Having Faith in Your Trade: Mutual Fund Risk-Taking and Local Religious Beliefs

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Abstract

We examine the relations between mutual fund risk-taking behaviors and local religious beliefs. We find that funds located in regions with lower Protestant population or higher Catholic population tend to have higher volatilities of fund returns, consistent with Protestants (Catholics) being more (less) risk-averse compared to general population. The variation in systematic risk exposures explains only a small portion of this difference as we observe a similar pattern in idiosyncratic portfolio risks. We also find that intra-year increases in fund volatility associated with tournament-like competition exist only in mutual funds located in areas with lower Protestant or higher Catholic population. After controlling for exposures to common risk factors, we find little evidence that higher return volatility is rewarded with higher returns. Funds located in lower Protestant population areas also appear to trade more frequently and have more positive return gaps. Overall, our findings suggest that the level of risk-taking by mutual fund managers varies reliably with local religious beliefs.

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Economists have long found that religious beliefs influence a wide range of human behaviors such as marriage, divorce, alcohol consumption, crime, etc.[1] Not until recently have financial researchers started to explore the relations between local religious beliefs and financial decisions, such as corporate policies (Hilary and Hui (2009)), corporate unethical behaviors (Grullon, Kanatas and Weston (2009)), and investment decisions (Kumar (2009), Kumar, Page and Spalt (2009)).[2] Collectively, evidence from this research indicates that religion appears to be a non-negligible force that influences economic outcomes in modern society. Our study contributes to this growing literature by examining the relation between local religious beliefs and the level of risk-taking by mutual funds.

We expect that geographical heterogeneity in religious beliefs affects mutual fund risk-taking behaviors because extant research has shown strong associations between religious beliefs and risk aversion.[3] Among other studies, Barsky et al. (1997) quantify individual risk aversion of survey respondents and find strong evidence that Protestants tend to have a higher risk aversion than the average population, while Catholics are more risk tolerant than the average population.[4] To the extent that mutual fund culture is influenced by the risk attitude reflected in local religious beliefs, mutual fund's risk-taking behavior should vary with local religious beliefs.

However, it is not obvious that we should observe a reliable relationship between local religious beliefs and the risk-taking behaviors of mutual fund managers. Mutual fund managers are professional investors who face stiff competition from other professional investors with a

[1] An incomplete list of papers include Bainbridge (1989), Cochran and Akers (1989), Heaton and Pratt (1990), Thornton et al. (1992), Lehrer and Chiswick (1993), Evans et al. (1995). These studies examine the effects of religious beliefs on various outcomes such as suicide, drug and alcohol consumption, crime participation, marriage, divorce, and extra-marital sex.

[2] Earlier international studies (e.g., La Porta et al. (1999), Stulz and Williamson (2003), Barro and McCleary (2003), and Guiso et al. (2003)) provide empirical evidence on the effects of religion belief of a country on its macro economic development.

[3] For example, Miller and Hoffmann (1995), Osoba (2004), Diaz (2000), Halek and Eisenhauer (2001), and Dehejia et al. (2007) find evidence that religious belief is related to attitudes towards risk, gambling, and preferences of income stream volatility.

[4] Using a survey methodology, Barsky et al. (1997) document the following risk-tolerance measure averages (in ascending order, a higher measure corresponds to a higher risk tolerance): 0.2350 for Protestant population, 0.2412 for unconditional average population, and 0.2514 for Catholic population.

variety of local religious beliefs. In particular, mutual fund managers have strong incentives to deliver good performance on a consistent basis. Risk-taking increases the probably of reporting a big loss as well as a large tracking error, and strategies of high volatility without a corresponding increase in returns are suboptimal and should be eliminated by competition.

Using a large sample of 1,621 distinct growth and aggressive growth mutual funds over 21 years from 1988–2008, we examine empirical relations between county-level religiosity ratios and return properties of mutual funds domiciled in that county. Our county-level measures of religious beliefs are derived from American Religion Data Archive, calculated as percentages of population in a county that are Protestants (Protestant ratio) and Catholics (Catholic ratio). Based on the findings in Barsky et al. (1997) that Protestants are more risk averse than the average population while Catholics are less risk averse than the average population, we predict that mutual funds located in areas with high Protestant ratios or low Catholic ratios exhibit risk and return features consistent with a higher degree of risk-aversion.

We first investigate fund risk across religiosity ratios. We predict that funds located in regions with higher Protestant population or lower Catholic population to have lower fund return volatilities. We sort funds on religiosity ratios, and find that total fund return volatility is decreasing in Protestant ratios and increasing in Catholic ratios.[5] Decomposing total volatility into systematic volatility (due to exposure to risk factors) and idiosyncratic volatility, we further find that the total volatility pattern largely results from the difference in idiosyncratic portfolio volatility. For example, total and idiosyncratic monthly return volatilities for funds in the top quintile of Protestant ratio are 0.28 and 0.20 percentage points higher than those in the bottom quintile. In terms of economic magnitude, these differences translate to about 15 percent and 20 percent of the sample standard deviation of total and idiosyncratic volatilities of fund returns,

[5] Due to the dichotomy between Protestants and Catholics in terms of risk aversion, the level of risk aversion may not increase with overall religiosity in general. We repeat all the tests in our paper with total religiosity ratio and find merely weak or no relations between total religiosity ratio and mutual fund risk and return.

respectively. In addition, these differences are larger in small funds and old funds, but quite persistent over time. These results are robust when we estimate multivariate regressions that control for a broad set of fund characteristics and county-level demographic variables.

We further investigate whether intra-year changes in fund volatility resulting from tournament-like competition are associated with local religious beliefs. Brown, Harlow and Starks (1996) and Chevalier and Ellison (1997) suggest that mid-year winners and losers have different incentives to take risk in the rest of the year due to compensation-performance linkage or the convexity in fund flow-performance relation. In particular, both studies find that funds that have performed poorly in the first half of a calendar year have an incentive to increase portfolio risk in the rest of the year to improve their annual performance. A recent study by Chen and Pennacchi (2009) finds that in the more recent periods, tournament-like competition appears to take the form of funds increasing the volatility of tracking errors (i.e., volatility of style-adjusted fund returns). We find that funds located in regions with low Protestant ratios or high Catholic ratios exhibit a strong tournament risk-taking behavior in terms of tracking errors, while funds located in regions with high Protestant ratios and low Catholic ratios exhibit no such tournament risk-taking behavior.

Given our findings that funds' risk-taking behavior is associated with religiosity, it is natural to examine whether the elevated level of risk is rewarded with higher returns. We find that funds in the top quintile of Protestant ratios underperform those in the bottom quintile by about one percent in annualized return. This return difference can be explained by the lower factor loadings of Protestant funds on size and growth premia (SMB and HML). These findings are robust in a multivariate regression setting that controls for fund characteristics and demographic variables. After controlling for the common risk factors, any elevated risk associated with religiosity is unassociated with higher returns, suggesting that the higher idiosyncratic risk exposure of funds in regions with low Protestant population is not compensated by higher returns. Likewise, we find little variation in four-factor alphas across fund portfolios sorted on Catholic ratios.

Financial researchers have long examined the variation in mutual fund turnovers.[6] If local religious belief is related to risk aversion of fund managers and, in turn, how aggressively they trade, then turnover may be related to local religious ratios. We expect that, everything else equal, funds located in counties with high Protestant ratios or low Catholic ratios trade less frequently. We find that this is indeed the case: fund turnovers decrease in Protestant ratios but increase in Catholic ratios. For example, annual turnover ratio is 0.79 for funds in the top quintile of Protestant ratio (i.e., they turn their holdings over 0.79 times per year) but 1.09 for funds in the bottom quintile. Again, these results are robust in regressions that control for fund characteristics and a broad set of demographic variables.

Finally, we examine the potential variation in "return gap" attributable to local religious beliefs. Kacperczyk, Sialm and Zheng (2008) define return gap as the difference between actual fund return and the return implied from its previously disclosed holdings and find that return gap is persistent over time and is a good predictor of future fund returns. However, the sources of return gap have not been completely identified.[7] Kacperczyk et al. (2008) point out that return gap could be caused by profitable interim trading within quarter. If the gap is caused by profitable interim trading, return gap should be positively related to fund turnover. It follows that with a lower propensity to trade, funds with high Protestant ratios (or low Catholic ratios) should have a smaller (greater) return gap.

We examine return gap sorted on religiosity ratios and find that return gap decreases in Protestant ratio. For example, monthly return gap is 4.61 basis points for funds in the top quintile but -1.70 basis points for funds in the bottom quintile. The difference is both statistically and economically significant: the 6.31 basis points difference is almost 40% of the difference between funds in the top and bottom quintiles of past return gap (about 16-17 bps, as reported in Table 3 of Kacperczyk et al. (2008)). This relation is robust in regressions that control for fund

[6] Grinblatt and Titman (1989), Carhart (1997), and Chen, Jegadeesh, and Wermers (2000) investigate mutual fund turnover and find mixed evidence on its relation with fund returns.
[7] For example, Ding and Wermers (2009) associate return gap with mutual fund governance.

characteristics and demographic variables. In the meantime, we find only weak and insignificantly positive relation between return gap and Catholic ratios.

Overall, we show that funds located in areas with lower Protestant (or higher Catholic) populations exhibit greater total and idiosyncratic return volatility and higher portfolio turnovers. In addition, we find no evidence that religious beliefs are associated with risk-adjusted return. Our paper is the first to thoroughly investigate the relation between religious beliefs and risk-taking behaviors of mutual fund managers. Providing evidence on how local religious beliefs affect risk-taking is important for at least three reasons. First, fund volatility is an important determinant of investment allocation. For example, Sirri and Tufano (1998) find a negative association between fund flows and fund return volatility. Our study provides a new important determinant of fund volatility. Second, we add new evidence to the debate on the existence of tournament risk-taking behavior (e.g., Busse 2001). While prior studies focus only on testing intra-year increases in volatility conditional on mid-year performance, we provide a strong evidence for tournament behavior by showing that the strength of tournament risk-taking behavior is a function of proxies of risk-aversion. Third, we provide evidence that risk-taking behavior is a potentially important determinant of mutual fund return gap. For example, our finding suggests that the persistence in return gap may be partially driven by the reluctance of "Protestant funds" to take on the additional risks associated with higher frequency trading strategies.

Current literature shows that characteristics of mutual fund managers affect their behaviors. For example, Chevalier and Ellison (1999a) document that younger managers have stronger incentives to avoid unsystematic risk. Greenwood and Nagel (2008) show that young managers buy more technology stocks than old managers during the technology bubble. Chevalier and Ellison (1999b) show that managers from high-SAT schools tend to hold less idiosyncratic risk and that there are no significant differences in the idiosyncratic risk holdings of MBA and non-MBA managers. We contribute to this line of literature by showing that local religious beliefs,

relatively exogenous proxies of risk tolerance, are also important determinants of the behaviors of mutual fund managers.

Finally, our study adds to the mutual fund location literature. Prior studies primarily focus on the information advantages of a fund due to its *relative* location to its holdings (e.g., Coval and Moskowitz (2001), Sulaeman (2009)). We show that the location of a fund itself is important because the fund's risk-taking behavior is potentially influenced by local religious beliefs.

The closest work to our study is Kumar et al. (2009) which provides evidence that *institutional* investors located in regions with a higher Catholic population relative to Protestant population exhibit a greater propensity to hold stocks with "lottery" features. Our paper differs from their work in that: 1) Our focus is on mutual funds as opposed to all institutional investors. While mutual funds make up a large part of the institutional investor sample, fund managers' behaviors can differ significantly from other institutional investors due to the unique features of their compensation scheme and performance evaluation; 2) We investigate risk-taking behaviors more closely by examining portfolio-level volatility of mutual fund returns as opposed to examining their selection of stocks with specific characteristics. This is a subtle and yet particularly important distinction as a portfolio comprising a high proportion of high idiosyncratic volatility stocks does not necessarily have a high volatility or a high idiosyncratic volatility; and 3) In addition to volatility, we examine a wide spectrum of other indicators of mutual funds' risk-taking tendencies such as factor loadings, turnover, tournament behavior, and return gap.

The rest of the paper is organized as follows. In the next section, we discuss and summarize our data. In Section II, we analyze volatility as a function of religious beliefs. In Section III, we analyze the tournament behavior of mutual funds as a function of religious beliefs. We discuss our analysis of raw returns, alphas, and factor loadings in section IV. In section V, we analyze fund turnover and return gap as a function of religious beliefs. We conclude in section VI.

I. Data and Sample Construction

A. Data Sources

Our sample consists of two main components: 1) county-level data on religious beliefs, and 2) mutual fund data. We obtain data on religious beliefs from the American Religion Data Archive (ARDA) which is used by other studies such as Hillary and Hui (2009) and Kumar (2009). ARDA data are constructed based on three surveys in 1980, 1990, and 2000, which include 111, 133, and 149 Judeo-Christian church bodies, respectively. Each survey provides county-level data on the total number of adherents of each church, and we scale our religiosity variables by total population of the county. Specifically, we construct the *Protestant Ratio* (*Catholic Ratio*, *Total Religiosity Ratio*) by adding up the numbers of adherents of Protestant denominations (Catholic denominations, all religious denominations) within a county, and dividing it by the total population of the county.[8] We calculate religiosity ratios for each survey year (1980, 1990, 2000), and follow the literature (Alesina and La Ferrara (2002), Hilary and Hui (2009), Kumar, Page and Spalt (2009)) to linearly interpolate the religiosity ratios to the non-survey years during 1981–1999. We apply the religiosity ratios in 2000 for the 2001–2008 period.

We hand-collect the mutual fund location data from Nelson's Directories of Investment Managers for the years of 1988, 1994, 2000 and 2007. To avoid survivorship bias, we apply location data to subsequent fund-year observations until new data are collected (e.g., location data of 1988 are applied to 1989–1993). After obtaining the county location information for each fund, we assign the domicile county's religiosity ratio to the fund.[9] In a small number of cases, a

[8] ARDA classify congregations into five groups: Catholics, Evangelical Protestants, Mainline Protestants, Orthodox, and other groups. We combine Evangelical Protestants and Mainline Protestants to form the group of Protestant congregations.

[9] Our data on mutual fund locations contain zip code for each fund in the years 1988, 1996, and 2000, and longitudes and latitudes coordinates for each fund in the year 2007. For 1988, 1996, and 2000, we match zip codes with counties using the geographic file from the SAS data library. For the year 2007, we first obtain the longitudes and latitudes of counties from the Census 2000 Gazetteer File. We then match each fund to the county that has the shortest geographic distance from the longitude and latitude of the fund location.

fund is managed by more than one management companies located in different regions, in which case we use the simple averages of religiosity ratios.

We obtain fund-level returns data from CRSP Survivor-Bias-Free US Mutual Fund database. We merge fund returns data from the Center for Research in Security Prices (CRSP) with fund holdings data from Thomson Reuters Mutual Fund Holdings database using the linkage files from Wharton Research Data Services. To ensure that the funds in our sample are actively managed equity funds, we include only funds whose objectives are identified by Thomson Reuters as growth (Investment Objective Code = 2) or aggressive growth (Investment Objective Code = 3). Some of our tests use the return gap measures proposed by Kacperczyk et al. (2008) which we obtained from the authors.[10]

We control for a broad set of demographic variables in the paper. Specifically, we obtain the following county-level demographic variables from the US Census Bureau. *Age* is the median age of the county population. *Education* is the fraction of the population over 25-years-old holding a bachelor's degree or higher. *Income* is the per capita personal income. *Population* is the total county population. *Minority* is the fraction of the minority populations in the total county population. *Married* is the fraction of married households in total number of households. *Mf* is the ratio of male population to female population in the county.[11]

B. Descriptive Statistics

Figure 1 plots geographic distribution of our sample funds for the two snapshots in 1988 (Panel A) and 2000 (Panel B). Both figures show that our mutual fund sample is quite dispersed

[10] We thank Marcin Kacperczyk, Clemens Sialm, and Lu Zheng for making the return gap data publicly available on http://www.rfs.org/txt/appendices/retgaprfs.zip.

[11] *Age*, *Edu*, *Mf*, *Minor*, and *Married* at county level are available for 1980, 1990 and 2000. We follow the same procedure as the one described above for the religiosity ratios to estimate these variables for interim years. *Money* and *Population* are available from 1988–2000. We apply their values in 2000 to the 2001–2008 period.

geographically, with the highest concentrations in New York, Boston, Chicago, and San Francisco but large portion of funds in other areas.

< Figure 1 about here >

Table I reports the summary statistics of our mutual fund sample. Our final sample consists of 15,013 fund-years during 1988–2008 period. A typical fund is located in a county with 57.44 percent of religious population, which consists of 15.02 percent Protestant population and 32.29 percent Catholic population. The total religiosity ratio of our mutual fund sample is close to the US average (55.64 percent), but the composition is the opposite of the U.S. population (39.67 percent Protestants and 13.26 percent Catholics). This is attributable to the fact that our mutual fund sample is tilted towards regions with a heavily Catholic population, such as Boston and New York (both with about 40 percent Catholic population in 2000). Nevertheless, Table I shows significant variations in religiosity ratios in our sample. For example, the 75th percentile of *Catholic Ratio* (39.93 percent) is almost twice the 25th percentile (23.35 percent), and a similar pattern can be observed with the *Protestant Ratio*.[12]

< Table I about here >

We measure return volatility (*Volatility*) of a fund-year as standard deviation of monthly fund returns during the year. A typical fund in our sample has a monthly portfolio volatility of 4.99 percent. We further calculate idiosyncratic volatility (*Idiosyncratic Volatility*) as the volatility of the error terms from annual four-factor model regressions of monthly fund returns on the market portfolio, SMB, HML, and UMD. The idiosyncratic volatility of a typical fund is only 1.44 percent, suggesting that more than 70 percent of the total volatility in fund returns can be attributed to movements in the market and/or price factors. There is a wide variation in

[12] Table I shows that about ten percent of population has non-Protestant/Catholic religious beliefs. Because this group represents an aggregation of a large number of heterogeneous beliefs, we expect the economic effects of each individual belief on risk-taking to be relatively small. Nevertheless, we note that prior evidence indicates that distinct risk attributes are associated with these religious beliefs. For example, Barsky et al. (1997) find that Jewish adherents have a higher risk tolerance than Catholics or Protestants.

idiosyncratic volatility. For example, the 75th percentile is 1.80 percent, more than twice the 25th percentile of 0.74 percent.

We obtain alphas and factor loadings of fund returns from the four-factor model described above. Consistent with the literature, a typical fund in our sample does not have a positive alpha. The mean and median alphas are about negative eight basis points. Funds in our sample generally have relatively neutral factor loadings: a typical fund has a Beta of one, HML loading of -0.02, and UMD loading of 0.05. However, they tend to hold more small stocks: their average SMB loading is 0.28. We also analyze the return gap measure proposed by Kacperczyk et al. (2008), defined as the monthly fund return in CRSP Mutual Fund database minus the buy-and-hold return of its portfolio as most recently disclosed in Thomson Reuters Mutual Fund Holdings database. Since holdings are reported quarterly, the gap could be due to interim trading over the quarter (for example, intra-quarter round trip trades) as well as transaction costs. Consistent with Kacperczyk et al. (2008), a typical fund in our sample does not have a significant return gap, with the mean and median return gaps of only one basis point.

An average fund in our sample turns its portfolio over almost once a year, but the variation in fund turnover is quite significant: the 75th percentile (1.25 times per year) is almost four times the 25th percentile (0.33 times per year). Our sample funds are relatively old and large, with a median age (*Fund Age*) of 8.3 years and a median size (*Fund Size*) of about $240 million.[13] The median firm in our sample comes from a family with 24 funds under management (*# Funds in Family*).

[13] Young funds could be excluded from our sample due to missing location data. Specifically, to avoid survivorship bias, we apply location data to subsequent fund-year observations until new data are collected (e.g., location data of 1988 are interpolated to 1989–1993). This approach excludes new funds founded between the two snapshots of location data. As a result, the average fund age of our sample is lower than mutual fund universe.

II. Fund Return Volatilities and Religious Beliefs

A. Portfolio Analysis

Figure 2 plots fund return volatilities and idiosyncratic volatilities for quintile portfolios of funds sorted on *Protestant Ratio* (Panel A), *Catholic Ratio* (Panel B), and *Total Religiosity Ratio* (Panel C). To control for variation in fund styles, we subtract from each volatility measure its sample median of all funds with the same objective in the same year. The volatility measures decrease almost monotonically in *Protestant Ratio*. In contrast, volatility measures are higher in the top *Catholic Ratio* quintile than those in the bottom quintile, but this relation is far from monotonic. In addition, the volatility measures are also decreasing, albeit non-monotonic, in *Total Religiosity Ratios*.

< Figure 2 about here >

We further report means and medians of fund return volatilities for quintile portfolios of funds sorted on religiosity ratios in Table II. Panel A shows that, consistent with Figure 1, fund return volatility decreases with *Protestant Ratio* and increases with *Catholic Ratio*. For example, the spread between the highest and the lowest quintiles is -0.28 percent, significant at the standard level (t-statistic 2.96). The spread also appears to be economically significant: it represents about 15% of the standard deviation of adjusted return volatility for funds in our sample (1.89 percent). The pattern in median values of adjusted volatility is similar, in that median values decrease monotonically from the lowest quintile (0.05 percent) to the highest quintile (0.15 percent) of *Protestant Ratio*.

< Table II about here >

Panel A further reports mean and median values of adjusted idiosyncratic volatility for quintiles of *Protestant Ratio*. Consistent with Figure 1, the mean values of adjusted idiosyncratic volatility decrease nearly monotonically as *Protestant Ratio* increases, with a spread of -0.20 percent between the highest and the lowest quintiles of *Protestant Ratio*, representing about 20%

percent of the standard deviation of adjusted idiosyncratic volatility in mutual fund returns for our sample (0.96 percent). The spread in idiosyncratic volatility is about 70 percent of that in total volatility, suggesting that most of the spread in total volatility can be attributable to idiosyncratic risk as opposed to systematic risk.

Panel A shows opposite, albeit weaker, patterns for *Catholic Ratio*. Between the highest and the lowest quintiles of *Catholic Ratio*, we document positively significant spreads for both mean and median values of raw and idiosyncratic volatilities. For instance, the mean spread of total volatility between the highest and the lowest quintiles is 0.10 percent with t-statistic 2.92. Results in Panel A are consistent with our hypothesis that funds in counties with higher Protestant population or lower Catholic population are more risk-averse.

Given that the two major components of total religiosity level have opposite relations with volatility, it is not surprising that in Panel C of Table I, total volatility and idiosyncratic volatility are only weakly associated with *Total Religiosity Ratio*. While it appears that total volatility and idiosyncratic volatility decrease in *Total Religiosity Ratio*, the spreads between the highest and the lowest quintiles are lower than the spreads obtained using *Protestant Ratio* and have conflicting signs relative to the spread obtained using *Catholic Ratio*. These results indicate that considering the heterogeneity in religious beliefs with respect to risk-taking is important in mutual fund settings.

Finally, we provide sub-sample analysis of volatility measures in Panel B of Table II. Overall, we find that the evidence of lower volatility for funds with high *Protestant Ratios* or low *Catholic Ratios* is more pronounced among smaller funds and older funds, and are quite persistent over time. In particular, we find that the spreads of raw and idiosyncratic volatilities between the highest and the lowest quintile portfolios sorted on *Protestant Ratio* and *Catholic Ratio* are mostly negative and statistically significant for 1) small and medium size funds and 2) old funds (age six or more). Our sub-period analysis shows that while the spreads for *Protestant*

Ratio are slightly larger in early period (1988–1999), the spreads for *Catholic Ratio* are much larger in later period (2000–2008).[14]

B. Regression Analysis

We extend our univariate analysis in Table II by performing regressions that control for a broad set of fund-level and county-level variables that may also be related to both the dependent variable (volatility proxies) and the independent variable (religious proxies). Our regression model is

$$Volatility_{i,t} = \alpha_0 + \alpha_1 Religiosity\ Ratio_{i,t} + \alpha^j\ Fund_{j,i,t} + \alpha^k\ Demo_{k,i,t} + \alpha^l\ Year \times Style_{l,i,t} + \varepsilon_{1,i,t} \quad (1)$$

where the volatility measures and religiosity ratios are defined in Section I. We expect α_1 to be negative for *Protestant Ratio* and positive for *Catholic Ratio*.[15] *Fund* includes a vector of fund-level variables that control for fund characteristics such as *Fund Size*, *Fund Age*, and # *Funds in Family* (defined in Section I). We include fund size and age because large and old funds are more established, and on average may have smaller incentives to take risk (Chevalier and Ellison (1997)). We include family size because managers could have greater incentives to take risk when there are more funds and hence greater competition within the same family (Kempf and Ruenzi (2008)).

Demo is a vector of demographic characteristics at county-level including *Age*, *Education*, *Income*, *Population*, *Mf*, *Minority*, and *Married* (defined in Section I). We control for these demographic variables because they may be correlated with religious participation, and we want to ensure that religiosity ratios capture the effect of religiosity as opposed to simply being correlated with the other demographic characteristics. One might expect that risk-taking behavior

[14] The subsample split reflects our location data snapshots. The first 12 years use snapshots from 1988 and 1994, while the last nine years use snapshots from 2000 and 2007.

[15] We also present results when we use the *Total Religiosity Ratio* as the main variable. However, our theory does not give us clear prediction on this variable.

is more aggressive among the higher educated and male but less so for minority and married households (Barsky et al. (1997)). Finally, we include year-style fixed effects to control for potential heterogeneity in risk-taking behavior across fund objectives and over time. We report robust t-statistics with clustered standard errors at the year-style level.

Table III presents the estimated coefficients and associated t-statistics for the regressions. Consistent with the reported univariate results in Table II, we find negative coefficients for *Protestant Ratio*. In particular, when the dependent variable is *Volatility*, the coefficient for *Protestant Ratio* is -0.58 percent, statistically significant at the standard level (t-statistic of -2.49). When the dependent variable is *Idiosyncratic Volatility*, the coefficient is -0.46 percent with t-statistic of -4.46. Consistent with the results in Table II, the coefficients for *Catholic Ratio* are positive and statistically significant, with the magnitude in the total volatility specification larger than that in the idiosyncratic volatility specification.

We find positive coefficients for *Total Religiosity Ratio* in both specifications and the signs are opposite of the univariate results in Table II. Further analysis indicates that these conflicting signs result solely from the inclusion of demographic control variables, suggesting that the cross-correlations between *Total Religiosity Ratio* and these demographic variables are quite significant in multivariate regressions. As such, it is comforting that the results for *Protestant* and *Catholic Ratios* are robust to controlling for these demographic variables. These results also highlight the importance of considering the heterogeneity in religious beliefs with respect to risk-taking as pointed out in Barsky et al. (1997).

< Table III about here >

The coefficients on fund characteristic variables are generally consistent with our expectations. We find negative coefficients for *Fund Size* and *Fund Age*, consistent with lower risk-taking incentives for larger funds and older funds. In addition, we find negative associations between volatility measures and *# Funds in Family*. We also find somewhat consistent

coefficient estimates for the demographic variables such as *Age*, *Mf*, *Minority*, and *Married*, suggesting that funds in counties with older population and higher male population exhibit greater volatility, while funds in counties with higher minority population and more married households have lower volatility.

Overall, we present strong evidence that funds in counties with lower proportion of Protestants or higher proportion of Catholics have greater raw and idiosyncratic volatilities of fund returns. These results cannot be attributed to other fund characteristics or county-level demographic variables. We also find that this risk-taking behavior for funds in counties with lower proportion of Protestants (or higher proportion of Catholics) is more pronounced among smaller and older funds and has not disappeared over time.

III. Tournament Risk Taking Behavior: Changes in Volatility Conditional on Performance

A. Tournament Hypothesis

The conflict of interests between investors and mutual fund managers poses a classical agency problem in mutual fund industry: while investors demand fund managers maximize risk-adjusted returns, fund managers have incentives to take excess risk. Brown, Harlow and Starks (1996) argue that changes in fund volatility during a year tend to be conditional on mid-year fund performance. Because fund managers face a tournament-like environment where annual winners take much of the reward (i.e., in terms of money inflow and hence compensation) but losers do not face harsh punishment, losers at the mid-year have strong incentives to take risk in the latter period of the year. In a similar vein, Chevalier and Ellison (1997) find that the inflow-performance relationship creates incentives for fund managers to take risk depending on year-to-date performance.

Recent studies find mixed evidence on the tournament hypothesis. Busse (2001) shows that tournament pattern disappears with daily mutual fund returns. However, Chen and Pennacchi

(2009) find evidence supporting the tournament hypothesis in terms of tracking error. They suggest that in recent periods, tournament behavior is caused by competition among funds within the same investment style. If religious beliefs influence fund managers' risk attitude, we expect that the strength of tournament risk-taking behavior should vary predictably with the degree of religious beliefs. Specifically, conditional on mid-year performance, the tendency of increasing fund volatility in the remaining months of a year should be lower (higher) when the fund is in a county with higher proportion of Protestants (Catholics).

B. Tournament Risk Taking and Religious Beliefs: Standard Deviation Ratio Tests

Following prior studies, we use a standard deviation ratio (SDR) analysis to test the relation between tournament risk taking behavior and religious beliefs. Specifically, the tournament hypothesis predicts that

$$\frac{\sigma_{2L}}{\sigma_{1L}} > \frac{\sigma_{2W}}{\sigma_{1W}} \tag{2}$$

where σ_{ij} denotes the standard deviation of mutual fund j's return during the ith half of the year and mutual fund $j = L$ (a "loser") when the fund has experienced relatively poor performance in the first half of the year, while mutual fund $j = W$ (a "winner") when it has had good performance during the first half of the year. This test follows the intuition that a mid-year loser is more likely to take risk than a mid-year winner does. We employ daily returns because Busse (2001) suggests that daily returns provide better estimates for SDRs. We follow Chen and Pennacchi (2009) to focus on "tracking error" which is the standard deviation of style-adjusted daily fund returns (i.e., fund return in excess of equally weighted return of funds with the same style).

Figure 3 Panel A plots the results of the tests on tournament behavior for funds in the top and bottom terciles of *Protestant Ratios*. Within each tercile portfolio, we report frequencies of 2 x 2 cells sorted on SDRs and mid-year returns. In particular, each year we assign funds into a 2 x 2

matrix based on an independent double sort on 1) a fund's return in the first X-month of the year and 2) SDR, the ratio of the fund's tracking error in the last (12-X) months of the year to the tracking error in the first X-months of the year. X takes the values of 5, 6, 7, 8, and 9 and represents individual assessment period. We then plot average percentage frequencies (minus 20 percent) using observations over all years across different values of X. Under the null hypothesis of no tournament risk taking, we expect 25 percent of the observations in each cell. In contrast, with the incentive to increase volatility conditional on poor performance, we expect that frequencies are higher than 25 percent in the cell of Low Return/High SDR but lower than 25 percent in the cell of Low Return/ Low SDR. In other words, we expect funds with low returns in the earlier part of the year to be more likely to increase their risk during the rest of the year.

<Figure 3 about here >

Panel A of Figure 3 presents strong evidence supporting the existence of tournament risk-taking behavior for funds with low *Protestant Ratios*. Specifically, for funds with low *Protestant Ratio*, frequency in the cell of Low Return/High SDR is much higher than in the cell Low Return/High SDR. In contrast, for funds with high *Protestant Ratios*, cell frequencies are very close to an even distribution, suggesting little tournament risk-taking behavior.

Panel B plots cell frequencies across portfolios based on *Catholic Ratio*. Funds with low *Catholic Ratios* portfolio demonstrate little tournament behavior while funds with high *Catholic Ratios* exhibit strong tournament behavior. Panel C shows that funds in the top tercile of *Total Religiosity Ratio* demonstrate stronger tournament behavior than in the bottom tercile, but this relation is weaker than with *Protestant Ratio* or *Catholic Ratio*.

We further present the frequencies with each assessment window and corresponding Chi-square statistics in Table IV. Panel A presents the frequencies for tercile portfolios of funds based on *Protestant Ratios*. Consistent with Figure 3, there is strong evidence of tournament risk-taking behavior for funds in low and medium *Protestant Ratio* terciles. Specifically, in these

two portfolios, we document higher frequencies in the cell of Low Return/High SDR than in the cell Low Return/High SDR across all assessment periods. In addition, in these two portfolios, three out of five Chi-square tests are statistically significant. On the other hand, for funds in the high tercile portfolio, there is little evidence supporting the existence of tournament risk-taking behavior. Overall, the results in Panel A of Table IV support our prediction that the tendency of increasing fund volatility in the remaining months of a year conditional on mid-year performance is lower when the funds are located in a county with higher *Protestant Ratio*. Panel B presents the results for funds sorted on *Catholic Ratio*. The results show that tournament behavior mainly concentrates in medium and high *Catholic Ratio* portfolios. In the low *Catholic Ratio* portfolio, however, none of the Chi-square statistics are significant at the conventional levels, suggesting little increase in risk conditional on mid-year performance.[16]

< Table IV about here >

Since Panels A and B report frequencies of observation over all years, the results could be driven by later years where we have more fund observations. To address this concern, we calculate cell frequencies for each year and tabulate the averages of yearly frequencies in Panel C. For brevity we report only the "Low Return" results for the top and bottom religiosity terciles, and the difference (and associated time-series t-statistics) between them. Consistent with earlier results, we find that funds with low *Protestants Ratios* are more likely to increase risk in the latter months of a year than funds in the high *Protestants Ratios*. The differences in cell frequencies are statistically significant for all assessment periods. The results for *Catholic Ratio* are also consistent with, yet slightly weaker than, the results based on the pooled sample.

Overall, we have documented that mutual funds in counties with lower proportion of Protestants or higher proportion of Catholics tend to have greater 1) volatility, 2) idiosyncratic

[16] When we form tercile portfolios of funds sorted on *Total Religiosity Ratio*, we find some evidence consistent with the tournament hypothesis in all tercile portfolios. Therefore, it does not appear that the tournament risk taking behavior varies with the level of total religiosity. For brevity, we do not tabulate these results.

volatility, and 3) intra-year increase in volatility conditional on mid-year performance. A natural question is whether the higher risk is rewarded with higher returns. We now turn our attention to this issue.

IV. Returns, Factor Loadings and Religious Beliefs

A. Portfolio Analysis

We sort funds into quintile portfolios based on religiosity ratios, and report in Table V the average values of monthly returns for each portfolio. We report two return statistics: 1) the annual average of monthly raw fund return (*Fund Return*) and 2) the *Four-Factor Alpha* estimated as the intercepts from annual four-factor model regressions of monthly fund returns (Carhart 1997). We also report the four factor loadings from these annual regressions, which provide evidence on the risk characteristics of mutual fund returns. We adjust returns, alphas, and loadings by subtracting the annual median values for all funds with the same investment objective code.

< Table V about here >

There is only weak evidence in Table V Panel A that raw returns are associated with religiosity ratios. Raw returns decrease in *Protestant Ratios* but this relation is not monotonic. The spread between the top and bottom quintiles is about -9 basis points per month (or slightly more than -1 percent a year). However, this spread is eliminated once we control for risk factors: the spread of four-factor alphas between High and Low *Protestant Ratio* portfolios is almost zero (-1 basis point per month). Therefore, the observed differences in raw returns can be attributed completely to the differences in the factor loadings: funds with low *Protestant Ratios* have significantly higher loadings on the *SMB* and *HML* factors than those with high *Protestant Ratios*, suggesting low Protestant funds tilt their portfolios towards stocks with smaller market capitalization and higher book-to-market ratio.

We find neither raw returns nor alphas vary significantly across quintile portfolios of funds sorted on *Catholic Ratio*. For factor loadings, *SMB* loading and *HML* loading have relatively larger spreads between *Catholic Ratios* portfolios, although only the difference in *SMB* loading is significant. In addition, funds in regions with higher *Total Religiosity Ratios* do not earn higher returns after controlling for risk factors.

In sum, Panel A of Table V provides no evidence that the higher volatilities of funds in counties with lower proportion of Protestants (or higher proportion of Catholics) are rewarded by higher returns after controlling for common risk factors. Funds with lower *Protestant Ratios* or higher *Catholic Ratios* appear to tilt their holdings towards smaller firms and value firms. These findings help explain the variation in total volatility documented in Table II but not the variation in idiosyncratic volatility. Interestingly, given that our sample is comprised of growth and aggressive growth funds, the variation in HML loading suggests that deviation from investment objective is decreasing in *Protestant Ratio* but increasing in *Catholic Ratio.*

We further present sub-sample and sub-period analyses in Panel B of Table V. The results support our general interpretation that there is no variation in risk-adjusted return across funds in regions with different religious beliefs. Specifically, most of the four-factor alphas are small in magnitude and statistically insignificant.

B. Regressions Analysis of Returns and Factor Loadings

To conduct multivariate analysis, we use regression models similar to model (1) that control for other fund-level and county-level characteristics:

$$Return_{i,t} = \beta_0 + \beta_1 Religiosity\ Ratio_{i,t} + \beta^j\ Fund_{j,i,t} + \beta^k\ Demo_{k,i,t} + \beta^l\ Year \times Style_{l,i,t} + \varepsilon_{2i,t} \quad (3a)$$

and

$$Loading_{i,t} = \gamma_0 + \gamma_1 Religiosity\ Ratio_{i,t} + \gamma^j Fund_{j,i,t} + \gamma^k Demo_{k,i,t} + \gamma^l Year \times Style_{l,i,t} + \varepsilon_{3i,t} \quad (3b)$$

where *Fund* is a vector that includes *Fund Size*, *Fund Age*, and # *Funds in Family* and *Demo* is also a vector of control variables that includes county-level demographic variables: *Age*, *Education*, *Income*, *Population*, *Mf*, *Minority*, and *Married*. All variables are defined in Section I. We also include year-style fixed effects to control for potential heterogeneity in risk-taking behavior across fund objectives and over time. We report robust t-statistics with clustered standard errors at the year-style level.

If risk-taking is compensated by higher returns, we expect β_1 to be negative for *Protestant Ratio* and positive for *Catholic Ratio*. In addition, if risk-taking is manifested in stock holdings with certain risk characteristics, we expect γ_1 to be negative for *Protestant Ratio* and positive for *Catholic Ratio*. In model (3a), we expect β^j to be insignificant, because prior studies do not find robust relation between fund characteristics and returns. We also expect that county-level demographic characteristics are not systematically associated with fund returns. Regarding model (3b), if fund characteristics are associated with risk-taking, which in turn is partially reflected in systematic risks, we expect negative coefficients for *Fund Size* and *Fund Age* and positive coefficient for # *Funds in Family*. Similarly, one might expect that risk-taking behavior is more aggressive among areas with the higher educated population and male population, and less aggressive among minority and married households.

Table VI presents the estimated coefficients and the associated t-statistics. Consistent with the univariate results (Table V), when the dependent variable is raw return, the coefficient for *Protestant Ratio* is -0.56 percent and the associated t-statistic is -2.31. However, in the regression of four-factor alpha, the coefficient is smaller in magnitude and only marginally significant. In addition, we find negative and statistically significant coefficients for *Protestant Ratio* in regressions of market *Beta*, *SMB Loading* and *HML Loading*. These results confirm the univariate results that the difference in raw returns appears to be attributable to funds in regions with low Protestant population taking more systematic risks.

< Table VI about here >

Panel A of Table VI also shows that many of the control variables are significantly associated with alphas and factor loadings. While exploring the exact nature of these associations is beyond the scope of our study, these results suggest the possibility that other county-level demographic characteristics may influence how mutual funds take systematic risks.

Panel B of Table VI presents the results of regression models focusing on *Catholic Ratio*. Consistent with the univariate results in Table V, we find insignificant coefficient for *Catholic Ratio* when the dependent variable is either adjusted return or four-factor alpha. These results indicate that funds in counties with more Catholic population are unlikely to be rewarded for taking on higher risk. Similar to the results in Panel A, we find that the estimated coefficients for *Catholic Ratio* are significant in *SMB* and *HML* among the factor loadings regressions. This evidence suggests that funds with higher *Catholic Ratio* are more likely to hold stocks with smaller market capitalization and higher book-to-market ratio.[17]

Overall, our analyses in this section reveal that the risk-taking behavior among mutual funds in counties with lower proportion of Protestants (or higher proportion of Catholics) is not associated with higher fund returns after controlling for common risk-factors. In addition, besides greater idiosyncratic risk, these funds appear to take more systematic risks associated with the size and book-to-mark risk premia.

V. Turnover Activities, Return Gaps, and Religious Beliefs

Our last set of empirical analyses focus on another mutual risk-taking behavior and its potential consequence: fund turnover and return gap. Financial researchers have long examined the variation in mutual fund turnovers (Grinblatt and Titman (1989), Carhart (1997), and Chen,

[17] We do not tabulate the multivariate regression results for *Total Religiosity Ratio*, because there is little evidence that returns are associated with total level of religiosity (Panel A of Table V).

Jegadeesh and Wermers (2000)). Faced with uncertainty, a more risk-averse manager would trade less aggressively and therefore less frequently compared to a more risk-tolerant manager. In our context of religious beliefs, we predict that funds in counties with lower proportion of Protestants (or higher proportion of Catholics) have relatively higher turnover.

Turnover can also in turn affect the 'return gap' measure proposed by Kacperczyk et al. (2008) that captures the hidden benefits and costs of interim trading over a quarter. If return cap is caused by fund managers making profits on interim trades, then a higher propensity to trade will lead to a positive return gap. On the contrary, if return gap is caused by the trading costs associated with interim trading, then a higher propensity will lead to a negative return gap. Therefore in the former (latter) case, we would expect funds with higher *Protestant Ratios* (or lower *Catholic Ratios*) to have lower (higher) return gap.

A. Fund Turnover

We collect fund-level annual turnover ratios from CRSP Mutual Fund database, which captures how many times a mutual fund turns its holdings over. Panel A of Table VII reports mean values of annual turnover ratio for each quintile of funds sorted on religiosity ratios. Consistent with our expectation, annual turnover decreases monotonically from low *Protestant Ratio* group (1.09 times per year) to high *Protestant Ratio* group (0.79 times per year). The difference between High and Low portfolios is -0.30, with t-statistic of 3.51. This difference is also economically significant, representing a 28 percent decrease as one moves from Low to High quintiles. This finding indicates that funds in the counties with lower proportion of *Protestant Ratio* trade more frequently on annual basis. The results with *Catholic Ratios* exhibit a positive but slightly weaker association with turnover. While the average turnover ratio increases from 0.75 per year in Low portfolio to 1.20 times per year in High portfolio, the

difference is statistically insignificant. In addition, we do not observe a clear pattern for turnover ratios across quintile portfolios sorted on *Total Religiosity Ratio*.

< Table VII about here >

Panel B of Table VII reports multivariate regression estimates of the model that we use to test the relation between annual turnover and religiosity ratios:

$$Turnover_{i,t} = \delta_0 + \delta_1 Religiosity\ Ratio_{i,t} + \delta^j\ Fund_{j,i,t} + \delta^k\ Demo_{k,i,t} + \delta^l\ Year \times Style_{l,i,t} + \varepsilon_{4i,t} \quad (4)$$

After controlling for fund characteristics and county-level demographical characteristics, we expect δ_1 to be negative for *Protestant Ratio* and positive for *Catholic Ratio*. If turnover represents aggressive trading associated with risk-taking, we predict lower turnover for large (*Fund Size*) and older funds (*Fund Age*) as they are relatively more established. On the other hand, we expect a positive coefficient for *# of Funds in Family*, as the pressure of competition may encourage more risk-taking behavior. We include demographic variables to control for other potential country-level effects and do not expect them to have strong associations with fund turnover ratio. For brevity, however, we do not report the estimated coefficients for these variables. We also include year-style fixed effects to control for potential heterogeneity in risk-taking behavior across fund objectives and over time. We report robust t-statistics with clustered standard errors at the year-style level.

We find evidence consistent with the univariate results reported in Panel A. Specifically, we find negative coefficient for *Protestant Ratio* (-1.08) with t-statistic of -3.00. Similarly, we find positive coefficient for *Catholic Ratio* (1.18) with t-statistic of 5.60. These results are consistent with our expectation that annual fund turnover is negatively associated with proxies for risk aversion. Estimated coefficients on fund characteristics are generally consistent with our expectations. Specifically, we find negative and statistically significant coefficients for *Fund Size* in all three models. In addition, the estimated coefficients for *# Funds in Family* are positive and

significant for all three models. These results indicate that smaller funds and funds with greater within-family competition are more likely to trade more frequently.

B. Return Gap

Following Kacperczyk et al. (2008), we define return gap as the difference between net investor return and the net holding return:

$$Return\ Gap_t = Return\ of\ Fund_t - (Return\ of\ Holding_t - Fund\ Expense_t) \quad (5)$$

where $Return\ of\ Fund_t$ is the relative change in the net asset value of the fund shares (including total dividend and capital gains distributions during period t) divided by the net asset value at the beginning of period t. $Return\ of\ Holding_t$ is calculated as the returns of stocks (held by the fund based on the most recent disclosure date) weighted by number of shares held by the fund. $Fund\ Expense_t$ is the expense ratio of the fund during period t.

< Table VIII about here >

Panel A of Table VIII reports the mean values of monthly return gaps for quintile portfolios of funds sorted by religiosity ratios. We find strong variation in monthly return gaps among portfolios sorted on *Protestant Ratio*. Moving from the lowest *Protestant Ratio* quintile to the highest *Protestant Ratio* quintile, monthly return gaps decrease from 4.61 basis points per month to -1.70 basis points per month. The difference of 6.31 basis points is statistically significant and represents about 0.75% return gap annually. Moreover, this difference represents almost 40% of the difference between funds in the top and bottom quintiles of past return gap (about 16-17 bps monthly, as reported in Table 3 of Kacperczyk et al. (2008)). On the other hand, we do not observe an obvious pattern when funds are sorted based on *Catholic Ratios*. Moreover, the spread between the High and Low *Total Religiosity Ratio* quintiles is statistically insignificant at -0.02 percent per month.

We present multivariate regression results in Panel B of Table VIII using the following regression model:

$$Return\ Gap_{i,t} = \theta_0 + \theta_1 Religiosity\ Ratio_{i,t} + \theta^j\ Fund_{j,i,t} + \theta^k\ Demo_{k,i,t} + \theta^l\ Year \times Style_{l,i,t} + \varepsilon_{5i,t} \quad (6)$$

We predict θ_1 to be negative for *Protestant Ratio* and positive for *Catholic Ratio*. Parallel to our previous arguments, we predict that the lower turnover for large (*Fund Size*) and older funds (*Fund Age*) should result in lower return gap. On the other hand, we expect a positive coefficient for *# of Funds in Family* because more aggressive trading of these funds leads to higher return gap.

Results in Panel B of Table VIII show that monthly return gaps are negatively associated with *Protestant Ratio* (-0.16 percent), with t-statistic of -2.18. This result is comparable to the univariate result reported in Panel A. We also find a positive coefficient for *Catholic Ratio*, although smaller in magnitude and statistically insignificant with a t-statistic of 1.44. The estimated coefficient for *Total Religiosity Ratio* is statistically significant, but with an opposite sign from the univariate result. Among the three fund characteristic variables, we find consistent and significant negative coefficients for *Fund Age*, consistent with older funds being less aggressive in generating values relative to a simple buy-and-hold strategy.

Overall, our findings suggest that more risk-averse managers in areas of low Protestant population or high Catholic population are relatively more willing to trade aggressively. Consequently, we observe that turnover and return gaps are higher for funds in counties with lower proportion of Protestants.

VI. Conclusion

Motivated by the economics literature that Protestants (Catholics) tend to be more (less) risk-averse than average population, we investigate the relations between mutual fund risk taking and

local religious beliefs. We find strong evidence that funds located in regions with lower Protestant population or higher Catholic population tend to have a higher return volatility and idiosyncratic volatility, higher risk factor loadings, and stronger tournament behavior. They turn their portfolios faster and have higher 'return gaps'.

In some sense, these results are surprising because mutual fund managers are professionals who compete furiously with other managers. It is striking that despite manager's strong incentives to maximize their utilities, local religious beliefs have a major impact on mutual fund behaviors. On the other hand, our findings echo recent research in the finance literature showing that religious beliefs influence a wide range of corporate and investment behaviors. Taken together, this literature suggests that geographical heterogeneity in religious beliefs is an important force shaping up financial decisions in modern finance world.

Our finding on the relation between local religious beliefs and mutual fund risk-taking is important to investment communities because volatility affects the optimal timing of clients' investments. Our study also contributes to the academic literature by showing the impact of risk attitudes on the tournament hypothesis and the return gap puzzle. While prior studies only focus on testing intra-year increases in volatility conditional on mid-year performance, we provide strong support for tournament behavior by showing the strength of tournament risk-taking as a function of proxies of risk-aversion. We also show that religiosity-related risk-taking behavior is a potentially important determinant of mutual fund return gap. For example, our finding suggests that the persistence in return gap may be partially driven by the reluctance of these "Protestant funds" to take on the additional risks associated with higher frequency trading strategies.

At a more general level, our paper adds to the understanding on how characteristics of mutual fund managers affect their behaviors. Prior studies tend on focus on manager-specific measures such as age, education, standardized test scores, and backgrounds. We show that geographical characteristics that capture local culture and norms can also be important. In this sense, we

expand the studies of pioneers in this area (e.g, Coval and Moskowitz (2001)) who study the advantages of mutual funds' geographic proximity to their holdings. We show that the geographic location of a fund itself is important as the fund's investment strategies can be significantly influenced by local religious beliefs.

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Table I
Summary Statistics

Our sample includes mutual funds at the intersection of Thomson Reuters Mutual Fund Holdings database and the CRSP Mutual Fund database from 1988–2008. To ensure that our sample comprises of actively managed equity funds, we include only funds whose objectives are identified by Thomson Financial as growth (IOC=2) or aggressive growth (IOC=3). For each of these funds, we collect the mutual fund location from Nelson's 1988, 1994, 2000 and 2007 Directories of Investment Managers. Location data is applied to subsequent fund-year observations until new data are collected (e.g., location data of 1988 are applied to 1989–1993). After obtaining the county location information for each fund, we assign the domicile county's religiosity ratios to the fund. Protestant ratio (Catholic ratio, total religiosity ratio) of a county is total number of members of Protestant congregations (Catholic congregations, all congregations) divided by total population of the county. *Volatility* is fund return volatility defined as standard deviation of monthly fund returns estimated at annual interval. *Idiosyncratic Volatility* is defined as the volatility of the error terms from annual four-factor model regressions of monthly fund returns (Carhart (1997)). We also use these regressions to obtain *Alpha* and factor loadings on the market portfolio, *SMB*, *HML* and *UMD*. *Return Gap* of a fund is defined as the monthly fund return in CRSP Mutual Fund database *minus* the buy-and-hold return of its portfolio as most recently disclosed in Thomson Reuters holdings database calculated for the same monthly interval. *Turnover* is obtained from CRSP mutual fund data directly and is the minimum of aggregated sales or aggregated purchases by a fund divided by the TNA of the fund. *Fund Age* is the number of years since the fund's first record in the CRSP Mutual Fund database. *Fund Size* is the TNA of the fund. # *Funds in Family* is the number of funds within the same management company as the fund.

				Percentile				
		Mean	Std. Dev.	5th	25th	Median	75th	95th
Religiosity Ratios: (%)	Protestant Ratio	15.02	9.10	7.72	8.59	11.63	17.72	34.00
	Catholic Ratio	32.29	11.75	9.01	23.35	36.72	39.93	49.14
	Total Religiosity Ratio	57.44	10.79	39.11	50.38	57.81	67.41	73.22
Monthly Volatility: (%)	Raw Volatility	4.99	2.89	1.96	3.11	4.28	6.05	10.26
	Idiosyncratic Volatility	1.44	1.17	0.39	0.74	1.15	1.80	3.42
Monthly Return: (%)	Raw Return	0.74	1.69	-2.35	-0.16	0.89	1.84	3.10
	Four-Factor Alpha	-0.08	1.82	-1.50	-0.53	-0.08	0.36	1.52
	Return Gap	0.01	1.47	-1.59	-0.34	0.01	0.38	1.60
Factor Loadings:	Beta	1.00	0.42	0.41	0.83	0.99	1.17	1.65
	SMB	0.28	0.58	-0.39	-0.08	0.22	0.59	1.12
	HML	-0.02	0.62	-0.93	-0.33	-0.02	0.29	0.83
	UMD	0.05	0.39	-0.50	-0.12	0.05	0.23	0.63
Fund Characteristics:	Turnover	0.98	1.29	0.08	0.33	0.67	1.25	2.79
	Age (in Year)	10.20	7.00	1.92	4.92	8.33	12.92	25.92
	Size (in $M)	1,105.21	3,353.01	8.72	69.20	240.55	821.80	4,632.60
	# of Funds in Family	53.86	70.67	1	6	24	74	211

Table II
Volatilities Sorted on Religiosity Ratios

This table reports average fund return volatilities and idiosyncratic volatilities across religiosity ratios. *Volatility* of a fund is defined as standard deviation of monthly returns of the fund estimated at annual interval. *Idiosyncratic Volatility* of a fund is defined as the volatility of the error terms from annual four-factor model regressions of the fund's monthly returns (Carhart (1997)). To control for investment objective, we further adjust *Volatility* and *Idiosyncratic Volatility* of a fund by subtracting the annual median values within the fund's investment objective code. Each year from 1988–2008, we sort funds into quintiles of religiosity ratios of fund locations, where Protestant ratio (Catholic ratio, total religiosity ratio) of a county is total number of members of Protestant congregations (Catholic congregations, all congregations) divided by total population of the county. We then calculate the annual means and medians of our volatility proxies for each quintile, and report the time-series means for each quintile in Panel A. We also report the difference between the top and bottom quintiles of religiosity ratios and their t-statistics in parentheses. In Panel B, we report only the difference between the top and bottom quintiles of religiosity ratios for sub-samples based on fund characteristics (Fund Size and Fund Age) as well as sub-periods (1988–1999 and 2000–2008). Fund Size is total assets (TNA) of a fund. Fund Age is the number of years since the fund's first record in the CRSP Mutual Fund database. Young (old) funds are funds of ages 2-5 (age 6 or more). ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Volatilities Sorted on Religiosity Ratios: Full Sample

	Low	2	3	4	High	H-L	t-stat
Sorted on Protestant Ratio							
Mean Volatility	0.40%	0.24%	0.27%	0.18%	0.12%	-0.28%***	(-2.96)
Median Volatility	0.05%	0.01%	0.00%	-0.03%	-0.09%	-0.15%	
Mean Idiosyncratic Volatility	0.32%	0.25%	0.17%	0.16%	0.12%	-0.20%**	(-2.50)
Median Idiosyncratic Volatility	0.02%	0.03%	-0.03%	0.02%	-0.03%	-0.05%	
Sorted on Catholic Ratio							
Mean Volatility	0.12%	0.42%	0.22%	0.16%	0.23%	0.10%***	(2.92)
Median Volatility	-0.08%	0.09%	0.01%	-0.06%	-0.01%	0.07%	
Mean Idiosyncratic Volatility	0.12%	0.26%	0.22%	0.13%	0.22%	0.09%***	(5.09)
Median Idiosyncratic Volatility	-0.02%	0.04%	0.04%	-0.03%	-0.01%	0.01%	
Sorted on Total Religiosity Ratio							
Mean Volatility	0.35%	0.21%	0.24%	0.17%	0.21%	-0.14%*	(-1.82)
Median Volatility	0.02%	0.01%	-0.04%	-0.03%	0.00%	-0.02%	
Mean Idiosyncratic Volatility	0.27%	0.17%	0.23%	0.16%	0.15%	-0.12%*	(-1.91)
Median Idiosyncratic Volatility	0.05%	0.02%	0.04%	-0.02%	-0.04%	-0.09%	

Panel B: Differences in Volatilities Between Funds with High and Low Religiosity Ratios: Sub-Samples

	Fund Size			**Fund Age**		**Sub-Period**	
	Small	Medium	Large	Young	Old	1988–1999	2000–2008
Sorted on Protestant Ratio							
Mean Volatility	-0.37%***	-0.22%***	-0.33%	-0.12%	-0.21%*	-0.33%*	-0.22%*
Mean Idiosyncratic Volatility	-0.14%***	-0.22%***	-0.28%	0.07%	-0.19%**	-0.28%**	-0.09%***
Sorted on Catholic Ratio							
Mean Volatility	0.23%*	0.23%***	0.11%**	0.09%	0.07%	0.07%	0.15%***
Mean Idiosyncratic Volatility	0.22%***	0.18%***	0.05%	-0.01%	0.13%***	0.08%***	0.12%***
Sorted on Total Religiosity Ratio							
Mean Volatility	0.22%***	-0.15%*	-0.14%	-0.32%***	-0.06%	-0.15%	-0.12%
Mean Idiosyncratic Volatility	0.04%	-0.09%***	-0.18%	-0.07%	-0.10%	-0.19%**	-0.02%

Table III
Panel Regressions of Volatilities on Religiosity Ratios

This table reports multivariate regressions of mutual fund return volatilities for the sample period of 1988–2008. *Volatility* of a fund is defined as standard deviation of monthly returns of the fund estimated at annual interval. *Idiosyncratic Volatility* of a fund is defined as the volatility of the error terms from annual four-factor model regressions of the fund's monthly returns (Carhart (1997)). Independent variables include religiosity ratios and fund characteristics. Protestant ratio (Catholic ratio, total religiosity ratio) of a county is total number of members of Protestant congregations (Catholic congregations, all congregations) divided by total population of the county. *Fund Age* is the number of years since the fund's first record in the CRSP Mutual Fund database. *Fund Size* is the TNA of the fund. *# Funds in Family* is the number of funds within the management company of the fund. We also include the following county-level demographic variables from the US Census Bureau. *Age* is the median age of the county population. *Education* is the fraction of the population over 25-years-old holding a bachelor's or higher degree. *Income* is the per capita personal income. *Population* is the total county population. *Minority* is the fraction of the minority populations in the total county population. *Married* is the fraction of married households in total number of households. *Mf* is the ratio of male population to female population in the county. We include (Year*Fund Objective) fixed effect in each regression. The t-statistics in parentheses are calculated using standard errors clustered at the year*fund-objective level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Dependent Variable: Volatility			**Dep. Variable: Idiosyncratic Volatility**		
	Protestant	**Catholic**	**Total Religiosity**	**Protestant**	**Catholic**	**Total Religiosity**
Religiosity Ratio	-0.5759%**	0.5323%***	0.6286%***	-0.4569%***	0.3886%***	0.2631%***
	(-2.49)	(3.84)	(3.74)	(-4.46)	(6.30)	(3.22)
Log (Fund Size, in $M)	0.0065%	0.0065%	0.0064%	-0.0994%***	-0.0994%***	-0.0995%***
	(0.29)	(0.29)	(0.29)	(-9.98)	(-9.96)	(-9.87)
Log (Fund Age, in Years)	-0.3217%***	-0.3256%***	-0.3251%***	-0.0340%	-0.0369%	-0.0356%
	(-3.76)	(-3.78)	(-3.77)	(-1.09)	(-1.18)	(-1.14)
Log (# Funds in Family)	-0.0362%***	-0.0379%***	-0.0346%***	-0.0027%	-0.0038%	-0.0011%
	(-3.06)	(-3.05)	(-2.79)	(-0.36)	(-0.50)	(-0.14)
Dem.: Age	0.0434%**	0.0505%***	0.0581%***	-0.0053%	0.0003%	0.0035%
	(2.65)	(3.30)	(3.53)	(-1.07)	(0.07)	(0.69)
Dem.: Education	0.0043%	0.0032%	0.0040%	0.0060%***	0.0052%***	0.0062%***
	(1.05)	(0.78)	(0.99)	(3.51)	(3.36)	(4.13)
Dem.: Income	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%*
	(0.08)	(0.24)	(-0.50)	(-1.29)	(-1.02)	(-1.96)
Dem.: Log (Population)	-0.0254%	-0.0362%	-0.0283%	-0.0461%***	-0.0527%***	-0.0400%***
	(-1.21)	(-1.54)	(-1.22)	(-3.77)	(-4.02)	(-3.31)
Dem.: Mf	5.9414%***	6.6336%***	7.3626%***	2.1767%***	2.7193%***	2.9914%***
	(3.99)	(4.65)	(4.87)	(4.81)	(5.72)	(5.68)
Dem.: Minority	-0.2509%	-0.1110%	-0.2486%	-0.0588%	0.0328%	-0.1199%
	(-0.98)	(-0.42)	(-0.87)	(-0.48)	(0.27)	(-1.15)
Dem.: Married	-2.0079%***	-2.1499%***	-2.6031%***	-0.8502%***	-0.9909%***	-1.3185%***
	(-3.80)	(-4.35)	(-5.33)	(-2.79)	(-3.65)	(-4.83)
*(Year*Fund Obj.) Fixed Effects*	Yes	Yes	Yes	Yes	Yes	Yes
N(Years)	21	21	21	21	21	21
Obs	13,733	13,733	13,733	13,733	13,733	13,733
R^2	48.53%	48.49%	48.54%	22.80%	22.83%	22.74%

Table IV
Mutual Fund Tournament across Religiosity Ratios: 1999–2008

Panel A presents mutual fund tournament risk taking behavior across Protestant ratios. Each year we sort funds into terciles of Protestant ratios of fund locations, where Protestant ratio of a county is total number of members of Protestant congregations divided by total population of the county. Then within each Protestant ratio tercile, we divide funds into four groups based on whether 1) RTN is below or above the median, and 2) SDR is above or below the median. For each (X, 12-X) row, RTN of a fund-year is the buy-and-hold return of the fund in the first X months of the year. SDR (standard deviation ratio) is the ratio of standard deviation of returns in the last (12-X) months of the year to standard deviation of returns in first X months of the year. Both RTN and SDR are calculated using daily mutual fund returns, and we follow Chan and Pennacchi (2009) to adjust a fund's daily return for investment objective by subtracting equal-weighted average daily return of all funds in the same investment category. We then report percentage frequencies for each cell using observations over all years. We also report Chi-square statistics and p-value relative to an equal probability distribution. Panel B repeats the test but with Catholic ratio, where Catholic ratio of a county is total number of members of Catholic congregations divided by total population of the county. Panel C sorts funds into 2X2 cells within religiosity ratio groups with the same method as Panels A and B but report the time-series averages of annual frequencies. For brevity we only report the cells in low RTN groups and for the top and bottom terciles of religiosity ratios. Panel C also report time-series t-statistics for the differences in frequencies of low RTN/high SDR cells between high and low religiosity ratios. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Frequency Distributions Across Protestant Ratios

	Low RTN		High RTN			
	Low SDR	High SDR	Low SDR	High SDR	Chi-square	p-value
Low Protestant Ratio						
(5, 7)	23.46	26.39	26.39	23.75	7.45*	0.059
(6, 6)	23.96	25.89	25.89	24.26	3.07	0.381
(7, 5)	23.29	26.56	26.56	23.59	9.34**	0.025
(8, 4)	23.67	26.18	26.18	23.96	5.39	0.145
(9, 3)	22.75	27.11	27.11	23.04	16.97***	0.001
Medium Protestant Ratio						
(5, 7)	23.27	26.67	26.67	23.40	13.74***	0.003
(6, 6)	24.50	25.44	25.44	24.63	0.95	0.812
(7, 5)	22.94	26.99	26.99	23.07	19.59***	0.000
(8, 4)	24.24	25.70	25.70	24.37	2.40	0.493
(9, 3)	23.43	26.50	26.50	23.56	11.21**	0.011
High Protestant Ratio						
(5, 7)	24.32	25.59	25.59	24.51	1.50	0.682
(6, 6)	25.81	24.10	24.10	26.00	3.53	0.317
(7, 5)	25.40	24.51	24.51	25.59	1.07	0.785
(8, 4)	25.81	24.10	24.10	26.00	3.53	0.317
(9, 3)	25.03	24.88	24.88	25.21	0.08	0.994

Table IV (Continued)
Mutual Fund Tournament across Religiosity Ratios: 1999–2008

Panel B: Frequency Distributions Across Catholic Ratios

	Low RTN		High RTN			
	Low SDR	High SDR	Low SDR	High SDR	Chi-square	p-value
Low Catholic Ratio						
(5, 7)	24.15	25.76	25.76	24.33	2.54	0.469
(6, 6)	24.92	24.99	24.99	25.10	0.02	0.999
(7, 5)	24.41	25.50	25.50	24.59	1.12	0.771
(8, 4)	25.28	24.63	24.63	25.47	0.63	0.889
(9, 3)	24.33	25.58	25.58	24.52	1.47	0.690
Medium Catholic Ratio						
(5, 7)	23.62	26.34	26.34	23.70	7.73*	0.052
(6, 6)	24.66	25.30	25.30	24.74	0.38	0.943
(7, 5)	23.58	26.38	26.38	23.66	8.16**	0.043
(8, 4)	24.55	25.41	25.41	24.63	0.72	0.867
(9, 3)	23.66	26.30	26.30	23.73	7.31*	0.063
High Catholic Ratio						
(5, 7)	23.35	26.56	26.56	23.53	10.70**	0.013
(6, 6)	24.19	25.72	25.72	24.37	2.30	0.513
(7, 5)	23.09	26.82	26.82	23.27	14.49***	0.002
(8, 4)	23.38	26.53	26.53	23.57	10.21**	0.017
(9, 3)	22.80	27.11	27.11	22.98	19.51***	0.000

Panel C: Frequency Distributions Across Religiosity Ratios: By-Year Approach

	Low Religiosity Ratio		High Religiosity Ratio			
	Low Return		Low Return			
	Low SDR (1)	High SDR (2)	Low SDR (3)	High SDR (4)	(4) - (2)	t-stat
Sorted on Protestant Ratio						
(5, 7)	23.61	26.22	24.78	25.12	-1.10*	(-2.07)
(6, 6)	23.88	25.95	25.71	24.20	-1.76**	(-2.80)
(7, 5)	23.28	26.56	25.21	24.69	-1.87***	(-3.44)
(8, 4)	23.74	26.09	25.76	24.14	-1.96**	(-3.06)
(9, 3)	23.11	26.72	25.34	24.56	-2.16**	(-2.64)
Sorted on Catholic Ratio						
(5, 7)	24.66	25.21	23.55	26.36	1.15	(1.47)
(6, 6)	24.89	24.98	24.10	25.81	0.83	(1.11)
(7, 5)	24.39	25.48	23.10	26.82	1.34*	(1.94)
(8, 4)	25.35	24.52	23.56	26.36	1.83**	(2.56)
(9, 3)	24.78	25.09	23.39	26.52	1.43*	(2.08)

Table V
Returns and Factor Loadings Sorted on Religiosity Ratios

This table reports average mutual fund return, alpha, and factor loadings across religiosity ratios. *Fund Return* of a mutual fund is annual average of monthly returns of the fund. We use annual four-factor model regressions of monthly fund returns (Carhart (1997)) to obtain *Alpha* as the intercept, and loadings on the market portfolio (*Beta*), *SMB*, *HML*, and *UMD*. We obtain factor returns from Kenneth French's data library. To control for investment objective, we further adjust returns and factor loadings of a fund by subtracting the annual median values within the fund's investment objective code. Each year from 1988–2008, we sort funds into quintiles of religiosity ratios of fund locations, where Protestant ratio (Catholic ratio, total religiosity ratio) of a county is total number of members of Protestant congregations (Catholic congregations, all congregations) divided by total population of the county. We then calculate the annual average returns and loadings for each quintile, and report the time-series means for each quintile in Panel A. We also report the difference between the top and bottom quintiles of religiosity ratios and their t-statistics in parentheses. In Panel B, we report only the difference between the top and bottom quintiles of religiosity ratios for sub-samples based on fund characteristics (Fund Size and Fund Age) as well as for sub-periods (1988–1999 and 2000–2008). Fund Size is total assets (TNA) of a fund. Fund Age is the number of years since the fund's first record in the CRSP Mutual Fund database. Young (old) funds are funds of ages 2-5 (age 6 or more). ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Returns and Loadings Sorted on Religiosity Ratios: Full Sample Analysis							
	Low	2	3	4	High	H-L	t-stat
Sorted on Protestant Ratio							
Fund Return	0.06%	0.02%	-0.03%	0.01%	-0.03%	-0.09%*	(-1.87)
Four-Factor Alpha	-0.01%	-0.03%	-0.02%	0.01%	-0.02%	-0.01%	(-0.29)
Beta	-1.50%	0.22%	-0.52%	-1.40%	-2.18%	-0.68%	(-0.29)
SMB Loading	10.00%	2.85%	8.62%	8.09%	2.47%	-7.53%**	(-2.13)
HML Loading	1.47%	4.80%	-0.66%	1.89%	-3.11%	-4.58%*	(-1.97)
UMD Loading	1.35%	-1.55%	0.50%	-1.21%	1.36%	0.01%	(0.00)
Sorted on Catholic Ratio							
Monthly Return	-0.01%	0.02%	0.03%	0.00%	-0.01%	0.00%	(0.04)
Four-Factor Alpha	0.02%	0.00%	-0.02%	-0.01%	-0.01%	-0.03%	(-1.14)
Beta	-1.90%	-1.20%	-0.09%	-0.07%	-1.15%	0.75%	(0.63)
SMB Loading	3.25%	8.16%	5.28%	6.60%	5.46%	2.21%*	(1.73)
HML Loading	-2.80%	-0.61%	5.18%	3.13%	-0.51%	2.29%	(1.22)
UMD Loading	0.06%	-0.28%	-1.28%	-0.08%	1.25%	1.19%	(1.22)
Sorted on Total Religiosity Ratio							
Monthly Return	0.01%	0.05%	0.02%	-0.03%	-0.02%	-0.03%	(-1.04)
Four-Factor Alpha	0.00%	0.04%	0.01%	-0.01%	-0.08%	-0.07%	(-1.35)
Beta	-1.77%	-0.10%	-1.08%	-0.41%	-1.13%	0.64%	(0.43)
SMB Loading	9.65%	2.70%	4.10%	5.36%	8.27%	-1.39%	(-0.46)
HML Loading	-2.16%	2.76%	-0.16%	3.26%	0.22%	2.38%	(1.12)
UMD Loading	-0.83%	-1.32%	0.57%	0.71%	1.17%	2.00%	(1.43)

Table V (Continued)
Returns and Factor Loadings Sorted on Religiosity Ratios

Panel B: Difference in Returns Between Funds with High and Low Religiosity Ratios: Sub-Samples							
	Fund Size			Fund Age		Sub-Period	
	Small	Medium	Large	Young	Old	1988–1999	2000–2008
Sorted on Protestant Ratio							
Monthly Return	-0.16%**	-0.15%*	-0.16%	0.07%	-0.11%**	-0.10%	-0.08%
Four-Factor Alpha	-0.05%	-0.10%	-0.11%	0.13%*	-0.03%	0.01%	-0.04%*
Beta	-4.99%**	-1.68%	0.01%	-1.82%	1.01%	1.40%	-3.46%**
SMB Loading	-4.93%**	-2.28%	-7.11%**	-5.45%	-7.84%*	-9.40%	-5.03%*
HML Loading	2.38%	-1.54%	-13.64%***	-7.29%*	-6.01%*	-6.98%*	-1.39%
UMD Loading	-8.16%**	3.69%	2.95%	5.48%	0.05%	1.92%	-2.54%*
Sorted on Catholic Ratio							
Monthly Return	0.14%	0.06%	-0.03%	-0.12%*	0.03%	-0.05%	0.07%
Four-Factor Alpha	0.01%	-0.05%	-0.08%**	-0.14%*	0.00%	-0.06%	0.01%
Beta	5.15%*	1.71%	0.19%	2.84%	-1.09%	-0.61%	2.56%
SMB Loading	-0.24%	4.92%	2.34%	-2.13%	3.23%*	2.55%	1.77%
HML Loading	4.66%	0.58%	0.02%	1.79%	2.91%	2.72%	1.72%
UMD Loading	1.76%	3.54%	0.99%	3.24%	-0.48%	0.74%	1.79%
Sorted on Total Religiosity Ratio							
Monthly Return	0.00%	0.04%	-0.10%*	0.05%	-0.05%	-0.08%**	0.04%
Four-Factor Alpha	-0.11%	-0.06%	-0.20%***	0.03%	-0.03%	-0.03%	-0.14%
Beta	-2.78%	0.83%	3.38%	0.48%	1.98%	2.59%	-1.97%
SMB Loading	-0.84%	2.56%	3.79%	-16.66%**	2.09%	-2.68%	0.34%
HML Loading	4.85%	3.89%*	-4.49%***	-3.19%	3.32%	1.24%	3.90%
UMD Loading	1.86%	2.73%*	2.87%*	1.04%	1.25%	3.49%	0.00%

Table VI
Panel Regressions of Returns and Factor Loadings

This table reports multivariate regressions from 1988–2008 where dependent variables are returns, alphas, and factor loadings. *Fund Return* of a mutual fund is the annual average of monthly returns of the fund. We use annual four-factor model regressions of monthly fund returns (Carhart (1997)) to obtain *Alpha* as the intercept, and loadings on the market portfolio (*Beta*), *SMB*, *HML*, and *UMD*. We obtain factor returns from Kenneth French's data library. Independent variables include religiosity ratios and fund characteristics. Protestant ratio (Catholic ratio) of a county is total number of members of Protestant congregations (Catholic congregations) divided by total population of the county. *Fund Age* is the number of years since the fund's first record in the CRSP Mutual Fund database. *Fund Size* is the TNA of the fund. # *Funds in Family* is the number of funds within the same management company as the fund. We also include the following county-level demographic variables from the US Census Bureau. *Age* is the median age of the county population. *Education* is the fraction of the population over 25-years-old holding a bachelor's or higher degree. *Income* is the per capita personal income. *Population* is the total county population. *Minority* is the fraction of the minority populations in the total county population. *Married* is the fraction of married households in total number of households. *Mf* is the ratio of male population to female population in the county. We include (Year*Fund Objective) fixed effect in each regression model. The t-statistics in parentheses are calculated using standard errors clustered at the year*fund-objective level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels.

Panel A: Regression Analysis for Protestant Ratio

	Return	Alpha	Market Beta	SMB Loading	HML Loading	UMD Loading
Protestant Ratio	-0.5606%**	-0.3423%*	-7.9518%*	-17.3717%***	-19.3967%**	5.9391%
	(-2.31)	(-1.84)	(-1.69)	(-3.62)	(-2.21)	(1.22)
Log (Fund Size, in $M)	-0.0148%	0.0222%*	1.4691%***	-1.1698%***	-2.2853%***	0.6202%*
	(-0.76)	(1.74)	(3.82)	(-2.98)	(-3.74)	(1.76)
Log (Fund Age, in Years)	-0.0551%*	-0.0126%	-3.1849%***	-9.7398%***	-0.0419%	-2.9054%**
	(-1.93)	(-0.70)	(-2.89)	(-7.77)	(-0.04)	(-2.31)
Log (# Funds in Family)	0.0176%*	0.0302%**	0.6850%***	-1.9881%***	0.0954%	0.0667%
	(1.89)	(2.48)	(2.71)	(-5.32)	(0.20)	(0.28)
Dem.: Age	-0.0301%***	-0.0059%	0.3372%	0.7244%**	-1.6298%***	0.3272%*
	(-3.13)	(-0.96)	(1.13)	(2.42)	(-3.74)	(1.77)
Dem.: Education	0.0014%	0.0059%	0.0199%	-0.4124%**	-0.2592%	0.0735%
	(0.63)	(1.50)	(0.18)	(-2.42)	(-1.57)	(0.67)
Dem.: Income	0.0000%	0.0000%*	0.0000%	0.0002%*	0.0001%	0.0000%
	(-0.88)	(-1.84)	(-0.79)	(1.94)	(0.75)	(-0.16)
Dem.: Log (Population)	-0.0017%	-0.0196%	0.0432%	1.8297%***	1.8633%***	0.1610%
	(-0.12)	(-1.49)	(0.09)	(2.89)	(3.13)	(0.29)
Dem.: Mf	-0.6875%	-0.9583%**	33.4455%	91.2813%***	-108.9849%***	36.3055%**
	(-0.89)	(-2.30)	(1.39)	(6.16)	(-4.12)	(2.07)
Dem.: Minority	-0.1479%	0.4432%***	-10.3928%**	-12.5241%**	-7.5094%	-17.6534%***
	(-1.42)	(3.06)	(-2.51)	(-2.47)	(-1.43)	(-4.55)
Dem.: Married	0.0936%	0.8824%***	-28.4034%**	-26.8466%**	16.5148%	-29.7590%***
	(0.37)	(2.60)	(-2.12)	(-2.23)	(1.10)	(-2.93)
(Year*Fund Obj.) Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
N(Years)	21	21	21	21	21	21
Obs	13,733	13,733	13,733	13,733	13,733	13,733
R^2	70.18%	2.55%	4.12%	5.95%	6.31%	4.14%

Table VI (Continued)
Panel Regressions of Returns and Factor Loadings

Panel B: Regression analysis for Catholic Ratio						
	Return	Alpha	Market Beta	SMB Loading	HML Loading	UMD Loading
Catholic Ratio	0.1253%	0.0027%	5.5152%	11.2997%***	10.1193%*	3.9356%
	(1.12)	(0.02)	(1.66)	(2.82)	(1.80)	(0.89)
Log (Fund Size, in $M)	-0.0149%	0.0221%*	1.4688%***	-1.1706%***	-2.2868%***	0.6225%*
	(-0.77)	(1.73)	(3.82)	(-2.97)	(-3.72)	(1.77)
Log (Fund Age, in Years)	-0.0564%*	-0.0129%	-3.2268%***	-9.8267%***	-0.1237%	-2.9232%**
	(-1.95)	(-0.71)	(-2.93)	(-7.77)	(-0.11)	(-2.33)
Log (# Funds in Family)	0.0191%**	0.0317%***	0.6763%***	-2.0011%***	0.1009%	0.0087%
	(2.07)	(2.71)	(2.75)	(-5.37)	(0.21)	(0.04)
Demographic Variables	Yes	Yes	Yes	Yes	Yes	Yes
(Year*Fund Obj.) Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
N(Years)	21	21	21	21	21	21
Obs	13,733	13,733	13,733	13,733	13,733	13,733
R^2	70.14%	2.53%	4.12%	6.28%	5.94%	4.14%

Table VII
Mutual Fund Turnover and Religiosity Ratios

Panel A reports average turnover ratios across religiosity ratios. Annual mutual fund *Turnover Ratio* is obtained from CRSP directly and is the minimum of aggregated sales or aggregated purchases by a fund divided by the TNA of the fund. To control for investment objective, we further adjust turnover of a fund by subtracting the annual median value of that variable for all funds with the same investment objective code. Each year from 1988–2008, we sort funds into quintiles of religiosity ratios, where Protestant ratio (Catholic ratio, total religiosity ratio) of a county is total number of members of Protestant congregations (Catholic congregations, all congregations) divided by total population of the county. We then calculate the annual means and medians of fund turnovers for each quintile, and report the time-series means for each quintile in Panel A. We also report the difference between the top and bottom quintiles of religiosity ratios and their t-statistics in parentheses. Panel B reports Panel regressions of turnovers. Independent variables include religiosity ratios and fund characteristics. *Fund Age* is the number of years since the fund's first record in CRSP Mutual Fund data. *Fund Size* is the TNA of the fund. # *Funds in Family* is the number of funds within the management company of the fund. We also include county-level demographic variables from the US Census Bureau. *Age* is the median age of the county population. *Education* is percentage population over 25-years-old holding a bachelor's or higher degree. *Income* is per capita personal income. *Population* is the total county population. *Minority* is the fraction of the minority populations in the total county population. *Married* is the fraction of married households in total number of households. *Mf* is the ratio of male population to female population in the county. We include (Year*Fund Objective) fixed effects in each regression. The t-statistics in parentheses are calculated using standard errors clustered at the year*fund-objective level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Coefficients of demographic variables are not reported for brevity.

Panel A: Annual Turnover Ratio Sorted on Religiosity Ratios

	Protestant Ratio		Catholic Ratio		Total Religiosity Ratio	
Ratio quintile	Mean	Median	Mean	Median	Mean	Median
Low	1.09	1.15	0.75	0.69	0.92	0.89
2	1.00	1.03	0.92	0.93	0.94	0.91
3	0.95	0.86	1.01	0.98	0.83	0.78
4	0.86	0.89	0.94	0.88	0.93	0.91
High	0.79	0.77	1.20	0.95	1.04	0.98
High – Low	-0.30***		0.44		0.11	
t-stat	(3.51)		(1.56)		(1.19)	

Panel B: Parameter Estimates from Regressions of Annual Turnover Ratio

	Model 1	Model 2	Model 3
Protestant Ratio	-1.0772***		
	(-3.00)		
Catholic Ratio		1.1756***	
		(5.60)	
Total Religiosity Ratio			0.9089***
			(3.08)
Log (Fund Size, in $M)	-0.0001***	-0.0001***	-0.0001***
	(-5.37)	(-5.45)	(-5.41)
Log (Fund Age, in Years)	0.3725	0.1546	0.2718
	(0.49)	(0.21)	(0.36)
Log (# Funds in Family)	0.0581***	0.0599***	0.0643***
	(3.55)	(3.46)	(3.62)
Demographic Variables	Yes	Yes	Yes
(Year*Fund Obj.) Fixed Effects	Yes	Yes	Yes
N(Year)	21	21	21
Obs.	6,760	6,760	6,760
R^2	3.68%	4.21%	3.61%

Table VIII
Return Gap and Religiosity Ratios

Panel A reports average monthly return gaps across religiosity ratios. The sample period is from 1988–2006 due to the availability of data on return gap. Monthly return gap is defined as the difference between the reported monthly return and the monthly holdings return of the portfolio disclosed in the previous period. Each year we sort funds into quintiles of religiosity ratios, where Protestant ratio (Catholic ratio, total religiosity ratio) of a county is total number of members of Protestant congregations (Catholic congregations, all congregations) divided by total population of the county. We then calculate the annual means and medians of fund return gaps for each quintile, and report the time-series means for each quintile in Panel A. We also report the difference between the top and bottom quintiles of religiosity ratios and their t-statistics in parentheses. Panel B reports Panel regressions where the dependent variables are monthly fund return gaps. The independent variables include religiosity ratios and fund characteristics. *Fund Age* is the number of years since the fund's first appearance in the CRSP Mutual Fund database. *Fund Size* is the TNA of the fund. # *Funds in Family* is the number of funds within the management company of the fund. We also include county-level demographic variables from the US Census Bureau. *Age* is the median age of the county population. *Education* is the fraction of the population over 25-years-old holding a bachelor's or higher degree. *Income* is the per capita personal income. *Population* is the total county population. *Minority* is the fraction of the minority populations in the total county population. *Married* is the fraction of married households in total number of households. *Mf* is the ratio of male population versus female population in the county. We include (Month*Fund Objective) fixed effect in each regression model. The t-statistics in parentheses are calculated using standard errors clustered at the month*fund-objective level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. For brevity we do not report coefficients of demographic variables.

Panel A: Monthly Return Gap Sorted on Religiosity Ratios

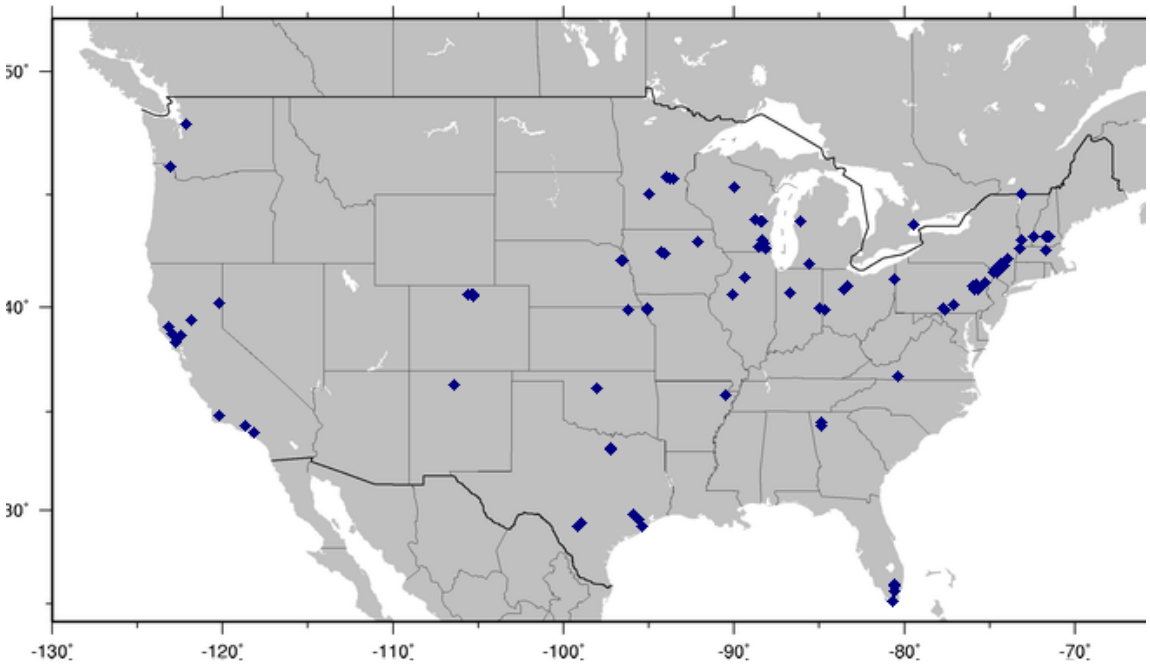
	Protestant Ratio		Catholic Ratio		Total Religiosity Ratio	
Ratio quintile	Mean	Median	Mean	Median	Mean	Median
Low	0.05%	0.03%	0.00%	-0.01%	0.04%	0.01%
2	0.03%	0.01%	0.05%	0.04%	0.02%	0.04%
3	0.02%	0.03%	0.04%	0.03%	0.01%	0.01%
4	0.04%	0.03%	0.03%	0.03%	0.03%	0.02%
High	-0.02%	-0.01%	0.01%	0.00%	0.02%	0.02%
High – Low	-0.06%***		0.01%		-0.02%	0.00%
t-stat	(-3.52)		(-1.49)		(-0.97)	

Panel B: Parameter Estimates from Regressions of Monthly Return Gap

	Model 1	Model 2	Model 3
Protestant Ratio	-0.1567%**		
	(-2.18)		
Catholic Ratio		0.0644%	
		(1.44)	
Total Religiosity Ratio			0.1109%**
			(2.17)
Log (Fund Size, in $M)	0.0000%	0.0000%	0.0000%
	(-0.34)	(-0.36)	(-0.34)
Log (Fund Age, in Years)	-0.3014%*	-0.3110%**	-0.3140%**
	(-1.96)	(-2.01)	(-2.03)
Log (# Funds in Family)	0.0002%	0.0002%	0.0003%
	(0.05)	(0.05)	(0.10)
Demographic Variables	Yes	Yes	Yes
(Month*Fund Obj.) Fixed Effects	Yes	Yes	Yes
N(Months)	228	228	228
Obs.	106,902	106,902	106,902
R^2	0.73%	0.72%	0.72%

Figure 1. **Geographic Distribution of Growth and Aggressive Growth Mutual Funds**
This figure depicts the snapshot of geographical distribution of growth and aggressive growth U.S. mutual funds in 1988 (Panel A) and 2000 (Panel B).

Panel A. Geographic Distribution of Mutual Funds in 1988



Panel B. Geographic Distribution of Mutual Funds in 2000

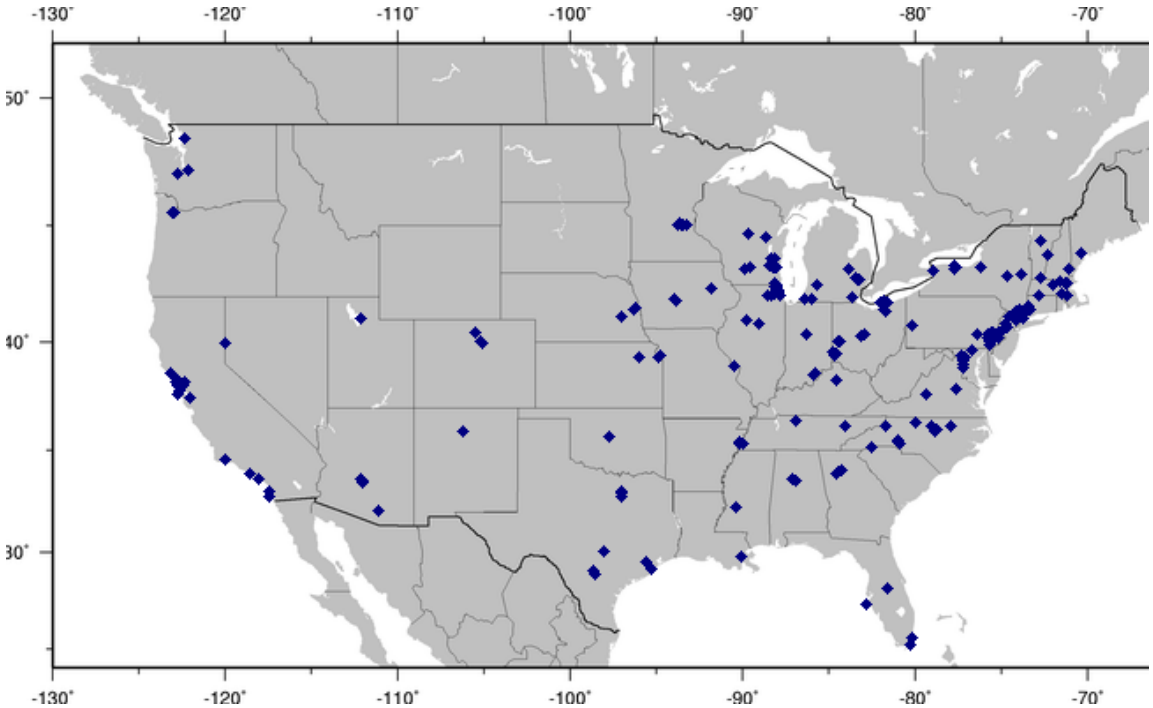


Figure 2. Volatilities Sorted on Religiosity Ratios

This figure plots total and idiosyncratic fund return volatilities across religiosity ratios of mutual fund locations. *Volatility* of a fund is defined as standard deviation of monthly returns of the fund estimated at annual intervals. *Idiosyncratic Volatility* of a fund is defined as the volatility of the error terms from annual four-factor model regressions of the fund's monthly returns (Carhart (1997)). To control for investment objective, we further adjust *Volatility and Idiosyncratic Volatility* of a fund by subtracting the annual median values within the fund's investment objective code. Each year from 1988–2008, we sort funds into quintiles of religiosity ratios, where Protestant ratio (Catholic ratio, total religiosity ratio) of a county is total number of members of Protestant congregations (Catholic congregations, all congregations) divided by total population of the county. We then calculate the annual means of our volatility proxies for each quintile, and plot the time-series means for each quintile. Panels A, B, and C plot results with Protestant ratio, Catholic ratio, and total religiosity ratio, respectively.

Panel A: Total and Idiosyncratic Volatilities Sorted on Protestant Ratios

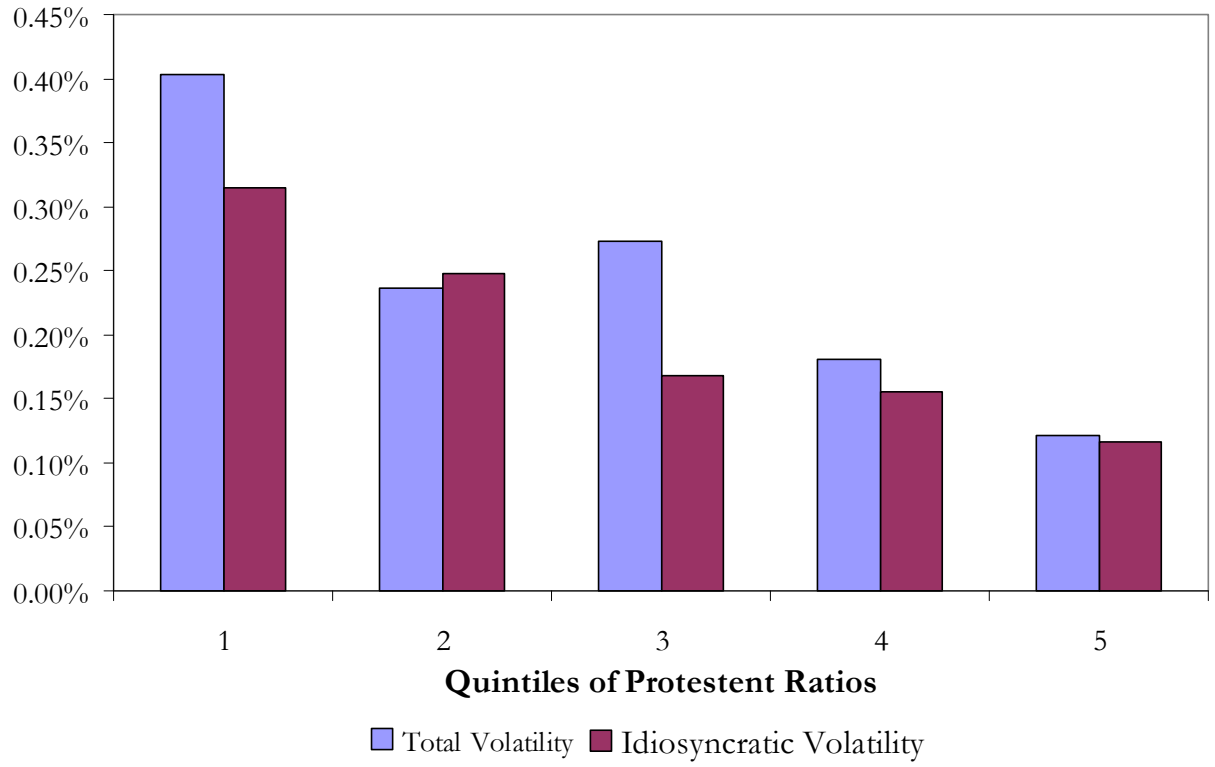
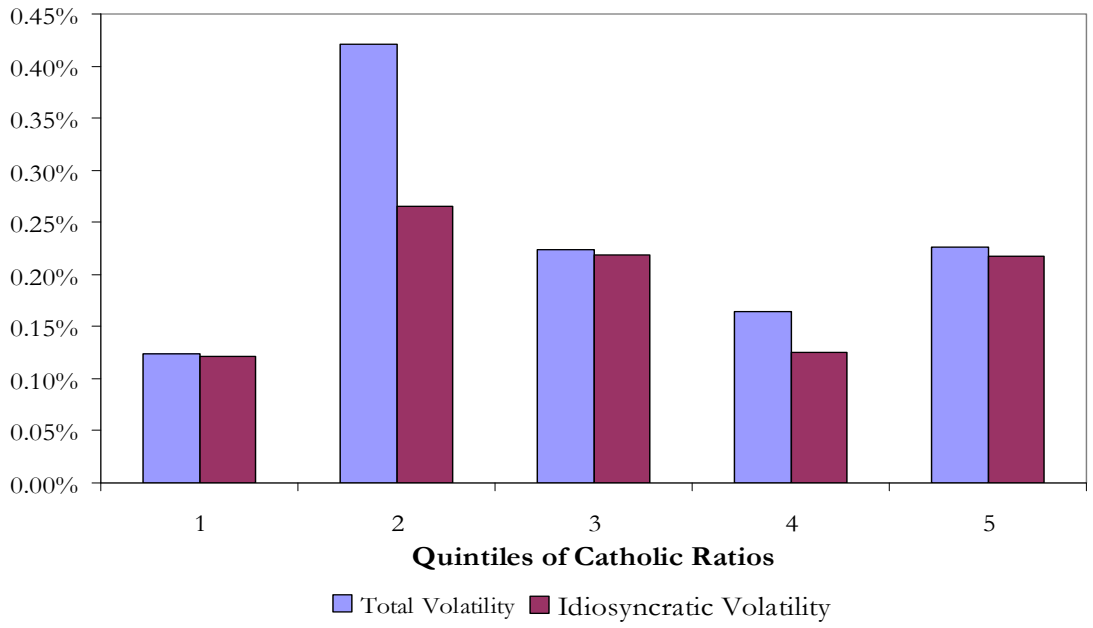


Figure 2. Volatilities Sorted on Religiosity Ratios (Continued)

Panel B: Total and Idiosyncratic Volatilities Sorted on Catholic Ratios



Panel C: Total and Idiosyncratic Volatilities Sorted on Total Religiosity Ratios

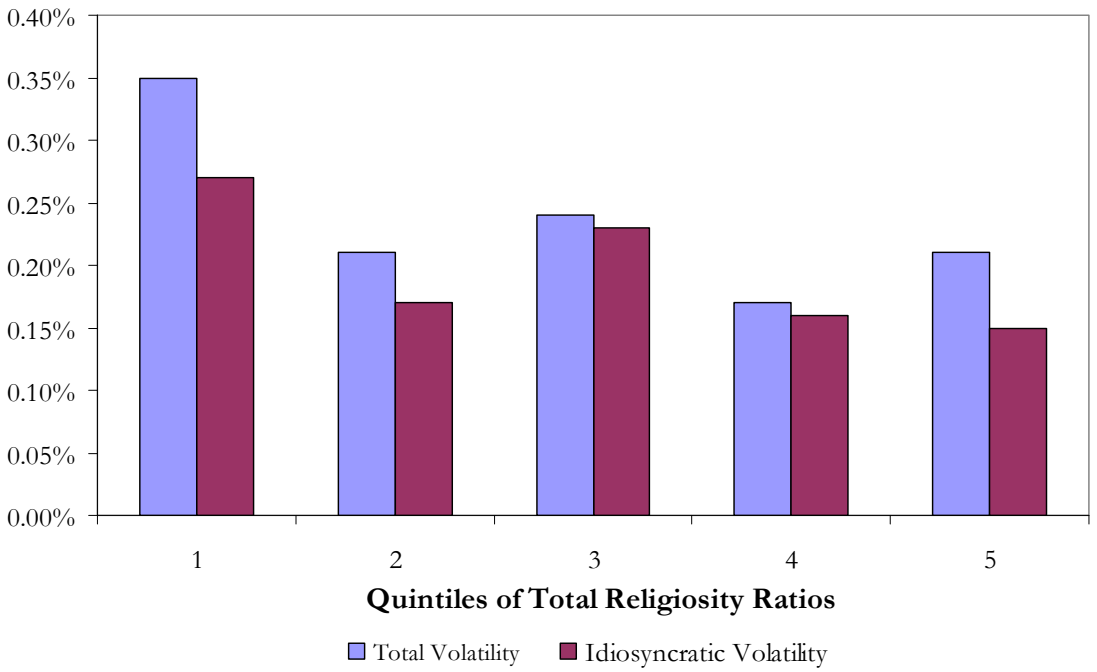
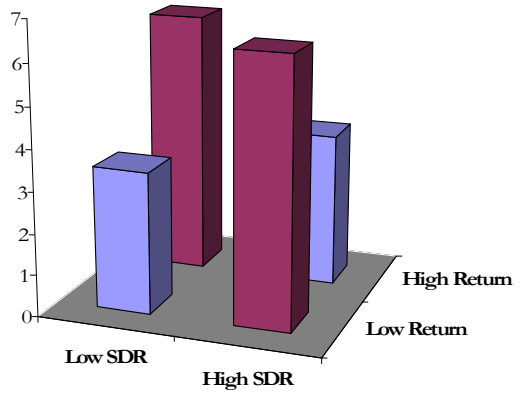


Figure 3. **Mutual Fund Tournament across Religiosity Ratios**

Panel A plots mutual fund tournament risk taking behavior across Protestant ratios. Each year from 1999–2008, we sort funds into terciles of Protestant ratios of fund locations, where Protestant ratio of a county is total number of members of Protestant congregations divided by total population of the county. Then within high and low Protestant ratio terciles, we divide funds into four groups based on whether 1) RTN is below or above the median, and 2) SDR is above or below the median. For each (X, 12-X) row, RTN of a fund-year is the buy-and-hold return of the fund in the first X months of the year. X takes the values of 5, 6, 7, 8, and 9. SDR (standard deviation ratio) is the ratio of standard deviation of returns in the last (12-X) months of the year to standard deviation of returns in first X months of the year. Both RTN and SDR are calculated using daily mutual fund returns, and we follow Chen and Pennacchi (2009) to further adjust a fund's daily return for investment objective by subtracting equal-weighted average daily return of all funds in the same investment category. We then plot percentage frequency for each cell using observations over all years across different values of X. To illustrate the patterns clearly we subtract all frequencies by 20 percent. Panels B and C plot percentage frequencies with Catholic ratios and total religiosity ratios, respectively, where Catholic ratio (total religiosity ratio) of a county is total number of members of Catholic congregations (all congregations) divided by total population of the county.

Panel A: Percentage Frequencies (minus 20%) of 2X2 cells sorted on RTN and SDR: High versus Low Protestant Ratios

Funds with Low Protestant Ratios



Funds with High Protestant Ratios

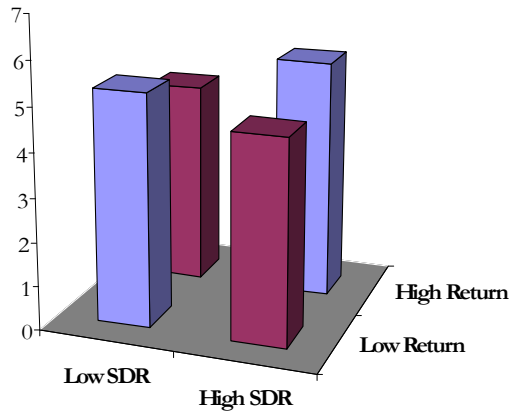
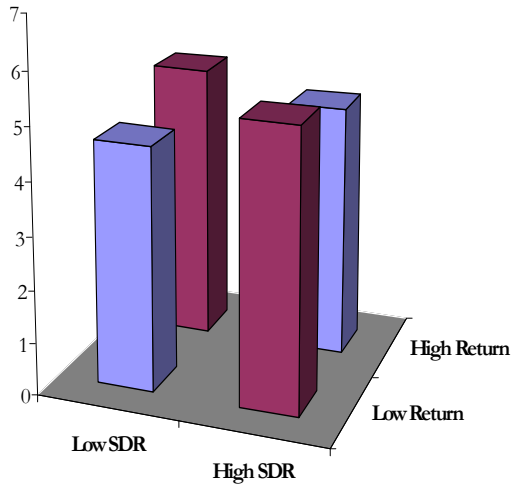


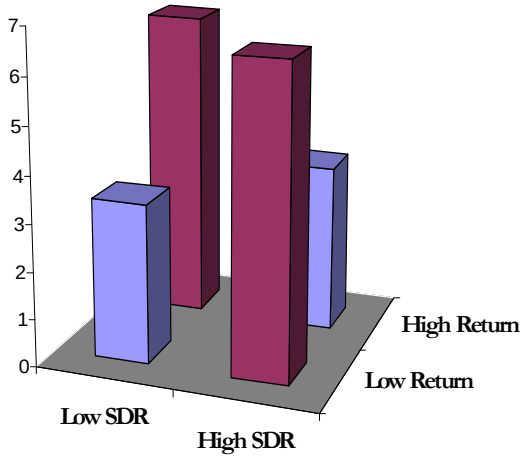
Figure 3. Mutual Fund Tournament across Religiosity Ratios (Continued)

Panel B: Percentage Frequencies (minus 20%) of 2X2 cells sorted on RTN and SDR: High versus Low Catholic Ratios

Funds with Low Catholic Ratios

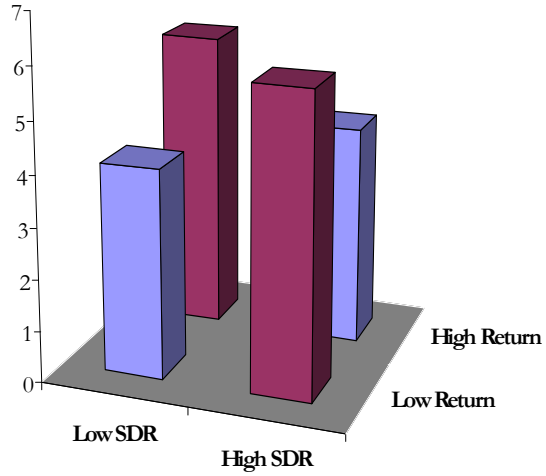


Funds with High Catholic Ratios



Panel C: Percentage Frequencies (minus 20%) of 2X2 cells sorted on RTN and SDR: High versus Low Total Religiosity Ratios

Funds with Low Total Religiosity Ratios



Funds with High Total Religiosity Ratios