Religious Beliefs, Gambling Attitudes, and Financial Market Outcomes*

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Abstract – We use people's religious background as a proxy for their gambling propensity and investigate whether geographical variation in religion-induced gambling norms affects aggregate market outcomes. We examine four economic settings in which the recent literature has suggested a role for gambling and speculation. Our key conjecture is that gambling propensity would be stronger in regions with higher concentration of Catholics relative to Protestants. Consistent with our conjecture, we find that religion-induced gambling preferences influence the portfolio decisions of institutional investors. Investors located in regions with high Catholic-Protestant ratio (CPRATIO) exhibit a stronger propensity to hold stocks with lottery features. Further, in a corporate setting, we show that broad-based employee stock option plans, which are likely to appeal more to employees with stronger gambling preferences, are more popular in high CPRATIO regions. Examining the aggregate impact of gambling on stock returns, we find that the initial day return following an initial public offering is higher for firms located in high CPRATIO regions where local speculative demand is expected to be stronger. In a broader market setting, we find that the magnitude of the negative lottery-stock premium is larger in high CPRATIO regions. Collectively, our results indicate that religious beliefs, through their influence on gambling attitudes, impact investors' portfolio choices, corporate decisions, and stock returns.

1. Introduction

Gambling and speculation play an important role in financial markets. These and related activities are often associated with high levels of trading volume, high return volatility, and low average returns (e.g., Scheinkman and Xiong (2003), Hong, Scheinkman, and Xiong (2006), Grinblatt and Keloharju (2009), Dorn and Sengmueller (2009)). As gambling attains wider acceptability in society and a "lottery culture" emerges (e.g., Shiller (2000)), the influence of gambling behavior in financial markets is likely to increase and could have economically significant effects on corporate decisions and stock returns. Specifically, in market settings that superficially resemble actual gambling environments and in which skewness is a salient feature, people's gambling attitudes may influence aggregate market outcomes.

For example, if the positively skewed returns of initial public offering (IPO) stocks lead investors to perceive IPOs as lotteries, their preference for lottery-like payoffs and trading behavior could generate initial overpricing (e.g., Barberis and Huang (2008)). More generally, if investors exhibit a preference for stocks with lottery features, all else equal, stocks with lottery-type characteristics would earn lower average returns.[1] Similarly, the popularity of broad-based

[1] Motivated by the salient features of state lotteries (low price, low negative expected return, and risky as well as skewed payoff) and the theoretical framework of Barberis and Huang (2008), Kumar (2009) defines stocks that have low prices, high idiosyncratic volatility, and high idiosyncratic skewness as lottery-type stocks. In contrast, non-lottery-type stocks have high prices, low idiosyncratic volatility, and low idiosyncratic skewness. See Section 2 for an additional discussion.

employee stock option (ESO) plans has been difficult to explain within the traditional economic framework (e.g., Oyer and Schaefer (2004), Bergman and Jenter (2007), Kedia and Rajgopal (2009)). One potential explanation for this puzzle is that option grants to non-executives reflect the gambling preferences of rank and file employees (e.g., Spalt (2009)). Individuals with strong gambling preferences may find firms that offer option-based compensation plans attractive if they view stock options as "lottery tickets" and some managers may even attempt to cater to those preferences.[2]

The important role of gambling in various market settings has been recognized in the recent asset pricing and corporate finance literatures. However, it has been difficult to attribute aggregate market outcomes directly to people's gambling preferences because individual-level gambling and speculative activities cannot be directly observed. In this paper, we use people's religious beliefs as a proxy for their gambling propensity and examine whether geographical variation in religious composition, particularly the variation in the ratio of Catholics to Protestants across U.S. counties, allows us to identify market-wide effects of gambling behavior.

Our choice of religious composition as a proxy for gambling propensity is motivated by the observation that gambling attitudes are strongly determined by one's religious background. In particular, the Protestant and Catholic churches have very distinct views on gambling.[3] A strong moral opposition to gambling and lotteries has been an integral part of the Protestant movement since its inception, and many Protestants perceive gambling as a sinful activity (e.g., Starkey (1964), Ozment (1991), Ellison and Nybroten (1999)). Although individual Protestant churches vary in the intensity with which they oppose gambling, the opposition to gambling is quite general. The largest Protestant group, the Southern Baptists, is particularly strident in their censure of gambling.

In contrast, the Roman Catholic church maintains a tolerant attitude towards moderate levels of gambling and is less disapproving of gambling activities. It has even used gambling in

[2]Evidence showing that employees frequently value options higher than the actuarially fair value (e.g., Hodge, Rajgopal, and Shevlin (2010), Hallock and Olson (2006), Devers, Wiseman, and Holmes (2007)), as well as the fact that riskier firms grant more employee stock options (Spalt (2009)), supports the conjecture that employees may perceive stock options as gambles.

[3]The gambling views typical of many Protestant churches are expressed in the United Methodist Church's *2004 Book of Resolutions*: "Gambling is a menace to society, deadly to the best interests of moral, social, economic, and spiritual life, and destructive of good government. As an act of faith and concern, Christians should abstain from gambling and should strive to minister to those victimized by the practice." The position of the Catholic Church on gambling is summarized in the *New Catholic Encyclopedia*: "A person is entitled to dispose of his own property as he wills... so long as in doing so he does not render himself incapable of fulfilling duties incumbent upon him by reason of justice or charity. Gambling, therefore, though a luxury, is not considered sinful except when the indulgence in it is inconsistent with duty." Further, *The Catechism of the Catholic Church (2413)* states: "Games of chance (card games, etc.) or wagers are not in themselves contrary to justice. They become morally unacceptable when they deprive someone of what is necessary to provide for his needs and those of others. The passion for gambling risks becoming an enslavement. Unfair wagers and cheating at games constitute grave matter, unless the damage inflicted is so slight that the one who suffers it cannot reasonably consider it significant." Thompson (2001, Pages 317-324) provides a summary of the gambling views of major religious denominations in the U.S.

the form of bingo and charitable gaming events as an important source of fund-raising (e.g., Diaz (2000), Hoffman (2000)). Among other prominent religious denominations in the U.S., people of Jewish faith behave similar to Catholics and accept gambling activities more readily, while the gambling attitudes of Latter-Day Saints (Mormons) are aligned more closely with those of Protestants.

The impact of these diverse viewpoints on gambling is evident in state lottery adoption policies and levels of lottery expenditures. Prior empirical research has shown that the popularity of state lotteries in a region is affected by the dominant local religion (e.g., Berry and Berry (1990), Martin and Yandle (1990), Ellison and Nybroten (1999)). A few recent studies also demonstrate that religion-induced gambling attitudes carry over into financial decisions (e.g., Kumar (2009), Doran, Jiang, and Peterson (2010)). We confirm these findings using our county-level measures of religious composition. In particular, we show that states with higher concentration of Catholics relative to Protestants (i.e., higher Catholic-Protestant ratio (CPRATIO)) are more likely to legalize state lotteries and adopt them earlier. Further, at both state and county levels, we find that per capita lottery sales are higher in regions with high CPRATIO. We also show that individual investors located in high CPRATIO regions assign larger portfolio weights to lottery-type stocks (see Figure 1) and confirm that religion-induced gambling attitudes carry over into financial decisions.

Motivated by these empirical findings, we conjecture that religion-induced heterogeneity in gambling preferences and behavior could affect economic decisions in other settings. In particular, the predominant local religion could influence local cultural values and norms and consequently affect the financial and economic decisions of individuals located in that region, even if they do not personally adhere to the dominant local faith.[4] Further, these financial and economic decisions could aggregate and generate market-wide forces that can potentially influence aggregate financial market outcomes.

We consider four specific economic settings in which the existing literature has suggested the possible role of gambling and examine the link between religious beliefs, gambling attitudes, and aggregate market outcomes. First, we examine the extent to which geographical heterogeneity in religious beliefs influences investors' portfolio choices. We find that the portfolio characteristics of institutional investors are influenced by the religious characteristics of the neighborhoods in which they are located. Although institutions on average tend to avoid lottery-type stocks (e.g., Kumar (2009)), institutions located in high CPRATIO regions assign a larger weight to stocks with lottery features and simultaneously under-weight non-lottery-type stocks. The religion-induced differences in stock holdings are stronger among "aggressive" institutions and

[4]We do not use the local religion measures to identify the religious background of the individual making a decision. While they may be related, our assumption is that the dominant local religion shapes the local culture, which in turn has the potential to systematically affect the decisions of local individuals in different settings, including economic decisions. For example, the decisions of an individual located in Utah might be influenced by the local Mormon culture even if the person is not a Mormon. Similarly, a Catholic in Protestant-dominated Tennessee might at least partially be influenced by local Protestant cultural norms.

those institutions that trade more actively or hold concentrated portfolios containing few stocks. Their preference for lottery-type stocks is also amplified during the end of the year when the temptation to engage in risk-seeking and gambling activities is likely to be stronger due to performance-based incentives (Brown, Harlow, and Starks (1996)).

Second, we investigate a corporate finance puzzle: Why do firms grant options to non-executive rank and file employees? We show that broad-based employee stock option plans, which would appeal more to employees with strong gambling preferences, are more popular in high CPRATIO regions where individuals are likely to exhibit a stronger propensity to gamble. Further, consistent with our gambling interpretation, we find that the sensitivity of the level of non-executive option grants to local religious composition is greater among high volatility firms, which would be more attractive to individuals with strong gambling preferences due to their higher skewness. These results indicate that the puzzle of broad-based employee stock option plans could at least be partially resolved within a theoretical framework that recognizes the potential link between compensation and gambling.

Third, we focus on the IPO markets and test one of the key empirical predictions of the Barberis and Huang (2008) model. They conjecture that excess speculative demand of skewness-loving investors can generate overpricing in securities such as IPOs that have positively skewed returns. Consistent with this conjecture, we find that the initial day return following an initial public offering is higher for IPO firms located in high CPRATIO regions where the propensity to gamble is likely to be higher. To strengthen the link between first-day IPO return and gambling propensity of local investors, we show that the relation between initial day returns and CPRATIO is stronger in regions with higher stock market participation rates (as proxied by higher income and higher education levels) and stronger local bias. In these areas, local investors are more likely to trade local IPOs and, thus, more likely to play a marginal price-setting role. Collectively, our IPO results indicate that the puzzling phenomenon of IPO underpricing is at least partially influenced by the gambling behavior of local investors.

In the last part of the paper, we study the effect of gambling on stock returns in a broader market setting. Specifically, we investigate the pricing of stocks with lottery-type characteristics. This exercise is also motivated by the theoretical predictions in Barberis and Huang (2008), who conjecture that securities with lottery features are expected to earn lower average returns because investors are willing to accept lower average returns for a tiny probability of a large potential gain. Consistent with their conjecture, we find that lottery-type stocks earn lower average returns. In addition, consistent with our gambling hypothesis, we find that the magnitude of the negative lottery-stock premium is stronger in regions with high CPRATIO.

Our empirical findings are robust to a large number of variations to the baseline specifications. In particular, when we use the Rajan and Zingales (1998) method to account for unobserved heterogeneity at the state- and county-levels, we obtain results that are qualitatively similar to our baseline results. Taken together, our empirical results indicate that religion-induced gambling norms influence gambling preferences, individual-level economic decisions,

and aggregate market-level outcomes. Both corporate policies and asset prices are influenced by religion-induced local gambling propensity.

These results complement recent evidence in Hilary and Hui (2009) and show that religion influences financial market outcomes not only through the risk aversion channel but also through its effect on the skewness and gambling preferences of individuals.[5] Further, while previous studies indicate that religion could influence economic growth (Barro and McCleary (2003)) and the level of investor protection in a country (Stulz and Williamson (2003)), our results highlight the importance of religious composition at a more disaggregate individual and firm level. In broader terms, our empirical evidence contributes to the emerging literature in economics that examines the interplay between culture and economic outcomes (e.g., Guiso, Sapienza, and Zingales (2003, 2006)). Because religion is a key cultural attribute, our results indicate that through its impact on people's gambling attitudes, cultural shifts can influence aggregate financial market outcomes.

The rest of the paper is organized as follows. In the next section, we summarize our key testable hypotheses. We describe our main data sources in Section 3 and motivate the choice of our gambling proxy in Section 4. We present our main empirical results in Section 5 and conclude in Section 6 with a brief summary.

2. Related Literature and Testable Hypotheses

We develop our gambling-motivated hypotheses in four distinct economic settings where the existing literature has emphasized the potential role of gambling and speculation in determining the aggregate market outcome. We assume that the religious composition of a region would reflect the gambling attitudes of local individuals. In particular, given the differences in the religious teachings and the related empirical evidence, we conjecture that Catholics (Protestants) are likely to exhibit a higher (lower) propensity to gamble.

In the first economic setting, we examine whether local gambling attitudes influence the portfolio decisions of local institutional investors. Specifically, we investigate whether the institutional preference for stocks with lottery features varies with the religious characteristics of institutional location. Our choice is motivated by the evidence in Kumar (2009), who shows that the socioeconomic characteristics of retail investors, including the religious characteristics of their local neighborhood, influence their investment in lottery-type stocks. We extend this insight to institutional investors and argue that religion-induced local cultural norms would influence institutional portfolio decisions.

Lottery-type stocks represent low cost investments with very high potential reward to cost

[5]Hilary and Hui (2009) examine the effect of corporate culture on economic decisions. They show that corporate policies of firms located in more religious areas are more conservative and reflect higher levels of risk aversion. Specifically, when the county-level religiosity is high, firms have lower risk exposures, require higher internal rates of return before investing in risky projects, and experience lower long-term growth.

ratio. Just as state lotteries have very low prices relative to the highest potential payoff, low negative expected returns, and risky as well as positively skewed payoffs, Kumar (2009) identifies stocks that have low prices, high idiosyncratic volatility, and high idiosyncratic skewness as lottery-type stocks. This definition is also motivated by the theoretical model of Barberis and Huang (2008), where investors overweight low probability events and exhibit a preference for stocks with positive skewness.[6] In contrast, stocks have high prices, low idiosyncratic volatility, and low idiosyncratic skewness are classified into the non-lottery-type category.[7]

Although a typical institution is likely to avoid risky, lottery-type stocks due to prudent man rules and other institutional constraints (e.g., Badrinath, Gay, and Kale (1989), Del Guercio (1996)), some institutions might gravitate toward these stocks because they provide "cheap bets" and offer good opportunities for exploiting information asymmetry. In particular, the institutional attraction for smaller, lottery-type stocks might increase over time as competition in other market segments increases (e.g., Bennett, Sias, and Starks (2003)). Therefore, we conjecture that:

> **H1:** *Institutional gambling preference:* Institutions located in regions with high concentration of Catholics would exhibit a stronger preference for lottery-type stocks than institutions located in Protestant-dominated regions.

We do not assume that institutional managers have the same religious beliefs as the dominant local religion. While this is possible, our conjecture is that local cultural norms, partially shaped by the dominant local religion, influence the behavior of local managers. This assumption is similar to Hilary and Hui (2009), who assume that local culture, as captured by the degree of religiosity of a region, influences the decisions of the managers of local firms.[8]

To gather additional support for the institutional gambling hypothesis, we examine whether the gambling propensity and its effect on portfolio decisions vary with institutional type and over time. This conjecture is motivated by the observation that certain types of institutions such as banks and insurance companies are known to hold conservative portfolios and are therefore less likely to engage in speculative activities. Further, performance based incentives could exacerbate

[6] In a similar spirit, in one of the early studies, Markowitz (1952) conjectures that some investors might prefer to "take large chances of a small loss for a small chance of a large gain."

[7] See Section III in Kumar (2009) for further motivation behind this definition of lottery-type stocks and also for a summary of the properties of lottery-type stocks.

[8] We also do not make any assumption about the location and stock preferences of the clients of institutional investors. In particular, we do not require the institutional customer base to be local. One possible alternative hypothesis is that the gambling preferences of the local clients of institutional investors influence their lottery stock preferences. While we do not have extensive data on institutional customers to directly test this conjecture, during the 1991 to 1996 period, we find that mutual funds (one of the institution types in our sample) have a small local clientele. Even for very small funds (e.g., fund size below $25m), less than 10% of the clientele is local and resides within 100 miles of the fund location. Further, some of the results reported in the paper are inconsistent with this conjecture. For example, we find that institutional preferences for lottery-type stocks are influenced by local culture even for large institutions.

the gambling temptations of institutions who are predisposed to gamble. More specifically, we conjecture that:

> **H1b:** *Institutional characteristics and gambling preference:* The religion-lottery weight relation would be stronger among institutions that hold concentrated portfolios and weaker among conservative institutions. Further, the religion-lottery weight relation would be stronger around year-end when performance incentives would induce institutions located in regions with large Catholic concentration to gamble more aggressively.

Next, we investigate a corporate finance puzzle and examine whether the widespread popularity of broad-based employee stock option plans reflects the gambling preferences of non-executive employees. Employees frequently value options higher than their actuarially fair values (e.g., Hodge, Rajgopal, and Shevlin (2010), Hallock and Olson (2006), Devers, Wiseman, and Holmes (2007)) and riskier firms grant more employee stock options (e.g., Spalt (2009)). This evidence is consistent with the hypothesis that employees perceive stock options as long shot gambles. If firms are aware that option-based compensation plans are more attractive to employees with stronger gambling preferences, they might even cater to those preferences to reduce the overall compensation costs. Motivated by these possibilities, we conjecture that:

> **H2a:** *Employee gambling preference:* Broad-based employee stock option plans would be more popular among firms that are located in regions with a higher concentration of Catholics relative to Protestants.

To strengthen the link between gambling preferences and popularity of non-executive ESO plans, we examine whether the ESO-religion relation is stronger within the subset of higher volatility firms that are likely to be more attractive to employees with gambling preferences because of their higher skewness. Specifically, we test the following hypothesis:

> **H2b:** *Firm volatility and employee gambling preference:* The religion-option value relation would be stronger among high volatility firms because Catholics (Protestants) are likely to find them more (less) attractive.

In the next two economic settings, we use our gambling proxy to examine the potential asset pricing implications of gambling. We first study the IPO markets where gambling and speculative activities are likely to be more prevalent. Barberis and Huang (2008) show that in an economy with cumulative prospect theory investors, low probability events are overweighted and, consequently, securities such as IPOs that have positively skewed returns can be overpriced in the short-run. If the propensity to over-weight the tiny probabilities of large initial gains and the preference for skewed payoffs vary with religious beliefs, the degree of initial overpricing would vary with the religious composition of the county in which an IPO firm is located. More formally, our third main hypothesis is:

H3a: *Gambling-induced initial day IPO return:* The initial day return would be higher for IPOs located in regions with higher concentration of Catholics relative to Protestants.

This hypothesis is based on the implicit assumption that the preferences of local investors are reflected in first-day IPO return. A necessary condition for this assumption to hold is that local investors participate in the stock market and exhibit a preference for local stocks. Therefore, the religion-IPO return relation should be stronger in regions with higher market participation rates and stronger local bias. To test this possibility, we conjecture that:

H3b: *Local bias and first-day IPO return:* The religion-first-day return relation would be stronger for IPO firms that are located in regions with higher stock market participation rates (as proxied by higher income and higher education levels) and stronger local bias.

Last, we examine the link between gambling preference and stock returns in a broader market setting. Motivated again by the theoretical predictions in Barberis and Huang (2008), we investigate the pricing of stocks with lottery-type characteristics. According to theory, these stocks with high idiosyncratic volatility, high idiosyncratic skewness, and low prices are expected to earn low average returns. We examine whether the religious characteristics of the county in which lottery-type firms are located affect the magnitude of the negative lottery stock premium. Specifically, given the known differences in the gambling attitudes of Protestants and Catholics, we conjecture that:

H4: *Lottery-stock premium:* The magnitude of the negative lottery-stock premium would be larger for the subset of firms located in regions with higher concentration of Catholics relative to Protestants.

To test these four sets of hypotheses, we use data from several different sources. We briefly describe those data sets in the following section.

3. Data and Summary Statistics

3.1 County-Level Religious and Demographic Characteristics

Our first main data set captures the county-level geographical variation in religious composition across the U.S. We collect data on religious adherence using the "Churches and Church Membership" files from the American Religion Data Archive (ARDA). The data set compiled by Glenmary Research Center contains county-level statistics for 133 Judeo-Christian church bodies, including information on the number of churches and the number of adherents of each church. During our 1980 to 2005 sample period, the county-level religion data are available only for years 1980, 1990, and 2000. Following the approach in the recent literature (e.g., Alesina and

La Ferrara (2000), Hilary and Hui (2009)), we linearly interpolate the religion data to obtain the values in the intermediate years.

We consider three main religion variables: (i) religiosity of the county defined as the total number of religious adherents in the county as a proportion of the total population in the county (REL); (ii) the proportion of Catholics in a county (CATH); and (iii) the proportion of Protestants in a county (PROT). Using these religion variables, we define the Catholic-Protestant ratio (CPRATIO) to capture the relative proportions of Catholics and Protestants in a county. Our main focus is on the CPRATIO variable and we consider other related religion variables for robustness.

Figure 1 shows the geographical variation in the county-level religiosity and religious composition across the U.S. counties. It is evident that the religiosity levels are lower on the two coasts and significantly higher in the Central region. For example, the state of Utah has one of the highest levels of religiosity. Examining the geographical variation in the proportion of Catholics and Protestants, we find that Catholics are concentrated more on the Eastern and Western coasts, while the Protestant concentration is greater in the Mid-Western and Southern regions.

We obtain additional county-level demographic characteristics from the U.S. Census Bureau. Specifically, we consider the total population of the county, the county level of education (the proportion of county population above age 25 that has completed a bachelor's degree or higher), male-female ratio in the county, the proportion of households in the county with a married couple, minority population (the proportion of county population that is non-white), per capita income of county residents, the median age of the county, and the proportion of the county residents who live in urban areas.[9] Similar to Hilary and Hui (2009), we employ these county characteristics as control variables in our empirical analysis.

Table 1, Panel A reports the summary statistics for the county-level religion and demographics data. Rather than present the results for all counties, we report the summary statistics based on the institutional investors sample, which covers the period from 1980 to 2005.[10]

The typical (median) firm is located in a county in which 29.93% of the population is Catholic and 18.30% adheres to the Protestant faith. This is in contrast to the typical county in the United States, in which 8.70% of the population is Catholic and 37.81% of the population is Protestant. These statistics indicate that firms in the United States tend to cluster in areas with higher concentration of Catholics. Nevertheless, there is substantial independent variation in both religion variables. The range of CPRATIO varies from 0.88 at the 25^{th} percentile to 3.74 at the 75^{th} percentile. The typical firm in our sample also tends to be located in relatively high-income ($37,624 in our sample versus $19,933 in the typical county) and well-educated (in our sample 32.48% of the population above the age of 25 has college degrees versus 13.71% in

[9] Although data on the average household income are available, we do not include income in our empirical analysis because it is highly correlated with the education proxy (correlation = 0.82).

[10] The religion statistics based on our employee stock option or IPO samples are qualitatively similar. For brevity, we do not report those estimates.

the median county) areas. Furthermore, the firms tend to be located in urban areas (94.14% of the county population in our sample lives in urban regions versus 37.63% in the typical county) and areas with higher concentration of minorities (31.88% in our sample versus 7.92% in the median county).

3.2 Institutional Ownership and Portfolio Weights in Lottery Stocks

Our second main data set is the quarterly common stock holdings of 13(f) institutions compiled by Thomson Reuters. The sample period is from 1980 to 2005. We identify the institutional location (zip code) using the *Nelson's Directory of Investment Managers* and by searching the SEC documents and web sites of institutional managers.

Every quarter, for each institutional portfolio, we compute the portfolio weight allocated to lottery-type stocks. Motivated by Kumar (2009), we define lottery-type stocks using idiosyncratic volatility and idiosyncratic skewness measures. A stock is considered "lottery-type" if it has above-median volatility and above-median skewness. Both the volatility and skewness measures are obtained using past six months of daily returns data. We do not use stock price as one of the lottery stock attributes because prudent man rules and other constraints prevent institutions from holding very low priced stocks.[11] For robustness, motivated by the conjecture in Barberis and Huang (2008), we also assume that recent IPOs could be perceived as stocks with lottery features.

Table 1, Panel B reports summary statistics for the institutional investor sample. The typical (median) institution assigns a portfolio weight of 4.99% to lottery-type stocks. However, the distribution of lottery stock portfolio weights is skewed as the mean is considerably higher (= 8.94%). This evidence suggests that some institutions may "specialize" and commit substantial portions of their portfolios to stocks with lottery features. In contrast, the median institution holds nearly 44.89% of its portfolio in non-lottery stocks that have relatively low volatility and low skewness. The mean institutional portfolio weight in recent IPOs (firms that went public in the previous quarter) is 0.265%. When we consider the set of non-local IPOs (firms located more than 250 miles away from the institutional location), the mean weight is only 0.158%. The typical institutional portfolio's size is $373 million and this distribution is also skewed upward with a mean of $3.12 billion. Portfolio concentration, measured as the Herfindahl index of institutional portfolio weights, has a median estimate of 0.025 and a mean of 0.063.

3.3 Stock Option Grants to Non-Executives

Our third main data set contains option grants to non-executive rank and file employees. We follow the recent ESO literature (e.g., Desai (2003), Bergman and Jenter (2007)) and use ExecuComp to obtain estimates of options granted to non-executives. Firms are not required to

[11] We obtain qualitatively similar results when we use stock price and define a stock as lottery-type if it has below-median price, above-median volatility, and above-median skewness.

disclose details about their stock option programs to non-executive employees but ExecuComp reports the number of options granted to each of the top five executives during a year. In addition, for each top executive, ExecuComp variable *pcttotopt* indicates the share of their option grant as a percentage of the total number of stock options granted by the firm during a fiscal year. Using the information on the individual option grants to top executives and these percentages, we are able to estimate the total number of options granted by the firm.

To obtain estimates of option grants to non-executive rank and file employees, we subtract the option grants to executives from the total number of options granted. We obtain the option grants to top executives using the ExecuComp data and use the method of Oyer and Schaefer (2004) to estimate the number options awarded to high-level executives not listed in ExecuComp, but for whom option grants may reasonably have incentive effects.[12] The number of employees reported in ExecuComp is used to calculate per-employee values of option grants. We obtain the number of options granted per non-executive employee by dividing the total option grants to non-executives by the total number of firm employees less the estimated number of high-level executives.

We compute the Black-Scholes values of non-executive option grants using the average of the grant date stock price reported in ExecuComp for all grants in a given firm-year. Option maturity and risk-free rate of interest are uniformly set to 7 years and 5%, respectively. Additional details about the construction of the non-executive option grant measure are available in Spalt (2009).

The initial ESO sample consists of all companies in the ExecuComp database for the 1992 to 2005 period. We exclude firms for which our procedure for identifying incentive-based option grants is likely to be inaccurate. Specifically, we drop firms with less than 40 employees or less than two reported executives. We further drop all firms in the financial sector (SIC codes 6000 to 6999) and all company-years in which the value of one of the independent variables in our baseline regression specification is missing. The resulting data set has 14,557 firm-year observations for 2,172 unique firms.

We use several firm characteristics as control variables in our empirical analysis. Specifically, we control for firm size using the log of sales. We account for investment opportunities using Tobin's Q (book assets minus book equity plus market value of equity, scaled by total assets) and research and development expenses (the three year average of research and development expense scaled by total assets). All balance sheet data for the ESO sample are taken from Compustat and stock prices and returns data are obtained from the CRSP-Compustat merged database.

Table 1, Panel C reports the summary statistics for the ESO sample. The median firm in the sample has 5,032 employees, a market capitalization of $1.08 billion and sales of $1.01

[12]We assume that the number of high-level executives in a firm can be approximated by the square root of the total number of employees. Further, like Oyer and Schaefer (2004), we assume that a high-level executive (excluding the top five executives) on average receives 10% of the average number of options granted to a top five executive.

billion. The median Tobin's Q and R&D expenses are 1.61 and 0.18%, respectively. A broad-based employee stock option plan exists in 58.38% of firm-years. In a median firm-year, options are granted on 1.88% of total shares outstanding. The Black-Scholes value of option grants to non-executive employees is low, with a median value of only $166 per employee. However, this distribution is skewed and the mean value of $4,103 per employee is significantly higher. In addition, these option grant estimates are biased downward because in most firms not all employees are offered options.

3.4 IPO Data

Our fourth main data set contains information about all initial offerings of common stocks during the 1980 to 2005 period. We obtain several attributes of IPOs from the Securities Data Corporation (SDC), including the offer date, offer price, zip code, initial filing price range, lead underwriters, and gross spread charged by the underwriters. The founding dates for the issuing firms and Carter and Manaster (1990) rankings for the lead underwriters are from Jay Ritter's web site.[13] We obtain closing prices for the first day of trading as well as first-day trading volume from CRSP.

To be included in the sample, the offering must have a CRSP share code of 10 or 11. Further, the first day of trading recorded by CRSP must be within three days of the SDC offer date. In most of our analysis, we require the initial offer price to be above $5, but we examine the sensitivity of our results when this constraint is relaxed. Our final IPO sample consists of 6,652 firms.

Table 1, Panel D reports summary statistics for the IPO sample. The mean first-day return is 16.78% and there is substantial variation in this measure. It ranges from 0.658% at the 25^{th} percentile to 21.43% at the 75^{th} percentile. The mean turnover on the first day of trading is high (= 20.26%) as compared to the daily turnover for the average CRSP firm ($\approx 0.50\%$). The typical IPO raises $32.66 million and the average firms goes public 8 years after being founded. 31.57% of the IPO firms in the sample are identified as technology firms, where following Oyer and Schaefer (2004) the technology firm dummy is set to one for firms with an SIC code of 3570 to 3579, 3661, 3674, 5045, 5961, or 7370 to 7379.

3.5 Other Data Sources

We gather data from several additional sources to construct other variables used in our empirical analysis. Specifically, we use data from a major U.S. discount brokerage house, which contain all trades and end-of-month portfolio positions of a sample of individual investors during the 1991 to 1996 time period.[14] We obtain state-level measures of stock market participation rates from the Federal Reserve Board. These participation rates are computed from dividend income data

[13]The data are available at `http://bear.cba.ufl.edu/ritter/ipodata.htm`.

[14]See Barber and Odean (2000) for additional details about the brokerage data.

reported on IRS tax returns. We obtain annual state lottery sales data for each state from the North American Association of State and Provincial Lotteries. We obtain price, volume, return, and industry membership data from the Center for Research on Security Prices (CRSP). The firm headquarter location data are from the CRSP-Compustat merged file. Finally, we obtain monthly values of the market (RMRF), size (SMB) and value (HML) factors from Kenneth French's web site.[15]

In our robustness checks, we use the Bushee (1998) classification method to divide the 13(f) institutions into quasi-indexers and non-quasi-indexers based on their portfolio turnover and concentration measures. Specifically, institutions classified as quasi-indexers have diversified portfolio holdings and low turnover.[16]

In some of our robustness tests we also use state-level Presidential elections data as well as state-level measures of trust and social capital.[17] The Social Capital measure is a composite index of 14 different state-level measures of community participation, including "group membership, attendance at public meetings on town or school affairs, service as an officer or committee member for some local organization, attendance at club meetings, volunteer work and community projects, home entertaining and socializing with friends, social trust, electoral turnout, and the incidence of nonprofit organizations and civic associations." (Putnam (2000, Pages 290-291)).

The Trust variable is based on a question in the General Social Survey that is conducted biannually since 1974 by the National Opinion Research Corporation at the University of Chicago. It measures the percentage of survey respondents in the state agreeing with the statement that "Most people can be trusted." Both the social capital and trust measures are available for only one year, but because these measures are relatively stable over time, we assume that they would be a good proxy for the level of trust and social capital in other years.

In untabulated results, we examine the correlations between the religion and demographic variables and the state-level control variables. We find that CPRATIO is positively correlated with social capital and trust, and it is lower in states that have voted for the Republican Party in the recent Presidential elections.

4. Choice of a Gambling Proxy

Our testable hypotheses implicitly assume that regional religious composition is an effective proxy for gambling attitudes. Specifically, motivated by the documented differences in the teachings of different religious denominations and the evidence from the recent literature, we assume that people's gambling propensity would be greater in Catholic-dominated regions than

[15]The data library is at `http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html`.

[16]See `http://accounting.wharton.upenn.edu/faculty/bushee/IIclass.html`. The classification data corrects the known errors in the institution types data beyond 1997.

[17]The election data are obtained from David Leip's web site (`www.uselectionatlas.org`), while the trust and social capital data are from Robert Putnam's Bowling Alone web site (`www.bowlingalone.com`).

in Protestant-dominated regions.[18] But before presenting our main empirical results, we provide further empirical justification for this choice.

4.1 Main Gambling Proxy: County-Level Religious Composition

Gambling activities in financial markets are very difficult to observe directly. Therefore, we use the exogenous geographical variation in religion as a proxy for gambling. Religion is likely to be an effective proxy for studying the implications of gambling on financial market outcomes because religious background is an important determinant of beliefs and preferences that influence economic and financial decisions. In particular, religious composition of a region is likely to be a strong predictor of people's gambling attitudes and it is unlikely to be directly related to aggregate outcomes in financial markets.

This geography-based identification strategy is similar to Becker (2007) and Becker, Ivkovich, and Weisbenner (2010). They study the availability of bank loans and firm payout policies using the concentration of seniors in a geographical region as a proxy for deposit supply and dividend demand, respectively. Like these two earlier studies, we use the geographical variation in a demographic variable as the main identification strategy.

Our key gambling proxy is the Catholic-Protestant ratio (CPRATIO) in a given county, but for robustness, we consider related measures such as the Catholic-Protestant differential (CPDIFF) as an alternative indicator of local gambling attitudes.[19] We also use the county-level proportions of Catholics and Protestants separately as our gambling proxies to ensure that we are capturing the distinct effects of skewness or gambling preferences rather than individual's risk preferences.[20] Additionally, because the gambling attitudes of Catholics and Jews and Protestants and Mormons are similar, we extend the definitions of Catholic and Protestant religious categories to include Jews and Mormons, respectively.

Other socioeconomic attributes such as age, level of education, income, or gender could also potentially serve as a gambling proxy because they are known to influence people's propensity to gamble (Kumar (2009)). However, compared to religion-based measures, these factors exhibit relatively less geographical variation (e.g., the male-female ratio). Even in instances in which the demographic variable exhibits significant variation (e.g., income or education), the direction of the relation between the demographic variables and gambling is not as clearly established as the relation between religious beliefs and gambling. For instance, while the propensity to play state lotteries decreases with income, the propensity to engage in other forms of gambling such

[18] Some of those studies are discussed in the Introduction section.

[19] The $C-P$ differential is the difference between the proportion of Catholics and the proportion of Protestants in a given county.

[20] Risk aversion increases with religiosity, irrespective of the type of religion. For example, Hilary and Hui (2009) show that the proportions of Catholics and Protestants have similar aggregate effects on corporate policies, although Protestants are somewhat more risk averse. In contrast, we expect gambling preferences to be stronger among Catholics and weaker among Protestants. The differences in the gambling attitudes of Catholics and Protestants predict opposite effects in our empirical tests and provide greater power to our identification strategy.

as casino gambling and horse race betting increases with income.

Besides demographic variables, another plausible proxy for gambling behavior in financial markets is the per capita lottery sales in a region. The lottery sales measure could reliably reflect the gambling propensity of individuals in a region and it is unlikely to directly affect financial market outcomes. Unfortunately, lottery sales data for extended time periods are available primarily at the state-level and this coarseness is likely to considerably diminish the power of our geography-based identification strategy. It is also difficult to compare lottery sales across regions because state lotteries were introduced at different times and per-capita lottery sales of all states at a given point in time might not reflect an equilibrium outcome. Further, lottery sales data at a more disaggregate level (county or zip code) are available only for a few states for a short time period.

Given these potential limitations of the lottery sales data, we do not use them in our main tests. However, we do use them to demonstrate that local religious composition is likely to be an appropriate proxy for people's gambling propensity. Although previous studies have already shown empirically that the state lottery adoption policies and lottery expenditures are influenced by the regional religious composition (e.g., Grichting (1986), Berry and Berry (1990), Diaz (2000)), we perform several empirical tests to confirm that gambling propensity, as reflected in the popularity of state lotteries, is stronger (weaker) in regions with higher concentration of Catholics (Protestants). The results from these tests are presented in Table 2.

4.2 Local Religious Composition and Popularity of State Lotteries

In the first test, we examine whether the religious composition of U.S. states influences the state-level lottery adoption policies. We find that states in which lotteries are legal have lower concentration of Protestants and higher concentration of Catholics. For example, in 1990, U.S. states with lotteries had 10.37% lower concentration of Protestants and 10.86% higher concentration of Catholics than states without state lotteries (see Table 2, Panel A).

Next, we present univariate sorting results. Using each of the four religion variables (PROT, CATH, CPRATIO, and REL), we sort counties into quintiles and compute the equal-weighted quintile averages of per capita county-level lottery sales. We also measure the average state lottery age (the number of years since the state lottery adoption year) for counties in the five quintiles. We find that state lotteries were adopted earlier and that lottery age is higher in Catholic-dominated regions (see Table 2, Panel B). Further, per capita lottery sales are higher in regions with lower concentration of Protestants and higher concentration of Catholics. For example, in counties with high concentration of Catholics (top quintile), per capita lottery sales is \$195.51, but in counties with high concentration of Protestants, per capita lottery sales is only \$94.23. Similarly, the state lottery ages in the highest and lowest CPRATIO quintiles are 24.10 and 3.09 years, respectively.

In the third test, for greater accuracy, we estimate a multi-period probit regression of lottery

existence dummy on various state-level demographics characteristics, including religion. The lottery existence dummy for a year is set to one if state lotteries are legal in the state during the year. The sample period is from January 1980 to December 2005. The set of primary independent variables includes the four religion variables, where we use only one of the religion variables in each regression specification. Because we use geography-based religion variables, the set of independent variables also includes county-level demographic variables to ensure that the effects we attribute to religion reflect the predominant local religion rather than other socioeconomic characteristics that may be correlated with religion. We cluster standard errors at the county level in all these regressions.

The marginal effects from probit regressions are reported in Table 2, Panel C (columns (1) to (4)). We find that the state lotteries are more common in states with higher concentration of Catholics and lower concentration of Protestants. For example, the lottery existence probability increases from the mean of 0.631 to 0.867 when there is a one standard deviation increase in the Catholic proportion ($0.631 + 1.737 \times 0.135 = 0.867$). In contrast, a one standard deviation increase in the Protestant proportion corresponds to a $1.698 \times 0.119 = 0.202$ decrease in the lottery existence probability.

In the last test, we use county-level lottery sales data for a representative set of states in year 2005 and estimate several cross-sectional regressions.[21] The dependent variable in these regressions is the county-level per capita lottery sales. The cross-sectional regression estimates, also reported in Table 2, Panel C (columns (5) to (8)), indicate that per capita lottery sales increases (decreases) with the proportion of Catholics (Protestants). Relative to the mean per capita lottery sales of \$144.68, a one standard deviation shift in CPRATIO corresponds to $2.00 \times 21.089 = \$42.18$ increase in per capita lottery expenditure.

Overall, the lottery sales sorting and regression estimates indicate that gambling attitudes, as reflected in local lottery adoption policies and lottery sales levels, are strongly influenced by the dominant local religion. Based on this evidence, we conjecture that even in other economic settings, local religious composition could serve as an effective proxy for the gambling preferences of local individuals. Consequently, we use the county-level religious composition as a proxy for local gambling attitudes. This choice is based on the observation that various forms of gambling have positively correlated demand levels and serve as complements. For example, survey evidence indicates that demand for many other forms of gambling are higher in regions in which state lotteries are more popular (e.g., Kallick, Smits, Dielman, and Hybels (1979), Clotfelter and Cook (1989)).

It is conceivable that the religious characteristics of a region is correlated with factors such as the strength of social network, risk aversion, information sharing propensity, population growth, growth opportunities, etc. However, it is more difficult to conceive a hypothesis that

[21] These data have been used recently in Coughlin and Garrett (2008) to examine the sensitivity of lottery expenditures to changes in income. We thank William Goetzmann and Jacqueline Yen for sharing the county-level lottery sales data with us.

predicts opposite relations between one of these measures and local Protestant and Catholic concentration levels. The opposite influence of Catholic and Protestant beliefs on gambling attitudes is unique and provides greater power to our identification strategy.[22]

5. Main Empirical Results

In this section, we use our religion-based gambling proxy to test the four sets of hypotheses outlined in Section 2. We conduct both univariate and multivariate tests and supplement them with an extensive set of robustness checks.

5.1 Sorting Results

We begin with a series of univariate tests. Using each of the four religion variables (PROT, CATH, CPRATIO, and REL), we sort firms into quintiles, where these sorts are performed quarterly for the institutional dataset and annually for others. We then compute the equal-weighted quintile averages of institutional portfolio weights in lottery-type and non-lottery-type stocks, the Black-Scholes value of options granted to non-executive employees, and the first-day IPO return. These sorting results are presented in Table 3.

In Panel A, corresponding to each of the four religion measures, we report the average institutional portfolio weights assigned to lottery-type and non-lottery-type stocks in the five religion quintiles. The evidence indicates that the mean weight in lottery-type stocks decreases as the Protestant concentration in a county increases. The average portfolio weight allocated to lottery-type stocks is 9.15% when the Protestant concentration is low (bottom quintile) and it drops to 6.51% in the highest Protestant quintile. In contrast, the weight in lottery-type stocks increases with Catholic concentration, although the pattern is not monotonic. When Catholic-Protestant ratio is the sorting variable there is an increasing pattern in the average weight allocated to lottery-type stocks. The patterns are opposite but weaker when we examine the portfolio weights assigned to non-lottery-type stocks.

The relation between local religious composition and the lottery-stock preferences of institutions is similar to the evidence obtained using the stock holdings of retail investors. Figure 2 shows the univariate sorting results obtained using the retail brokerage data. Like the composition of institutional portfolios, the mean retail portfolio weight allocated to lottery-type stocks increases with Catholic concentration and decreases with Protestant concentration. This evidence indicates that even though the average gambling preferences of retail and institutional investors differ (e.g., Kumar (2009)), they exhibit similar sensitivity to local religious characteristics, which are likely to capture the local gambling "culture".[23] Overall, the institutional

[22] As discussed later, we also use the Rajan and Zingales (1998) method in our main empirical analysis to ensure that our gambling proxy does not merely reflect the effects of certain omitted variables.

[23] See Kumar (2009) for additional evidence on the relation between religious composition and the propensity to invest in lottery-type stocks. In this paper, we partially replicate those results for completeness.

sorting results are consistent with our first main hypothesis (H1a) and indicates that institutional gambling tendencies are sensitive to local religious composition.

We find a similar pattern when we examine the relation between county-level religious composition and non-executive option grants. The Black-Scholes value of option grants per employee decreases with Protestant concentration and increases with Catholic concentration (see Table 3, Panel B). For example, the average Black-Scholes value of option grants in the lowest Protestant quintile is $10,864 and it is only $1,422 in the highest Protestant quintile. Like the institutional lottery weight results, the sorting results are non-monotonic and weaker when we sort using the Catholic concentration measure. However, in unreported results, we find a monotonic pattern when we examine medians. The ESO sorting results are consistent with the hypothesis that individuals whose religious beliefs discourages gambling are less likely to find option-based compensation attractive. Alternatively, managers may be less inclined to offer compensation schemes with gambling-like payoffs to employees in regions where religion-based local social norms condemn gambling. Overall, the ESO sorting results are consistent with our second main hypothesis (H2a).

In the last set of univariate tests, we focus on the first-day IPO return. These results, also reported in Panel B, indicate that the mean first-day IPO return decreases monotonically with Protestant concentration, increases with Catholic concentration but again the pattern is non-monotonic, and exhibits an almost monotonically increasing pattern when Catholic-Protestant ratio is the sorting variable. For example, when the average Protestant concentration increases from 7.89% to 40.22% across the extreme quintiles, the average first-day IPO return decreases from 20.05% to 13.85%. Similarly, the average first-day IPO return increases from 13.79% to 18.46% across the extreme Catholic-Protestant ratio quintiles. These univariate sorting results are consistent with our third main hypothesis (H3a).

The consistency in the patterns in the univariate results across the three distinct economic settings is striking. In all three instances, the results exhibit a strong monotonic pattern when the Protestant concentration measure is the sorting variable and an increasing but non-monotonic pattern when the Catholic concentration measure is the sorting variable. The patterns with the religiosity measure weakly reflect the sorting results obtained using the Protestant concentration measure. Taken together, the univariate sorting results are consistent with our key conjecture that regional religious beliefs influence financial market outcomes through their impact on gambling attitudes of local individuals.

5.2 Regression Model and the Choice of Independent Variables

To examine whether the significance of the sorting results remain when we account for other known determinants of aggregate market outcomes, we estimate a series of multivariate regression models. We use the same empirical framework in the first three settings that we examine. The dependent variable in these regressions is one of the following three variables: (i) portfolio

weight in lottery-type or non-lottery-type stocks, (ii) Black-Scholes value of non-executive employee stock option (ESO) grants, and (iii) first-day IPO return. The key independent variable is one of the four religion variables, where we assume that these geographic measures of religious concentration would proxy for religion-based differences in gambling attitudes.

We use multiple religion variables to ensure that we are capturing the gambling attitudes of local individuals rather than other related aspects of their behavior such as risk aversion. In particular, Hilary and Hui (2009) use the fraction of religious inhabitants per county as a proxy for risk aversion and show that this variable influences corporate policies of firms with headquarters in this location.[24] Because religiosity and our gambling proxy (CPRATIO) are positively correlated, the effects that we document might reflect the level of religiosity, and therefore risk aversion, rather than the differences in the gambling attitudes of Catholics and Protestants. We address this issue in several ways. First we report all our regression estimates with the level of religiosity as the main independent variable and examine whether there is a consistent relation between the dependent variables and the level of religiosity. Second, we use the proportion of Catholics and Protestants as separate independent variables to demonstrate that their influences on gambling attitudes differ.[25] Third, we include the level of religiosity as an additional control variable when CPRATIO is the key independent variable.

Variation in religious concentration across the U.S. may also be correlated with other geographic characteristics beyond risk aversion that can influence our main dependent variables. In particular, since Catholics and Protestants cluster in certain geographical areas, some specific characteristics of those areas might be correlated with our financial outcome variables.[26] Several studies at both the micro- and macro-levels have examined the effects of religion on economic and social outcomes, considering both general religiosity and differences between denominations.[27] The difficulty of establishing causality has been the subject of much debate in this literature, and it is a challenge that is also relevant for our study.

For example, Catholics tend to be concentrated in more urban areas, where more firms tend to be located and where growth opportunities may be higher. Further, religious affiliation has been associated with many social and economic outcomes that could themselves impact employee compensation, portfolio choice, and the initial pricing of IPO firms that we examine in this paper. For example, Catholics in the United States tend to have higher wages and

[24]See Renneboog and Spaenjers (2009) for additional evidence on the impact of religious beliefs on investments decisions through the risk aversion channel.

[25]In contrast, Hilary and Hui (2009) find qualitatively similar results with the Protestant and Catholic concentration measures as with the overall level of religiosity.

[26]State level factors that are unobserved or hard to measure could include, for example, statewide welfare policies that would influence background risks of state residents and consequently their propensity to gamble. Factors that may be correlated with both our religion measures and dependent variables at the county level could be related to the ancestry of the local population, historical agglomeration patterns, as well as local social networks and customs.

[27]Guiso, Sapienza, and Zingales (2003) is a recent example and includes an excellent review of prior literature in this area. Also, see Iannaccone (1998) and Lehrer (2009).

exhibit greater upward mobility (Keister (2003, 2007)). Catholics also have particularly high marriage rates, high rates of marital stability, and low divorce rates (Lehrer and Chiswick (1993), Lehrer (1998)), and these patterns are likely to facilitate wealth accumulation as well as attitudes toward gambling. Religious background also affects orientations toward education and educational attainment (Darnell and Sherkat (1997), Lehrer (1999)), which in turn may shape career opportunities, as well as stock market participation rates and financial sophistication.

Religious background is also known to be correlated with factors such as political affiliation and trust, which are known to influence investment decisions as well as broader economic decisions (e.g., Guiso, Sapienza, and Zingales (2003, 2006, 2008)). In particular, Glaeser and Ward (2006) show that Catholics have a greater propensity to vote for the Democratic Party. These differences in political preferences could be correlated with other personality traits and attitudes that may affect gambling behavior. Catholics are also more trusting (Guiso, Sapienza, and Zingales (2003)) and may therefore exhibit a greater propensity to gambling with financial instruments because they may believe that they are less likely to be cheated. Further, if people gamble for entertainment (e.g., Dorn and Sengmueller (2009)), gambling activities might be more prevalent in regions with higher social capital where people interact more and spend more time together in social activities (Putnam (2000)).

We address these potential concerns about omitted variables in two primary ways. First, we explicitly control for geographic variation in income, education, family structure and marital stability, and other demographic characteristics that are related to religion and may themselves influence the financial market outcomes we examine in this study. We also control for urbanicity, and in some cases include additional dummy variables for the largest metropolitan areas in the country to control for the possibility that our measures of religious concentration merely capture a "big city" effect. We also consider additional control variables appropriate to the chosen setting, which are derived from the prior research in that setting. The set of additional control variables typically includes firm or institutional characteristics. In addition, religious beliefs have been related to a number of demographic factors such as age, education, minority status, income, gender, and marital status (e.g. Iannaccone (1998) and Lehrer (2009)). These demographic variables may be related to gambling activities directly (e.g., Kumar (2009)) and, therefore, we control for several demographic variables in all our regressions.

Second, in spite of having a large number of control variables in our regression specifications, the additional demographic and geographic control variables may be incomplete or inadequate to control for other geographic characteristics. To account for the effects of those unobserved variables, we employ a difference-in-differences estimation method similar to Rajan and Zingales (1998). This approach allows us to employ geographic fixed effects while testing for differential effects across firms within a chosen geographical region (e.g., states or counties) that are consistent with our gambling hypotheses. These tests enable us to fully control for unobserved regional differences even though our main variables of interest are at the regional-level and relatively constant over time.

Specifically, we include either state or county fixed effects in our baseline regressions along with additional interaction terms. The collinearity between the religion variables and the geographical dummies prevents us from estimating the baseline regressions with religion variables in the presence of additional state or county fixed effects. By introducing the interaction variables, we are able to circumvent this problem and can test the key gambling hypotheses while controlling for the unobserved geographical heterogeneity. We define the interaction variables using the religion variables and other variables that are ex ante associated with higher propensity to gamble. The interaction terms test the hypothesis that the effects of variables known to be associated with higher levels of gambling are stronger when the religion variables predict a higher gambling propensity among the local population. Since we use geographical fixed effects, the results from this estimation procedure cannot reflect unobserved heterogeneity at the state or county level.

In addition to the demographic controls and geographic dummies, we employ time (year or quarter) dummies to control for the time variation in the cross-sectional mean levels of our dependent variables. Because our religion variables also exhibit trends over time, we want to guard against the possibility that our regression estimates simply reflect unrelated time trends in the dependent variable and the primary independent variables. Last, we include industry dummies in the IPO and ESO regressions to control for industry effects that might not be captured by the other control variables. And we include institutional type dummies in the institutional holdings regressions to account for known differences in the stock preferences of different types of institutions.

With the exception of the ESO setting, we use a pooled ordinary least squares (OLS) specification with fixed effects and control variables mentioned above. To estimate the ESO regressions, we use a Tobit specification because a significant number of firms do not have a broad-based employee stock option plan and, thus, the dependent variable assumes a value of zero.[28] In all specifications, we use heteroskedasticity-robust standard errors. Additionally, because the religion variables are measured at the county-level, we cluster standard errors by county in all our regressions.

5.3 Institutional Lottery-Stock Weight Regressions Estimates

In our first set of multivariate tests, we examine the gambling preferences and portfolio decisions of institutional investors. We estimate OLS regressions in which the dependent variable is the lottery-stock weight in an institutional portfolio at the end of a certain quarter. The set of explanatory variables includes the religion variables and the demographic characteristics of the county in which the institution is located. In addition, we consider two institutional characteristics: (i) portfolio size, which is defined as the market value of the total institutional portfolio; and (ii) portfolio concentration, which is defined as the Herfindahl index of the institution's

[28]We also estimate the ESO regressions using OLS and find qualitatively similar results. For brevity, we do not report those results.

portfolio weights. In all our regressions we also include quarter and institution type dummies and cluster standard errors by county.

The lottery weight regression estimates are presented as specifications (1) to (4) in Table 4. Consistent with the evidence from the univariate sorts, we find that PROT has a negative coefficient estimate. In contrast, when CATH is the main independent variable, it has a significantly positive coefficient estimate. Likewise, when CPRATIO is the main independent variable, it has a positive and significant coefficient estimate. The coefficient estimate is also positive and statistically significant when the overall religiosity level REL is the main independent variable, which reflects the joint preferences of Catholics and Protestants. This evidence indicates that the preferences of institutions located in Catholic regions determine the overall institutional preferences.

The coefficient estimates of religion variables are significant in economic terms. For example, a one standard deviation shift in CPRATIO corresponds to a $0.407 \times 2.00 = 0.814\%$ increase in the weight assigned to lottery-type stocks.[29] Relative to the mean lottery-stock weight of 8.94%, this represents an economically significant $100 \times 0.814/8.94 = 9.10\%$ increase.

Specifications (5) to (8) in Table 4 show the results from similar regressions, where the portfolio weight allocated to non-lottery-type stocks is the dependent variable. These regression estimates exhibit an opposite pattern. We find that institutions located in Protestant regions overweight non-lottery-type stocks, while institutions in Catholic regions underweight these stocks. The coefficient estimates of CPRATIO and REL are similar to the estimates of CATH, which again indicate that gambling preferences of institutions in Catholic counties dominate the overall institutional gambling preferences.

For robustness, we consider an alternative set of lottery-type stocks. Motivated by the conjecture in Barberis and Huang (2008), we assume that IPOs offered in the most recent quarter would be perceived as lottery-type stocks. We re-estimate institutional regressions with the portfolio weight in recent IPOs as the dependent variable. We consider the portfolio weight in all IPOs and also the weight only in the subset of IPOs that are non-local (i.e., IPOs that are located at least 250 miles away from the institutional location). The results are reported in Table 4, Panel B. Similar to the results with lottery-stock weights, we find that institutions in high CPRATIO regions allocate a larger weight to recent IPOs. This evidence does not simply reflect the fact that there are more IPO firms in regions with high CPRATIO because we find qualitatively similar results when the dependent variable is the portfolio weight in non-local IPOs. These results indicate that the institutional propensity to hold lottery-type stocks is influenced by the local religious composition and are consistent with our first institutional gambling preference hypothesis (H1a).

While these baseline results discussed above show a significant relation between our religion measures and the portfolio choices of institutional investors, we perform the same analysis on various subsamples of institutions for further confirmation that the local religion measures

[29] To improve readability, we multiply the coefficient estimates of CPRATIO in Table 4 by 100.

reflect local gambling propensity. In particular, we split the sample into subsamples based on institutional characteristics that are *ex ante* associated with more speculative portfolio decisions by institutional managers. If our religion measures truly reflect gambling attitudes, their effects should be stronger in settings in which there is a greater latitude or incentive to speculate and "gamble". The subsample results are summarized in Panels C and D of Table 4.

First, we divide the institutional sample based on portfolio concentration because institutions with more concentrated portfolios are more likely to speculate or gamble. Consistent with this conjecture, we find that the effects of PROT, CATH and CPRATIO are notably stronger for the subsample of institutions that hold concentrated portfolios. The coefficient estimates of each of the three religion variables are approximately three times as strong in the subsample of institutions with concentrated portfolios than in the diversified institutions subsample.

Next, we perform a similar split sample analysis based on institution type, noting that banks and insurance companies tend to invest more conservatively than investment companies, independent investment advisors, and other institution types. Consistent with this prior evidence, we find a strong distinction between the strengths of the religion variables across the subsamples. The coefficient estimates of religion variables are strongly significant with the expected signs in the subsample of "aggressive" institutions (i.e., independent investment advisors, investment companies, and others), while among "conservative" institutions (i.e., banks and insurance companies), the coefficient estimates of PROT, CATH, and CPRATIO reverse signs but are statistically insignificant. These patterns are similar when we use non-lottery portfolio weights as the dependent variable (see Panel D) as none of the religion variables is significant in the subsample of conservative investors.[30]

In the third set of subsample tests, we consider institutions that are identified as quasi-indexers and non-quasi-indexers according to the Bushee (1998) institutional classification method. Quasi-indexers hold well-diversified portfolios and follow buy-and-hold type trading strategies, while non-quasi-indexers, in contrast, hold concentrated portfolios and trade actively. We find that the coefficient estimates of the religion variables are statistically significant only for the subsample of non-quasi-indexers. The local religious composition does not have a significant effect on the portfolio decisions of quasi-indexers.

Next, we split the sample into large and small institutions using the annual median portfolio size. Smaller institutions may have greater latitude to invest aggressively and could hold larger positions in lottery-type stocks. Further, the customer base of smaller institutions may be local and the gambling preferences of that local clientele could influence institutional portfolio decisions. As a result, in the small institutions subsample, the effect of religion variables may be stronger. A comparison of the religion coefficients for the large and small institution subsamples

[30]Institution types reported by Thomson Reuters are unreliable after 1997. However, the type code errors are more common among institution types 3, 4, and 5 (Lewellen (2008)). Because we group these types together in the "Aggressive" subsample, our results are not sensitive to type coding errors. Nevertheless, to be conservative, we repeat our analysis with the observations only through 1997 and, in unreported analysis, we find qualitatively similar results.

does not provide a clear pattern. We find that the differences between the coefficient estimates of religion variables for the small and large institutions subsamples are statistically insignificant. Thus, the local religious composition affects the portfolio decisions of both small and large institutions to a similar extent.

In our final set of subsample tests, we split the sample into two using the time of observation: fourth quarter observations and observations in the first three quarters. These tests are motivated by Brown, Harlow, and Starks (1996), who find that performance-based incentives induce under-performing managers to "gamble" by investing in more volatile stocks at the end of the year. Consistent with their incentive-based conjecture and with our conjecture that religious background generates variation in gambling propensity, we observe somewhat stronger estimates for the religion variables in the fourth quarter subsample. This result also holds when the dependent variable is non-lottery portfolio weights, as reported in Panel D. Overall, the subsample results support our institutional gambling preference hypothesis (H1b) and indicate that the effect of local religious composition on portfolio decisions is stronger on institutions that are expected to exhibit a stronger propensity to invest in lottery-type stocks.

5.4 Robustness of Institutional Regression Estimates

We conduct a series of additional tests to ensure the robustness of our institutional regression estimates. We consider several variations of our main institutional regression specification, estimate the institutional regressions for different subperiods, include additional control variables and use geography-based subsamples. These results are summarized in Table 5, Panel A, where for brevity, we focus only on the CPRATIO estimates.

First, we control for the overall level of religiosity in the county. We find that our results are qualitatively unchanged. The CPRATIO estimates are similar to the baseline estimates and the unreported coefficient estimates of REL variable are statistically insignificant. Second, we control for the industry preferences of institutions. We add industry concentration measured as the Herfindahl index of 48 Fama and French (1997) industry weights as an additional independent variable and re-estimate the lottery and non-lottery weight institutional regressions. We find that the coefficient estimates of CPRATIO remain similar to the baseline estimates.

Third, we reproduce our OLS results using a two-stage least squares (2SLS) approach using the three-year lagged value of the religion values rather than the concurrent value. This check ensures that our results are not subject to an omitted variable bias. Using lagged values as the instrument also allows us to address the issue of causality. We find that the 2SLS estimates are very similar to the OLS estimates.

Next, we use an alternative definition of lottery-type stocks that includes stock price and find qualitatively similar results.[31] Our results are also robust to the exclusion of institution type

[31]Stocks with below median price in addition to above median volatility and above median skewness are defined as lottery-type stocks.

dummies, using the difference between CATH and PROT rather than their ratio, and extending the definitions of PROT and CATH to include Mormons and Jews, respectively. Because we are interested in examining the effects of gambling propensity, we also consider per capita state lottery sales as an alternative to the religion variables. Consistent with the gambling hypothesis, the lottery sales variable has a positive but insignificant coefficient estimate. Moreover, it does not affect the CPRATIO estimate when we include both gambling proxies in the regression specification. This evidence indicates that our county-level religion measures capture gambling propensity more accurately than the state-level lottery sales measure.

When we divide the sample into sub-periods, we find that the effect of the religion variables reverses in the early part of the sample. Further investigation suggests that this opposite effect is mostly concentrated among banks and insurance companies, who dominated the institutional investor sample in the earlier years. Next, to ensure that our results are not driven by institutions in any particular geographical region, we perform our regressions on various regional subsamples: excluding California, and excluding in turn each of the four Census regions (Northeast, Midwest, South and West). The results are robust in each case and support our institutional gambling preference hypotheses.

In the last set of robustness tests, we investigate whether state-level omitted variables correlated with our religion variables influence our results. Specifically, we introduce state-level measures of social capital and trust into our set of control variables. In addition, we include a dummy variable that equals one if more people in a state voted for the Republican Party in the recent Presidential elections. We find that the coefficient estimates of CPRATIO weaken but remain significant at the 10% level even when we include all three state-level controls in the regression specification.

5.5 Estimates with State and County Fixed Effects

In spite of our large number of control variables, it is still possible that geographical factors correlated with the religion variables drive our main results. To ensure that our results are robust to such concerns about omitted variables, we estimate the institutional portfolio weight regressions using the Rajan and Zingales (1998) method. In addition to year and institutional type dummies, we include state or county dummies in the regression specification. In the county fixed effects regressions, we exclude all variables that are measured at the county level.

Our regression specifications also include interaction variables between various institutional attributes and CATH, PROT, CPRATIO, or REL variables. We consider three institutional attributes, including portfolio concentration, an "aggressive" institution dummy that is set to one for all institutions except banks and insurance companies, and a non-quasi-indexer dummy that is set to one for institutions that hold concentrated portfolios and trade actively (Bushee (1998)). Institutions with these attributes are expected to exhibit a stronger propensity to hold lottery-type stocks. Our regression estimates test whether these institutions exhibit even

stronger propensity to hold lottery-type stocks when they are located in counties in which the local propensity to gamble is stronger.

The regression estimates are reported in Table 5, Panels B and C. We find that in both state and county fixed effects specifications, the coefficient estimates of all three interaction terms are statistically significant and have the appropriate signs. They are positive in the lottery weight regressions (Panel B) and negative in non-lottery weight regressions (Panel C). The estimates are also significant economically. For example, consider institutions located in counties at the 25^{th} and 75^{th} CPRATIO percentiles, respectively. The portfolio concentration interaction estimate in the state fixed effects regression in Panel B indicates that a one standard deviation increase in portfolio concentration is associated with a $(3.74 - 0.88) \times 2.043 \times 0.141 = 0.824$ percentage higher lottery weight for an institution located in a 75^{th} CPRATIO percentile county than in a 25^{th} CPRATIO percentile county. Relative to the mean lottery stock weight of 8.90%, this represents an economically significant 9.26% weight differential. In the county fixed effects regression, the average portfolio weight differential between institutions in the two counties is $(3.74 - 0.88) \times 2.423 \times 0.141 = 0.977$ percentage and, thus, even more pronounced.

These results from Rajan and Zingales (1998) type regressions provide strong support for our gambling hypotheses and confirms that our results are not driven by unobserved geographical heterogeneity. Overall, we conclude from these robustness test results that the institutional regression estimates are robust to a large number of variations to the baseline specifications.

5.6 Employee Stock Option Plan Regression Estimates

In this section, we estimate multivariate regressions to test whether the observed univariate relation between county-level religious composition and stock option grants to non-executive employees is robust to controlling for other known determinants of broad-based employee stock option plans. The dependent variable in these ESO regressions is the natural logarithm of the Black-Scholes (BS) value of option grants to non-executive employees.[32] As before, the set of independent variables includes firm characteristics as well as demographic characteristics of the county in which a firm is located. Motivated by Spalt (2009), the firm-level control variables include size defined as the log of sales and investment opportunities as proxied by Tobin's Q and R&D expenses. In addition, we include year and industry dummies in the ESO regression specification and cluster standard errors at the county level. Because roughly half of the firms in the sample do not have a stock option plan, we estimate Tobit regressions and report marginal effects of all independent variables computed at their respective means.

The full-sample regression estimates are presented in Table 6, Panel A. In specifications (1) to (4) we regress the per-employee option value on each of the religion measures plus the firm-level controls. Consistent with the findings from the univariate sorts, we find that the PROT coefficient estimate is significantly negative. In contrast, in the specifications that include CATH,

[32]We use the log transformation because the distribution of the dependent variable is skewed.

the coefficient estimate of CATH is positive and statistically significant. Likewise, when we use CPRATIO as the primary independent variable, consistent with the univariate pattern, the CPRATIO coefficient estimate is positive and significant. The estimate of REL is negative but statistically weak.

Specifications (5) to (8) show the results of similar regressions where we add other county-level demographic variables associated with the firm's location. When these variables are included, the estimates for the religion variables weaken slightly, but have the expected signs and remain mostly significant. In particular, the coefficient estimate of our main variable CPRATIO remains statistically and economically significant. A one standard deviation increase in CPRATIO is associated with a $0.107 \times 2.00 = 0.214$ increase in the log Black-Scholes option value. Relative to the mean value of 4.24, this represents a 5.05% increase in the log BS option value. In dollar terms, this value translated into an increase in the mean BS value from \$4,103 to \$5,082, which is a 23.86% increase.[33]

In the next set of tests, we examine whether the religion variables proxy for other neighborhood factors such as local labor market characteristics and social interaction effects that are known to influence option grants to non-executive employees (Kedia and Rajgopal (2009)). Motivated by their study, we enhance the ESO regression specification by including five neighborhood variables that are measured for the metropolitan statistical area (MSA). Specifically, the tight labor market dummy is set to one if the MSA unemployment rate is higher than the average MSA employment rate; Local beta is the firm's exposure to local return index, which is computed using the Pirinsky and Wang (2006) method; State-level non-compete enforceability index is from Garmaise (2010); Market-adjusted MSA return is the median 12-month return of all firms headquartered in the MSA; Industry cluster dummy is set to one for firms that are located in MSAs with an industry cluster;[34] and Option grants at other firms in the MSA is the average Black-Scholes value of option grants at other firms located in the MSA.

The regression estimates from the extended specifications are presented in Table 6, Panel B. To facilitate comparison with prior results, in columns (1) and (3), we report estimates from specifications similar to those used in the Kedia and Rajgopal (2009) study.[35] Consistent with their evidence, we find that non-executive option grant levels are higher among firms that have higher local betas, are located in MSAs in which option grants are more common, or are located in states with weaker non-compete agreements. Further, similar to their results, the unreported demographic variable estimates indicate that more options are granted to non-executives in firms located in counties with more educated individuals.

[33]The new value of the option grant is computed as $\exp^{(\ln(4103)+0.214)} = \$5{,}082$.

[34]We use the same definition of industry cluster as in Kedia and Rajgopal (2009). It is an MSA-level dummy variable that takes a value of one if an industry makes up more than 10% of the MSA's market capitalization and firms from that industry in that MSA make up more than 10% of the industry's total market capitalization. Industries are based on two-digit SIC codes.

[35]Our empirical method is slightly different from Kedia and Rajgopal (2009). Unlike their study, we use a Tobit specification and use the Black-Scholes value of option grants per employee instead of number of option grants scaled by shares outstanding.

When we include CPRATIO in the regression specification (see columns (2) and (4)), it has a significantly positive coefficient estimate. The estimate of the neighborhood variables remain qualitatively similar, although the statistical significance of some variables weaken. In particular, the coefficient estimate of "Option grants at other firms in the MSA" becomes insignificant. We also estimate the ESO regression separately for low and high CPRATIO sub-samples (see columns (5) and (6)) and find that neighborhood variables have significant estimates only in the high CPRATIO sub-sample. This evidence indicates that neighborhood factors have a stronger effect on non-executive option grants when the local Catholic concentration is higher and the Protestant concentration is lower.

The ESO regression estimates from these extended specifications indicate that prevalence of certain religious beliefs could drive the social interaction effects that are known to influence option grants. In particular, the local "culture" might be shaped by the religious composition of that region, which in turn could influence the option grant policies of all firms located in the region.

To further examine the sensitivity of our baseline results, we consider an alternative measure of option grants (the annual number of stock option grants per employee) and an alternative estimation method (OLS instead of Tobit). For this estimation, we only consider the subsample of firms that have an employee stock option plan. We find that our results are not affected by using these alternative specifications (see Table 6, Panel B). Overall, the results from the ESO regressions are consistent with our hypothesis H2a, which conjectures that religion-induced gambling attitudes influence stock option grants to non-executive employees.

Similar to our previous analysis of institutional stock holdings, we look for further confirmation that the observed effect of religion measures is due to their influence on gambling attitudes. We first re-estimate the ESO regression for volatility-based subsamples. Each year we divide firms into high and low subsamples based on the median level of volatility, which is reported as *Sigma* in ExecuComp and is computed using the monthly stock returns over the prior 60 months. As the return volatility of the underlying stock increases, stock options are likely to become increasingly attractive to employees with preference for skewness. Thus, our proxies for gambling preferences should yield stronger results in the high volatility subsample.

The subsample results are summarized in Table 6, Panel C. Consistent with our second employee gambling preference hypothesis H2b, we find that the coefficient estimates of PROT, CATH and CPRATIO are all statistically significant in the high volatility subsample but insignificant or weaker in the low volatility subsample. We find similar results when we consider size-based subsamples. In particular, the CPRATIO coefficient estimate is stronger for the small firms subsample for which local cultural factors are more likely to influence option grant policies and the headquarter location would be a good proxy for the location of the majority of the workforce.

We also form subsamples based on county level measures of income and education. The motivation for this exercise is that the relation between the Black-Scholes value of non-executive

option grants and the religion variables would be stronger in counties in which the average county population characteristics reflect employee characteristics more accurately. Compared to non-employees, firm employees are likely to possess higher education levels and earn higher salaries. Thus, the cross-sectional relation is expected to be stronger in the high education and high income sub-samples. Consistent with this conjecture, we find that the coefficient estimates of the religion variables are stronger in the high education and high income samples, while weak and insignificant in the low income and low education subsamples.

5.7 Robustness of Employee Stock Option Plan Regressions

We examine the robustness of these ESO results using several additional tests. The results from these robustness tests are summarized in Table 7, Panel A, where as before, for brevity, we focus on the CPRATIO estimates. To begin, as with the institutional investor holdings regressions, we control for the level of religiosity in our CPRATO regressions and find qualitatively similar results. When we adopt a two-stage least squares approach using lagged values of the religion variables as instruments, we find that the OLS and 2SLS results are very similar. The results are also robust when we do not include industry dummies, use the CPDIFF measure instead of CPRATIO, and extend the definition of PROT and CATH to include Mormons and Jews, respectively.

Our main results remain significant when we include additional control variables such as contemporaneous stock return, past two-year stock return, industry volatility, earnings volatility, and measures of cash constraints (cash balances, cash dividends, cash flow and leverage). Additionally, we find consistent results when we follow Oyer and Schaefer (2004) to define an indicator variable for the existence of an ESO plan and then estimate logit regressions. To control for the differences in option granting policies at the firm-level or differences in fairness concerns, we include the Black-Scholes value of options granted to the CEO as an additional control variable and find that the CPRATIO estimate remains significant.

The results are robust across time periods and in various geography-based subsamples. When we do not use interpolated religion data and estimate cross-sectional ESO regressions for the year 1993 (the first year with the ESO data) and year 2000 only, we find that CPRATIO still has significantly positive estimates. We find that the results remain significant when we exclude technology firms, which are more likely to offer stock option plans to their employees. We also find that the results are unchanged when we include the Republican state dummy, or a measure of social capital and trust.[36]

In the last set of robustness tests, we estimate state and county fixed effects regressions

[36]To better establish the causal relation between regional religious composition and broad-based option grants, we collected data on headquarter location changes. We wanted to examine whether the option grant policy changes when a firm moves from a Catholic region to a Protestant region, and vice versa. Unfortunately, although there are 195 moves during the ESO sample period, there are only 15 matches with the set of firms in the ESO sample. The small number of matches prevents us from conducting any meaningful statistical analysis.

using the Rajan and Zingales (1998) method to further investigate the possibility that omitted geographical variables drive our ESO results. In these regressions, we examine whether high volatility firms grant more employee stock options if they are located in a region where the local population has a higher propensity to gamble. We consider the high volatility measure in the Rajan and Zingales (1998) type regressions because high volatility firms are more likely to be perceived as gambles by employees due to their higher skewness (Spalt (2009)). We examine the within-state and within-county differences between high and low volatility firms by defining an interaction variable between one of the religion variables and the high volatility dummy. Our key conjecture is that the difference in ESO grants between high and low volatility firms would be greater among firms located in high CPRATIO regions.[37]

The results from the state fixed effects regressions presented in Table 7, Panel B are consistent with our conjecture. The coefficient estimates of interaction terms defined using PROT, CATH, and CPRATIO are all significant and have the correct signs. These estimates are also significant economically. For example, increasing CPRATIO by one standard deviation for a firm with above median stock return volatility increases the number of granted options by $0.057 \times 2.00 \times 100 = 12.40\%$.[38] To further test the robustness of our prediction, we estimate the state fixed effects regression separately for the subset of small and large firms. Each year, we define small (large) firms as those with below (above) median annual sales. Since we assign firms to counties and states by the location of their headquarters, our estimates are likely to be more precise for small firms. Consistent with this conjecture, we find that interaction term estimates have larger magnitudes and are statistically more significant for the subsample of small firms.

When we estimate the ESO regressions using county fixed effects, all coefficient estimates have the expected signs and they are similar in magnitudes to the state effects regressions, but only the estimate of CATH is significant. The weak statistical significance is not surprising because there is limited within-county variation in the option grant policies as there are an average of only 1.7 firms with ESO plan per county-year.

When we split the sample into large and small firms and re-estimate the county fixed effects regressions, we again find that the estimates are stronger and consistent with our gambling hypotheses for the subsample of small firms. All interaction terms are statistically significant for the small firms subsample. In economic terms, the coefficient estimate of the CPRATIO

[37]We estimate these regressions using OLS on the subsample of firms that grant employee stock options. Because the Rajan and Zingales (1998) method involves the use of fixed effects, we estimate OLS regressions on the firm-year observations with positive option grants instead of the Tobit model that we use in our baseline specifications. We cannot estimate ESO regressions using Tobit when the model has interaction terms because of the well-known incidental parameters problem associated with non-linear panel data models, which would make our estimates biased and inconsistent (Neyman and Scott (1948), Lancaster (2000)). Further, when we estimate the ESO model with such a large number of indicator variables and interaction, we face practical problems with difficulty of convergence in many cases. For example, our Tobit estimation procedure with state, year, and industry dummies does not converge when we focus on small or large firm subsamples.

[38]To be conservative, we assume in this calculation that the statistically insignificant coefficient estimate of CPRATIO is zero.

interaction term implies that the difference in stock option grants between small firms with high and low volatility in a county that is at the 75th CPRATIO percentile is $(3.740.88) \times 0.071 \times 100 = 20.31\%$ higher than the corresponding difference in a county that is at the 25th CPRATIO percentile.[39]

Collectively, the results from these robustness tests indicate that our baseline ESO regression estimates are robust. We also find strong support for our second ESO hypothesis (H2b). Further, we demonstrate that the impact of local religious composition on stock option grant policies is unlikely to be driven by unobserved factors at the state or county levels.

5.8 First-Day IPO Return and Turnover Regression Estimates

To test our third set of hypotheses, we use the first-day IPO return as the dependent variable. The set of independent variables includes the religion measures, the county level demographic characteristics, and the following determinants of initial day return identified in the recent IPO literature (e.g., Purnanandam and Swaminathan (2004), Loughran and Ritter (2004), Cliff and Denis (2004)): (i) the size of the offering, defined as the natural logarithm of the total IPO proceeds; (ii) the Carter and Manaster (1990) rating of the lead underwriter as a proxy for underwriter reputation;[40] (iii) the gross spread charged by the underwriter; (iv) offer price revision, defined as the percentage revision between the mid-point of the initial filing price range and the final offer price; (v) a technology dummy that is set to one for a technology firm; (vi) the average daily return of the CRSP value-weighted index over the three week period prior to the IPO offer date; and (vii) the age of the issuing firm, defined as the natural logarithm of one plus the number of years since the founding date. We estimate OLS regressions with year and industry dummies and cluster standard errors at the county level.

The estimation results are presented in Table 8, Panel A. In specifications (1) to (4) of Panel A, the dependent variable is the first-day IPO return. We find that the coefficient estimates of PROT and CATH have the correct signs but they are not statistically significant. The coefficient estimate of our key religion variable CPRATIO, however, is significant both statistically and economically.[41] A one standard deviation increase in CPRATIO corresponds to a $0.526 \times 2.00 = 1.05\%$ higher first-day return. Relative to the mean first-day return of 16.78%, this is a 6.27% increase. Further, there is a 2.86 standard deviation difference between the CPRATIO levels across the extreme quartiles. Thus, IPOs offered in counties that are

[39] An alternative explanation for higher ESO grants in high CPRATIO regions is that the Protestant work ethic might provide more intrinsic motivation to Protestants (Weber (1905, 1956)), while Catholics need stronger incentives due to their lower intrinsic motivation. The volatility interaction results are inconsistent with this explanation because it is not clear why the intrinsic motivation levels of Catholics and Protestants would systematically vary across high and low volatility firms. The intrinsic motivation hypothesis can only be valid if less motivated Catholics and more motivated Protestants systematically sort into high volatility firms within counties. While we cannot definitively rule out this possibility, it is not obvious why such a systematic pattern would arise.

[40] When there are multiple lead underwriters, we use their average reputation.

[41] As before, to improve readability, we multiply the coefficient estimates of CPRATIO in Table 9 by 100.

in the two extreme CPRATIO quintiles would have an average first-day return differential of $0.526 \times 2.86 \times 2.00 = 3.01\%$. These estimates indicate that differences in religious composition across counties have an economically significant influence on the first-day IPO return.

In addition to the first-day return, we examine the effect of local religion on the first-day IPO turnover in specifications (5) to (8) of Table 8, Panel A. First-day turnover can be interpreted as an alternative measure of speculative interest in an issuing firm's stock. We expect the religion-first-day turnover relation to be similar to the religion-first-day return relation. Consistent with this conjecture, we find that the results from turnover regressions are qualitatively similar to those from the return regressions, although the statistical significance is weaker. PROT is negatively related to first-day turnover, while CATH and CPRATIO are positively related to turnover. Taken together, the first-day return and turnover regression results are consistent with our first IPO hypothesis (H3a).

To test the second IPO hypothesis (H3b), which posits that high local market participation and strong local bias would amplify the relation between religion and first-day returns, we re-estimate the IPO regressions for various market participation, retail clientele, and local bias subsamples. Motivated by the evidence in Campbell (2006), we use income and education as proxies for stock market participation. For the 1998 to 2005 period, we consider another state-level stock market participation proxy that has been proposed in Brown, Ivković, Smith, and Weisbenner (2007). It is defined as the proportion of tax returns in each state that reports dividend income on IRS tax returns.

We also partition the sample based on offer price and first-day turnover to focus on IPOs in which retail investors are more likely to participate and influence the first-day return. Retail investors are known to prefer low-priced stocks (e.g., Kumar (2009)) and high initial turnover is likely to be a rough indicator of the degree to which investors with initial allocations of the IPO "flip" the shares to retail or other investors. To capture the incremental effects of local bias, we obtain state-level measures of local bias using the retail brokerage data and examine subsamples based on this retail local bias measure.[42]

The IPO subsample results are summarized in Table 8, Panel B. We find that the coefficient estimates of religion variables are stronger in high income, high education, and high market participation subsamples. Consistent with our conjecture, we also find that the IPO regression results are stronger in the low price, small size, and high turnover IPO subsamples. Further, even with a coarse state-level measure of local bias, we find that the effect of religion measures is notably stronger in the high local bias subsample. When we examine subsamples formed on both market participation proxy (income) and local bias, we find that the results are strongest in the high income, high local bias subsample. These results provide strong support for our second local bias hypothesis (H3b) and indicate that the effect of religion on first-day return is

[42]The local bias measure is defined as $LB = 1 - D_{act}/D_{portf}$, where D_{act} is the average distance between an investor's location and stocks in her portfolio, while D_{portf} is the average distance between an investor's location and other characteristic-matched portfolios not held by the investor. The state-level local bias measure is an equal-weighted average of the local bias of brokerage investors located in the state.

stronger among IPOs with stronger retail clientele and when local stock market participation rate and local bias are high.

5.9 Robustness of IPO Regression Regressions

We perform several robustness checks similar to those in the previously discussed settings. These results are presented in Table 9, Panel A. We find that IPO regression results are stronger when we control for the degree of religiosity in the county. The results remain strong when we use an instrumental variables specification with a lagged religion variable. The results are also robust when we exclude industry dummies, use the CPDIFF measure instead of CPRATIO, or extend the religion variables to include Mormons and Jews. When we use state lottery sales as an independent variable, we find that it has a weak positive effect. However, its estimate is no longer significant when we include CPRATIO in the regression specification.

The subperiod estimates indicate that the IPO regression estimates are strong in the latter part of the sample and weak in the early half of the sample. The results are mostly robust in the various geography-based subsamples. The results are weak when California or the West Census region are excluded, but the results in these geographic subsamples improve considerably in the latter sample period or when we focus on the high retail bias subsample. The IPO results are unlikely to be driven by unobserved factors at the state level because when we include state-level controls for political preferences, social capital, and trust, the CPRATIO coefficient remains significant.

As in the previous settings, we use the Rajan and Zingales (1998) estimation method to further ensure that our results are robust to unobserved geographical heterogeneity at the county and state levels. In both county and state fixed effects regressions, we find a positive coefficient estimate for the interaction between CPRATIO and the technology firm dummy. Consistent with our gambling hypothesis, this evidence indicates that the first-day return for technology stocks is significantly higher if the company is located in a high CPRATIO county. This effect is stronger in regions with stronger local bias, which again supports our conjecture that local gambling attitudes affect first-day IPO return.

Using counties in the extreme quartiles to illustrate the economic significance of the IPO results, we find that the difference between the mean first-day IPO return for technology firms and other firms is $(3.74 - 0.88) \times 1.158 = 3.31\%$ higher in a county with CPRATIO at the 75^{th} percentile than in a county with CPRATIO at the 25^{th} percentile. Relative to the mean first-day return of 16.78%, this reflects a 19.74% difference. These differences are even more pronounced in high local bias regions or when we estimate the IPO regressions using county fixed effects.

Overall, these robustness test results provide strong support for our conjecture that religion-induced gambling preferences of local individuals affect first-day return and turnover of local IPOs. We are also able to establish that these effects are unlikely to be driven by unobserved geographical heterogeneity.

5.10 Lottery Stock Premium: Fama-MacBeth Regression Estimates

In the last part of the paper, we estimate Fama-MacBeth regressions to estimate the lottery-stock premium and gather support for our fourth hypothesis (H4). We modify the primary regression specification used in Kumar (2009) to estimate the lottery-type stock premium. This specification is very similar to the specification used in Ang, Hodrick, Xing, and Zhang (2009) to examine the pricing of idiosyncratic volatility. The dependent variable in these regressions is the monthly stock return.

The set of independent variables includes several stock characteristics and factor exposures as well as religion related variables. The primary independent variable is the Lottery Stock × High Religion interaction term, where one of the four religion variables (PROT, CATH, CPRATIO, or REL) is used to define the interaction variable. The High Religion dummy is set to one for firms that are located in regions in which the religion measure is above its median value. Our main conjecture is that the negative lottery stock premium would be more negative when a firm is located in a high CPRATIO region. Therefore, the interaction variable defined using PROT should have a significantly positive estimate, while the CATH and CPRATIO interaction terms should have significantly negative estimates.

The Fama-MacBeth regression results for the 1980 to 2005 sample period are reported in Table 10, Panel A. When the religion interaction is not included in the specification, the lottery stock dummy has a significantly negative coefficient estimate. The estimate of -0.125 (t-statistic $= -3.52$) translates into an annualized average lottery stock underperformance of $0.125 \times 12 = 1.50\%$. When we include Lottery Stock × PROT interaction term in the specification, consistent with our hypothesis, we find that it has a significantly negative sign. Similarly, the CATH interaction term has a marginally positive coefficient estimate and CPRATIO has a strongly positive estimate.

In economic terms, these estimates indicate that when the local clientele exhibits a preference for lottery-type stocks due to their religious background, the lottery-type stocks earn significantly lower average return. For instance, when the CPRATIO in a region is above its median, lottery-type stocks underperform by an additional $0.053 \times 12 = 0.64\%$ on an annual basis. The average annualized underperformance increases from 1.50% to 2.14%. In contrast, when the PROT measure is above its median value, lottery-type stocks earn $0.058 \times 12 = 0.70\%$ higher average annualized return. The average annualized underperformance of lottery type stocks drops from 1.50% to 0.80%.

Our robustness check results reported in Table 10, Panel B indicate that the incremental effect of CPRATIO on the lottery stock premium is robust. We find that Lottery Stock × High CPRATIO interaction term remain significant when we use the CPDIFF measure instead of CPRATIO, extend the religion variables to include Mormons and Jews, use characteristic-adjusted return to measure performance, consider sub-periods, or consider geographic subsamples. The interaction estimates also remain qualitatively similar when we introduce additional regional controls such as the Republican state dummy and measures of social capital and trust.

Taken together, these results support our lottery-stock premium hypothesis (H4) and indicate that the magnitude of the negative lottery stock premium is incrementally affected by the religious characteristics and gambling propensity of local investors.

6. Summary and Conclusion

We use people's religious background as a proxy for their gambling propensity and examine whether geographical variation in religion-induced gambling norms affects aggregate market outcomes. We focus on four distinct economic settings in which the existing literature has suggested a role for gambling and speculative behavior. Our results indicate that in regions with higher concentration of Catholics relative to Protestants, institutions hold larger lottery-type stock portfolios, non-executive employees receive larger stock option grants, the initial day IPO return is higher, and the magnitude of the negative lottery stock premium is higher. These seemingly unrelated findings are driven by a common gambling-based mechanism. Operating through this gambling channel, religion influences investors' portfolio choices, corporate decisions, and stock returns.

The consistency in the relation between local religious composition and aggregate market outcomes in multiple settings provide strong support to our gambling-related hypotheses and highlight the important role of gambling in understanding aggregate market outcomes. In broader terms, our empirical evidence contributes to the emerging literature in economics that examines the interplay between culture and economic outcomes. Because religion is one of the key cultural attributes, our results indicate that through an influence on gambling attitudes, cultural norms may impact financial markets more strongly than previously believed.

Our study focuses on economic settings in which the existing literature has already suggested a possible role of gambling and speculation. However, the remarkable similarities in our results across different economic settings indicate that religious beliefs might be important in other economic settings and could have an even stronger influence on financial markets. For example, recent studies in corporate finance indicate that managerial incentives affect corporate policies. It is likely that when offered similar contracts, the religious background of a manager determines her response to performance-based incentives. Therefore, through its effect on ethics and values, differences in religious beliefs could have a significant effect on corporate policies, including capital structure choices.

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TABLE 1
Summary Statistics

This table presents summary statistics for the various data sets used in the paper. Panel A presents county-level religion variables and demographic characteristics based on the institutional investors sample. Protestants (PROT) is the proportion of Protestant adherents in a county, Catholics (CATH) is the proportion of Catholic adherents in a county, Catholic-Protestant Ratio (CPRATIO) is the ratio of Catholics to Protestants, and Religiosity (REL) is the proportion of county population that adheres to any religion. Income is the median household income in a county. Total population is the total county-level population in millions. Education is the proportion of county-level population over the age of 25 with a bachelor's degree or higher. Male-Female Ratio is the ratio of male to female residents in a county. Married is the proportion of county households with a married couple. Minority is the proportion of county residents who are non-white. Age is the average age of county residents. Urban is the proportion of county population that lives in urban areas. Panel B shows institutional portfolio characteristics for the 1980 to 2005 period. Here, lottery stocks are defined as stocks with above-median idiosyncratic volatility and above-median idiosyncratic skewness levels, while non-lottery stocks have below median volatility and skewness levels. The volatility and skewness measures are computed using past six months of daily returns. (Non-) Lottery-Stock Weight is the fraction of the portfolio holdings that is allocated to (non-) lottery-type stocks. IPO Weight is the average portfolio weight allocated to all firms that went public in the previous quarter. Non-local IPOs are located at least 250 miles away from the location of the institution. Portfolio Size is the market value of the total institutional equity portfolio and Portfolio Concentration is the Herfindahl index computed using the portfolio weights. Panel C shows summary statistics for the employee stock option plan sample for the 1992 to 2005 period. ESO Plan is the percentage of firms with an employee stock option plan. Options-Shares Ratio is the ratio of stock options granted to the number of shares outstanding. BS Value per Employee is the Black-Scholes value of non-executive stock options granted divided by the number of non-executive employees in the firm and BS Value CEO is the Black-Scholes value of options granted to the firm's CEO. Sales is the dollar-value of annual firm sales. Tobin's Q is calculated as book assets minus book equity plus market value of equity, scaled by total assets. R&D is the three year average of research and development expense scaled by total assets. Panel D presents the characteristics of IPOs offered during the 1980 to 2005 period. First-Day Return is the return from the offer price to the closing price on the first day of trading. First-Day Turnover is the turnover on the first trading day. IPO Proceeds is the total capital raised by the firm through the IPO process. Underwriter Rank is the Carter and Manaster (1990) rank of the lead manager. Underwriter Spread is the gross spread charged by the underwriter as compensation for its underwriting services. Offer Price Revision is the price change from the midpoint of the filing range to the offer price. Pre-IPO Market Return is the average daily CRSP value-weighted market return during the three week period prior to the offer date. Firm Age is the age of the firm relative to the founding date. Following Oyer and Schaefer (2004), the Technology Firm Dummy is set to one for IPOs with SIC codes between 3570 and 3579, 3661, 3674, 5045, 5961, or 7370 and 7379.

TABLE 1 (Continued)

Summary Statistics

Panel A: County-Level Demographic Characteristics

Variable	Mean	Median	Std Dev	10^{th} Pctl	25^{th} Pctl	75^{th} Pctl	90^{th} Pctl	N
PROT	18.30%	14.51%	11.91%	7.53%	9.74%	23.15%	35.74%	120,978
CATH	29.93%	32.74%	13.54%	10.12%	19.43%	37.98%	48.19%	120,978
CPRATIO	2.59	2.31	2.00	0.34	0.88	3.74	5.38	120,978
REL	56.68%	57.49%	12.29%	39.71%	47.55%	67.30%	71.87%	120,978
Income	$37,624	$31,607	$20,662	$16,842	$22,983	$45,845	$76,450	120,978
Total Population (in m)	1.49	0.86	1.92	0.25	0.59	1.53	2.94	120,978
Education	32.48%	30.66%	10.98%	18.94%	24.14%	41.30%	49.14%	120,978
Male-Female-Ratio	93.75%	93.01%	4.14%	89.15%	90.59%	96.57%	99.40%	120,978
Married	43.32%	46.96%	12.41%	25.37%	29.97%	53.03%	57.84%	120,978
Minority	31.88%	34.32%	15.56%	10.06%	18.49%	44.73%	48.05%	120,978
Age	34.36	34.73	2.71	30.92	32.30	35.82	37.48	120,978
Urban	94.14%	99.05%	12.28%	83.78%	94.61%	100.00%	100.00%	120,978

Panel B: Institutional Portfolio Characteristics

Lottery-Stock Weight	8.94%	4.99%	11.93%	0.34%	1.93%	11.11%	22.08%	120,978
Non-Lottery-Stock Weight	43.98%	44.89%	15.57%	24.71%	36.08%	53.04%	61.01%	120,978
IPO Weight	0.265%	0.00%	1.88%	0.00%	0.00%	0.007%	0.446%	120,969
Non-Local IPO Weight	0.158%	0.00%	1.28%	0.00%	0.00%	0.00%	0.183%	120,969
Portfolio Size (in $b)	$3.12	$0.373	$17.48	$0.083	$0.155	$1.26	$4.66	120,978
Portfolio Concentration	0.063	0.025	0.141	0.009	0.015	0.043	0.109	120,978

Panel C: Employee Stock Option Plan Characteristics

ESO Plan	58.38%	-	-	-	-	-	-	14,557
Options-Shares Ratio	3.19%	1.88%	16.92%	0.58%	1.05%	3.46%	5.85%	14,557
BS Value per Employee	$4,103	$166	$11,165	$0	$0	$1,933	$11,425	14,557
BS Value CEO (in $m)	$1.70	$0.55	$7.02	$0.07	$0.19	$1.43	$3.46	14,555
Number of Employees	19,009	5,032	55,416	574	1,690	15,300	43,400	14,557
Sales (in $m)	$4,036	$1,007	$12,091	$144	$356	$2,992	$9,021	14,557
Firm Value (in $m)	$5,505	$1,082	$19,087	$188	$413	$3,345	$10,509	14,557
Tobin's Q	2.11	1.61	1.49	1.01	1.21	2.40	3.82	14,557
R&D	3.84%	0.18%	7.26%	0.00%	0.00%	5.09%	12.34%	14,557

Panel D: IPO Sample Characteristics

First-Day Return	16.78%	6.88%	29.03%	−1.25%	0.658%	21.43%	45.00%	6,652
First-Day Turnover	20.26%	15.35%	19.25%	3.59%	7.69%	27.05%	41.06%	6,481
Proceeds (in $m)	71.12	32.66	232.82	7.54	15.74	61.76	122.45	6,652
Underwriter Rank	6.94	8.00	2.36	3.00	6.00	9.00	9.00	6,652
Underwriter Spread	7.28%	7.00%	1.13%	6.50%	7.00%	7.24%	9.00%	6,652
Offer Price Revision	0.49%	0.00%	23.43%	−24.49%	−11.11%	8.33%	21.43%	6,633
Pre-IPO Market Return	0.064%	0.069%	0.199%	−0.195%	−0.048%	0.187%	0.306%	6,652
Firm Age (in years)	16.44	8.00	22.23	2.00	4.00	17.00	48.00	6,336
Technology Firm	31.57%	0.00%	46.68%	0.00%	0.00%	100.00%	100.00%	6,652

TABLE 2
State Lottery Sorting Results and Regression Estimates

This table reports results from univariate and multivariate tests associated with state lotteries. Panel A reports the mean religious characteristics of states with and without state lotteries in 1990 and 2000. In 1990, 34 states offered lotteries, while in 2000, lotteries were legal in 38 states. The religious composition is characterized using the following four measures, which have been defined in Table 1: Percentage Protestants (PROT), Percentage Catholics (CATH), Catholic-Protestant Ratio (CPRATIO), and Religiosity (REL). The t-statistics indicate the statistical significance of the difference in the means of religious compositions and p-values are from the Kolmogorov-Smirnov (K-S) test, which compares the two religious composition distributions. Panel B presents univariate sorting results for the four religion variables. We report the mean lottery age in years (measured in 2000) and the per capita lottery sales in a county for the year 2005. Counties from five representative states (California, Florida, Iowa, New York, and West Virginia) are included in the sample. Panel C (specifications (1) to (4)) reports the marginal effects computed at the mean from a multi-period probit regression of lottery existence dummy on the religion variables and various state-level demographic characteristics. The lottery existence dummy for a year is set to one if state lotteries are legal in the state during the year. The sample period is from January 1980 to December 2005. In specifications (5) to (8), we report the estimates from cross-sectional regressions, where per capita lottery sales in a county for the year 2005 is the dependent variable. The independent variables have been previously defined in Table 1. In this panel, robust z- or t-statistics, clustered by county, are reported below the coefficient estimates.

Panel A: Religious Composition of States With and Without Lotteries

	1990				2000			
Group	PROT	CATH	CPRATIO	REL	PROT	CATH	CPRATIO	REL
All	30.03%	18.77%	0.980	54.88%	25.47%	19.74%	1.251	50.50%
Has Lotteries	26.57%	23.38%	1.195	52.77%	22.53%	23.31%	1.479	50.13%
No Lotteries	36.94%	11.53%	0.550	59.09	34.07%	9.31%	0.585	51.59%
Difference	−10.37%	10.86%	0.645	−6.32%	−11.54%	14.00%	0.894	−1.46%
t-statistic	−2.46	2.98	2.04	−1.71	−2.83	4.03	2.15	−0.41
K-S Test p-value	0.024	0.003	0.013	0.119	0.004	0.001	0.007	0.874

Panel B: Lottery Age and Per Capita Lottery Sales

	Lottery Age (in Years)				Per Capita Lottery Sales			
Quintile	PROT	CATH	CPRATIO	REL	PROT	CATH	CPRATIO	REL
Low	19.91	3.09	4.09	13.09	$166.16	$141.61	$133.45	$117.47
Q2	15.80	10.50	11.00	16.30	$197.44	$111.62	$106.89	$165.82
Q3	15.70	16.90	15.30	8.50	$158.65	$121.36	$120.81	$161.35
Q4	12.00	14.30	16.50	14.80	$106.94	$153.32	$156.35	$141.44
High	3.80	24.10	21.90	15.20	$94.23	$195.51	$205.46	$133.34
High−Low	−16.11	22.01	17.81	2.11	−$71.93	$53.90	$72.01	$19.88
t-statistic	−3.41	6.13	4.41	0.48	−4.38	2.99	4.05	1.20
K-S Test p-value	0.003	0.001	0.005	0.883	0.000	0.001	0.000	0.124

TABLE 2 (Continued)

State Lottery Sorting Results and Regression Estimates

Panel C: State Lottery Regression Estimates

	State Lottery Existence Dummy				County-Level Per-Capita Lottery Sales			
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PROT	−1.698				−127.054			
	−3.66				−3.87			
CATH		1.737				178.653		
		4.00				4.63		
CPRATIO			0.228				21.089	
			3.34				4.85	
REL				−1.031				45.166
				−1.58				1.75
Total Population	0.029	0.019	0.013	0.026	−4.682	−8.181	−8.039	−5.737
	2.41	1.79	1.60	2.62	−0.76	−1.43	−1.49	−0.95
Education	0.062	0.063	0.039	0.072	−0.100	−0.320	−0.836	0.021
	3.80	3.61	2.45	3.92	−0.11	−0.37	−0.96	0.02
Male-Female Ratio	−8.360	−6.520	−4.253	−9.777	44.236	75.074	72.090	61.974
	−2.59	−2.21	−1.82	−2.81	0.93	1.70	1.57	1.41
Married	−5.078	−2.817	−1.701	−6.189	−529.158	−642.786	−680.035	−636.769
	−1.93	−1.42	−1.17	−2.23	−4.25	−5.72	−6.33	−5.29
Minority	−3.030	−2.635	−1.462	−4.429	68.612	113.344	26.495	121.379
	−2.97	−2.66	−1.46	−4.46	1.25	2.19	0.47	2.36
Age	0.023	0.022	0.016	−0.028	5.345	6.123	5.769	5.964
	0.49	0.67	0.85	−0.55	4.41	5.22	4.72	4.96
Urban	−1.070	−0.069	−0.453	0.210	33.588	25.753	33.138	47.764
	−1.64	−0.13	−1.47	0.37	1.69	1.30	1.58	2.43
Constant					178.952	112.640	173.964	119.086
					1.71	1.12	1.77	1.12
Year Dummies	Yes	Yes	Yes	Yes	-	-	-	-
Pseudo R^2	0.611	0.610	0.611	0.568	0.264	0.391	0.326	0.240
Number of Obs	1,326	1,326	1,326	1,326	340	340	340	340

TABLE 3

Religious Beliefs and Financial Market Outcomes: Univariate Sorting Results

This table reports the mean financial outcomes for religion sorted firm categories. The following four religion measures are considered: Protestants (PROT), Catholics (CATH), Catholic-Protestant Ratio (CPRATIO), and Religiosity (REL). They have been previously defined in Table 1. In each case we annually (quarterly for institutional holdings) sort observations into quintiles based on each of the four religion measures for the county in which the firm/institution is located and present the equal-weighted mean value in each quintile. Panel A shows the mean portfolio weights of lottery-type and non-lottery-type stocks held in institutional portfolios. Panel B presents the mean Black-Scholes value of per employee option grants to non-executive employees and the mean first-day returns for IPOs. Lottery stocks are defined as stocks with above-median idiosyncratic volatility and above-median idiosyncratic skewness levels, while non-lottery stocks have below median volatility and skewness levels. The volatility and skewness measures are computed using past six months of daily returns. BS Value per Employee is the Black-Scholes value of non-executive stock options granted divided by the number of non-executive employees in the firm. First-Day IPO Return is the return from the offer price to the closing price on the first day of trading. The sample period is from January 1980 to December 2005, except for the employee stock options (ESO) sample, which covers the January 1992 to December 2005 period.

Panel A: Portfolio Weights in Lottery and Non-Lottery Type Stocks

	Lottery-Stock Weights				Non-Lottery-Stock Weights			
Quintile	PROT	CATH	CPRATIO	REL	PROT	CATH	CPRATIO	REL
Low	9.15%	5.88%	5.86%	7.77%	77.51%	81.31%	81.88%	78.81%
Q2	8.89%	7.94%	6.66%	6.34%	81.54%	79.25%	81.37%	81.76%
Q3	7.02%	8.96%	8.83%	6.77%	81.50%	80.48%	81.61%	81.37%
Q4	6.06%	7.20%	8.84%	8.86%	81.88%	80.11%	80.77%	81.84%
High	6.51%	7.65%	7.45%	7.88%	82.93%	80.06%	78.63%	79.48%

Panel B: Black-Scholes Value of ESOs Per Employee and First-Day IPO Return

	Black-Scholes Value				First-Day IPO Return			
Quintile	PROT	CATH	CPRATIO	REL	PROT	CATH	CPRATIO	REL
Low	$10,864	$1,873	$1,788	$5,621	20.05%	14.69%	13.79%	17.58%
Q2	$3,497	$3,279	$2,345	$7,342	19.09%	15.41%	15.26%	20.76%
Q3	$2,568	$6,083	$2,697	$2,096	16.62%	20.41%	16.53%	14.60%
Q4	$2,157	$5,353	$7,904	$1,814	14.32%	17.21%	19.80%	14.56%
High	$1,422	$3,925	$5,793	$3,646	13.85%	16.14%	18.46%	16.39%

TABLE 4
Institutional Portfolio Weight Regression Estimates

This table presents estimates from OLS regressions of institutional lottery-stock, non-lottery-stock, and recent initial public offering (IPO) holdings on religion measures for the county in which the institution is located and other control variables. Panels A and B report full sample estimates, while Panels C and D report the estimates for various subsamples of institutions. In Panel A, the dependent variable in specifications (1) to (4) is the proportion of the institution's portfolio held in lottery-type stocks, while the dependent variable in specifications (5) to (8) is the portfolio weight in non-lottery-type stocks. In Panel B, the dependent variable is either the weight in all recent IPOs (specifications (1) to (4)) or non-local IPOs (specifications (5) to (8)). Recent IPOs refer to firms that went public in the last one quarter. Non-local IPOs are new firms that are located at least 250 miles away from the institutional location. The dependent variable in Panel C (Panel D) is the portfolio weight in lottery- (non-lottery-) type stocks. All variables have been previously defined in Table 1. Each regression also includes a set of dummy variables for each quarter-year combination and institution type. For conciseness, in Panels B, C, and D, the control variable estimates are suppressed. In Panels C and D, each row presents estimates for the religion measures from each of four separate regressions corresponding to specifications (1) to (4) (in Panel C) or specifications (5) to (8) (in Panel D) of the respective regressions in Panel A. The main estimates from Panel A are reprinted as the "Baseline". Concentrated (diversified) institutions are those above (below) the median portfolio concentration in the quarter. Portfolio Concentration is the Herfindahl index of the institutional portfolio computed using the portfolio weights. Banks and insurance companies are considered "Conservative", while investment companies, independent investment advisors and others are considered "Aggressive". Following Bushee (1998), we define quasi-indexers as institutions that have diversified portfolio holdings and low portfolio turnover. The remaining institutions are labeled as non-quasi-indexers. Small (large) institutions are those below (above) the median portfolio size in the quarter. In the last two tests, we estimate the lottery weight regressions by pooling data from the last quarter and the first three quarters of all years, respectively. To improve readability, the coefficient estimates of CPRATIO have been multiplied by 100 in all regressions. The sample period is from January 1980 to December 2005. Robust t-statistics, clustered by county, are reported below the coefficient estimates (Panels A and B) or to the right of the coefficient estimates (Panels C and D).

Panel A: Full Sample Estimates

Dependent variable: Quarter-t weight in lottery or non-lottery type stocks in institutional portfolio i.

	Lottery Weight				Non-Lottery Weight			
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PROT	−0.038				0.043			
	−1.62				1.79			
CATH		0.035				−0.042		
		2.35				−2.66		
CPRATIO			0.407				−0.433	
			2.63				−2.74	
REL				0.037				−0.046
				2.42				−2.85
Portfolio Size	−0.216	−0.217	−0.221	−0.213	0.207	0.208	0.212	0.203
	−2.41	−2.46	−2.51	−2.39	2.26	2.31	2.36	2.22

Continued ...

TABLE 4 (Continued)
Institutional Portfolio Weight Regression Estimates

Panel A: Full Sample Estimates (Continued)

	Lottery Weight				Non-Lottery Weight			
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Portfolio Concentration	0.125	0.126	0.124	0.125	−0.107	−0.108	−0.106	−0.107
	5.93	5.96	5.95	5.95	−4.31	−4.37	−4.31	−4.34
Total Population	0.000	0.000	−0.000	0.000	−0.000	0.000	0.000	−0.000
	0.17	0.00	−0.11	0.40	−0.06	0.18	0.19	−0.24
Education	0.140	0.140	0.133	0.140	−0.141	−0.139	−0.134	−0.131
	5.07	4.89	4.61	4.55	−4.92	−4.75	−4.48	−4.33
Male-Female Ratio	0.154	0.204	0.204	0.238	−0.146	−0.205	−0.200	−0.248
	2.74	3.44	3.67	3.94	−2.59	−3.34	−3.45	−3.99
Married	0.037	0.026	0.033	0.019	−0.044	−0.033	−0.040	−0.023
	0.86	0.68	0.85	0.48	−1.04	−0.85	−1.02	−0.60
Minority	0.053	0.059	0.056	0.052	−0.057	−0.065	−0.059	−0.056
	1.60	1.76	1.70	1.62	−1.71	−1.91	−1.79	−1.72
Age	0.191	0.210	0.242	0.240	−0.201	−0.233	−0.261	−0.270
	2.49	2.55	2.92	3.04	−2.94	−2.88	−3.26	−3.38
Urban	0.016	0.015	0.016	0.023	−0.017	−0.015	−0.019	−0.025
	1.04	1.09	1.24	1.89	−1.09	−1.08	−1.34	−1.98
Quarter Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Institution Type Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.142	0.143	0.145	0.142	0.162	0.162	0.164	0.162
Number of Insti-Quarter Obs	120,978	120,978	120,978	120,978	120,978	120,978	120,978	120,978

Panel B: Institutional Regression Estimates with IPO Weights

Dependent variable: Quarter-t weight allocated to recent IPOs in institutional portfolio i.

	All IPOs				Non-Local IPOs			
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PROT	−0.353				−0.150			
	−2.43				−1.61			
CATH		0.376				0.170		
		3.70				2.52		
CPRATIO			2.786				1.367	
			3.31				2.71	
REL				0.202				0.111
				2.11				1.84
Coefficient estimates of control variables have been suppressed.								
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Institution Type Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.016	0.016	0.016	0.016	0.012	0.012	0.012	0.012
Number of Insti-Quarter Obs	120,969	120,969	120,969	120,969	120,969	120,969	120,969	120,969

TABLE 4 (Continued)
Institutional Portfolio Lottery Weight Regression Estimates

Panel C: Lottery Weight Regression Estimates for Sub-Samples

Sub-Sample	PROT	*t*-stat	CATH	*t*-stat	CPRATIO	*t*-stat	REL	*t*-stat	N
Baseline	−0.038	−1.62	0.035	2.35	0.407	2.63	0.037	2.42	120,978
Institutional Characteristics Sub-Samples									
(1) Concentrated	−0.053	−1.77	0.041	1.95	0.557	2.55	0.042	2.22	60,482
(2) Diversified	−0.014	−0.64	0.019	1.56	0.200	1.74	0.024	1.72	60,496
(3) Aggressive	−0.067	−2.14	0.050	2.54	0.474	2.63	0.041	2.01	96,538
(4) Conservative	0.028	0.77	−0.010	−1.37	−0.134	−1.05	0.003	0.43	24,440
(5) Non-Quasi-Indexers	−0.081	−2.23	0.076	3.57	0.675	3.76	0.028	1.02	48,012
(6) Quasi-Indexers	−0.020	−1.21	0.005	0.45	0.166	1.46	0.006	0.54	65,328
(7) Small Institutions	−0.031	−1.17	0.028	1.55	0.412	2.29	0.044	2.37	60,496
(8) Large Institutions	−0.036	−1.70	0.033	2.55	0.342	2.51	0.029	2.09	60,482
Time of Year Sub-Samples									
(9) Last Quarter	−0.063	−2.74	0.047	3.21	0.491	3.29	0.033	1.87	31,940
(10) First Three Quarters	−0.046	−1.95	0.038	2.51	0.428	2.88	0.032	1.90	89,038

Panel D: Non-Lottery Weight Regression Estimates for Sub-Samples

Sub-Sample	PROT	*t*-stat	CATH	*t*-stat	CPRATIO	*t*-stat	REL	*t*-stat	N
Baseline	0.043	1.79	−0.042	−2.66	−0.433	−2.74	−0.046	−2.85	120,978
Institutional Characteristics Sub-Samples									
(1) Concentrated	0.057	1.72	−0.051	−2.19	−0.588	−2.61	−0.063	−2.81	60,482
(2) Diversified	0.017	0.81	−0.023	−1.76	−0.209	−1.77	−0.026	−1.78	60,496
(3) Aggressive	0.071	2.21	−0.053	−2.60	−0.483	−2.63	−0.047	−2.20	96,538
(4) Conservative	−0.018	−1.52	−0.009	−0.96	0.003	0.05	−0.021	−1.83	24,440
(5) Quasi-Indexers	0.019	1.14	−0.008	−0.76	−0.165	−1.51	−0.012	−0.98	65,328
(6) Non-Quasi-Indexers	0.100	2.64	−0.092	−4.06	−0.738	−3.88	−0.059	−2.06	48,012
(7) Small Institutions	0.029	1.05	−0.031	−1.65	−0.400	−2.27	−0.055	−2.81	60,496
(8) Large Institutions	0.051	2.23	−0.044	−3.06	−0.413	−2.73	−0.035	−2.28	60,482
Time of Year Sub-Samples									
(9) Last Quarter	0.078	3.12	−0.056	−3.05	−0.547	−3.36	−0.045	−2.13	31,940
(10) First Three Quarters	0.049	2.00	−0.045	−2.86	−0.447	−2.92	−0.040	−2.30	89,038

TABLE 5

Robustness Checks: Institutional Portfolio Weight Regression Estimates

This table presents several alternative versions of the institutional holdings regressions estimated in Table 4 as robustness checks. In Panel A, we re-estimate the regressions in Table 4, Panel A. All regression specifications include one of the religion variables, portfolio concentration, portfolio size, demographic controls, institution type dummies and year-quarter dummies, but for conciseness, we report only the estimates of CPRATIO. The main estimates from Table 4, Panel A (columns (3) and (7)) are reprinted as "baseline". In the first test, we control for county-level religiosity. Next, we control for industry concentration, which is defined as the Herfindahl index of the 48 Fama and French (1997) industry weights in the institution's portfolio. The two-stage least squares (2SLS) estimate uses three-year lagged value of the religions variables as an instrument for the concurrent value. The alternative lottery stock definition classifies lottery stocks as those with below median price in addition to above median volatility and skewness. In test (5), we estimate the lottery weight regression without institution type dummies. In test (6), CPDIFF is the difference between the proportions of Catholics and Protestants in a county. The "Include Mormons and Jews" test uses an alternative measure of CPRATIO, where the Catholic population includes the Jewish adherents and the Protestant population includes the Mormons. In test (8), we use lottery sales as the main independent variable instead of CPRATIO, where lottery sales is defined as the inflation-adjusted per-capita state-level lottery sales. In test (9), both the state-level lottery sales and CPRATIO are included in our regression. In tests (10) and (12), we estimate the return regressions for different sub-periods and in tests (13) to (17), we consider several geography based sub-samples. "Conservatives" in test (11) include banks and insurance companies (institution types 1 and 2). In the last four tests, we include additional state-level control variables in the specification. We control for political environment using a dummy variable that is set to one for states that voted in favor of the Republican party in the last Presidential elections. The Social Capital variable is a composite index of 14 different state-level measures of community participation and the Trust variable is based on a question in the General Social Survey that measures the percentage of survey respondents in the state who agrees with the statement that "Most people can be trusted." In Panels B and C, we present estimates from OLS regressions of institutional lottery-stock and non-lottery-stock weights using state and county fixed effects. In the first set, we re-estimate the regressions in Table 4, Panel A with state fixed effects and include an interaction variable between one of the institutional attributes and CATH, PROT, CPRATIO, or REL. In the second set, we re-estimate the regressions in Table 4, Panel A with the interaction term and county fixed effects and, therefore, exclude all county-level independent variables. We consider three institutional attributes: (i) Portfolio Concentration, which is the Herfindahl index of the institutional portfolio computed using the portfolio weights; (ii) "Aggressive" institutions, which includes investment companies (type 3), independent investment advisors (type 4), and "Others" (type 5); and (iii) Non-Quasi-Indexer institutions, which have non-diversified portfolios and have high portfolio turnover (Bushee (1998)). For brevity, we report only the coefficient estimates of the institutional attribute-religion interaction terms. All variables in the table have been previously defined in Table 1. To improve readability, the coefficient estimates of CPRATIO have been multiplied by 100 in all regressions. The sample period is from January 1980 to December 2005. Robust t-statistics, clustered by county, are reported to the right of the coefficient estimates.

TABLE 5 (Continued)
Robustness Checks: Institutional Portfolio Weight Regression Estimates

Panel A: Robustness Checks

	Lottery Weight				Non-Lottery Weight			
Test	Est.	t-stat	N	Adj. R^2	Est.	t-stat	N	Adj. R^2
Baseline	0.407	2.63	120,978	0.143	−0.433	−2.74	120,978	0.164
Basic Robustness								
(1) Control for Religiosity	0.381	2.16	120,978	0.149	−0.388	−2.17	120,978	0.165
(2) Control for Industry Conc.	0.393	2.57	120,978	0.149	−0.427	−2.71	120,978	0.165
(3) 2SLS, Lagged Religion	0.415	2.39	114,885	0.146	−0.452	−2.58	114,885	0.158
(4) Alternative Lott. Stock Definition	0.127	2.69	120,978	0.170	−0.232	−2.99	120,978	0.175
(5) No Institution Type Dummies	0.445	3.00	120,978	0.132	−0.005	−3.07	120,978	0.156
(6) CPDIFF instead of CPRATIO	0.022	2.10	120,978	0.143	−0.026	−2.36	120,978	0.163
(7) Include Mormons and Jews	0.424	3.50	120,978	0.146	−0.444	−3.65	120,978	0.165
(8) Lott. Sales instead of CPRATIO	0.001	0.77	94,026	−0.001	−0.002	−1.30	94,026	0.151
(9) Lott. Sales and CPRATIO:								
Lottery Sales Estimate	−0.005	−1.93			0.004	1.65		
CPRATIO Estimate	0.664	2.88	94,026	0.147	−0.678	−2.80	94,026	0.155
Sub-Periods								
(10) 1980-1992	−0.289	−2.46	38,496	0.146	0.346	2.57	38,496	0.185
(11) 1980-1992, Excl. Conservatives	−0.224	−1.30	24,358	0.121	0.347	1.81	24,358	0.144
(12) 1993-2005	0.506	2.95	82,482	0.133	−0.549	−3.10	82,482	0.148
Geography-Based Sub-Samples								
(13) Exclude California	0.319	2.22	107,057	0.138	−0.356	−2.36	107,057	0.163
(14) Exclude North-East	0.891	2.11	66,463	0.143	−0.897	−2.14	66,463	0.157
(15) Exclude Mid-West	0.417	2.58	97,150	0.141	−0.416	−2.45	97,150	0.161
(16) Exclude South	0.279	1.91	98,818	0.156	−0.307	−1.93	98,818	0.173
(17) Exclude West	0.321	2.23	100,503	0.141	−0.371	−2.42	100,503	0.164
Additional Regional Controls								
(18) Control for Political Environment	0.297	1.86	120,978	0.147	−0.316	−1.94	120,978	0.165
(19) Control for Social Capital	0.400	2.57	120,687	0.147	−0.423	−2.68	120,687	0.65
(20) Control for Trust	0.397	2.43	116,686	0.146	−0.432	−2.60	116,686	0.164
(21) All Regional Controls	0.306	1.88	116,686	0.148	−0.334	−2.02	116,686	0.142

TABLE 5 (Continued)
Institutional Portfolio Lottery Weight Regression Estimates

Panel B: Lottery Weight Regression Estimates using the Rajan and Zingales (1998) Method

Interaction Variable	PROT	*t*-stat	CATH	*t*-stat	CPRATIO	*t*-stat	REL	*t*-stat	N
State Fixed Effects									
(1) Portfolio Concentration	−0.333	−3.19	0.191	1.66	2.043	2.16	−0.005	−0.03	120,978
(2) Aggressive Type	−0.081	−2.95	0.042	2.24	0.538	2.53	0.028	1.23	120,978
(3) Non-Quasi-Indexer	−0.121	−5.45	0.062	3.02	0.679	7.24	−0.004	−0.13	108,027
County Fixed Effects									
(4) Portfolio Concentration	−0.355	−3.25	0.249	2.00	2.423	2.60	0.037	0.68	120,978
(5) Aggressive Type	−0.089	−2.06	0.049	2.48	0.716	4.04	0.049	3.08	120,978
(6) Non-Quasi-Indexer	−0.119	−5.05	0.057	2.49	0.696	7.41	0.002	0.06	108,027

Panel C: Non-Lottery Weight Regression Estimates using the Rajan and Zingales (1998) Method

Interaction Variable	PROT	*t*-stat	CATH	*t*-stat	CPRATIO	*t*-stat	REL	*t*-stat	N
State Fixed Effects									
(1) Portfolio Concentration	0.409	3.07	−0.332	−2.25	−2.617	−2.28	−0.080	−0.60	120,978
(2) Aggressive Type	0.083	2.96	−0.036	−1.84	−0.516	−2.60	−0.018	−0.75	120,978
(3) Non-Quasi-Indexer	0.128	5.51	−0.064	−3.18	−0.648	−6.41	0.011	0.35	108,027
County Fixed Effects									
(4) Portfolio Concentration	0.445	3.21	−0.392	−2.62	−3.005	−2.66	−0.148	1.22	120,978
(5) Aggressive Type	0.100	2.39	−0.053	−2.67	−0.721	−4.86	−0.047	−2.78	120,978
(6) Non-Quasi-Indexer	0.126	5.09	−0.060	−2.61	−0.647	−6.79	0.005	0.15	108,027

TABLE 6
Employee Stock Option Regression Estimates

This table reports marginal effects computed at the mean from Tobit regressions of employee stock option grants on religion measures for the county in which the institution is located and other control variables. Stock option grants are measured as the natural logarithm of the Black-Scholes value of per-employee option grants to non-executive employees. All independent variables have been previously defined in Table 1. Panel A shows the full sample estimates for baseline specifications, Panel B presents results from extended specifications with neighborhood controls such as local labor market and social interaction variables, and Panel C reports estimates obtained using alternative specifications and different subsamples. In Panels B and C, for conciseness, the estimates of all control variables are suppressed. In Panel B, the following neighborhood controls are considered: (i) tight labor market dummy that is set to one if the MSA unemployment rate is higher than the average MSA employment rate, (ii) local beta that is the firm's exposure to the local return index computed using the Pirinsky and Wang (2006) method, (iii) the state-level non-compete enforceability index obtained from Garmaise (2010), (iv) the market-adjusted MSA return that is the median 12-month return of all firms headquartered in the MSA, (v) the industry cluster dummy is set to one for firms that are located in MSAs with an industry cluster, and (vi) option grants at other firms in the MSA is the average Black-Scholes value of option grants at other firms in the MSA. In specifications (5) and (6), high and low CPRATIO subsamples include firms that are located in counties with above and below median CPRATIO levels, respectively. In Panel C, the main estimates from specifications (5) to (8) in Panel A are reprinted as the "Baseline". Each row presents estimates for the religion measures from each of four separate regressions corresponding to specifications (5) to (8) in Panel A. We first consider an alternative measure of option grants and use the annual number of granted options per non-executive employee as a dependent variable. In this regression we also control for the volatility of the firm (based on the past 60 month stock return reported in ExecuComp), as well as the natural logarithm of the beginning of the year stock price. In the second regression in this panel, we estimate the ESO regressions using OLS, where we only consider the subsample of firms that grant employee stock options. The high (low) volatility subsamples consist of firms with above (below) median volatility. Larger (smaller) firms are defined as those with fiscal year sales greater (smaller) than the median firm in the sample. The high (low) income subsample consists of firms located in counties with above (below) median per-capita income (median is based on the sample of firm observations) per year. High and low education samples are similarly defined per year using the proportion of county residents above age 25 with bachelor's degree or higher. Industry dummies are based on 30 Fama-French industries. The sample period is from January 1992 to December 2005. Robust z-statistics (t-statistics for OLS regressions), clustered by county, are reported below the coefficient estimates (Panels A and B) or to the right of the coefficient estimates (Panel C).

TABLE 6 (Continued)
Employee Stock Option Regression Estimates

Panel A: ESO Regression Estimates for the Full Sample

Dependent variable: Ln(1 + Black-Scholes value of ESOs per employee) in year t.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PROT	−2.232				−1.517			
	−3.74				−2.84			
CATH		0.951				0.717		
		2.75				1.54		
CPRATIO			0.123				0.107	
			4.04				3.16	
REL				−0.361				−0.253
				−0.52				−0.48
Ln(Sales)	−0.299	−0.299	−0.298	−0.296	−0.297	−0.297	−0.294	−0.298
	−10.36	−10.07	−10.14	−9.77	−10.20	−10.14	−10.06	−10.13
Tobin's Q	0.189	0.194	0.191	0.193	0.178	0.179	0.177	0.179
	7.57	7.43	7.45	7.60	7.94	7.92	7.90	7.93
R&D Expenses	6.192	6.626	6.346	6.770	5.488	5.659	5.464	5.743
	4.95	5.09	5.07	5.01	4.79	4.95	4.90	4.85
Total Population					0.016	0.020	0.003	0.049
					0.60	0.71	0.10	1.93
Education					0.022	0.022	0.019	0.026
					3.45	3.33	3.05	3.52
Male-Female Ratio					4.681	5.987	6.276	4.973
					2.45	2.83	3.10	2.26
Married					1.764	1.582	1.438	1.757
					2.32	2.00	1.91	2.10
Minority					0.678	0.839	0.685	0.642
					1.13	1.31	1.18	0.98
Age					0.018	0.033	0.020	0.043
					0.68	1.21	0.76	1.61
Urban					0.437	0.752	0.703	0.971
					0.97	1.67	1.59	2.14
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.091	0.090	0.091	0.089	0.095	0.094	0.095	0.094
Number of Firm-Year Obs	14,557	14,557	14,557	14,557	14,557	14,557	14,557	14,557

Panel B: ESO Regression Estimates With Neighborhood Controls

Dependent variable: Ln(1 + Black-Scholes value of ESOs per employee) in year t.

					MSA CPRATIO	
					Low	High
Variable	(1)	(2)	(3)	(4)	(5)	(6)
CPRATIO		0.099		0.081		
		2.82		2.23		
Tight Labor Market Dummy	0.098	0.091	0.068	0.068	0.224	−0.016
	0.91	0.82	0.62	0.60	1.46	−0.08
Local Beta	0.066	0.070	0.069	0.074	0.044	0.104
	2.89	3.10	3.07	3.25	1.35	1.80
Non-Compete Enforceability Index	−0.079	−0.054	−0.044	−0.030	0.038	−0.032
	−2.40	−1.63	−1.35	−0.91	0.69	−0.64
Median Market-Adj. MSA Return	−0.038	−0.016	−0.108	−0.102	−0.260	0.050
	−0.20	−0.09	−0.55	−0.51	−0.87	0.18
Industry Cluster Dummy	0.131	0.066	0.104	0.062	−0.063	0.232
	1.19	0.62	1.01	0.58	−0.49	1.06
Option Grants at Other Firms in MSA			0.071	0.046	−0.006	0.124
			1.84	1.17	−0.14	1.79
Coefficient estimates of other variables have been suppressed.						
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.095	0.096	0.097	0.097	0.070	0.118
Number of Firm-Year Obs	12,666	12,666	12,152	12,152	5,767	6,385

Panel C: Estimates From Alternative Specifications and Sub-Samples

Test	PROT	z-stat	CATH	z-stat	CPRATIO	z-stat	REL	z-stat	N
Baseline	−1.517	−2.89	0.717	1.55	0.107	3.16	−0.253	−0.48	14,557
Alternative Specifications									
(1) Dep Var: Num of Options	−1.167	−2.88	0.608	1.73	0.085	3.33	−0.108	−0.27	14,557
(2) Firms with ESO Plan: OLS	−1.022	−2.50	0.191	0.47	0.080	3.12	−0.349	−0.80	8,499
Firm Characteristics Sub-Samples									
(3) High Volatility Firms	−3.119	−4.10	1.501	2.17	0.166	3.26	−0.120	−0.16	7,291
(4) Low Volatility Firms	−0.820	−1.62	0.648	1.62	0.075	2.15	0.296	0.55	7,266
(5) Smaller Firms	−2.880	−3.84	1.283	2.12	0.157	3.31	−0.258	−0.28	7,275
(6) Larger Firms	−0.855	−1.40	0.245	0.48	0.060	1.63	−0.260	−0.49	7,282
Location Characteristics Sub-Samples									
(7) High Income	−3.872	−1.96	2.769	2.15	0.170	2.12	1.263	1.17	7,533
(8) Low Income	−0.915	−1.75	0.322	0.65	0.077	1.83	−0.522	−0.79	7,024
(9) High Education	−4.203	−4.92	2.879	3.99	0.201	3.79	0.560	0.60	7,381
(10) Low Education	−0.645	−1.30	0.180	0.40	0.056	1.59	−0.178	−0.33	7,176

TABLE 7
Robustness Checks: ESO Regression Estimates

This table presents several alternative versions of the employee stock option regressions in Table 6 as robustness checks. Unless otherwise stated, we run Tobit regressions with the natural logarithm of the Black-Scholes value of options granted to non-executive employees as dependent variable. For conciseness we report only the marginal effect estimates computed at the mean for CPRATIO. The CPRATIO estimate from Table 6, Panel A (column (7)) is reprinted as "baseline". In the first test, we control for county-level religiosity. Next, we estimate an instrumental variable Tobit specification, where the three-year lagged value of the religion variables is used as an instrument for the concurrent value. The set of "Additional Control Variables" includes contemporaneous stock return, past 2-year stock return, industry volatility, earnings volatility, and measures of cash constraints (cash balances, cash dividends, cash flow and leverage). In test (5), CPDIFF is the difference of the natural logarithm of Catholics and Protestants in a county. The "Include Mormons and Jews" test uses an alternative measure of CPRATIO, where the Catholic population includes the Jewish adherents and the Protestant population includes the Mormons. The "Binary dependent variable" specification reports the results of logit regressions where the dependent variable equals one if the firm has a broad-based employee stock option plan and zero otherwise. In test (9), we exclude technology firms, as defined in Table 1. The CEO option grant is the natural logarithm of the Black-Scholes value of the stock options granted to the CEO in the fiscal year. In tests (11) to (14), we estimate the ESO regressions for different sub-periods and in tests (15) to (19), we consider several geography based sub-samples. In the last four tests, we include additional state-level control variables in the specification. We control for political environment using a dummy variable that is set to one for states that voted in favor of the Republican party in the last Presidential elections. The Social Capital variable is a composite index of 14 different state-level measures of community participation and the Trust variable is based on a question in the General Social Survey that measures the percentage of survey respondents in the state who agrees with the statement that "Most people can be trusted." In Panel B, we present ESO regression estimates using specifications that include state and county fixed effects. In the first set, we re-estimate the regressions in Table 6, Panel A with state fixed effects and include an interaction variable between the high volatility firm dummy and CATH, PROT, CPRATIO, or REL. In the second set, we re-estimate the regressions in Table 6, Panel A with the interaction term and county fixed effects and, therefore, exclude all county-level independent variables. The high volatility dummy is one if the firm's stock return volatility is above the median monthly return volatility (measured over the prior 60 months). In tests (2) and (5), we estimate the state fixed effects regressions using a sub-sample of small firms, while in tests (3) and (6), we estimate the state fixed effects regressions using a sub-sample of large firms. Large (small) firms are defined as those with fiscal year sales greater (smaller) than the median firm in the sample. The state and county fixed effects regressions are estimated using OLS on the subsample of firms that offer an employee stock option plan. For brevity, we report only the coefficient estimates of the volatility-religion interaction terms. The sample period is from January 1992 to December 2005. Robust z-statistics (t-statistics for OLS regressions), clustered by county, are reported to the right of the coefficient estimates.

TABLE 7 (Continued)
Robustness Checks: ESO Regression Estimates

Panel A: Additional Robustness Checks

Test	Estimate	z-statistic	N	Pseudo R^2
Basic Robustness				
(1) Control for Religiosity	0.136	3.45	14,557	0.095
(2) IV Tobit, Lagged Religion	0.108	3.24	14,491	0.420
(3) No Industry Dummies	0.141	3.52	14,557	0.074
(4) Additional Control Variables	0.092	2.07	10,870	0.085
(5) Use CPDIFF instead of C/P	0.090	2.56	14,557	0.094
(6) Include Mormons and Jews	0.076	2.69	14,491	0.094
(7) Binary Dependent Variable	0.012	1.95	14,557	0.209
(8) Binary Dep Var w/o Industry Dummies	0.015	2.25	14,557	0.176
(9) Exclude Technology Firms	0.096	3.11	12,248	0.068
(10) Control for CEO Option Grant	0.099	3.00	14,555	0.098
Sub-Periods				
(11) 1993 Cross-Section Only	0.171	2.89	875	0.108
(12) 2000 Cross-Section Only	0.166	3.08	1,115	0.094
(13) 1992-2000	0.093	2.22	9,159	0.099
(14) 2001-2005	0.123	2.63	5,398	0.087
Geography-Based Sub-Samples				
(15) Exclude California	0.062	2.20	12,092	0.075
(16) Exclude Northeast	0.144	1.69	11,049	0.096
(17) Exclude Midwest	0.106	2.48	11,073	0.102
(18) Exclude South	0.095	1.98	10,580	0.109
(19) Exclude West	0.069	2.38	10,969	0.072
Additional Regional Controls				
(20) Control for Political Environment	0.101	2.87	14,557	0.095
(21) Control for Social Capital	0.105	3.13	14,523	0.095
(22) Control for Trust	0.106	3.06	14,168	0.095
(23) Include All Regional Controls	0.101	2.74	14,168	0.096

Panel B: ESO Regression Estimates using the Rajan and Zingales (1998) Method

Interaction Variable	PROT	t-stat	CATH	t-stat	CPRATIO	t-stat	REL	t-stat	N
State Fixed Effects									
(1) High Volatility Firm	−1.004	−2.50	0.747	2.29	0.054	2.25	0.072	0.16	8,499
(2) High Volatility, Small Firms	−1.544	−2.50	0.897	1.77	0.071	2.06	−0.056	−0.61	4,253
(3) High Volatility, Large Firms	−1.012	−2.13	0.493	1.16	0.055	1.90	−0.048	−0.25	4,246
County Fixed Effects									
(4) High Volatility Firm	−0.770	−1.63	0.837	2.20	0.045	1.49	0.493	1.03	8,499
(5) High Volatility, Small Firms	−1.948	−2.81	1.646	3.04	0.103	2.67	0.380	0.63	4,253
(6) High Volatility, Large Firms	−0.642	−1.22	0.397	0.74	0.033	0.89	0.127	0.19	4,246

TABLE 8
IPO First-Day Return and Turnover Regression Estimates

This table reports the results from OLS regressions of first-day IPO return and turnover on religion measures and other control variables. In specifications (1) to (4) of Panel A, the dependent variable is the first-day return (offer price to closing price on the first trading day), while in specifications (5) to (8), the dependent variable is the share turnover on the first trading day. All independent variables have been previously defined in Table 1. Panel A presents full-sample results, while Panel B presents estimates for various subsamples. In Panel B, each row presents estimates for the religion measures from each of four separate regressions corresponding to specifications (1) to (4) in Panel A. For conciseness, the estimates of all control variables are suppressed. The religion variable estimates from specifications (1) to (4) in Panel A are reprinted as the "Baseline". The high (low) income subsample consists of IPOs located in counties with above (below) median annual per-capita income. The high (low) education samples consists of IPOs located in counties with above (below) median education level. The education level is defined as the proportion of county residents above the age of 25 with a bachelor's degree or higher. The high (low) local participation subsamples are based on the median of state-level stock market participation measures constructed using the IRS tax return data. The small (large) IPO subsample contains IPOs that are below (above) the median IPO size. The high (low) retail local bias subsamples consist of firms in states with above (below) median retail local bias, as measured using the portfolio holdings of retail investors at a large discount brokerage firm. In the last test, we consider all IPOs and do not exclude those which are priced below \$5. To improve readability, the coefficient estimates of CPRATIO have been multiplied by 100 in all regressions. The industry dummies are based on 30 Fama and French (1997) industries. The sample period is from January 1980 to December 2005. Robust t-statistics, clustered at the county level, are reported below (Panels A) or to the right (Panel B) of the coefficient estimates.

Panel A: Full Sample Estimates

	First-Day Return				First-Day Turnover			
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PROT	−0.037				−0.052			
	−1.40				−1.95			
CATH		0.032				0.032		
		1.12				1.60		
CPRATIO			0.526				0.317	
			2.22				1.87	
REL				−0.017				−0.006
				−0.52				−0.23
Ln(Proceeds)	−0.002	−0.002	−0.002	−0.002	−0.019	−0.019	−0.019	−0.019
	−0.39	−0.38	−0.31	−0.40	5.27	5.26	5.31	5.16
Underwriter Rank	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
	4.04	4.05	4.04	4.03	4.44	4.48	4.45	4.52
Underwriter Spread	0.031	0.031	0.031	0.031	0.003	0.003	0.004	0.004
	4.45	4.43	4.45	4.45	1.15	1.13	1.16	1.17

Continued . . .

TABLE 8 (Continued)
IPO First-Day Return and Turnover Regression Estimates

Panel A: Full Sample Estimates (Continued)

	First-Day Return				First-Day Turnover			
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Offer Price Revision	0.551	0.551	0.550	0.551	0.183	0.183	0.183	0.184
	13.06	13.08	13.07	13.07	7.85	7.83	7.85	7.85
Pre-IPO Market Return	11.562	11.554	11.501	11.601	1.758	1.774	1.751	1.813
	7.48	7.53	7.47	7.55	1.33	1.35	1.33	1.39
Ln(1 + Firm Age)	−0.010	−0.011	−0.011	−0.010	0.005	0.005	0.005	0.005
	−3.60	−3.65	−3.67	−3.58	2.28	2.25	2.28	2.34
Technology Firm Dummy	0.042	0.042	0.041	0.042	−0.014	−0.014	−0.014	−0.013
	3.93	3.92	3.89	3.92	−1.54	−1.52	−1.58	−1.47
Total Population	−0.001	−0.001	−0.002	−0.001	−0.001	0.002	−0.002	0.000
	−0.28	−0.39	−0.76	0.27	−1.00	−1.00	−1.01	−0.25
Education	0.046	0.043	0.035	0.059	0.002	0.002	0.001	0.014
	0.94	0.91	0.77	1.17	0.05	0.05	0.02	0.39
Male-Female Ratio	0.193	0.254	0.256	0.187	−0.163	−0.090	−0.100	−0.133
	1.93	2.24	2.51	1.39	−2.31	−1.35	−1.53	−1.61
Married	0.012	0.005	−0.003	0.011	−0.005	−0.013	−0.016	0.008
	0.15	0.06	−0.03	0.14	−0.12	−0.35	−0.42	−0.21
Minority	0.088	0.093	0.090	0.082	0.018	0.021	0.016	0.012
	1.44	1.46	1.55	1.30	0.59	0.70	0.54	0.38
Age	0.003	0.003	0.003	0.003	−0.001	−0.001	−0.001	−0.001
	1.65	1.75	1.60	1.77	−1.04	−0.64	−0.75	−0.41
Urban	−0.023	−0.019	−0.024	−0.014	−0.023	−0.021	−0.021	−0.015
	−0.97	−0.82	−1.02	−0.62	−1.55	−1.19	−1.21	−0.84
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.388	0.388	0.389	0.388	0.244	0.243	0.244	0.243
Number of IPOs	6,254	6,254	6,254	6,254	6,100	6,100	6,100	6,100

TABLE 8 (Continued)
IPO First-Day Return and Turnover Regression Estimates

Panel B: Return Regression Estimates For Market Participation and Local Bias Sub-Samples

Sub-Sample	PROT	t-stat	CATH	t-stat	CPRATIO	t-stat	REL	t-stat	N
Baseline	−0.037	−1.40	0.032	1.12	0.526	2.22	−0.017	−0.52	6,254
Market Participation Proxy									
(1) High Income	−0.116	−1.86	0.101	1.78	0.927	2.60	0.036	0.53	3,149
(2) High Income, 1993-2005	−0.145	−2.19	0.115	1.93	1.092	2.92	0.033	0.47	2,760
(3) Low Income	−0.014	−0.56	−0.013	−0.57	−0.038	−0.17	−0.045	−1.88	3,105
(4) High Education	−0.043	−0.74	0.081	1.41	0.803	2.15	0.048	0.73	3,154
(5) High Education, 1993-2005	−0.103	−1.47	0.104	1.44	1.100	2.62	0.042	0.53	2,297
(6) Low Education	−0.022	−0.86	−0.013	−0.59	0.080	0.34	−0.072	−3.02	3,100
(7) High Part States, 1998-2005	−0.570	−2.87	0.184	1.25	1.350	1.90	−0.026	−0.15	718
(8) Low Part States, 1998-2005	0.036	0.26	−0.062	−0.45	0.544	0.43	−0.163	−1.19	719
IPO Characteristics and Retail Clientele									
(9) Price Below Median	−0.063	−2.04	0.055	2.21	0.504	2.14	−0.001	−0.00	3,374
(10) Price Above Median	0.041	0.12	0.010	0.27	0.418	1.44	−0.016	−0.40	3,279
(11) Small IPOs	−0.060	−1.58	0.072	2.27	0.724	2.40	0.017	0.44	3,112
(12) Large IPOs	−0.010	−0.33	−0.019	−0.50	0.286	0.94	−0.050	−1.22	3,142
(13) High First-Day Turnover	−0.073	−1.78	0.054	1.28	0.817	2.50	−0.021	−0.43	3,265
(14) Low First-Day Turnover	0.020	0.68	−0.001	−0.43	−0.025	−0.12	−0.014	−0.52	2,989
(15) High Retail Local Bias	−0.006	−0.12	0.071	1.66	1.029	2.45	0.052	0.80	2,746
(16) Low Retail Local Bias	0.014	0.37	−0.013	−0.47	0.105	0.38	−0.031	−0.98	3,508
Local Bias and Income									
(17) Low Income, Low LB	0.016	0.41	−0.055	−1.84	−0.335	−0.99	−0.060	−1.60	1,753
(18) Low Income, High LB	−0.042	−1.21	0.051	1.49	0.408	1.39	−0.025	−0.75	1,352
(19) High Income, Low LB	−0.074	−0.97	0.058	0.99	0.478	1.23	0.022	0.35	1,755
(20) High Income, High LB	0.069	0.41	0.121	1.04	2.130	2.17	0.128	0.91	1,394
Other Tests									
(21) No Min $5 Price Filter	−0.043	−1.73	0.035	1.34	0.540	2.55	−0.016	−0.53	6,653

TABLE 9

Robustness Checks: IPO First-Day Return Regression Estimates

This table reports several alternative versions of the IPO return regressions as robustness checks. In Panel A, we re-estimate the regressions in Table 8, Panel A and, for conciseness, we only report the CPRATIO coefficient estimates. The CPRATIO estimate from Table 9, Panel A (Column (3)) is reprinted as "baseline". In the first test, we control for the overall level of religiosity in the county. The two-stage least squares (2SLS) estimate uses three-year lagged value of the religion variables as an instrument for the concurrent value. In test (3), we do not include industry dummies in the specification. In test (4) the main independent variable is CPDIFF, which is the difference between the proportions of Catholics and Protestants in a county. The "Include Mormons and Jews" test uses an alternative measure of CPRATIO, where the Catholic population includes the Jewish adherents and the Protestant population includes the Mormons. In test (6), we use lottery sales as the main independent variable instead of CPRATIO, where lottery sales is defined as the inflation-adjusted per-capita state-level lottery sales. In test (7), both the state-level lottery sales and CPRATIO are included in our regression. In tests (8) and (9), we estimate the return regressions in two sub-periods and in tests (10) to (20), we consider several geography based sub-samples. A county is more (less) urban if the proportion of the county population living in urban areas is larger (smaller) than the median proportion across counties. In the last four tests, we include additional state-level control variables in the specification. We control for political environment using a dummy variable that is set to one for states that voted in favor of the Republican party in the last Presidential elections. The Social Capital variable is a composite index of 14 different state-level measures of community participation and the Trust variable is based on a question in the General Social Survey that measures the percentage of survey respondents in the state who agrees with the statement that "Most people can be trusted." In Panel B, we present return regression estimates with state and county fixed effects. In the first set, we re-estimate the regressions in Table 8, Panel A with state fixed effects and include an interaction variable between the Technology Firm Dummy and CATH, PROT, CPRATIO, or REL. In the second set, we re-estimate the regressions in Table 8, Panel A with the interaction term and county fixed effects and, therefore, exclude all county-level independent variables. The high (low) retail local bias (LB) subsamples consist of IPOs located in states with above (below) median retail local bias, as measured using the portfolio holdings of retail investors at a large discount brokerage firm. For brevity, we report only the coefficient estimates of the technology firm dummy-religion interaction terms. To improve readability, the coefficient estimates of CPRATIO have been multiplied by 100 in all regressions. The sample period is from January 1980 to December 2005. Robust t-statistics, clustered at the county level, are reported to the right of the coefficient estimates.

TABLE 9 (Continued)

Robustness Checks: IPO First-Day Return Regression Estimates

Panel A: Additional Robustness Checks (Continued)

Test	Estimate	t-statistic	N	Adj R^2
Basic Robustness				
(1) Control for Religiosity	0.714	3.00	6,254	0.389
(2) 2SLS, Lagged Religion	0.520	2.13	6,081	0.394
(3) No Industry Dummies	0.534	2.37	6,316	0.386
(4) Use CPDIFF instead of CPRATIO	0.006	1.73	6,251	0.388
(5) Include Mormons and Jews	0.379	1.71	6,254	0.389
(6) Use Lottery Sales instead of CPRATIO	0.006	1.34	4,171	0.393
(7) Use Lottery Sales and CPRATIO:				
Lottery Sales Estimate	0.001	0.24		
CPRATIO Estimate	0.542	1.45	4,171	0.393
Sub-Periods				
(8) 1980-1992	−0.173	−0.75	2,494	0.242
(9) 1993-2005	0.766	2.46	3,760	0.400
Geography-Based Sub-Samples				
(10) Exclude California	0.241	1.28	4,807	0.350
(11) Exclude California, 1993-2005	0.489	1.74	2,811	0.364
(12) Exclude California, High Retail LB	0.653	2.21	1,299	0.286
(13) Exclude North-East	1.281	2.29	4,575	0.396
(14) Exclude Mid-West	0.554	2.05	5,311	0.400
(15) Exclude South	0.482	2.18	4,636	0.399
(16) Exclude West	0.228	1.16	4,240	0.343
(17) Exclude West, 1993-2005	0.476	1.68	2,429	0.360
(18) Exclude West, High Retail LB	0.677	2.12	1,204	0.299
(19) More Urban	0.847	2.06	3,126	0.382
(20) Less Urban	−0.039	−0.15	3,128	0.390
Additional Regional Controls				
(21) Control for Political Environment	0.401	1.83	6,254	0.396
(22) Control for Social Capital	0.502	2.25	6,247	0.396
(23) Control for Trust	0.502	2.25	6,093	0.397
(24) All Regional Controls	0.398	1.86	6,093	0.398

Panel B: IPO Regression Estimates using the RZ Method

Interaction Variable	PROT	t-stat	CATH	t-stat	CPRATIO	t-stat	REL	t-stat	N
State Fixed Effects									
(1) Technology Firm Dummy	−0.112	−2.29	0.073	1.54	1.158	2.41	−0.045	−1.03	6,254
(2) Technology Firm, High LB	−0.205	−3.04	0.175	1.72	2.750	3.25	0.002	0.03	2,811
(3) Technology Firm, Low LB	−0.035	−0.46	0.024	0.49	0.413	0.91	0.016	0.29	3,443
County Fixed Effects									
(4) Technology Firm Dummy	−0.085	−1.42	0.097	1.74	1.252	2.33	0.073	1.36	6,254
(5) Technology Firm, High LB	−0.159	−1.67	0.242	2.06	2.763	2.96	0.140	1.34	2,811
(6) Technology Firm, Low LB	−0.033	−0.39	0.027	0.49	0.544	1.01	0.023	0.37	3,443

TABLE 10
Lottery-Stock Premium: Fama-MacBeth Cross-Sectional Regression Estimates

This table reports the estimates from monthly Fama-MacBeth cross-sectional regressions, where the monthly stock return is the dependent variable. The main independent variables are the lottery-type stock indicator and interaction between this variable and one of the religion variables. The lottery-stock indicator is defined at the end of the previous month. The religion variables have been previously defined in Table 1. The High Religion dummy is set to one for firms that are located in counties in which the religion measure is above its median value. The idiosyncratic volatility in month t is the standard deviation of the residual from a four-factor model, where daily returns from month t are used to estimate the model. Other independent variables include three factor exposures (market, small-minus-big (SMB), and high-minus-low (HML) betas) and four firm characteristics (firm size, book-to-market ratio, past six-month return, and monthly turnover). The factor exposures are measured contemporaneously, while firm size, six-month returns, and turnover are measured in the previous month, and the book-to-market measure is from six months ago. In Panel A, we report the main estimates. In Panel B we report alternative versions of this baseline specification as robustness checks, where for conciseness, we only report the estimate of the Lottery Stock × High CPRATIO interaction term. The interaction estimate from CPRATIO column in Panel A is reprinted as "baseline". CPDIFF is the difference between the proportions of Catholics and Protestants in a county. The "Include Mormons and Jews" test uses an alternative measure of CPRATIO, where the Catholic population includes the Jewish adherents and the Protestant population includes the Mormons. Characteristic-adjusted returns are computed using the Daniel, Grinblatt, Titman, and Wermers (1997) method. In tests (5) and (6), we estimate the regression for two sub-periods and in tests (7) to (11), we consider several geography based sub-samples. In the last four tests, we include additional state-level control variables in the specification. We control for political environment using a dummy variable that is set to one for states that voted in favor of the Republican party in the last Presidential elections. The Social Capital variable is a composite index of 14 different state-level measures of community participation and the Trust variable is based on a question in the General Social Survey that measures the percentage of survey respondents in the state who agrees with the statement that "Most people can be trusted." We winsorize all variables at their 0.5 and 99.5 percentile levels and the independent variables have been standardized. Only stocks with CRSP share codes of 10 and 11 are included in the analysis. We use the Pontiff (1996) method to correct the Fama-MacBeth standard errors for potential serial correlation. The sample period is from January 1980 to December 2005. The t-statistics for the coefficient estimates are shown either below (Panel A) or to the right (Panel B) of the coefficient estimates.

TABLE 10 (Continued)
Lottery-Stock Premium: Fama-MacBeth Cross-Sectional Regression Estimates

Panel A: Main Estimates

	Religion Interaction Variable				
Variable	None	PROT	CATH	CPRATIO	REL
Intercept	1.499	1.484	1.503	1.489	1.501
	4.61	4.63	4.57	4.67	4.63
High Religion		0.023	−0.043	−0.021	0.011
		1.25	−1.85	−1.03	0.80
Lottery Stock Dummy × High Religion		0.058	−0.031	−0.053	0.035
		3.27	−1.77	−2.87	1.88
Lottery Stock Dummy	−0.125	−0.167	−0.145	−0.160	−0.108
	−3.52	−4.47	−3.80	−4.32	−3.67
Idiosyncratic Volatility	−0.156	−0.155	−0.149	−0.151	−0.152
	−2.62	−2.61	−2.60	−2.61	−2.60
Idiosyncratic Skewness	−0.174	−0.176	−0.176	−0.175	−0.174
	−5.62	−5.67	−5.68	−5.65	−5.64
Stock Price	0.092	0.091	0.091	0.092	0.091
	3.82	3.96	3.80	3.99	3.93
Market Beta	1.198	1.199	1.198	1.202	1.194
	5.30	5.32	5.35	5.34	5.30
SMB Beta	0.224	0.223	0.225	0.233	0.223
	1.64	1.65	1.66	1.75	1.65
HML Beta	−0.606	−0.606	−0.603	−0.608	−0.605
	−3.17	−3.14	−3.16	−3.16	−3.13
Firm Size	−0.460	−0.459	−0.456	−0.458	−0.459
	−4.51	−4.51	−4.48	−4.49	−4.50
Book-To-Market Ratio	0.144	0.145	0.146	0.146	0.143
	2.26	2.27	2.31	2.29	2.24
Past 12-Month Return	0.184	0.149	0.153	0.149	0.148
	2.32	2.38	2.40	2.39	2.32
Monthly Turnover	−0.162	−0.166	−0.175	−0.171	−0.163
	−1.26	−1.28	−1.41	−1.33	−1.24
Average Number of Stocks	4,205	4,205	4,205	4,205	4,205
Average Adjusted R^2	0.057	0.060	0.059	0.059	0.058

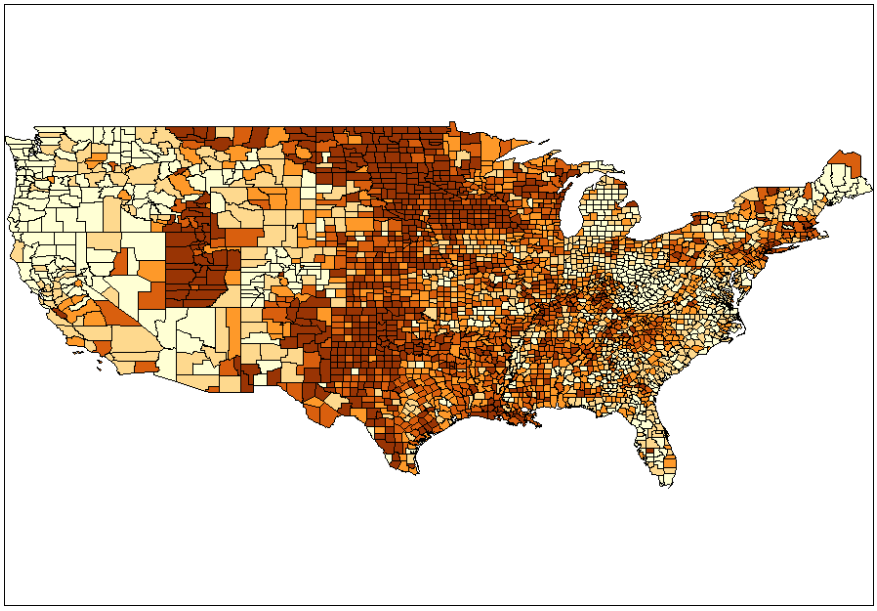
Panel B: Estimates From Robustness Tests

Test	Interaction	t-statistic	Avg N	Avg Adj R^2
Baseline	−0.053	−2.87	4,205	0.059
Basic Robustness				
(1) Use Ln(CPRATIO) instead of CPRATIO	−0.054	−2.97	4,205	0.059
(2) Use CPDIFF instead of CPRATIO	−0.050	−2.74	4,205	0.059
(3) Include Mormons and Jews	−0.052	−2.74	4,205	0.058
(4) Use Char-Adj Returns	−0.052	−2.40	4,063	0.044
Sub-Periods				
(5) 1980-1992	−0.038	−1.84	3,259	0.056
(6) 1993-2005	−0.081	−3.07	5,155	0.062
Geography-Based Sub-Samples				
(7) Exclude California	−0.053	−2.73	3,869	0.059
(8) Exclude North-East	−0.040	−2.09	3,168	0.060
(9) Exclude Mid-West	−0.067	−3.24	3,429	0.062
(10) Exclude South	−0.044	−2.12	3,299	0.060
(11) Exclude West	−0.058	−2.87	3,311	0.061
Additional Regional Controls				
(12) Control for Political Environment	−0.053	−2.78	4,069	0.060
(13) Control for Social Capital	−0.052	−2.82	4,059	0.060
(14) Control for Trust	−0.049	−2.77	3,951	0.061
(15) All Regional Controls	−0.051	−2.70	3,951	0.062

FIGURE 1
Geographical Variation in Religiosity and Religious Composition Across the U.S.

This figure shows the county-level religiosity (Panel A) and Catholic-Protestant ratio (Panel B) across the U.S. Each small outlined region in the figure corresponds to a county. In the top panel, darker shade indicates more religious counties, while in the bottom panel, darker shade indicates counties with higher Catholic concentration. The county-level religion data are available for years 1980, 1990, and 2000 and the figure shows the average religiosity and concentration measures for these three years.

Panel A: Religiosity Across the U.S.



Panel B: Catholic-Protestant Ratio Across the U.S.

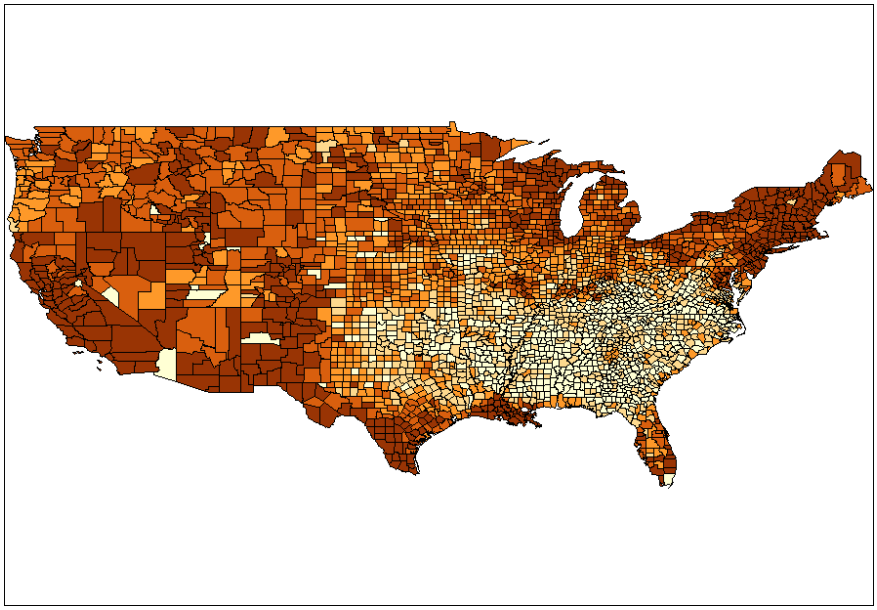


FIGURE 2
Religious Beliefs and Retail Investor Preference for Lottery-Type Stocks

This figure shows the average portfolio weights allocated to lottery-type stocks in the aggregate retail investor portfolio at a large U.S. discount brokerage house during the 1991 to 1996 period. Lottery-type stocks are defined as stocks with below-median price, above-median idiosyncratic volatility, and above-median idiosyncratic skewness. The aggregate investor portfolio is created by combining the portfolios of all investors in the sample. Investors are grouped into quintiles based on one of following three religion measures associated with the county of investor's residence: Protestants (PROT), Catholics (CATH), and Catholic-Protestant ratio (CPRATIO). PROT is the proportion of Protestant residents in the county where the investor resides, CATH is the proportion of Catholic residents in the investor's county, and CPRATIO is the ratio of Catholic to Protestant residents in the investor's county of residence. The figure shows the equal-weighted average lottery stock weights for each religion quintile. The portfolio weights allocated to lottery-type stocks are computed each month and the graph reports the average values of those monthly weights.

