hypothesis, famously presented as the 'Secularization Thesis' posits that as societies modernize, individuals become less likely to belong to a religious group and to believe in a deity (Bruce, 2002). Despite this hypothesis, substantial differences in religiosity persist among countries with similar levels of economic development. In the United States, for example, in stark contrast to the rest of the Western world, three-quarters of the adult population declare to be religiously affiliated, and two-thirds attend religious services at least once a month (see Pew Research Center, 2014). One strand of the literature has focused on how supply-side factors—such as religious pluralism or the "quality" of clerics—explain differences in religiosity across and within countries, while holding demand for religion constant (e.g. Finke and Iannaccone, 1993; Stark and Iannaccone, 1994; Stark and Bainbridge, 1985; McBride, 2010; Engelberg et al., 2016). However, an open question remains: to what extent do demand-side factors, such as shocks to income and wealth, drive differences in religiosity?

We delve into the heart of this question by studying the effects of homeownership and changes in property values on religiosity. Our research is focused on the United States, where residential property constitutes the largest asset for most households, accounting for approximately 60% of all personal wealth (U.S. Census, 2010). This reflects, in part, a long-term policy push towards an "ownership society."[1] Moreover, we focus on the time-intensive component of religiosity rather than proxies such as membership in religious organizations or donations to religious institutions. To conduct the study, we integrate individual-level data from the American Time Use Survey (ATUS) and the Current Population Survey (CPS) with housing price data from the Federal Housing Finance Agency (FHFA). The final dataset comprises approximately 22,000 individuals observed during the period 2003–2012. We then proceed to analyze how individual homeowners adjust the time allocated to building and maintaining religious capital—defined as the time spent on religious and spiritual activities—in response to increasing house prices. This comparison is made relative to otherwise similar renters within the same narrowly defined geographic locality (a Metropolitan Statistical Area, or an MSA). Our underlying hypothesis is that rising residential property prices increase the housing wealth of homeowner and enhance the attractiveness of activities related to the residential asset, while renters are not affected. The identifying assumption is that, in the absence of changes in property prices, one would expect an otherwise similar trend in religiosity for homeowners and renters in the same MSA.

Our principle finding is that relative to renters, homeowners in MSAs experiencing an increase in local housing prices spend significantly less time on religious and spiritual activities. The decline in religious participation is economically sizeable as well. The economic effect is economically meaningful, too. A two-standard-deviation increase in house prices (corresponding to an increase of 66 points) leads to 3.6 fewer minutes per day, or almost one-half hour less per week, spent on religious and spiritual activities, corresponding to a one-third decline.

Further tests strengthen the notion that the mechanism we document is specific to religious activities. We find that time spent on other types of social-capital-related activities, such as volunteering for or through an organization, and time spent on government-required duties, voting, and attending town hall meetings, is not affected by housing market dynamics. Moreover, a positive shock to housing wealth does not have a statistically significant effect on social activities not related to social capital, such as interpersonal communication or participation in social functions. We also find that while increasing residential prices have no effects on activities such as market work, job search, or child care, they have a statistically significant positive effect for homeowners relative to renters, on non-religious education, on some components of non-market work (such as home-ownership activities and shopping), and on some components of leisure (such as personal care, entertainment, and sports). Moreover, increases in housing wealth are associated with a significant decline in other income-generating activities.

The combined evidence thus suggests that rising residential prices affect social capital-related activities through two separate channels. The first one is a wealth effect: the value of the residential property increases, making it possible for homeowners to either extract and spend the additional home equity, or at least to "feel richer".[2] The second is a substitution effect: as the value of the residential asset increases, it enhances the attractiveness of related activities. Our empirical results thus imply that homeowners reallocate time towards activities that have a luxury-good component and/or are an input in the ever more valuable residential asset. Conversely, activities that have an inferior-good component decline. The latter rationale appears to apply to religious and spiritual activities, but not to secular social capital-related ones. Importantly, since we are looking at high-frequency changes in house prices, our results capture a short-term phenomenon related to the business cycle, rather than a long-term one related to slow-moving economic development. Therefore, we believe that our analysis provides evidence for an empirical mechanism that is related to, but somewhat different from the "Secularization Thesis"–i.e., the notion that religiosity declines as societies modernize–first put forth by Weber (1905).

We also explore the role that individual-level and MSA-level heterogeneity plays in the interaction between homeownership, house prices, and social capital. We find that the same housing market dynamics do not affect older, female, or married homeowners differently. At the same time, we find that Black and low-income homeowners significantly reduce the time they spend on religious activities when residential property prices go up. This suggests that the reduction in religious activities can in part be explained by the social motive for religious participation, as the need for social insurance declines with increasing wealth. It also speaks to the importance of credit constraints in determining the allocation of time. The main effect is weaker for homeowners living in more White MSAs, as well as in those that exhibit a more equal income distribution. This suggests that higher racial and income homogeneity dampens the negative effect of rising housing wealth on religiosity.

We address a number of concerns with our identification strategy. We test our hypothesis separately for the sub-sample of homeowners and for the sub-sample of renters, and we show that the results hold only for the former. Put differently, we show that among homeowners, those who experienced a larger increase in housing wealth also experienced a larger decline in time spent on religious activities. This test addresses two different concerns. The first one is that renters may not be a good control group, because in a general-equilibrium sense, they are affected negatively (positively) by an increase (decline) in house prices, e.g., through changes in rental costs. The second concern is that ownership is not exogenous, and those who choose to own residential property may be different from those who choose to rent, in important unobservable ways that are correlated with religiosity.[3] We also show that the main results of the paper are driven by homeowners who have lived in their property for a while, alleviating the concern that our

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[1] "We're creating [...] an ownership society in this country, where more Americans than ever will be able to open up their door where they live and say, welcome to my house, welcome to my piece of property." President George W. Bush, June 17, 2004.

[2] Mian and Sufi (2011) show that during our sample period, homeowners extracted and used for real outlays 25 cents for every dollar increase in home equity.

[3] At the same time, we note that comparing homeowners and renters and interpreting changes in house prices as a wealth shock to homeowners, but not to renters, is a well established empirical strategy in the empirical literature on the socio-economic effects of housing market trends (e.g., Lovenheim, 2011; Farnham et al., 2011; Lovenheim and Mumford, 2013; Dettling and Kearney, 2014; Laeven and Popov, 2016; Schmalz et al., 2017).

results are driven by changes in the ownership composition of our sample over time. Finally, in robustness tests, we confirm that the main effect is especially large on weekends, when the bulk of religious activities take place.

Arguably, the ATUS does not allow us to capture religious participation in terms of donations, which might be a substitute for time invested in religious life. It is possible that the decline in time spent on religious activities is accompanied by lower donations to religious organizations, which would strengthen the secularization thesis. Alternatively, donations may go up, suggesting constant religiosity, but substitution away from time intensive activities. At the same time, we report complementary evidence using data from the PSID, which suggests that there is no statistical correlation between time spent on religious and spiritual activities and financial donations to religious organizations. While these data are only available for 2003 and 2005, they do point in the direction of a lack of substitution between the time-intensive and the money-intensive components of religiosity.

Documenting a robust relationship between housing market dynamics and religiosity in particular is important because variations in both belonging and believing can have material economic consequences. At a national level, religion can potentially have long-term effects on the provision of public goods (Cantoni et al., 2018), state legitimacy (Chaney, 2013; Rubin, 2017; Auriol and Platteau, 2017), institutions (Kuran, 2011; Pascali, 2016; Belloc et al., 2016; Platteau, 2017; Bisin et al., 2019; Bazzi et al., 2020), intolerance (Becker and Pascali, 2019), generalized trust (Putnam, 1993; La Porta et al., 1997), human capital and income (Valencia Caicedo, 2019, Botticini and Eckstein, 2005, Becker and Woessmann, 2009), and economic growth (Barro and McCleary, 2003; Campante and Yanagizawa-Drott, 2015). At an individual level, religiosity has been shown to affect economic outcomes such as personal income (Gruber, 2005; Bryan and Karlan, 2021), education (Gruber, 2005), subjective well-being, life satisfaction, and physical and mental health (Deaton, 2009; Fruehwirth et al., 2019; Campante and Yanagizawa-Drott, 2015; Koenig, 2018; Boelens et al., 2009), alcohol and drug use (Mellor and Freeborn, 2011; Gruber, 2005), marriage and fertility (Lehrer, 2004; Adsera, 2006), contributions to public goods (Benjamin et al., 2016), and political preference over redistribution (Esteban et al., 2018). Religious beliefs and religious participation also shape more fundamental variables such as preferences, attitudes, and values, which foster pro-social behavior and are conducive to development and growth (Norenzayan and Shariff, 2008; Norenzayan, 2013; Henrich et al., 2010; Schulz et al., 2019; Guiso et al., 2003).

Relative to most of the literature on religion and development, our empirical design has four main advantages. First, by focusing on changes in housing wealth, we make sure that we are capturing a wealth effect uncontaminated by a concurrent substitution effect, which would be the case if the focus were on shocks to market wages. Second, the US housing boom of the early-to-mid 2000 s was characterized by a significant and heterogeneous increase in house prices across regions. This makes it possible to simultaneously identify and reliably quantify the impact of housing wealth shocks on social capital-related activities. Third, we control for a wide host of individual background characteristics that can simultaneously determine time allocation to religious and civic activities and homeownership, such as age, race, gender, education, marital status, employment status, household size, labor income, health, and mobility. In addition, we allow for the impact of those individual characteristics to fluctuate with changes in house prices. Fourth, our differences-in-differences estimation strategy allows us to include interaction terms of geography, time, and ownership dummies in our regressions and thereby holding a host of unobservable background forces constant. In particular, we include $MSA \times Year$ fixed effects which control for unobservable MSA-wide temporal shocks that are common to all individuals in an MSA-year; $MSA \times Owner$ fixed effects which control for MSA-wide differences between owners and renters that are persistent over time; and $Owner \times Year$ fixed effects which control for any US-wide trends in time allocated to social capital that are different across homeowners and renters. We are thus fairly confident that our results are driven neither by unobservable differences between owners and renters in local markets, nor by unobservable geography-specific or owner-specific trends. Particularly, the inclusion of $MSA \times year$ fixed effects allows us to hold constant background forces that are common to both owners and renters in a narrow geographic locality.

This paper is related to three separate strands of literature. First, it contributes to the literature on the determinants of social capital and religious participation.[4] The main challenge in this line of research is establishing a direction of causality and disentangling factors such as education and urbanization that are correlated with general economic development from income levels per se. Some scholars have established a robust link between social capital and development, uncontaminated by changes in income. For example, a large body of literature has documented that a component of social capital, such as trust, is a good predictor of government performance (Putnam, 1993), financial development (Guiso et al., 2004), entrepreneurship (Guiso et al., 2006), stock market participation (Guiso et al., 2008), trade (Guiso et al., 2009), growth (Algan and Cahuc, 2010), and the utilization of information (Pevzner et al., 2015). Similarly, a number of cross-country or cross-region studies have established a negative link between economic development and religious beliefs and participation, without claiming causality (e.g., Barro and McCleary, 2006; Becker and Woessmann, 2013). More recent attempts to identify a causal effect include Buser (2015) who studies the effect of a change in the eligibility criteria for a government cash transfer program on church attendance in Ecuador. Chen (2010) studies the impact of financial distress on religious education in Indonesia. Relative to these papers, we look at a major developed country (the United States), whose case has puzzled researchers in the secularization debate. Relative to these papers, we study a representative sample of the US population, not only cash-constraint or credit-constraint households in an economy characterized by underdeveloped financial and insurance markets. Our analysis is thus closest to Bottan and Perez-Truglia (2015) who find that the U.S. Catholic clergy's abuse scandals led to a decline in religious participation. At the same time, being the first to employ the American Time Use Survey for the purpose of this question, our work is the first to explore the effect of homeownership and housing dynamics on time allocated to building and maintaining various types of social capital.

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[4] For comprehensive reviews, see Guiso et al. (2006), Guiso et al. (2011), Barro and McCleary (2019), and Carvalho (2019).

Our paper is also related to the literature on the economic and social effects of fluctuations in housing markets. One strand of this literature has linked the U.S. housing boom of the early-to-mid 2000 s to household portfolio and labor choices, as well as to changes in the U.S. industrial structure. Mian and Sufi (2011) provide evidence on how home equity-based borrowing during the U.S. housing boom of the 1990 s and 2000 s was responsible for the large observed increase in housing debt among U.S. households. Chetty et al. (2017) show that increases in home equity wealth tend to raise share holdings by U.S. households. Charles et al. (2016) show that the housing boom allowed for a reallocation of unskilled workers from manufacturing to construction sectors, masking the overall unemployment effect of the U.S. manufacturing decline. Corradin and Popov (2015) show that the rise in homeowners' housing wealth and collateral values brought about by an increase in house prices increased the rate of creation of business start-ups. Li et al. (2020) demonstrate a deterrent effect of housing wealth on labor supply. Laeven and Popov (2017) show that by pricing young individuals out of housing markets, local housing booms distorted their household-formation and fertility choices. More recent papers have also looked at the effect that housing plays in a number of socio-economic decisions, ranging from schooling (Lovenheim, 2011; Laeven and Popov, 2016) to fertility and marital stability (Farnham et al., 2011; Lovenheim and Mumford, 2013; Dettling and Kearney, 2014) to labor supply (Hausman et al., 2022). These papers use alternatively the increase in housing wealth for homeowners, or the transition into homeownership, to test a similar hypothesis to ours, namely, whether the consumption of a particular good (children, education, or marriage) increases or not with wealth or homeownership. However, ours is the first paper to look at social capital-related activities in this context, and to use time allocation to test for whether time spent on building and maintaining social capital moves with housing wealth.

Finally, our paper relates to the literature on the determinants of time allocation. Research in this literature has typically been concerned with documenting trends in different types of time allocation over time or over the business cycle. For instance, Ramey and Francis (2009) document that over the past century, the split between time allocated to work and to leisure has remained remarkably stable, with just a modest increase in leisure. Aguiar et al. (2013) explore how foregone market work hours are allocated to other activities during a recession, and find that they are mostly allocated to home production, sleep, and leisure. We complement this literature by focusing on time allocated to a narrow activity, and by identifying the impact thereon over the short-to-medium run of an exogenous positive wealth shock.

2. Data

Our empirical analysis uses individual-level information from two separate surveys. First, we use data from the American Time Use Survey (ATUS) on time allocated to social capital-related activities. The ATUS started in 2003, and is conducted by the Bureau of Labor Statistics (BLS). Individuals in the sample are drawn from the existing sample of the Current Population Survey (CPS). On average, individuals are sampled approximately three months after the completion of their final CPS survey. At the time of the ATUS survey, the BLS updates the respondent's employment and demographic information. Each wave is based on 24-hour time diaries where respondents report the activities from the previous day in detailed time intervals. Survey personnel then assign the activities reported by the individual to a specific category in the ATUS's set classification scheme which comprises over 400 detailed time-use categories. For more information on the types of activities that are recorded in the ATUS see Hamermesh et al. (2005) and Aguiar et al. (2013). The 2003 wave of the survey includes over 20,000 respondents, while each subsequent wave includes roughly 13,000 respondents.

We complement the information on time allocation from ATUS with data on demographic characteristics, employment, education, labor market participation, and income from the Integrated Public Use Microdata Series Current Population Survey (IPUMS-CPS) (for more details, see Flood et al., 2015). The IPUMS-CPS also contains information on home ownership status (i.e., whether the respondent is a renter or owns a home). Because the CPS samples multiple individuals in the same household, it is important to match the individuals in ATUS and in IPUMS uniquely. We do so by following a scheme proposed by the BLS that aims at identifying unique individuals in the same households on the basis of a household identifier, year of survey, and age.[5]

We are interested in yearly observations, which are available in the March Annual Demographic Supplements from the U.S. Current Population Survey. We include the survey years 2003–2012 in our sample to capture the period of the ATUS that coincides with the most recent housing boom-bust period for as many individuals as possible.

Finally, we compute local house prices using data from the Federal Housing Finance Agency (FHFA), which is a repeat-sales housing price index with data for most metropolitan areas. We map the FHFA metro areas to the Census-CPS metro areas. In the FHFA, the base year is 1996.

The main dependent variable in our analysis is 'Religious and spiritual activities'. It is calculated as the sum of the following components: 'Attending religious services', 'Participating in religious practices', 'Religious education activities', and 'Travel associated with religious and spiritual practices'. In falsification tests, we construct a variable 'Volunteering and civic activities' that captures non-religious social capital. It is calculated as the sum of 'Volunteering for or through an organization', 'Government-required duties, such as serving jury duty or appearing in court', 'Voting', and 'Attending town hall meetings'.

For our final data set, we also construct a dummy variable 'owner' that is equal to 1 if the housing unit in which the individual resides is owned, and to 0 if it is rented. Housing units acquired with a mortgage or other lending arrangement(s) are classified as 'owned,' even if repayment has not yet been completed.

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[5] For more information, see https://www.bls.gov/tus/atuscpscodebk13.pdf.

In terms of demographics, we include information on the individual's age, gender, race, and marital status. The latter is split into three different categories: 'married', 'single', and 'divorced or widowed'. We also classify the respondents into three educational categories: 'high-school or less' (includes all persons with 0 to 12 years of schooling), 'college drop-outs' (includes all respondents who have less than four years of college education), and 'college or more' (includes all respondents with at least a college degree). We also include information on the household's total income, in thousands of dollars, on the individual's employment status, and on whether the individual has a health disability. To capture the effect of family size, we include the total number of persons in the household. Finally, we include information on whether in the past year, the individual moved to their current residence from the same state, from another state, or from abroad. This is important because the negative relationship between mobility and social capital is well-documented (e.g., Welch and Baltzell, 1984; Bibby, 1997), and geographical relocation has been found to be one of the most important reasons for reduced church attendance in particular (see Religion and Center, 1988). Moreover, the mobility of homeowners typically increases in booms (see Ferreira et al., 2010). If the boom affects mobility of homeowners and renters differently, the effect of booms on social capital-related activities is likely also to differ across homeowners and renters.

After dropping individuals for which we do not observe time allocation, ownership status, or geographic location, we end up with at most 21,938 observations over the sample period 2003–2012 that are matched across ATUS and CPS and are not lacking any geographic identifier.

Table 1 presents summary statistics for the variables in our final dataset, based on the individuals in the primary sample period. Panel A of Table 1 shows that the average individual in the ATUS spends around 14 minutes per day on religious and spiritual activities, totaling an hour and forty minutes per week. Additionally, individuals spend around 10 minutes per day on volunteering and civic activities, totaling one hour and ten minutes per week.

Panel B shows the same statistics for those respondents who spend strictly more than 0 minutes per day on religious and spiritual activities (column 'Mean (non-zero)'). Limiting the sample to these individuals results in an average time spent on religious and spiritual activities of 121 minutes. We obtain very similar summary statistics when we limit the sample to individuals interviewed about their activities on a weekend day (column 'Mean (weekend)'), or on Sunday (column 'Mean (Sunday)'). The data suggest that 89% of individuals spend no time whatsoever on religious activities on an average day, and 73% of respondents interviewed about their activities do not do so on Sunday. This necessitates the evaluation of the pattern of individual religious participation over time using both linear and non-linear estimation techniques.

Panels A and B of Table 1 also present summary statistics for the daily allocation of time to all other types of activities. The summary statistics imply that for the population at large (Panel A), time spent on religious and spiritual activities and time spent on volunteering and civil activities is at par with time spent on educational activities (9.5 minutes per day), but is much more limited than any other activity except 'Other income-generating activities' and 'Job search'. However, for those who spend a strictly positive amount of time on each activity (Panel B), time spent on social religious and spiritual activities dominates all other activities on average, with the exception of 'Market work', 'Non-market work', and 'Leisure'.

Panel C of Table 1 reports summary statistics for the individual demographic and financial characteristics of interest used in the analysis. The table shows that the median individual in our sample is a homeowner, female, White, married, and around 48 years old. The median respondent also has some college education. A total of 3% of the individuals in our sample are unemployed, reflecting the exceptionally high levels of labor demand during the sample period. The average household has three members, but this number rises to four for couples with children. Around 4% of those interviewed report a health disability. Finally, 13% of respondents moved to their current residence from the same state, from another state, or from abroad in the previous year.

Panel C of Table 1 also presents summary statistics on the index of house prices over the period 2003–2012. We focus on the 212 MSAs with non-missing information on both individual characteristics and house prices. It shows that on average during the sample period, the HPI was 172, with a wide variation (from a minimum of 109.8 to a maximum of 316.3). This means that the cumulative 5-year increase in MSA-specific house prices was 38%, which is consistent with the US-wide developments reported in Shiller (2007). In addition, there are vast regional variations: for example, average house prices only increased by 1.4% between 2002 and 2007 in Flint, MI, but they more than doubled between 2000 and 2005 in Merced, CA. However, the overall increase is not driven by a few outlier MSAs: In 67 MSAs, house prices increased by more than 50% over at least one 5-year period between 2001 and 2006, and in 23 MSAs they increased by more than 75% over at least one 5-year period. Fig. 1 demonstrates the spacial distribution of the house price changes during the boom part of the sample.

To assess the homogeneity of MSAs in terms of race, income inequality, and variations in religious denominations, we include variables that capture the share of White individuals in an MSA, the skewness of the distribution of household income in an MSA, the Herfindahl-Hirschmann index of religious affiliations in an MSA, and a dummy variable equal to 1 if Catholic is the majority religious denomination in the state (as opposed to Mainstream Protestant or Black Protestant). The former two variables are calculated using data from IPUMS-CPS, and the latter two variables are calculated using data from the 2000 Religious Congregations and Membership Study. For an MSA, the average share of White individuals is 0.85, the average measure of income inequality is 2.99, the religion HHI is 0.29, and approximately one-third of all MSAs are in states where Catholic is the dominant religious denomination.

3. Empirical model and identification

The sample described in Section 2 consists of repeated cross-sections of unique individuals who allocate some time to religious activities. We base our estimating equation on Chaney et al. (2012) and Schmalz et al. (2017). With i denoting an individual, m an MSA, and t the year in which the individual is surveyed, our estimating equation is

Table 1

Summary statistics, 2003–2012.

Panel A. Time allocation, all activities

Variable	Observations	Mean	Median	St. dev.	Min	Max
Religious and spiritual activities	21,938	13.98	0	50.35	0	950
Volunteering and civic activities	21,938	10.16	0	52.12	0	1,080
Educational activities	21,938	9.48	0	58.93	0	1,040
Market work	21,938	171.34	0	258.15	0	1,430
Other income-generating activities	21,938	1.42	0	22.84	0	890
Job search	21,938	1.22	0	16.67	0	840
Child care	21,938	30.45	0	78.52	0	1,050
Non-market work	21,938	187.56	144	173.31	0	1,349
Core home production	21,938	81.78	40	109.94	0	975
Home-ownership activities	21,938	34.43	0	76.91	0	1,220
Getting goods and services	21,938	51.51	0	85.12	0	1,320
Care for others	21,938	15.43	0	60.87	0	1,060
Leisure	21,938	922.53	900	254.46	10	2,372
Sleeping	21,938	523.89	510	133.98	0	1,428
TV watching	21,938	172.17	125	171.12	0	1,348
Eating and drinking	21,938	68.94	60	52.14	0	735
Personal care	21,938	46.81	35	61.65	0	1,400
Sport	21,938	25.12	0	70.93	0	1,073
Socializing	21,938	66.91	20	105.87	0	1,160

Panel B. Time allocation on religiosity, by day

Variable	Mean (non-zero)	Mean (weekend)	Mean (Sunday)
Religious and spiritual activities	121.12	145.14	146.07

Notes: '*Religious and spiritual activities*' denotes time spent on activities associated with membership in or iden-
tification with specific religions or denominations, such as attending religious services, participating in choirs,
youth groups, orchestras, or unpaid teaching, as well as on personal religious practices, such as praying. '*Vol-
unteering and civic activities*' denotes time spent volunteering for or through an organization, and time spent on
government-required duties, such as serving jury duty or appearing in court, voting, and attending town hall meet-
ings. '*Educational activities*' denotes time spent taking classes for a degree or for personal interest (including taking
Internet or other distance-learning courses), time spent doing research and homework, and time spent taking care
of administrative tasks related to education (such as registering for classes or obtaining a school ID). '*Market work*'
denotes time spent working in the market sector on main jobs, second jobs, and overtime, as well as any time
spent commuting to or from work and time spent on work related meals and activities. '*Other income-generating
activities*' denotes time spent on activities such as hobbies, crafts, food preparation, and performances that generate
income, and the time spent on income-generating services such as babysitting and home improvements for pay. '*Job
search*' denotes time spent by the individual searching for a job. '*Child care*' denotes time spent by the individual
caring for, educating, or playing with their children. '*Non-market work*' denotes core home production, activities
related to home ownership, obtaining goods and services, and care for other adults. '*Core home production*' denotes
time spent on activities such as cooking, cleaning, and laundry. '*Home-ownership activities*' denotes time spent on
activities such as household repairs, time spent on exterior and interior cleaning and improvements, garden and
lawn care, and household financial management. '*Getting goods and services*' denotes time spent on obtaining any
goods or services, excluding medical care, education, and restaurant meals. '*Care for others*' denotes time spent on
activities such as supervising and caring for other adults, preparing meals and shopping for other adults, helping
other adults around the house with cleaning and maintenance, and transporting other adults to doctors' offices and
grocery stores. '*Leisure*' denotes the remaining time individuals spend that is not on market work, non-market work,
job search, child care, or socializing / religious participation. '*Sleeping*' denotes times spent sleeping. '*TV watching*'
denotes time spent watching television. '*Eating and drinking*' denotes time spent on preparing and consuming food.
'*Personal care*' denotes time spent on grooming, self-care, and personal activities. '*Sport*' denotes time spent on doing
and watching sport. '*Socializing*' denotes time spent on socializing and communicating with others. Data come from
ATUS. The sample period is 2003—2012.

$$Religion_{i,m,t} = \alpha Owner_{i,m,t} + \beta Owner_{i,m,t} \times HPI_{m,t}$$
$$\gamma X_{i,m,t} + \delta X_{i,m,t} \times HPI_{m,t} + \Psi_{m,t} + \Phi_{o,t} + \varepsilon_{i,m,t}$$

(1)

where $Religion_{i,m,t}$ is the time, in minutes per day, that an individual i residing in MSA m during year t allocates to social capital-
related activities. $Owner_{i,m,t}$ is an indicator variable equal to one if individual i in MSA m during year t is a homeowner as opposed
to renter. $HPI_{m,t}$ denotes the MSA-level house-price index during year t, for each individual MSA m. The vector $X_{i,m,t}$ contains the
individual control variables summarized in Table 1, or derivatives thereof: age and age squared, a gender dummy, two marital
status dummies, two education dummies, two race dummies, a health disability dummy, the logarithm of total household income,
an unemployed dummy, and the number of household members.

We augment our empirical specifications with interactions of the variable capturing the evolution of MSA-specific house prices
with all individual demographic characteristics. This alleviates concerns that heterogeneity across homeowners and renters is in-
fluencing our results, and makes it superfluous to match renters and homeowners on observable characteristics. Individuals with
particular characteristics that are correlated with the propensity to engage in social capital-related activities could have been ex-

Table 1 (*continued*)

Panel C. Demographic characteristics, financials, and changes in home prices

Variable	Observations	Mean	Median	St. dev.	Min	Max
Demographic characteristics and financials						
Owner	21,938	0.74	1	0.44	0	1
Age	21,938	48.12	47	16.91	18	85
Female	21,938	0.57	1	0.49	0	1
Single	21,938	0.20	0	0.40	0	1
Married	21,938	0.52	1	0.50	0	1
Divorced or widowed	21,938	0.28	0	0.45	0	1
High school or less	21,938	0.40	0	0.49	0	1
College dropout	21,938	0.20	0	0.40	0	1
College or more	21,938	0.40	0	0.49	0	1
White	21,938	0.73	1	0.44	0	1
Black	21,938	0.11	0	0.31	0	1
Hispanic	21,938	0.13	0	0.33	0	1
Total household income ('000s)	21,938	64.65	49.02	65.24	0	1,145.69
Unemployed	21,938	0.03	0	0.18	0	1
Household size	21,938	2.62	2	1.48	1	13
Disabled	21,938	0.04	0	0.21	0	1
Migrated	21,938	0.13	0	0.33	0	1
MSA characteristics						
HPI	21,938	172.02	164.92	33.08	109.76	316.31
Share white	21,938	0.85	0.86	0.11	0.27	1
Income distribution skewness	21,938	2.99	3.07	1.49	0.01	8.98
HHI	21,938	0.30	0.29	0.05	0.22	0.54
Dominant Catholic	21,938	0.32	0	0.47	0	1

Notes: '*Owner*' is a dummy variable equal to 1 if the respondent is a home-owner rather than a renter. '*Age*' denotes the respondent's age, in years. '*Female*' is a dummy variable equal to 1 if the respondent is a female. '*Single*' is a dummy variable equal to 1 if the respondent is single. '*Married*' is a dummy variable equal to 1 if the respondent is married. '*Divorced or widowed*' is a dummy variable equal to 1 if the respondent is divorced or widowed. '*High school or less*' is a dummy variable equal to 1 if the respondent has a high school degree at most. '*College drop-out*' is a dummy variable equal to 1 if the respondent dropped out from college, '*College or more*' is a dummy variable equal to 1 if the respondent has at least a college degree. '*White*' is a dummy variable equal to 1 if the respondent is white. '*Black*' is a dummy variable equal to 1 if the respondent is black. '*Hispanic*' is a dummy variable equal to 1 if the respondent is of Hispanic origin. '*Total household income* ('000*s*)' is total household income in '000 of USD. '*Unemployed*' is a dummy variable equal to 1 if the respondent is unemployed. '*Household size*' measures the total number of persons in the household. '*Disabled*' is a dummy variable equal to 1 if the respondent claims a health disability. '*Migrated*' is a dummy variable equal to 1 if in the past year, the respondent moved into their current residence from within state, from another state, or from abroad. '*HPI*' denotes an MSA-wide house-price index. '*Share white*' is the percentage of individuals who identify themselves as white in a particular MSA over the sample period. '*Income distribution skewness*' is the skewness of the distribution of total household income in a particular MSA over the sample period. '*Religion HHI*' is a Herfindahl-Hirschmann index of religious affiliations in an MSA. '*Dominant Catholic*' is a dummy variable equal to 1 if Catholic is the main religious denomination in the MSA. Data come from the IPUMS-CPS, the FHFA, and the 2000 Religious Congregations and Membership Study. The sample period is 2003—2012.

posed to house price shocks to different degrees. For example, it is possible that a housing boom was more likely to happen in regions with a higher concentration of non-married male individuals who are more likely over time to reduce the time they devote to religious practices.

We also include two different interaction terms of fixed effects. $\Psi_{m,t}$ is a matrix of *MSA* × *Year* fixed effects that control for unobservable time-varying MSA-wide shocks that are common to all individuals in an MSA-year. This is important as any unobservable variation at the local level in, e.g., economic or financial conditions can affect the estimates. These fixed effects also allow us to keep constant changes over time in local factors that affect homeowners and renters equally. $\Phi_{o,t}$ is a matrix of *Owner* × *Year* fixed effects that control for any US-wide trends among homeowners. This is of primary importance because local differences in religious or civic engagement between owners and renters over time can be driven by US-wide shocks to the demand for social capital which are unrelated to local conditions. Because of the inclusion of these fixed effects, we do not include $HPI_{m,t}$ and *Owner* on their own because their direct effect on social capital-related activities is subsumed in the coefficients $\Psi_{m,t}$ and $\Theta_{o,t}$, respectively.

The main coefficient of interest in Equation (1) is β. Its estimation relies on a difference-in-differences identification. The 'treatment group' comprises those individuals in the CPS who own their house, whereas the 'control group' consists of renters. The (continuous) 'treatment' is the five-year cumulative house-price growth in the MSA where the respondent resigns. An increase in house prices increases the homeowners' wealth, which they can extract from the house if mortgage markets are sufficiently liquid, while leaving renters' wealth unaffected. Alternatively, even in the absence of mortgage markets, house prices may make homeowners "feel richer". At the same time, homeowners face the same local shocks to economic conditions or labor markets, which is why renters' time allocation decisions serve as a useful counterfactual for how much time homeowners would be spending on social capital-related activities in the absence of the wealth shock.
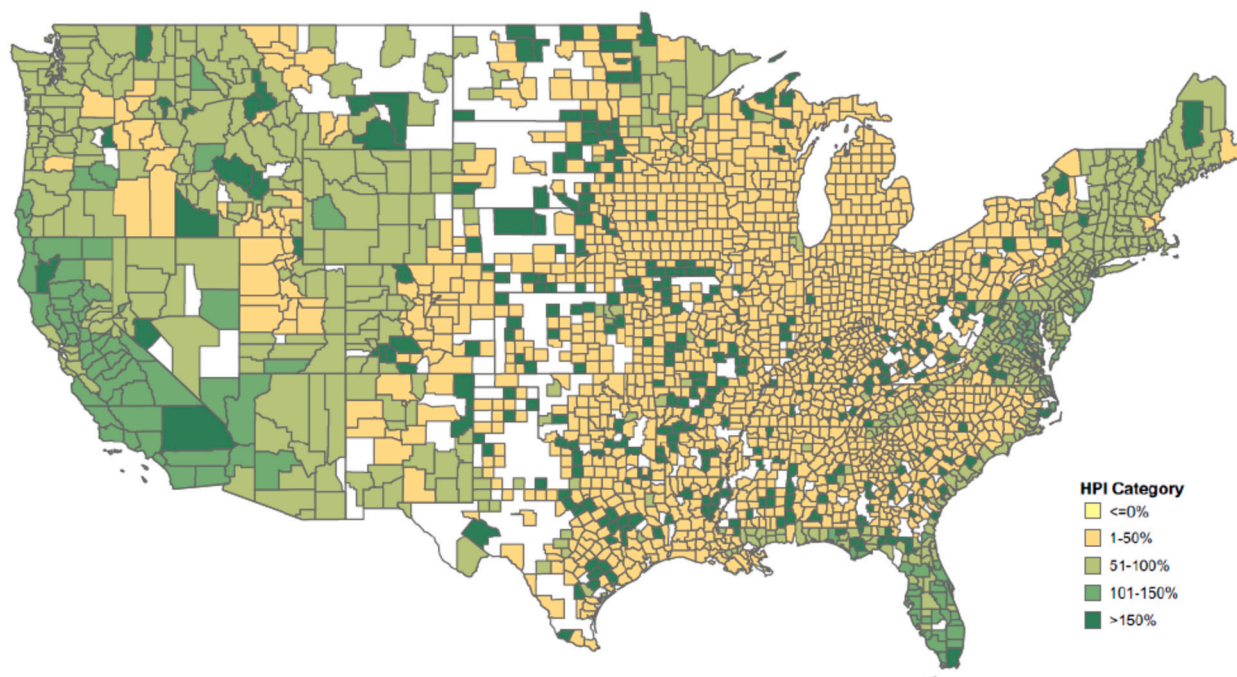
Fig. 1. Changes in US house prices, 2000—2007, by county. *Note*: Changes in county-level house prices between 2000 and 2007. Data come from the Federal Housing Finance Agency.

Specifically, our identification strategy relies on two sources of variation in the data to identify β. First, within a given year, some MSAs experience larger house-price growth than others, and so β is identified by comparing the difference in time allocated to social capital-related activities between homeowners and renters across MSAs with different house-price growth. Second, within a given MSA, house-price growth varies in the time series, so β is also identified by comparing, within each MSA, how the difference in time allocated to social capital-related activities between homeowners and renters varies with house-price growth. A negative sign on β suggests that homeowners spend less time than renters on religious and spiritual activities in regions with higher increases in house prices, relative to regions with low house-price growth. The null hypothesis is that $\beta = 0$, which would indicate that positive wealth shocks have no material impact on religiosity. By contrast, if religious participation declines with wealth—which would be consistent with the "Secularization Thesis" by Weber (1905)—we should expect a negative estimate, $\hat{\beta} < 0$.

The sample period spans 2003–2012. In the main tests reported in the paper, we estimate Equation (1) and variants thereof using OLS. However, it is possible that the accumulation and maintenance of religiosity is fundamentally a zero-one activity whereby one either goes to church (volunteers) or not. Therefore, we also estimate a Probit model using the same fixed effect structure, where the dependent variable is a dummy equal to one if the individual spends any time on religious and spiritual activities.

In all specifications, we use robust standard errors clustered at the MSA level. Assuming that the standard errors are correlated within an MSA allows us to account for potential changes in the dispersion of the errors within an MSA over time (see Bertrand et al., 2004). Notably, the main results of the paper continue to be obtained in unreported regressions where we cluster the standard errors at the MSA-year level instead of at the MSA level.

Finally, the ATUS aims to provide nationally and locally representative estimates for how Americans use their time. To that end, survey weights are included in the ATUS. In all regressions in our analysis, we make use of these weights, in order to restore the representativeness of each individual observation.

One potential concern with the effect of changes in local prices on individual religiosity is the "ecological fallacy." Specifically, we cannot definitively ascertain whether homeowners in the MSAs we study personally experienced an increase in their house prices; we only have information that they reside in an MSA where prices, on average, increased. In principle, it is possible that whatever effects we observe stem from individuals whose property values did not appreciate but who witnessed others in their MSAs experiencing an increase. While this scenario might be true for isolated cases, we consider it unlikely that such a pattern systematically characterizes the data given that real estate prices exhibit a substantial common component derived from land.

4. Empirical evidence

4.1. Main result

Table 2 presents the results from different econometric variants of Equation (1) where we gauge the differential effect of positive shocks to house prices across owners and renters. We build the specification gradually, in terms of controls and fixed effects. We start

Table 2
Housing booms, home ownership, and religiosity: Main test.

	Religious and spiritual activities				
	OLS	OLS	OLS	OLS	Probit
	(1)	(2)	(3)	(4)	(5)
Owner × HPI	-0.042**	-0.034*	-0.050**	-0.054**	-0.001**
	(0.020)	(0.020)	(0.023)	(0.025)	(0.000)
Owner	8.686**	6.852*	9.816**		
	(3.716)	(3.930)	(4.474)		
HPI	-0.001				
	(0.165)				
Individual controls	No	Yes	Yes	Yes	Yes
Individual controls × HPI	No	No	Yes	Yes	Yes
MSA × Year FEs	No	Yes	Yes	Yes	Yes
MSA × Owner FEs	No	No	No	Yes	Yes
Owner × Year FEs	No	No	No	Yes	Yes
R-squared	0.01	0.12	0.12	0.12	0.13
Observations	21,938	21,529	21,529	21,529	18,024

Notes: The table reports estimates of individual propensity to engage in religious and spiritual activities. '*Religious and spiritual activities*' denotes time spent on activities associated with membership in or identification with specific religions or denominations, such as attending religious services, participating in choirs, youth groups, orchestras, or unpaid teaching, as well as on personal religious practices, such as praying. '*Owner*' is a dummy variable equal to 1 if the respondent is a homeowner rather than a renter. '*HPI*' denotes an MSA-wide house-price index. For the rest of the variable definitions, see Table 1. Time-allocation data come from the ATUS, demographic data come from the IPUMS-CPS, and data on HPI come from the FHFA. The sample period is 2003–2012. The model is estimated using OLS (columns (1)–(4)) and Probit (column (5)). All regressions use sampling weights that adjust the sample to be representative of the population. All regressions include fixed effects as specified. Standard errors clustered at the MSA level are included in parentheses, where ***, **, and * indicate significance at the 1, 5, and 10 percent statistical level, respectively.

with a linear probability model (columns (1)–(4)) where the dependent variable is the time in minutes per day allocated to religious and spiritual activities. We also run a Probit model where the dependent variable is a dummy equal to one if the individual spends any time on religious and spiritual activities, and to zero otherwise (column (5)). In all regressions, the standard errors are clustered at the MSA level to allow for heteroskedasticity of the MSA-specific shock.

The point estimate on the coefficient β is negative and significantly different from zero across all five specifications. Starting with the OLS specification in columns (1)–(4), the data suggest that relative to a renter in the same MSA at the same point in time, a homeowner devotes less time to religious and spiritual activities, as house prices increase. With the exception of column (2), the point estimate is significant at least at the 5% statistical level. The economic effect is economically meaningful, too. Using the point estimate from the preferred specification with all controls and fixed effects in column (4), it can be observed that a two-standard-deviation increase in house prices (corresponding to an increase of 66 points) leads to 3.6 fewer minutes per day, or almost one-half hour less per week, spent on social capital-related activities. The unconditional mean is 14 minutes per day, therefore the estimate corresponds to a one-third decline in time allocated to religious and spiritual activities.[6]

In column (5), we run a probit model where the dependent variable is a dummy equal to 1 if the respondent spends a strictly positive amount of time on religious and spiritual activities, and 0 otherwise. The column reports marginal probability changes. Therefore, the point estimate of -0.0007 suggests that a two-standard-deviation increase in house prices reduces by 4.6 percentage points the probability that an individual engages in religious and spiritual activities. The effect is significant at the 5-percent statistical level.[7]

The data also suggest that some individual characteristics predict well on their own the individual propensity to engage in social capital-related activities unrelated to the house price increase (see Appendix Table A.1 for the full set of coefficients). Columns (1)-(3) indicate that homeowners spend on average more time on religious and spiritual activities, which provides further justification for the inclusion of *Owner* × *Year* fixed effects. This finding is also consistent with the evidence in Glaeser et al. (2002) who find that homeowners are more likely to be members of various clubs and civic organizations. In column (2), a U-shaped relationship is observed between age and time allocated to religious and spiritual activities. It can also be observed that females spend about 4 minutes per week more on religious and spiritual activities than males. Married individuals spend more time on religious activities than the divorced and the widowed. Black individuals appear to spend significantly more time (about 15 minutes) on religious and spiritual activities, and White individuals spend significantly less (4 minutes) compared to Hispanics. A larger household is associated with significantly more time spent on religious and spiritual activities, as does college education. Individuals who recently migrated

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[6] Lovenheim and Mumford (2013) show that increases in housing values increase the probability of having a child, which suggests that a sensitivity analysis for the inclusion of controls is warranted. In unreported regressions, we show that the main result of the paper still obtains after excluding one control variable at a time, and it is always significant at the 5-percent statistical level.

[7] We verify that the effect reported in Table 2 is symmetric, meaning that time spent on religious and spiritual activities goes down when house prices go up, and down when house prices decline.

to the area are more likely to spend time building religious ties. Finally, income is negatively correlated with religiosity, as measured on the time-intensive margin.[8] In summary, these variables prove relevant for explaining the time allocated to religious and spiritual activities, as evidenced by the increase in the R-squared (from 0.01 in column (1) to 0.12 in column (2)). At the same time, in the specification with all controls and fixed effects (column (4)), only household size and Black ethnicity are associated with significant differences in time spent on religious and spiritual activities.

One limitation of our analysis is that the ATUS starts in 2003, and therefore does not pre-date the US housing boom. Consequently, and compared to a standard difference-in-differences approach, we cannot compare the trends we observe to a period before the shock takes place. Therefore, we cannot formally test for the existence of common pre-treatment trends in time spent on religious activities between owners and renters. This makes it difficult to know whether the presented estimates are really driven by the housing boom or whether homeowners were already on a different path before the boom compared to renters. However, in Appendix Table A.3 we present some evidence in support of our approach. Panel A demonstrates that in low-house-price-growth MSAs–defined as those MSAs with below-median house price growth between 2003 and 2007–the propensity to engage in religious and spiritual activities did not change materially between 2003 and 2007. This suggests that for a counterfactual set-up where income shocks are largely absent, homeowners and renters are on similar trends. At the same time, the evidence in Panel B suggests that while in high-house-price-growth MSAs homeowners and renters spend similar time on religious and spiritual activities in 2003, a statistically significant difference was observed in 2007.

4.2. Falsification: volunteering and civic activities

Table 3 presents the results from both the OLS and the Probit versions of Equation (1) where we test for changes in civic, as opposed to religious, capital. We evaluate the full model with individual covariates, the interaction of the covariates with ΔHPI, with $MSA \times Year$, and with $Owner \times Year$ fixed effects. As before, the standard errors are clustered at the MSA level to allow for heteroskedasticity of the MSA-specific shock. For brevity, in this and the next tables, we do not report the coefficients for the remaining individual controls.

The data fail to reject the hypothesis that housing market dynamics have no effect on civic capital (column (1)). The coefficient is 0.006, and it is statistically indistinguishable from zero. The same non-result is recorded after running the Probit version of our model (column (2)). The evidence implies that the decline in time spent on religious and spiritual activities in response to increases in housing wealth that we documented in Table 2 is not mirrored by similar changes in civic capital building. Our evidence is thus consistent with Bottan and Perez-Truglia (2015) who find that the U.S. Catholic clergy's abuse scandals led to a decline in religious participation, but not in other forms of pro-social behavior, like voter turnout.

4.3. Robust sample

In Table 4, we present estimates from three robust variants of the equation evaluated in Table 3. We first run an alternative test whereby we again look at changes in the propensity to engage in religious and spiritual activities, but we do so separately for the sub-sample of homeowners and for the sub-sample of renters. This test addresses two different concerns. The first one is that renters may not be a good control group, because in a general-equilibrium sense, they are affected negatively (positively) by an increase (decline) in house prices (e.g., through changes in rental costs). The second concern is that ownership is not exogenous: agents tend to move in and out of homeownership, and more importantly, those who choose to own residential property may be different from those who choose to rent in important unobservable ways that are correlated with social capital.

The estimates strongly suggest that, holding all else equal, homeowners in MSAs where house prices appreciated more devote less time to religious and spiritual activities than homeowners in MSAs that experienced smaller house price appreciations (column (1)). At the same time, there is no statistical relationship between changes in house prices and time devoted to social capital-related activities in the sub-sample of renters (column (2)). This confirms the intuition that changes in house prices constitute a wealth effect only for homeowners. Moreover, the size of the wealth shock matters, too: the higher the increase in housing wealth for a home owner, the larger the reduction in time spent on building and maintaining social capital.[9] While this test has the advantage of not relying on a potentially non-random comparison group, it has the disadvantage of only controlling for MSA and year fixed effects, rather than for the full matrix of fixed effects included in Equation (1). Nevertheless, it confirms the important point that while owners spend on average more time than renters on building religious ties, our main result is not explained by time-invariant differences in religiosity between the two groups of individuals. Instead, positive shocks to housing wealth lead to a decline in the time spent on religious and spiritual activities *within the sample of owners*, too.

Another drawback of the analysis reported in Table 2 is that the data are only a repeated cross-section. This raises the possibility that our results may be influenced by compositional changes in ownership patterns.[10] This is important because migration has been

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[8] This potentially suggests that time spent on religion is a substitute for money spent on donations to religious organizations. To test for this possibility, and as there is no information on donations in the ATUS, we downloaded the necessary data from the PSID and isolated the information on time spent on religious activities and donations to religious organizations. In addition, we split the observations between homeowners and renters. The data on amounts spent on religious activities is available only for the years 2003 and 2005. In Appendix Table A.2, we report the simple pairwise correlations for both years for all households, and for the subgroups of renters and homeowners. The correlations are essentially zero, suggesting no substitution between time spent on religious activities and donations to religious organizations.

[9] An F-test confirms that the coefficients in columns (1) and (2) are statistically different from each other.

[10] We test for the share of homeowners over time and find it to be very stable, both in high- and low-house-price-growth MSAs, at around 74%.

Table 3

Housing booms, home ownership, and volunteering and civic activities.

	Volunteering and civic activities	
	OLS	Probit
	(1)	(2)
Owner × HPI	0.006	-0.001
	(0.033)	(0.001)
Individual controls	Yes	Yes
Individual controls × HPI	Yes	Yes
MSA × Year FEs	Yes	Yes
MSA × Owner FEs	Yes	Yes
Owner × Year FEs	Yes	Yes
R-squared	0.12	0.15
Observations	21,529	16,153

Notes: The table reports estimates of individual propensity to engage in activities related to non-religious social capital. '*Volunteering and civic activities*' denotes time spent volunteering for or through an organization, and time spent on government-required duties, such as serving jury duty or appearing in court, voting, and attending town hall meetings. '*Owner*' is a dummy variable equal to 1 if the respondent is a homeowner rather than a renter. '*HPI*' denotes an MSA-wide house-price index. All regressions include all individual controls and interactions from Table 2. For variable definitions, see Table 1. Time-allocation data come from the ATUS, demographic data come from the IPUMS-CPS, and data on HPI come from the FHFA. The sample period is 2003–2012. The model is estimated using OLS (column (1)) and Probit (column (2)). All regressions use sampling weights that adjust the sample to be representative of the population. All regressions include fixed effects as specified. Standard errors clustered at the MSA level are included in parentheses, where ***, **, and * indicate significance at the 1, 5, and 10 percent statistical level, respectively.

shown to be a fundamental ingredient of social ties and economic outcomes (see, e.g., Kinnan et al., 2018). To address this issue, in columns (3) and (4) we run Equation (1) separately for movers (i.e., those who moved to their current residence in the past year) and non-movers (i.e., those who lived in their current residence already last year). We find that the main effect reported in Table 2 is entirely driven by non-mover homeowners (column (3)), i.e., by those who were living in their residential property when residential prices started booming. Even though the coefficients in columns (3) and (4) are not different in the statistical sense, only in the sample of non-movers do changes in housing wealth affect time spent on religious and spiritual activities. These tests strongly suggest that the results documented in Table 2 are not spuriously driven by the changing composition of the sample over time.[11]

Finally, the allocation of time to religious and spiritual activities is not equal across all days of the week, with the bulk of it taking place during the weekend. By pooling respondents interviewed on different days of the week, we may have introduced a bias in the estimation (e.g., if homeowners who spend little time on religion are increasingly likely to be interviewed on a weekday). We address this concern in columns (5) and (6). We find that the main effect registered in Table 2 is much stronger when we only focus on individuals interviewed about their activities on Saturday or Sunday (column (5)). The effect is significant at the 5-percent statistical level. The point estimate in column (6) implies that a two-standard-deviation increase in house prices leads to 16 fewer minutes spent on religious and spiritual activities on Sunday. Given an unconditional mean of 146 minutes, this corresponds to a 11-percent decline in the time allocated to building and maintaining religious ties on Sunday.

One final robustness test deals with outliers. As Fig. 2 demonstrates, some MSAs have particularly high house prices, and individuals in some MSAs spend much more time than others on religious and spiritual activities. Appendix Table A.4 demonstrates that the main result of the paper still obtains when we exclude outliers, both in terms of house prices and in terms of time spent on religious and spiritual activities.

4.4. Other activities

In Table 5, we use the regression framework in Equation (1) to explore whether the positive wealth shock had an effect on any other activity. This allows us to shed light on whether the housing shock we employ is a pure wealth shock that leads to an increase in the consumption of all "normal goods", or whether it leads to a reallocation towards more housing-intensive activities, as the value of the asset increases. It also allows us to study whether the effect on social capital is unique in the class of non-market activities.

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[11] We also verify that the share of migrants is stable over time and similar across high- and in low-house-price-growth MSAs. This alleviates concerns that the decline in time spent on religious and spiritual activities is due to the reduction in the quality of religious services as religious congregations shrink.
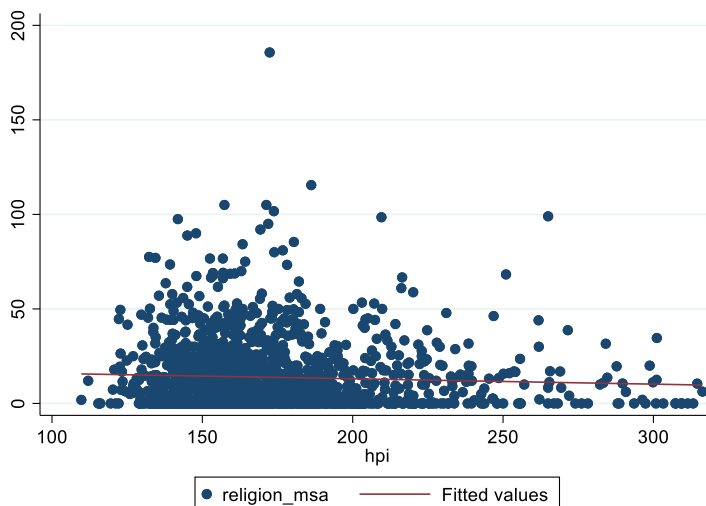
Fig. 2. Religiosity and HPI, MSA-level. *Notes*: The Figure plots, for each MSA-year, average time spent on religious and spiritual activities against HPI. The sample period is 2003—2012. Data from ATUS and FHFA.

Table 4
Housing booms, home ownership, and religiosity: Robust sample.

	Religious and spiritual activities					
	Owners	Renters	Non-movers	Movers	Weekend	Sunday
	(1)	(2)	(3)	(4)	(5)	(6)
Owner × HPI			-0.060**	-0.133	-0.102**	-0.241***
			(0.028)	(0.092)	(0.043)	(0.077)
HPI	-0.043**	-0.005				
	(0.017)	(0.040)				
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls × HPI	No	No	Yes	Yes	Yes	Yes
MSA FEs	Yes	Yes	No	No	No	No
MSA × Year FEs	No	No	Yes	Yes	Yes	Yes
MSA × Owner FEs	No	No	Yes	Yes	Yes	Yes
Owner × Year FEs	No	No	Yes	Yes	Yes	Yes
R-squared	0.05	0.08	0.13	0.31	0.20	0.32
Observations	16,013	5,536	18,783	2,315	10,689	5,170

Notes: The table reports estimates of individual propensity to engage in religious and spiritual activities. '*Religious and spiritual activities*' denotes time spent on activities associated with membership in or identification with specific religions or denominations, such as attending religious services, participating in choirs, youth groups, orchestras, or unpaid teaching, as well as on personal religious practices, such as praying. '*Owner*' is a dummy variable equal to 1 if the respondent is a homeowner rather than a renter. '*HPI*' denotes an MSA-wide house-price index. All regressions include all individual controls and interactions from Table 2. For variable definitions, see Table 1. The sample includes: individuals who own the residential property they live in (column (1)); individuals who rent the residential property they live in (column (2)); individuals who lived in their current residence a year ago (column (3)); individuals who in the past year moved into their current residence from within state, from another state, or from abroad (column (4)); individuals who were interviewed about their daily activities on Saturday or Sunday (column (5)); and individuals who were interviewed about their daily activities on Sunday (column (6)). Time-allocation data come from the ATUS, demographic data come from the IPUMS-CPS, and data on HPI come from the FHFA. The sample period is 2003–2012. The model is estimated using OLS. All regressions use sampling weights that adjust the sample to be representative of the population. All regressions include fixed effects as specified. Standard errors clustered at the MSA level are included in parentheses, where ***, **, and * indicate significance at the 1, 5, and 10 percent statistical level, respectively.

To do so, we in turn replace the dependent variable in Equation (1) with variables that capture the whole spectrum of human activities (following the classification in (Aguiar et al., 2013)), excluding the ones we have studied so far: 'educational activities', which denotes time spent taking classes for a degree, certification, or licensure (including taking internet or other distance-learning courses), time spent doing research and homework, and time spent taking care of administrative tasks related to education (such as registering for classes or obtaining a school ID); 'market work', which includes all time spent working in the market sector on main jobs, second jobs, and overtime, as well as any time spent commuting to or from work and time spent on work related meals and activities; 'other income-generating activities', which includes all time spent on activities such as hobbies, crafts, food preparation, and performances that generate income, and the time spent on income-generating services such as babysitting and home improvements for pay; 'job search', which includes all time spent by the individual searching for a job; 'child care', which

Table 5
Housing booms, home ownership, and other activities.

Panel A. All other activities

	Educational activities	Market work	Other income-generating activities	Job search	Child care	Non-market work	Leisure
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Owner × HPI	0.077*	0.098	-2.682*	-0.016	-0.014	-0.002	-0.024
	(0.042)	(0.141)	(1.516)	(0.021)	(0.037)	(0.108)	(0.160)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls × HPI	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MSA × Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MSA × Owner FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Owner × Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.16	0.20	0.09	0.09	0.21	0.17	0.16
Observations	21,529	21,529	21,529	21,529	21,529	21,529	21,529

Panel B. Non-market work

	Core home production	Home-ownership activities	Getting goods and services	Care for others
	(1)	(2)	(3)	(4)
Owner × HPI	-0.102*	0.088**	0.096*	-0.051
	(0.058)	(0.044)	(0.064)	(0.038)
Individual controls	Yes	Yes	Yes	Yes
Individual controls × HPI	Yes	Yes	Yes	Yes
MSA × Year FEs	Yes	Yes	Yes	Yes
MSA × Owner FEs	Yes	Yes	Yes	Yes
Owner × Year FEs	Yes	Yes	Yes	Yes
R-squared	0.21	0.13	0.11	0.10
Observations	21,529	21,529	21,529	21,529

Panel C. Leisure

	Sleeping	TV watching	Eating and drinking	Personal care	Entertainment and sports	Socializing
	(1)	(2)	(3)	(4)	(5)	(6)
Owner × HPI	-0.129	-0.244*	-0.003	0.103***	0.107**	0.096
	(0.084)	(0.127)	(0.036)	(0.034)	(0.047)	(0.075)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls × HPI	Yes	Yes	Yes	Yes	Yes	Yes
MSA × Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
MSA × Owner FEs	Yes	Yes	Yes	Yes	Yes	Yes
Owner × Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.14	0.22	0.14	0.12	0.11	0.11
Observations	21,529	21,529	21,529	21,529	21,529	21,529

Notes: The table reports estimates of individual propensity to engage in various activities unrelated to religious or other social capital. '*Educational activities*' denotes time spent taking classes for a degree or for personal interest (including taking Internet or other distance-learning courses), time spent doing research and homework, and time spent taking care of administrative tasks related to education (such as registering for classes or obtaining a school ID). '*Market work*' denotes time spent working in the market sector on main jobs, second jobs, and overtime, as well as any time spent commuting to or from work and time spent on work related meals and activities. '*Other income-generating activities*' denotes time spent on activities such as hobbies, crafts, food preparation, and performances that generate income, and the time spent on income-generating services such as babysitting and home improvements for pay. '*Job search*' denotes time spent by the individual searching for a job. '*Child care*' denotes time spent by the individual caring for, educating, or playing with their children. '*Non-market work*' denotes core home production, activities related to home ownership, obtaining goods and services, and care for other adults. '*Leisure*' denotes the remaining time individuals spend that is not on market work, non-market work, job search, child care, or socializing / religious participation. '*Core home production*' denotes time spent on activities such as cooking, cleaning, and laundry. '*Home-ownership activities*' denotes time spent on activities such as household repairs, time spent on exterior and interior cleaning and improvements, garden and lawn care, and household financial management. '*Getting goods and services*' denotes time spent on obtaining any goods or services, excluding medical care, education, and restaurant meals. '*Care for others*' denotes time spent on activities such as supervising and caring for other adults, preparing meals and shopping for other adults, helping other adults around the house with cleaning and maintenance, and transporting other adults to doctors' offices and grocery stores. '*Owner*' is a dummy variable equal to 1 if the respondent is a homeowner rather than a renter. '*HPI*' denotes an MSA-wide house-price index. All regressions include all individual controls and interactions from Table 2. For variable definitions, see Table 1. Time-allocation data come from the ATUS, demographic data come from the IPUMS-CPS, and data on HPI come from the FHFA. The sample period is 2003–2012. The model is estimated using OLS. All regressions use sampling weights that adjust the sample to be representative of the population. All regressions include fixed effects as specified. Standard errors clustered at the MSA level are included in parentheses, where ***, **, and * indicate significance at the 1, 5, and 10 percent statistical level, respectively.

measures all time spent by the individual caring for, educating, or playing with their children; 'non-market work', which consists of core home production, activities related to homeownership, obtaining goods and services, and taking care of other adults; and 'leisure', which is comprised of sleeping, TV watching, eating and drinking, personal care, entertainment and sports, and socializing.[12]

The evidence presented in column (1) suggests that a two-standard-deviation increase in house prices is associated with an *increase* in time spent on education activities by about 5.1 minutes per day. Given a sample mean of 9.5, this constitutes an increase of 54%. We then conclude that the negative wealth effect we document in Table 2 is specific to religious activities but not to human capital. If anything, the two appear to be substitutes. This is an important finding because human capital has a positive impact both on individual income and on aggregate growth.[13]

We also observe that an increase in house prices has a statistically significant negative effect on other-income generating activities for homeowners relative to renters (column (3)). This suggests that higher housing wealth may reduce the need to acquire income outside of the workplace. At the same time, changes in house prices do not affect the time spent on market work (column (2)), job search (column (4)), child care (column (5)), non-market work (column (6)), or leisure (column (7)). Given that all of these are traditionally considered "normal" goods, the evidence suggests that the increase in housing wealth we utilize throughout the analysis is not a pure wealth shock.

In Panels B and C, we dig deeper into the components of non-market work and leisure, respectively. In column (2) of Panel B, it can be seen that a positive housing wealth shock has a significant (at the 5% level) positive effect on 'homeownership activities' (such as household repairs, time spent on exterior and interior cleaning and improvements, garden and lawn care, and household financial management). In column (3) of Panel B, it can be seen that the same is true in the case of 'getting goods and services' (obtaining any goods or services, excluding medical care, education, and restaurant meals). The impact on the remaining variables (shopping and care) is not significant. When considering the components of leisure, we observe that an increase in housing wealth is associated with an increase in time spent on 'personal care' and 'entertainment and sports' (columns (4) and (5) of Panel C).

The evidence presented in Table 5 thus suggests that, for homeowners as opposed to renters, an increase in property values increases the time spent on activities associated with either investments in the individual or the now-more-valuable asset, or the consumption of leisure time. An increase in property prices therefore appears to be both a wealth shock (as time spent on education, shopping, and leisure go up) and a shock that increases the attractiveness of (or return to) the residential asset (as time spent on homeownership activities goes up). Remarkably, religious participation is the only activity related to the accumulation of social or human capital that declines as the demand for time spent on or in the residence increases. We can thus conclude that the accumulation of religious capital is a peculiar social activity, the demand for which declines with wealth and with the rising value of the home.

4.5. Heterogeneous effects

4.5.1. Individual heterogeneity

To further investigate the drivers of our main result—the decline in time spent on religious activities in response to rising property prices—in Tables 6 and 7 we explore individual and MSA-level heterogeneity. In Table 6, we estimate Equation (1) using OLS, where we include additional triple interactions of $Owner \times HPI \times Z$, where Z is a control variable of interest. We consider the interactions of $Owner \times HPI$ with variables that have empirically been demonstrated to explain variations in religiosity (e.g., see Iannaccone (1998)), namely proxies for the individual's age, disability, race, gender, marital status and fertility, and income. Note that we still include all of the covariates and all of the interaction terms of HPI with all of the covariates from Table 2.

In column (1), we include triple interactions with 'age' and 'age squared'. Both coefficients are statistically indistinguishable from zero, suggesting that age does not play a role in the decision to reallocate time away from religious activities in response to a positive housing wealth shock.

In column (2), we include the triple interaction with the dummy variable 'disabled'. The coefficient on $Owner \times HPI$ stays statistically significant at the 5% level and has approximately the same magnitude as in our baseline specification in Table 2 in column (2). The coefficient on $Owner \times HPI \times Disabled$ is positive, suggesting that a positive wealth shock decreases religious participation less for disabled people. This result can be seen as evidence for the consumption motive for religiosity, that is, deriving hope to be helped in the current life.[14] The result could also be seen as evidence for the social motive for a group of the population that might depend relatively more on the social benefits of religious participation. However, while economically meaningful, the coefficient is insignificant from zero in the statistical sense.

In column (3), it can be observed that an increase in housing wealth reduces time spent on religious and spiritual activities relatively more for Black individuals. This finding is insightful because one limitation of our data is that we do not know the respondent's religious affiliation. As a result, the coefficient on $Owner \times HPI$ measures an average effect over the entire population in the US. One resulting concern is that due to sorting into religious groups, a positive housing wealth shock decreases religious participation for some denominations, while increasing it for others (e.g., as in Buser, 2015). The negative coefficient in column (3) thus provides tentative evidence that those individuals belonging to the religious group 'Black Protestant' may be most sensitive to changes in housing wealth.

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[12] See Table 1, Panel A, for summary statistics on these time-allocation variables.

[13] See, for example, Mincer (1970, 1974); Card (1999); Hanushek and Woessmann (2008); Jackson et al. (2016); Harmon et al. (2003); Gennaioli et al. (2013, 2014); Mankiw et al. (1992); Barro and McCleary (2005); Galor (2011).

[14] This motive is different from the salvation motive which is about salvation in the afterlife.

Table 6
Housing booms, home ownership, and religious and spiritual activities: Individual heterogeneity.

	Religious and spiritual activities					
	(1)	(2)	(3)	(4)	(5)	(6)
Owner × HPI	0.010	-0.058**	-0.039*	-0.023	-0.055**	-0.593***
	(0.176)	(0.026)	(0.023)	(0.035)	(0.025)	(0.190)
Owner × HPI × Age	-0.001					
	(0.008)					
Owner × HPI × Age squared	-0.000					
	(0.000)					
Owner × HPI × Disabled		0.080				
		(0.096)				
Owner × HPI × Black			-0.174*			
			(0.098)			
Owner × HPI × Female				-0.053		
				(0.047)		
Owner × HPI × Married with children					0.006	
					(0.029)	
Owner × HPI × Log (Total household income)						0.051***
						(0.018)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls × HPI	Yes	Yes	Yes	Yes	Yes	Yes
Double interactions	Yes	Yes	Yes	Yes	Yes	Yes
MSA × Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
MSA × Owner FEs	Yes	Yes	Yes	Yes	Yes	Yes
Owner × Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.12	0.12	0.12	0.12	0.12	0.12
Observations	21,529	21,529	21,529	21,529	21,529	21,529

Notes: The table reports estimates of individual propensity to engage in religious and spiritual activities. '*Religious and spiritual activities*' denotes time spent on activities associated with membership in or identification with specific religions or denominations, such as attending religious services, participating in choirs, youth groups, orchestras, or unpaid teaching, as well as on personal religious practices, such as praying. '*Owner*' is a dummy variable equal to 1 if the respondent is a homeowner rather than a renter. '*HPI*' denotes an MSA-wide house-price index. '*Age*' denotes the respondent's age, in years. '*Age squared*' denotes the square of the respondent's age, in years. '*Disabled*' is a dummy variable equal to 1 if the respondent claims a health disability. '*Black*' is a dummy variable equal to 1 if the respondent is black. '*Female*' is a dummy variable equal to 1 if the respondent is a female. '*Married with children*' is a dummy variable equal to 1 if the respondent is married and has children younger than 18 living at home. '*Total household income* ('000*s*)' is total household income in '000 of USD. All regressions include all individual controls and interactions from Table 2. For variable definitions, see Table 1. Time-allocation data come from the ATUS, demographic data come from the IPUMS-CPS, and data on HPI come from the FHFA. The sample period is 2003–2012. The model is estimated using OLS. All regressions use sampling weights that adjust the sample to be representative of the population. All regressions include fixed effects as specified. Standard errors clustered at the MSA level are included in parentheses, where ***, **, and * indicate significance at the 1, 5, and 10 percent statistical level, respectively.

In columns (4) to (5), we include the triple interactions of $Owner \times HPI$ with the dummies 'female' and 'married with children', indicating whether the individual is female and/or married with children, respectively. The estimated coefficients are not statistically significantly different from zero. This means that our baseline results are not driven by heterogeneity along these dimensions, for example because of decreased enrollment in religious private schools (and associated Sunday attendance for the related religious service) when the property tax base improves.

In column (6), we include the triple interaction $Owner \times HPI \times Log$ (*Total Household Income*) in our regression. The coefficient on $Owner \times HPI$ stays statistically significant at the 1% level. The coefficient on $Owner \times HPI \times Log$ (*Total Household Income*) is positive and statistically different from zero at the 1% statistical level. This finding indicates that poorer homeowners decrease their religious participation by relatively more in response to a positive housing wealth shock. This suggests a social function of religion that can explain the relatively higher decrease in religious participation by poorer (more constrained) households caused by the positive wealth shock. Therefore, one interpretation of this result is that part of the decline in religious participation that we observe must be of a social form that is related, for example, to social insurance. Alternatively, these heterogeneous effects could also be driven by the consumption motive. Due to the positive wealth shock, formerly credit-constrained individuals can now afford something that gives them more utility than religious participation, so they substitute away from religion.

4.5.2. Regional heterogeneity

In Table 7, we explore MSA and state-level heterogeneity to shed further light on the mechanisms behind our results. We estimate Equation (1) through OLS, where we include additional triple interactions $Owner \times HPI \times Z$, where Z is an MSA or state-level characteristic. We consider characteristics such as racial homogeneity, income inequality, and religious fractionalization. In column (1), we include the triple interaction $Owner \times HPI \times Share$ *white*, where 'Share white' is the (time-varying) share of White respondents in the MSA (from the CPS). We find that the decline in time spent on religious and spiritual activities following an increase in housing wealth is lower in MSAs with a relatively higher share of White individuals. This complements the evidence in column (3) of Table 6 that Black individuals' religiosity on the time-intensive margin is more sensitive to changes in housing wealth.

Table 7

Housing booms, home ownership, and religious and spiritual activities: Regional heterogeneity.

	Religious and spiritual activities			
	(1)	(2)	(3)	(4)
Owner × HPI	-0.454**	0.017	0.081	-0.070*
	(0.183)	(0.051)	(0.201)	(0.045)
Owner × HPI × Share white	0.477**			
	(0.220)			
Owner × HPI × Income distribution skewness		-0.023*		
		(0.014)		
Owner × HPI × Religion HHI			-0.437	
			(0.643)	
Owner × HPI × Dominant Catholic				0.022
				(0.049)
Individual controls	Yes	Yes	Yes	Yes
Individual controls × HPI	Yes	Yes	Yes	Yes
Double interactions	Yes	Yes	Yes	Yes
MSA × Year FEs	Yes	Yes	Yes	Yes
MSA × Owner FEs	Yes	Yes	Yes	Yes
Owner × Year FEs	Yes	Yes	Yes	Yes
R-squared	0.12	0.12	0.12	0.12
Observations	21,529	21,529	21,529	21,529

Notes: The table reports estimates of individual propensity to engage in religious and spiritual activities. '*Religious and spiritual activities*' denotes time spent on activities associated with membership in or identification with specific religions or denominations, such as attending religious services, participating in choirs, youth groups, orchestras, or unpaid teaching, as well as on personal religious practices, such as praying. '*Owner*' is a dummy variable equal to 1 if the respondent is a homeowner rather than a renter. '*HPI*' denotes an MSA-wide house-price index. '*Share white*' is the percentage of individuals who identify themselves as white in a particular MSA over the sample period. '*Income distribution skewness*' is the skewness of the distribution of total household income in a particular MSA over the sample period. '*Religion HHI*' is a Herfindahl-Hirschmann index of religious affiliations in an MSA. '*Dominant Catholic*' is a dummy variable equal to 1 if Catholic is the majority religious denomination in the MSA. All regressions include all individual controls and interactions from Table 2. For variable definitions, see Table 1. Time-allocation data come from the ATUS, demographic data come from the IPUMS-CPS, data on HPI come from the FHFA, and data on MSA-level religious characteristics come from the 2000 Religious Congregations and Membership Study. The sample period is 2003–2012. The model is estimated using OLS. All regressions use sampling weights that adjust the sample to be representative of the population. All regressions include fixed effects as specified. Standard errors clustered at the MSA level are included in parentheses, where ***, **, and * indicate significance at the 1, 5, and 10 percent statistical level, respectively.

In column (2), we include the triple interaction *Owner × HPI × Income distribution skewness*, that is, with the skewness of the (time-varying) household income distribution in the MSA (from IPUMS-CPS). The estimated coefficient of the triple interaction is negative and statistically significant at the 10% level. Thus, the presence of a small share of very rich households is associated with a larger decline in religious participation in response to a positive wealth shock. This implies that the social-pressure motive for religious participation may be greater in MSAs with lower income inequality.

In column (3), we include the triple interaction *Owner × HPI × Religion HHI*, where 'religion HHI' is measured as the Herfindahl-Hirschmann index of religious affiliations in an MSA, using data from the 2000 Religious Congregations and Membership Study. The coefficient on the triple interaction is statistically insignificant, therefore our baseline result does not vary with the degree of religious fractionalization. This result is somewhat inconsistent with the hypothesis by Gruber (2005), who argues that the higher the share of an individual's religion in a given area, the more likely the individual is to attend church due to the social-pressure motive.

Finally, in column (4), we include the triple interaction *Owner × HPI × Dominant Catholic*, where *Dominant Catholic* is a dummy variable equal to one if the majority denomination in the MSA is Catholic (i.e., there are more Catholics than Mainstream Protestants, and more Catholics than Black Protestants), once again using data from the 2000 Religious Congregations and Membership Study. The estimated coefficient on *Owner × HPI × Dominant Catholic* is positive, suggesting that the effect of the positive wealth shock is less negative for Catholics compared to the baseline results in Table 3, column (1). This could in principle indicate that in Catholic religious communities the social pressure motive is more pronounced, and so it is not negated by an increase in wealth, or that Catholics derive more utility from church attendance, or that their beliefs in the afterlife are stronger. However, the effect, while economically meaningful, is statistically indistinguishable from zero.

5. Conclusion

We are the first to analyze and document the effect of housing price dynamics and housing wealth on the time-intensive margin of religiosity. We use data from approximately 22,000 individuals in the United States during the decade between 2003 and 2012, and exploit variations in local house prices as an exogenous shock to wealth that affects homeowners but not renters. We provide

evidence consistent with the idea that higher housing wealth is associated with a decline in time allocated to religious and spiritual activities. Our estimates imply that a two-standard-deviation increase in MSA house prices reduces the amount of time allocated to activities such as church attendance, praying, and religious education by almost one-half hour per week, corresponding to a one-third decline in the time devoted to religion.

A similar effect of a positive wealth shock on time allocation is absent for investment in other types of social capital, such as volunteering and civic participation. At the same time, the same individuals experience an increase in time allocated to education, to home-ownership activities (e.g., household repairs, exterior and interior cleaning improvements, garden and lawn care, and household financial management), to shopping, to personal care, and to consuming entertainment and sports. Our evidence suggests that the increasing value of the residential property, in combination with a positive shock to housing wealth, increases the demand for activities that have a luxury-good component, as well as the return to activities related to the residential asset, but decreases the time allocated to activities that have an inferior-good component, such as religious and spiritual activities.

We also identify a number of factors that affect the interplay between home ownership, house prices, and religiosity. For example, we observe that Black homeowners, credit-constrained homeowners, and homeowners in more income-unequal MSAs are more likely to reduce the time they spend on religious activities. This suggests that individual factors and social interactions play a role in the transmission of shocks from housing markets to time spent on religious activities. Moreover, it suggests that positive shocks to housing wealth are more relevant when the social-insurance function of religion dominates.

Declaration of competing interest

The authors declare that they have no relevant or material financial interests that relate to the research described in this paper.

Data availability

Data will be made available on request.

Appendix A

Table A.1
Housing booms, home ownership, and religiosity: Main test.

	Religious and spiritual activities				
	OLS	OLS	OLS	OLS	Probit
	(1)	(2)	(3)	(4)	(5)
Owner × HPI	-0.042**	-0.034*	-0.050**	-0.054**	-0.001**
	(0.020)	(0.020)	(0.023)	(0.025)	(0.000)
Owner	8.686**	6.852*	9.816**		
	(3.716)	(3.930)	(4.474)		
HPI	-0.001				
	(0.165)				
Age		-0.375**	-0.537	-0.548	-0.003
		(0.156)	(0.740)	(0.745)	(0.006)
Age squared		0.006***	0.007	0.008	0.000
		(0.002)	(0.008)	(0.008)	(0.000)
Female		4.041***	3.215	3.108	0.052**
		(0.771)	(3.228)	(3.243)	(0.030)
Single		1.929*	3.736	3.700	0.010
		(1.154)	(5.891)	(5.828)	(0.049)
Married		3.036***	-1.088	-1.143	-0.025
		(1.068)	(5.159)	(5.165)	(0.023)
High school or less		-0.133	-0.154	-0.170	-0.009
		(0.995)	(4.484)	(4.469)	(0.039)
College or more		3.797***	2.884	2.897	0.023
		(1.015)	(4.475)	(4.461)	(0.046)
White		-4.132***	-1.764	-1.524	-0.023
		(1.265)	(6.222)	(6.166)	(0.052)
Black		15.290***	26.295**	26.716**	0.105*
		(2.789)	(11.775)	(11.662)	(0.086)
Log (Total household income)		-0.702*	-3.082	-3.033	-0.008
		(0.437)	(2.341)	(2.320)	(0.018)
Unemployed		-0.290	-12.974	-12.676	-0.059
		(1.983)	(9.175)	(9.114)	(0.043)
Household size		1.543***	4.612***	4.630***	0.019*
		(0.373)	(1.671)	(1.664)	(0.012)
Disabled		-2.331	-7.448	-7.567	-0.045
		(1.636)	(8.410)	(8.377)	(0.057)

Table A.1 (*continued*)

	Religious and spiritual activities				
	OLS	OLS	OLS	OLS	Probit
	(1)	(2)	(3)	(4)	(5)
Migrated		2.539*	4.482	4.450	0.058
		(1.335)	(6.225)	(6.262)	(0.071)
Age × HPI			0.001	0.001	-0.000
			(0.004)	(0.004)	(0.000)
Age squared × HPI			-0.001	-0.001	0.000
			(0.001)	(0.001)	(0.000)
Female × HPI			0.005	0.005	-0.000
			(0.017)	(0.017)	(0.000)
Single × HPI			-0.010	-0.010	0.000
			(0.033)	(0.033)	(0.000)
Married × HPI			0.023	0.024	0.000
			(0.028)	(0.028)	(0.000)
High school or less × HPI			0.002	0.002	0.000
			(0.025)	(0.024)	(0.000)
College or more × HPI			0.005	0.005	0.000
			(0.026)	(0.026)	(0.000)
White × HPI			-0.014	-0.016	-0.000
			(0.031)	(0.031)	(0.000)
Black × HPI			-0.066	-0.069	-0.000
			(0.063)	(0.062)	(0.000)
Log (Total household income) × HPI			0.014	0.013	0.000
			(0.013)	(0.013)	(0.000)
Unemployed × HPI			0.073	0.072	0.000
			(0.052)	(0.052)	(0.000)
Household size × HPI			-0.018**	-0.018**	-0.000
			(0.009)	(0.008)	(0.000)
Disabled × HPI			0.030	0.031	0.000
			(0.050)	(0.049)	(0.000)
Migrated × HPI			-0.011	-0.011	-0.000
			(0.036)	(0.036)	(0.000)
MSA × Year FEs	No	Yes	Yes	Yes	Yes
MSA × Owner FEs	No	No	No	Yes	Yes
Owner × Year FEs	No	No	No	Yes	Yes
R-squared	0.01	0.12	0.12	0.12	0.13
Observations	21,938	21,529	21,529	21,529	18,024

Notes: The table reports estimates of individual propensity to engage in religious and spiritual activities. '*Religious and spiritual activities*' denotes time spent on activities associated with membership in or identification with specific religions or denominations, such as attending religious services, participating in choirs, youth groups, orchestras, or unpaid teaching, as well as on personal religious practices, such as praying. '*Owner*' is a dummy variable equal to 1 if the respondent is a homeowner rather than a renter. '*HPI*' denotes an MSA-wide house-price index. For the rest of the variable definitions, see Table 1. Time-allocation data come from the ATUS, demographic data come from the IPUMS-CPS, and data on HPI come from the FHFA. The sample period is 2003–2012. The model is estimated using OLS (columns (1)–(4)) and Probit (column (5)). All regressions use sampling weights that adjust the sample to be representative of the population. All regressions include fixed effects as specified. Standard errors clustered at the MSA level are included in parentheses, where ***, **, and * indicate significance at the 1, 5, and 10 percent statistical level, respectively.

Table A.2
Time spent on religious activities and donations to religious organizations.

Year	All households	Owners	Renters
2003	-0.003 (0.761)	-0.007 (0.620)	0.002 (0.911)
2005	0.008 (0.504)	0.022 (0.130)	-0.001 (0.973)

Notes: This table shows the annual pairwise correlation coefficient between the time spent (in total hours per annum) on religious activities (for household head, and on regular activities) (variable M15E) and the total amount of financial donations (dollar amount er annum) to religious organizations (variable M2A), based on PSID survey data for the years 2003 and 2005, both for the total number of households and separately for owners and renters (based on the response to question A19 indicating whether the households owns or rents their main residence). P-value of statistical significance indicated between brackets). PSID data on donations is available since 2001 but data on time spent on religious activities is available only for the years 2003 and 2005. For details of the PSID data see https://psidonline.isr.umich.edu/default.aspx.

Table A.3

Owners vs. renters, 2003 vs. 2007.

Panel A. Low-house-price-growth MSAs

	Religious and spiritual activities		
	Renters	Owners	Difference
2003	15.33	15.32	0.01
2007	14.62	15.30	-0.68
Difference	0.71	0.02	

Panel B. High-house-price-growth MSAs

	Religious and spiritual activities		
	Renters	Owners	Difference
2003	10.41	11.45	-1.04
2007	14.83	9.92	4.91**
Difference	-4.42	1.53	

Notes: The table reports means for owners and renters, in 2003 and in 2007, in low- and high-house-price-growth MSAs, as well as a two-sided Mann-Whitney test of differences-in-means. '*Religious and spiritual activities*' denotes time spent on activities associated with membership in or identification with specific religions or denominations, such as attending religious services, participating in choirs, youth groups, orchestras, or unpaid teaching, as well as on personal religious practices, such as praying. '*Owner*' is a dummy variable equal to 1 if the respondent is a homeowner rather than a renter. '*Renter*' is a dummy variable equal to 1 if the respondent is a renter rather than a homeowner. '*Low-house-price-growth MSAs*' are MSAs with below-median house price growth between 2003 and 2007. '*High-house-price-growth MSAs*' are MSAs with above-median house price growth between 2003 and 2007. ***, **, and * indicate significance at the 1, 5, and 10 percent statistical level, respectively.

Table A.4

Housing booms, home ownership, and religiosity: Outliers.

	Religious and spiritual activities			
	(1)	(2)	(3)	(4)
Owner × HPI	-0.030**	-0.018*	-0.058**	-0.091**
	(0.016)	(0.010)	(0.029)	(0.042)
Individual controls	Yes	Yes	Yes	Yes
Individual controls × HPI	Yes	Yes	Yes	Yes
MSA × Year FEs	Yes	Yes	Yes	Yes
MSA × Owner FEs	Yes	Yes	Yes	Yes
Owner × Year FEs	Yes	Yes	Yes	Yes
R-squared	0.13	0.12	0.12	0.12
Observations	21,291	20,492	21,115	19,512

Notes: The table reports estimates of individual propensity to engage in religious and spiritual activities. '*Religious and spiritual activities*' denotes time spent on activities associated with membership in or identification with specific religions or denominations, such as attending religious services, participating in choirs, youth groups, orchestras, or unpaid teaching, as well as on personal religious practices, such as praying. '*Owner*' is a dummy variable equal to 1 if the respondent is a homeowner rather than a renter. '*HPI*' denotes an MSA-wide house-price index. For the rest of the variable definitions, see Table 1. Time-allocation data come from the ATUS, demographic data come from the IPUMS-CPS, and data on HPI come from the FHFA. The sample period is 2003–2012. The model is estimated using OLS. In column (1), we exclude the top 1% of observations in terms of time spent on religious and spiritual activities. In column (2), we exclude the top 5% of observations in terms of time spent on religious and spiritual activities. In column (3), we exclude the top and bottom 1% of observations in terms of HPI. In column (4), we exclude the top and bottom 5% of observations in terms of HPI. All regressions use sampling weights that adjust the sample to be representative of the population. All regressions include fixed effects as specified. Standard errors clustered at the MSA level are included in parentheses, where ***, **, and * indicate significance at the 1, 5, and 10 percent statistical level, respectively.

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