Religious Beliefs, Gambling Attitudes, and Financial Market Outcomes*

Alok Kumar
Jeremy Page
Oliver Spalt

University of Texas at Austin
McCombs School of Business

March 6, 2009

*Please address all correspondence to Alok Kumar, Department of Finance, McCombs School of Business, University of Texas at Austin, 1 University Station, B6600, Austin, TX 78712; *Phone:* 512-232-6824; *email:* akumar@mail.utexas.edu. Jeremy Page can be reached at 512-431-6157 or jeremy.page@phd.mccombs.utexas.edu. Oliver Spalt can be reached at 512-232-6825 or oliver.spalt@mccombs.utexas.edu. We would like to thank Sudheer Chava, Xavier Gabaix, Hamed Ghoddusi, Will Goetzmann, John Griffin, Gilles Hilary, Kai Wai Hui, Shimon Kogan, George Korniotis, Alexandra Niessen, Amiyatosh Purnanandam, Clemens Sialm, Laura Starks, and seminar participants at UT-Austin for helpful discussions and valuable comments. We also thank Garrick Blalock, Will Goetzmann, and Jacqueline Yen for the lottery sales data. We are responsible for all remaining errors and omissions.

Religious Beliefs, Gambling Attitudes, and Financial Market Outcomes

ABSTRACT

We use religion as a proxy for gambling and investigate whether geographical variation in religion-induced gambling norms affects aggregate market outcomes. Motivated by the evidence from gambling studies, we conjecture that gambling propensity would be higher in regions with higher concentration of Catholics relative to Protestants. We consider four economic settings in which the existing literature has suggested a role for gambling and speculation. First, we show that gambling preferences influence the portfolio choices of institutional investors. Investors located in regions with a higher Catholic-Protestant ratio (CPRATIO) exhibit a greater propensity to hold stocks with lottery features. Next, 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 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 and subsequent long term under-performance (e.g., Barberis and Huang (2008)). More generally, if investors exhibit a preference for stocks with lottery features (e.g., low prices, high idiosyncratic volatility, and high idiosyncratic skewness; Kumar (2009)), all else equal, stocks with lottery-type characteristics would earn lower average returns. Similarly, the popularity of broad-based 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 (2008)). Individuals with strong gambling preferences may find firms that offer option-based compensation plans attractive if they view stock options as "lottery tickets". Moreover, managers may even attempt to cater to those preferences.[1]

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 religion as a proxy for an individual's propensity to gamble and examine whether geographical variation in religious composition across the U.S. allows us to identify market-wide effects of gambling behavior.

Our choice of religion as a proxy for gambling 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.[2] 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 the form of bingo and charitable gaming events as an important source of fund-raising (e.g., Diaz

[1]Evidence showing that employees frequently value options higher than the actuarially fair value (e.g. Hodge, Rajgopal and Shevlin (2006), Hallock and Olson (2006), Devers, Wiseman and Holmes (2007)), as well as the fact that riskier firms grant more employee stock options (Spalt (2008)), support the conjecture that employees perceive stock options as gambles.

[2]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.

(2000), Hoffman (2000)). Among other prominent religious denominations in the U.S., people of Jewish faith are like 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)). Recent studies have also demonstrated that religion-induced gambling attitudes carry over into financial decisions (e.g., Kumar (2009)). We confirm these findings using our measures of religious composition and show that states with higher concentration of Catholics relative to Protestants (i.e., higher Catholic-Protestant ratio (CPRATIO)) are more likely to have state lotteries and to have adopted lotteries earlier. At both state and county levels, we find that per capita lottery sales are higher in regions with high CPRATIO. We also find that individual investors located in high CPRATIO regions assign larger portfolio weights to lottery-type stocks (see Figure 1), confirming that religion-induced gambling attitudes carry over into financial decisions.[3]

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 religion of a region could influence local cultural values and norms and thereby affect the financial and economic decisions of individuals located in that region, even if they do not personally adhere to the local faith.[4] Further, these financial and economic decisions could aggregate and generate market-wide forces that influence 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 institutions who hold concentrated

[3]Similar to Kumar (2009), stocks that have low prices, high idiosyncratic volatility, and high idiosyncratic skewness are identified as lottery-type stocks. In contrast, non-lottery-type stocks have high prices, low idiosyncratic volatility, and low idiosyncratic skewness.

[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.

portfolios with a smaller number of stocks and also during times (year-end) 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 (less) popular in Catholic (Protestant) dominated regions where individuals are likely to exhibit a greater (weaker) 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 relatively more attractive to individuals with strong gambling preferences. 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 important 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 returns and local investors, we show that the CPRATIO-IPO initial day return relation is stronger in regions with higher stock market participation rates (as proxied by higher income and 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 driven 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 of 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 higher CPRATIO.

Taken together, our empirical results indicate that religion-induced gambling norms influence gambling preferences, individual-level economic decisions, and aggregate market-level outcomes. Operating through the gambling channel, religion influences portfolio choices, corporate decisions, and stock returns. These results extend the recent evidence in Hilary and Hui (2009) and show that religion could influence financial market outcomes not only through the risk aversion channel but also through its effect on the skewness and gambling preferences of individuals.[5]

While our study uses religion as a proxy to investigate the role of gambling in financial markets, our evidence also highlights the important role of religion in shaping various economic phenomena. 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 religion at a more disaggregate individual or 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 have the potential to influence 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 highlighted 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 the 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 the gambling propensity influences the portfolio choices of investors. Specifically, we investigate whether the institutional preference for stocks with lottery features varies with the religious characteristics of institutional location. 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 offer greater opportunities to exploit information asymmetry. In particular, the institutional attraction for smaller,

[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.

lottery-type stocks might increase over time as competition in other market segments increases (e.g., Bennett, Sias and Starks (2003)).

Our first empirical test 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. In particular, we conjecture that:

> **H1a:** *Institutional gambling preference:* Institutions located in regions with higher 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, it is more likely that local cultural norms, partially shaped by the dominant local religion, influence the behavior of local managers.[6]

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 more conservative and are less likely to engage in speculative activities. Further, performance based incentives could exacerbate the gambling temptations of institutions who are predisposed to gamble.

> **H1b:** *Institutional characteristics and gambling preference:* The religion-lottery weight relation would be stronger among smaller institutions and those who hold concentrated portfolios. Further, the religion-lottery weight relation would be stronger around year-end when performance incentives would induce institutions in Catholic regions 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 et al. (2006), Hallock and Olson (2006), Devers et al. (2007)) and riskier firms grant more employee stock options (e.g., Spalt (2008)). 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:

[6] 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 local CEOs. Also, see footnote 4.

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 further 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. 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 third economic setting, we use our gambling proxy to examine the potential asset pricing implications of gambling. We begin by focusing on 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 and earn low average returns in the long-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 and long-run underperformance 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 initial day IPO returns. 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 would be stronger in regions with higher market participation rates and stronger local bias. To test this possibility, we conjecture that:

H3b: *Local bias and initial 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.

We also examine the link between gambling preference and stock returns in a broader market setting. Motivated again by the theoretical predictions of 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 differences in the gambling attitudes of Protestants and Catholics, we conjecture that:

> **H4:** *Lottery-stock premium:* The magnitude of negative lottery-stock premium would be larger 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 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 the 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.

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 Catholic-Protestant ratio (CPRATIO) and Catholic-Protestant differential (CPDIFF) measures 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 variables for robustness.

Figure 1 shows the geographical variation in the county-level religiosity and religious composition across the U.S. 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. This set includes the total population of the county, the county-level 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.

Our firm location data are available as zip codes, while religion and demographic characteristics are available at the county-level. To link these data sets, we obtain the November 1999 version of the zip code to county mapping file from the U.S. Census Bureau. Using the mapping data, we assign the nearest county-level religion and demographic characteristics to each firm in the sample. 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.

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 employee stock option sample, which represents all firms in ExecuComp from 1992-2005. This makes the statistics representative of the actual distribution of firm locations throughout the United States.[7]

The typical (median) firm is located in a county in which 25.80% of the population is Catholic and 15.81% is Protestant. This is in contrast to the typical county in the United States, in which 8.66% of the population is Catholic and 37.79% of the population is Protestant. These statistics indicate that firms in the United States tend to cluster in areas with higher concentrations of Catholics. However, there is substantial independent variation in both variables. The range of CPRATIO varies from 0.637 at the 25^{th} percentile to 3.29 at the 75^{th} percentile.

The typical firm in our sample also tends to be located in relatively high-income ($32,594 versus $19,933 in the typical county) and well-educated (29.80% of the above-25 population has college degrees, versus 13.70% in the median county) areas. Furthermore, the firms tend to be located in urban areas (97.64% of the county population in our sample lives in urban regions, versus 37.58% in the typical county) and areas with higher concentration of minorities (27.73% 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

[7]The religion statistics based on our institutional investor or IPO samples are similar. For brevity, we do not report those estimates.

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 a lottery stock attribute because prudent man rules and other constraints prevent institutions from holding very low priced stocks.[8] For robustness, motivated by the conjecture in Barberis and Huang (2008), we also assume that recent IPOs might 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 somewhat skewed, with a mean of 8.94%. This evidence suggests that some institutions may "specialize" and commit substantial portions of the portfolios to stocks with lottery-like features. In contrast, the median institution holds nearly half (44.89%) of its portfolio in non-lottery stocks that exhibit 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 only 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 portfolios 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 portfolio weights, has a median value of 0.025.

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 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

[8]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.

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.[9] The number of employees reported in ExecuComp is used to calculate per-employee values of option grants. To obtain the number of options granted per non-executive employee, we divide 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 non-executive option grants measure are available in Spalt (2008).

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 might be insufficient. 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 14,379 firm-year observations for 2,143 unique firms.

We use several firm characteristics as control variables in our empirical exercise. Specifically, we control for firm size using the log of sales. We account for investment opportunities using Tobin's Q (calculated as 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). Because firms with lower stock prices have to grant more options to offer an option package with the same Black-Scholes value, in some specifications, we also use the log of the average grant-date stock prices reported in ExecuComp for all grants in a respective firm-year as an additional control variable. All balance sheet data for the ESO sample are taken from Compustat and the 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 4,990 employees, a market capitalization of $986 million and sales of $1.07 billion. The median Tobin's Q and R&D expenses are 1.62 and 0.26%, respectively. A broad-based employee stock option plan exists in 58.69% of firm-years. In a median firm-year, options

[9] 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.

are granted on 1.90% of total shares outstanding. The Black-Scholes value of option grants to non-executive employees is low, with a median value of only $174 per employee. However, the distribution is skewed and the mean value at $4,168 per employee is higher. Moreover, 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 for 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. Founding dates for the issuing firms and Carter-Manaster rankings for the lead underwriters are from Jay Ritter's web site.[10] 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. 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. 31.57% of the IPO firms in the sample are identified as technology firms. 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 quite high (= 20.26%), compares to the daily turnover for the average CRSP firm ($\approx$ 0.50%). The typical IPO raises $32.66 million and becomes public 8 years after being founded.

3.5 Other Data Sources

We gather data from several additional sources to construct other variables used in our 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.[11] We obtain state-level measures of stock market participation rates from the Federal Reserve Board. These participation rates are computed from dividend income 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

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

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

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.[12]

4. Choice of a Gambling Proxy

Our testable hypotheses implicitly assume that regional religious composition would serve as an effective proxy for gambling attitudes. Specifically, we assume that people's gambling propensity in Catholic-dominated regions would be greater than their gambling propensity in Protestant-dominated regions. Before presenting our main empirical results, we justify 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 (2008). 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 the Catholic-Protestant differential (CPDIFF) as an alternative gambling instrument.[13] 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.[14] Additionally, because the gambling attitudes of Catholics and Jews and Protestants and Mormons are similar, we extend

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

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

[14] 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.

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 influence the propensity to gamble and one or more of these demographic variables could also potentially serve as a gambling proxy. However, compared to religion, these factors exhibit relatively less geographical variation (e.g., 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 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 religion is likely to be an appropriate proxy for gambling. 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 show 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, states with state lotteries had 10.37% lower percentage of Protestants and 10.86% higher percentage 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 quintiles. We find that state lotteries were adopted earlier and the lottery age is higher in Catholic-dominated regions (see Panel B). Furthermore, 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), the per capita lottery sales is over $200, but in counties with high concentration of Protestants, the per capita lottery sales is more than $100 lower (= $98.59). Similarly, the state lottery ages in the highest and lowest CPRATIO quintiles are 24.1 and 3.1 years, respectively.

In the third test, 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 include 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. In particular, following Hilary and Hui (2009), we consider the total county population, the proportion of the population above age 25 with a bachelor's degree or higher (an education proxy), the male-to-female ratio in the county, the proportion of households with a married couple, the proportion of the population in the county that is non-white, the median age of the population, and the percentage of county population that lives in urban areas.[15]

The marginal effects from probit regressions are reported in 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 0.877 when there is a one standard deviation increase in CPRATIO ($0.631 + 0.228 \times 1.081 = 0.877$). In contrast, a one standard deviation increase in the Protestant proportion corresponds to a $1.698 \times 0.148 = 0.251$ 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. The dependent variable in these regressions is the county-level per capita lottery sales.[16] The cross-sectional regression estimates,

[15] Although data on the average household income are available, we do not include income in the regression specification because it is highly correlated with the education proxy.

[16] 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.

also reported in 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 $1.161 \times 21.089 = \$24.48$ or 16.92 percent increase in 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 assume that even in other economic settings, local religious composition could serve as an effective proxy for the gambling preferences of local individuals and 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 possible 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 difficult to conceive a hypothesis that 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.

5. Main Empirical Results

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

5.1 Sorting Results

To begin, we perform a series of univariate tests. Using each of the four religion variables (PROT, CATH, CPRATIO, and REL), we sort firms into quintiles, where the sorting is performed either quarterly or annually. We then compute the equal-weighted quintile averages of institutional portfolio weight in lottery-type and non-lottery-type stocks, the Black-Scholes value of options granted to non-executive employees, and the first-day returns of IPOs.[17] 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 weight assigned to lottery-type and non-lottery-type stocks in the five

[17]Quintile medians exhibit a similar pattern but for brevity we do not report those estimates.

religion quintiles. The evidence indicates that the 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 we consider the relative proportions of Catholics and Protestants in a county (i.e., the Catholic-Protestant ratio), there is an increasing pattern in the average weight allocated to lottery-type stocks. The patterns are opposite but weaker when we examine the 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 institutional results, the 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 investor differ (e.g., Kumar (2009)), they exhibit similar sensitivity to local religious characteristics, which are likely to reflect local gambling preferences.[18] The institutional 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 Panel B). For example, the average Black-Scholes value of option grants in the lowest Protestant quintile is $10,972 and it is only $1,461 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.

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 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. The results, also reported in Panel B, indicate that first day IPO return decreases monotonically with Protestant concentration, increases with Catholic concentration but the pattern is non-monotonic, and exhibits an almost monotonically increasing pattern when Catholic-Protestant ratio is the

[18]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 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. Overall, the univariate sorting results are consistent with our basic conjecture that regional religious beliefs influence financial market outcomes through their impact on people's gambling attitudes.

5.2 Regression Specification

To examine whether the significance of the sorting results remain when we account for other 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.

Like the lottery sales regressions, the set of primary independent variables include the four religion variables and county-level demographic variables. 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 to these controls, 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. We also include industry dummies in the IPO and ESO regressions to control for industry effects that might not be captured by the other control variables. 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 takes on a value of zero.[19] In all specifications, we use heteroskedasticity-robust standard errors. Additionally, in the ESO and institutional portfolio holding regressions, we cluster the standard errors at the level of the firm and institution, respectively. This clustering is intended to account for the fact that subsequent observations for the same firm or institution are not necessarily independent.

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 regression specifications in which the dependent variable is the lottery-stock weight in an institutional portfolio at the end of a certain quarter. Stocks with above-median idiosyncratic volatility and above-median skewness are identified as lottery-type stocks. 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 portfolio weights. Quarter and institution type dummies are also included in the regression specification.

The regression estimates are presented in Table 4. Consistent with the evidence from the univariate sorts, we find that PROT has a significantly negative coefficient estimate (estimate $= -0.038$, t-statistic $= -2.83$). In contrast, when CATH is the main independent variable (specification (2)), it has a significantly positive coefficient estimate (estimate = 0.035, t-statistic = 3.24). Likewise, when CPRATIO is the main independent variable (specification (3)), it has a positive and significant coefficient estimate. The coefficient estimate is also positive and statistically significant when the overall religiosity measure 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 $0.004 \times 1.90 \times 100 = 0.76\%$ increase in the weight assigned to lottery-type stocks. Relative to the mean lottery-stock weight of 8.94%, this represents a $100 \times 0.76/8.94 = 8.50\%$ increase.

Specifications (5) to (8) in Table 4 show results from similar regressions, where the portfolio weight of non-lottery-type stocks is the dependent variable. Stocks with below-median idiosyncratic volatility and below-median skewness are identified as non-lottery-type stocks. These regression estimates exhibit an opposite pattern. Institutions located in Protestant regions over-

[19]For robustness, we also estimate the ESO regressions using OLS.

weight 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 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., they 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 (see specification (3)). Compared to the mean portfolio weight of 0.265%, there is a $0.028 \times 2.588 = 0.072\%$ increase (a 27.34% increases relative to the mean) in the IPO weight when the CPRATIO increases by one standard deviation. 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 (see specification (7)). These results indicate that the institutional propensity to hold lottery-type stocks is correlated with local religious composition and are consistent with our first institutional gambling preference hypothesis (H1a).

While the results above show a significant relation between our religion measures and the portfolio choices of institutional investors, we also perform the same analysis on various subsamples of institutions for further confirmation that our religion measures reflect gambling propensity. In particular, we split the sample into subsamples based on institutional characteristics that are *ex ante* associated with more speculative portfolio choices 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 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. Thus, in this subsample, the effect of religion variables may be stronger if they reflect local gambling norms. Comparison of the religion coefficients for the large and small institution subsamples is inconclusive. While the effect of the CPRATIO is slightly stronger for both lottery weights and non-lottery weights, the effects of PROT and CATH are marginally stronger among larger institutions. In all three instances, the differences, however, are negligible.

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

We perform a similar sample split 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 conjecture, we find a strong distinction between the strengths of the religion variables across the subsamples. They are strongly significant with the expected signs in the subsample of "aggressive" institutions, while among "conservative" institutions, the signs on PROT, CATH, and CPRATIO reverse and are mostly insignificant. These subsample results are consistent when we use non-lottery portfolio weights as the dependent variable (see Panel D).[20]

In our final subsample test, we split the sample into two using the time of observation: fourth quarter observations and observations in quarters 1 to 3. This test is motivated by Brown et al. (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. Collectively, these subsample results support our second institutional gambling preference hypothesis (H1b).

5.4 Robustness of Institutional Regression Estimates

To ensure the robustness of our institutional regression estimates, we conduct three broad sets of robustness checks. We consider several variations of our main institutional regression specification and estimate the institutional regressions for different subperiods and geography-based subsamples. These results are presented in Table 5 where, for brevity, we focus 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 are statistically insignificant. Second, we control for the industry preferences of institutions. We add industry concentration (measured as the

[20] We acknowledge that the institution types reported by Thomson Financial 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 similar results.

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 industry concentration has a significantly positive estimate in the lottery weight regression (estimate = 0.059, t-statistic = 3.61) and a weakly negative estimate in the non-lottery weight regression (estimate = −0.024, t-statistic = −1.40). This evidence indicates that allocations to lottery-type and non-lottery-type stocks are influenced by industry preferences. More importantly, 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 alternate definition of lottery-type stocks that includes stock price and find similar results.[21] The results are also robust to the exclusion of institution type 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 weakly significant estimate. Moreover, it loses significance when we also include CPRATIO in the 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 concentrates among banks and insurance companies, who dominated the institutional investor sample in the earlier years. Finally, 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.

5.5 Employee Stock Option Plan Regression Estimates

In this section, we estimate multivariate regressions to test whether the observed relation between county-level religion and stock option grants to non-executive employees is robust to

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

controlling for other known determinants of broad-based employee stock option plans. The dependent variable in the ESO regression is the natural logarithm of the Black-Scholes (BS) value of option grants to non-executive employees.[22] As before, the set of independent variables includes firm characteristics as well as demographic characteristics of the county in which the firm is located. Motivated by Spalt (2008), the firm-level control variables include size (defined as the log of sales) and investment opportunities (proxied by Tobin's Q and R&D expenses). In addition, we include year and industry dummies in the ESO regression specification.

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. A one standard deviation increase in PROT is associated with log Black-Scholes option value that is $2.158 \times 0.125 = 0.270$ lower. Relative to the mean value of 4.27, this represents a 6.32% decrease in the option value.[23] In contrast, in the specifications that include CATH, the coefficient on CATH is positive and statistically significant. Likewise, when we use CPRATIO as the primary independent variable, the effect is positive and significant, consistent with the univariate pattern. The effect of REL is negative but weak and statistically insignificant.

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 remain significant and have the expected signs.[24] In particular, our main religion variable remains statistically and economically significant. A one standard deviation increase in CPRATIO is associated with log Black-Scholes option value that is $0.092 \times 1.90 = 0.175$ higher. Relative to the mean value of 4.27, this represents a 4.09% increase in the option value. In dollar terms, this corresponds to an increase from the mean BS value of $4,168 to $4,965, which is a 19.12% increase.[25]

To examine the sensitivity of our baseline results, we consider an alternative measure of option grants (number of option grants per employee) and an alternative estimation method (OLS instead of Tobit). The results with these alternative regression specifications are reported in Table 6, Panel B. We find that the estimates of CATH become more significant, while the other coefficient estimates continue to remain strongly significant. Overall, the results from ESO regressions are consistent with our hypothesis (H2a) that religion-induced gambling attitudes are important determinants of the compensation contract between a firm and its non-executive employees.

[22]We use the log transformation because the distribution of the dependent variable is skewed.
[23]The mean of the log(Black-Scholes option value) = 4.27.
[24]One exception is CATH, which is now significant only at the 10% level.
[25]The new value of the option grant is computed as: $\exp^{(\ln(4168)+0.175)} = 4965$.

5.6 Impact of Firm and Location Characteristics on Option Grants

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. Specifically, we re-estimate the ESO regression for volatility-based subsamples. Each year we divide firms into high and low subsamples based on the median volatility, measured as the volatility of monthly stock returns over the prior 60 months (reported by ExecuComp as "Sigma"). As the volatility of the underlying stock increases, stock options would 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 statistically significant in the high volatility subsample but insignificant in the low volatility subsample. We find similar results when we consider size-based subsamples. The CPRATIO coefficient estimate is stronger for the small firms subsample where local cultural factors are more likely to influence option grant policies.

We also form subsample based on county level measures of income and education. The motivation here 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 on the religion variables are strong in the high education and high income samples, but weak and insignificant in the low income and education subsamples.

We examine the robustness of these ESO results using several additional tests. The results from these robustness tests are summarized in Table 7, 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 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 2-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 use the Oyer and Schaefer (2004) indicator variable and estimate a logit regression of the probability that a firm has a broad-based employee stock option plan. To control for the differences in option granting policies at the firm-level, we include the Black-Scholes value of options granted to the CEO as an additional control variable. We 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 years 1993 (first year with ESO data) and 2000 only, we find that CPRATIO still has significantly positive estimates. Finally, we find that the results remain significant when we exclude technology firms, which are more likely to offer stock option plans to their employees.[26]

5.7 Influence of Other Neighborhood Factors on Option Grants

In our next set of tests, we examine whether our 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 our regression specification by including five neighborhood variables that are measured for the metropolitan statistical area (MSA). 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 and it is computed using the Pirinsky and Wang (2006) method; State-level non-compete enforceability index is from Garmaise (2006); 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;[27] and Option grants at other firms in the MSA is the average Black-Scholes value of option grants at other firms in the MSA.

The regression estimates from the extended specifications are presented in Table 8. In columns (1) and (3), we report estimates from specifications similar to those used in the Kedia and Rajgopal (2009) study.[28] 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.

[26]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.

[27]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 industrys total market capitalization. Industries are based on two-digit SIC codes.

[28]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. For robustness, however, we also present OLS estimates.

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.

When we include CPRATIO in the regression specification (see columns (2) and (4)), we find that 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" remains positive but is only weakly significant. The estimate drops from 0.071 (t-statistic = 2.39) to 0.053 (t-statistic = 1.70). When we estimate the ESO regressions using an ordinary least squares (OLS) specification instead of a Tobit specification, we again find that the estimate of "Option grants at other firms in the MSA" weakens but remains significant (see columns (5) and (6)). We also estimate the ESO regression separately for low and high CPRATIO sub-samples (see columns (7) and (8)). We 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 (Protestant) concentration is higher (lower).

The ESO regression estimates from these extended specifications indicate that prevalence of certain religious beliefs could be behind the social interaction effects that have been known to influence option grants. In particular, the local "culture" might be shaped by the religious composition of the region, which in turn could influence the option grant policies of all firms located in the region. The similarities in regional corporate policies could extend beyond non-executive stock option grants. For instance, similarities in local cultural norms could generate stronger comovements in realized stock returns. This could be one of the reasons why non-executive option grant levels are higher among firms with higher local betas.

5.8 First Day IPO Return and Turnover Regression Estimates

To test our third set of hypotheses, we use the initial day IPO return, the first day IPO turnover, or one of the long-term IPO performance measures 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-Manaster rating of the lead underwriter as a proxy for underwriter reputation;[29] (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

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

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 also include year and industry dummies in all specifications.

The results are presented in Table 9, Panel A. When we do not include demographic characteristics in the regression specification, consistent with the evidence from the univariate sorts, we find that PROT coefficient is significantly negative (see specification (1)). When CATH is the primary independent variable, it has a positive but statistically insignificant estimate (see specification (2)). The coefficient on the religiosity variable REL is similar to that of PROT, but somewhat weaker. When we include demographic characteristics in the regression specification, the statistical significance of religion variables is mostly weakened. The coefficients on PROT and CATH are marginally significant and REL loses its significance.

The coefficient on our main religion variable (i.e., CPRATIO), however, is significant both with and without the demographic controls (see specifications (3) and (7)). This evidence indicates that the relative proportions of Catholics and Protestants more accurately reflects the local gambling preferences. For example, when demographic controls are included, the coefficient estimate of CPRATIO is 0.005 with a t-statistic of 2.70.

In economic terms, a one standard deviation increase in CPRATIO corresponds to a $0.005 \times 1.90 \times 100 = 0.95\%$ higher first day return. Relative to the mean first day return of 16.78%, this is a 5.66% increase. Across the extreme CPRATIO quintiles, there is a 2.61 standard deviation difference between CPRATIO averages. Thus, IPOs offered in counties that are in the two extreme CPRATIO quintiles would have an average first day return differential of $0.005 \times 2.61 \times 1.90 \times 100 = 2.48\%$. These estimates indicate that differences in religious composition across counties can 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. 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 (see Table 9, Panel B). 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).

5.9 Market Participation, Local Bias and First Day IPO Returns

We now 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. Since we do not have a good proxy for county-level or state-level stock market participation rates, motivated by the evidence in Campbell (2006), we use income and education as proxies for stock market participation.[30] 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 initial day returns. 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 the measure of retail local bias.[31]

The IPO subsample results are summarized in Table 9, Panel C. 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 estimates of religion variables 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 to our second local bias hypothesis (H3b) and indicate that the effect of religion on first day return is stronger among IPOs with stronger retail clientele and when local stock market participation rate and local bias are high.

We perform several robustness checks similar to those in the previously discussed settings. These results are presented in Table 10. We find that IPO regression results are somewhat stronger when we control for the degree of religiosity in the county. The results remain strong with 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 results are strong in the latter part of the sample but very weak in the early half of the sample. However, the early sample results strengthen when we focus on low priced or high turnover IPOs. The results are mostly robust in the various geography-based subsamples. The results are weak when California or the West Census region

[30] For the 1998 to 2005 period, we have another state-level stock market participation proxy 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.

[31] 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.

are excluded, but the results in these geographic subsamples improve in the latter sample period or when we focus on the high retail bias subsample.

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 $\times$ 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 interaction variable defined using PROT will have a significantly positive estimate, while the CATH and CPRATIO interactions will have significantly negative estimates.

The Fama-MacBeth regression results for the 1980 to 2005 sample period are reported in Table 11. 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 $\times$ 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 12 indicate that the incremental effect of CPRATIO on the lottery stock premium is robust. We find that Lottery Stock $\times$ 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. Overall, 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 religion as a proxy for gambling 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 the role of 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 returns are higher, and the magnitude of the negative lottery stock premium is higher. These seemingly unrelated findings are driven by a common gambling-induced 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 its impact on gambling attitudes, the link between culture and financial markets might be stronger 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 the 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.

References

Alesina, Alberto and Eliana La Ferrara, "Participation in Heterogeneous Communities," *Quarterly Journal of Economics*, 2000, *115* (3), 847–904.

Ang, Andrew, Robert J. Hodrick, Yuhang Xing, and Xiaoyan Zhang, "High Idiosyncratic Volatility and Low Returns: International and Further U.S. Evidence," *Journal of Financial Economics*, 2009, *91* (1), 1–23.

Badrinath, S. G., Gerald D. Gay, and Jayant R. Kale, "Patterns of Institutional Investment, Prudence, and the Managerial "Safety-Net" Hypothesis," *Journal of Risk and Insurance*, 1989, *56*, 605–629.

Barber, Brad M. and Terrance Odean, "Trading is Hazardous to Your Wealth: The Common Stock Investment Performance of Individual Investors," *Journal of Finance*, 2000, *55*, 773–806.

Barberis, Nicholas and Ming Huang, "Stocks as Lotteries: The Implications of Probability Weighting for Security Prices," *American Economic Review*, 2008, *98* (5), 2066–2100.

Barro, Robert J. and Rachel M. McCleary, "Religion and Economic Growth Across Countries," *American Sociological Review*, 2003, *68* (5), 760–781.

Becker, Bo, "Geographical Segmentation of U.S. Capital Markets," *Journal of Financial Economics*, 2007, *85* (1), 151–178.

——, **Zoran Ivkovich, and Scott Weisbenner**, "Local Dividend Clienteles," 2008. Working Paper (January), University of Illinois.

Bennett, James A., Richard W. Sias, and Laura T. Starks, "Greener Pastures and the Impact of Dynamic Institutional Preferences," *Review of Financial Studies*, 2003, *16* (4), 1203–1238.

Bergman, Nittai and Dirk Jenter, "Employee Sentiment and Stock Option Compensation," *Journal of Financial Economics*, 2007, *84* (3), 667–712.

Berry, Frances S. and William D. Berry, "State Lottery Adoptions as Policy Innovations: An Event History Analysis," *Amerian Political Science Review*, June 1990, *84* (2), 395–415.

Brown, Jeffrey R., Zoran Ivković, Paul A. Smith, and Scott Weisbenner, "Neighbors Matter: Causal Community Effects and Stock Market Participation," *Journal of Finance*, 2007, *63* (3), 1509–1531.

Brown, Keith C., W. Van Harlow, and Laura T. Starks, "Of Tournaments and Temptations: An Analysis of Managerial Incentives in the Mutual Fund Industry," *Journal of Finance*, 1996, *51*, 85–110.

Campbell, John Y., "Household Finance," *Journal of Finance*, 2006, *61* (4), 1553–1604.

Cliff, Michael T. and David Denis, "Do Initial Public Offering Firms Purchase Analyst Coverage with Underpricing?," *Journal of Finance*, 2004, *59* (6), 2871–2901.

Clotfelter, Charles T. and Philip J. Cook, *Selling Hope: State Lotteries in America*, Harvard University Press, Cambridge, MA, 1989.

Coughlin, Cletus C. and Thomas A. Garrett, "Income and Lottery Sales: Transfers Trump Income from Work and Wealth," 2008. FRB of St. Louis Working Paper No. 2008-004C; Available at SSRN: http://ssrn.com/abstract=1084183.

Daniel, Kent D., Mark Grinblatt, Sheridan Titman, and Russell Wermers, "Measuring Mutual Fund Performance with Characteristic-Based Benchmarks," *Journal of Finance*, 1997, *52*, 1035–1058.

Del Guercio, Diane, "The Distorting Effect of the Prudent Man Law on Institutional Equity Investments," *Journal of Financial Economics*, 1996, *40*, 31–62.

Desai, Mihir, "The Divergence Between Book and Tax Income," *Tax Policy and the Economy*, 2003, *17*, 169–206. James Poterba (Editor), MIT Press.

Devers, Cynthia, Robert Wiseman, and Michael Holmes, "The Effects of Endowment and Loss Aversion in Managerial Stock Option Valuation," *Academy of Management Journal*, 2007, *50* (1), 191–208.

Diaz, Joseph D., "Religion and Gambling in Sin-City: A Statistical Analysis of the Relationship between Religion and Gambling Patterns in Las Vegas Residents," *Social Science Journal*, 2000, *37* (3), 3.

Dorn, Daniel and Paul Sengmueller, "Trading as Entertainment," *Management Science*, 2009, *Forthcoming.*

Ellison, Christopher G. and Kathleen A. Nybroten, "Conservative Protestantism and Opposition to State-Sponsored Lotteries: Evidence from the 1997 Texas Poll," *Social Science Quarterly*, 1999, *80*, 356–369.

Fama, Eugene F. and Kenneth R. French, "Industry Costs of Capital," *Journal of Financial Economics*, 1997, *43*, 153–193.

Garmaise, Mark J., "Ties that Truly Bind: Non-competition Agreements, Executive Compensation and Firm Investment," 2006. Working Paper, UCLA Andersen School.

Grichting, W.L., "The Impact of Religion on Gambling in Australia," *Australian Journal of Psychology*, 1986, *38* (1), 4558.

Grinblatt, Mark and Matti Keloharju, "Sensation Seeking, Overconfidence, and Trading Activity," *Journal of Finance*, 2009, *Forthcoming.*

Guiso, Luigi, Paola Sapienza, and Luigi Zingales, "People's Opium? Religion and Economic Attitude," *Journal of Monetary Economics*, 2003, *50*, 225–282.

____ , ____ , and ____ , "Does Culture Affect Economic Outcomes?," *Journal of Economic Perspectives*, 2006, *20* (2), 23–48.

Hallock, Kevin and Craig Olson, "The Value of Stock Options to Non-Executive Employees," 2006. NBER Working Paper 11950.

Hilary, Gilles and Kai Wai Hui, "Does Religion Matter in Corporate Decision Making in America?," *Journal of Financial Economics*, 2009, *Forthcoming.*

Hodge, Frank, Shiva Rajgopal, and Terry Shevlin, "How Do Managers Value Stock Options and Restricted Stock?," 2006. Working Paper, University of Washington.

Hoffman, John P., "Religion and Problem Gambling in the U.S.," *Review of Religious Research*, 2000, *41* (4), 488–509.

Hong, Harrison, José A. Scheinkman, and Wei Xiong, "Asset Float and Speculative Bubbles," *Journal of Finance*, 2006, *61* (3), 1073–1117.

Kallick, Maureen, Daniel Smits, Ted Dielman, and Judith Hybels, "A Survey of American Gambling Attitudes and Behavior," 1979. Survey Research Center Research Report, Institute for Social Research, University of Michigan.

Kedia, Simi and Shiva Rajgopal, "Neighborhood Matters: The Impact of Location on Broad Based Stock Option Plans," *Journal of Financial Economics*, 2009, *Forthcoming.*

Kumar, Alok, "Who Gambles in the Stock Market?," *Journal of Finance*, 2009, *Forthcoming.*

Lewellen, Jonathan, "Institutional Investors and the Limits of Arbitrage," 2008. Working Paper (May), Tuck School of Business, Dartmouth College.

Loughran, Timothy and Jay Ritter, "Why Has IPO Underpricing Changed Over Time?," *Financial Management*, 2004, *33* (3), 5–37.

Martin, Robert and Bruce Yandle, "State Lotteries as Duopoly Transfer Mechanisms," *Public Choice*, 1990, *64* (3), 253–264.

Oyer, Paul and Scott Schaefer, "Why Do Some Firms Give Stock Options to All Employees? An Empirical Examination of Alternative Theories," *Journal of Financial Economics*, 2004, *76* (1), 99–133.

Ozment, Steven, *Protestant: The Birth of a Revolution*, New York: Doubleday, 1991.

Pirinsky, Christo and Qinghai Wang, "Does Corporate Headquarters Location Matter for Stock Returns?," *Journal of Finance*, 2006, *61* (4), 1991–2015.

Pontiff, Jeffrey, "Costly Arbitrage: Evidence from Closed-End Funds," *Quarterly Journal of Economics*, 1996, *111* (4), 1135–1151.

Purnanandam, Amiyatosh and Bhaskaran Swaminathan, "Are IPOs Really Underpriced?," *Review of Financial Studies*, 2004, *17* (3), 811–848.

Scheinkman, José A. and Wei Xiong, "Overconfidence and Speculative Bubbles," *Journal of Political Economy*, 2003, *111* (6), 1183–1219.

Shiller, Robert J., *Irrational Exuberance*, Princeton University Press, Princeton, NJ, 2000.

Spalt, Oliver G., "Probability Weighting and Employee Stock Options," 2008. Working Paper (November), University of Texas at Austin.

Starkey, Lycurgus M., *Money, Mania, and Morals: The Churches and Gambling*, Abingdon Press, New York, NY, 1964.

Stulz, René M. and Rohan Williamson, "Culture, openness, and finance," *Journal of Financial Economics*, 2003, *70*, 313349.

Thompson, William N., *Gambling in America: An Encyclopedia of History, Issues, and Society*, ABC-CLIO, Inc., 2001.

TABLE 1

Summary Statistics

This table presents summary statistics for the various data sets used in our study. **Panel A** presents county-level religion variables and demographic characteristics (based on the employee stock-option plan sample). Religiosity (REL) is the proportion of the county population adhering to any religion, Protestants (PROT) is the proportion of Protestant adherents, Catholics (CATH) is the proportion of Catholic adherents, and Cath-Prot Ratio (CPRATIO) is the ratio of Catholics to Protestants. Income is the median household income; Education is the proportion of population over age 25 with bachelors degree or higher; Male-Female Ratio is the ratio of male and female residents in the county; Married is the proportion of households with a married couple; Minority is the proportion of the county residents who are non-White; Age is the average age of county residents; and Urban is the proportion of the county population living in urban areas. **Panel B** shows institutional portfolio characteristics for the 1980 to 2005 period, where lottery stocks are defined as stocks with above-median idiosyncratic volatility and above-median idiosyncratic skewness. The volatility and skewness measures are obtained using past six months of daily returns. Non-lottery stocks are defined conversely. IPO weight is the average portfolio weight allocated to all firms that went public in the previous quarter. Non-local IPOs are those that 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 of portfolio weights. **Panel C** shows summary statistics for employee stock option plans for the 1992 to 2005 period. It includes the ratio of stock options granted to the number of shares outstanding, the Black-Scholes value of non-executive stock options granted divided by the number of employees, as well as the Black-Scholes value of options granted to the firms CEO. Several characteristics of firms that offer ESO plans are also reported, including firm size, annual sales, Tobin's Q (calculated as book assets minus book equity plus market value of equity, scaled by total assets), and R&D expenses (the three year average of research and development expense scaled by total assets). **Panel D** presents IPO characteristics for the 1980 to 2005 period. This set includes the return from the offer price to the closing price on the first day of trading, turnover on the first trading day, the Carter-Manaster rank of the lead manager, issue proceeds, the spread charged by the underwriter, a technology firm indicator, price change from the midpoint of the filing range to the offer price, pre-IPO return (the average daily CRSP value-weighted market return during the three week period prior to the offer date), and the age of the firm relative to the founding date.

TABLE 1 (Continued)
Summary Statistics

Variable	Mean	Median	Std Dev	10^{th} Pctl	25^{th} Pctl	75^{th} Pctl	90^{th} Pctl	N
Panel A: County-Level Demographic Characteristics								
Religiosity	53.26%	53.52%	11.67%	39.11%	44.04%	59.81%	70.73%	14,379
Protestants	20.10%	15.81%	12.53%	8.31%	10.01%	28.69%	37.53%	14,379
Catholics	26.69%	25.80%	13.93%	7.88%	16.90%	36.85%	47.49%	14,379
Cath-Prot Ratio	2.19	1.72	1.90	0.240	0.637	3.29	4.78	14,379
Income	$35,305	$32,594	$12,341	$23,182	$26,897	$40,317	$49,530	14,379
Population (in $m)	1.45	0.90	1.69	0.226	0.515	1.61	3.11	14,379
Education	31.63%	29.80%	9.40%	20.21%	25.30%	38.70%	44.34%	14,379
Male-Female Ratio	0.961	0.961	0.004	0.908	0.930	0.991	1.02	14,379
Married	49.88%	50.75%	8.80%	39.32%	45.94%	55.16%	60.26%	14,379
Minority	28.69%	27.73%	14.86%	9.56%	16.43%	41.27%	48.56%	14,379
Age	34.67	34.46	2.51	31.47	33.01	36.18	37.78	14,379
Urban	92.88%	97.64%	12.78%	79.47%	93.66%	99.23%	99.93%	14,379
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								
Options-Shares Out Ratio	3.22%	1.90%	17.03%	0.59%	1.05%	3.48%	5.92%	14,379
BS Value Per Employee	$4,168	$174	$11,248	$0	$0	$2,032	$11,680	14,379
BS Value: CEOs (in $m)	$1.72	$0.551	$7.07	$0.073	$0.194	$1.45	$3.50	14,379
Number of Employees	19,054	4,990	55,691	568	1,644	15,245	44,000	14,379
Firm Size (in $m)	$4,070	$986	$12,200	$141	$351	$2,990	$9,050	14,379
Sales (in $m)	$5,540	$1,070	$19,200	$184	$406	$3,350	$10,600	14,379
Tobin's Q	2.12	1.62	1.49	1.01	1.21	2.41	3.85	14,379
R&D	3.89%	0.26%	7.33%	0.00%	0.00%	5.17%	12.42%	14,379
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
Underwriter Rank	6.94	8.00	2.36	3.00	6.00	9.00	9.00	6,652
Proceeds (in $m)	71.12	32.66	232.82	7.54	15.74	61.76	122.45	6,652
Underwriter Spread	7.28%	7.00%	1.13%	6.50%	7.00%	7.24%	9.00%	6,652
Technology Firm	31.57%	0.00%	46.68%	0.00%	0.00%	100.00%	100.00%	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

TABLE 2
State Lottery Sorting Results and Regression Estimates

This table reports univariate and multivariate test results for state lotteries. Panel A reports the religious composition 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. Panel B presents univariate sorting results for the four primary religion variables (PROT, CATH, CPRATIO, and REL) considered in our study. They have been defined in Table 1. 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 from 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. 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. All independent variables have been previously defined in Table 1. In Panel A, we report the t-statistics from the difference in the means test and p-values from the Kolmogorov-Smirnov (KS) test, which compares the two distributions. In Panel C, robust z- or t-statistics, clustered by firm, 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	19.9	3.1	4.1	13.1	$176.71	$141.32	$135.51	$128.26
Q2	15.8	10.5	11.0	16.3	$174.00	$115.78	$108.36	$142.66
Q3	15.7	16.9	15.3	8.5	$159.60	$109.32	$108.85	$169.09
Q4	12.0	14.3	16.5	14.8	$111.44	$153.56	$163.41	$146.60
High	3.8	24.1	21.9	15.2	$98.59	$200.36	$203.36	$133.74

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)
Protestants	−1.698				−127.054			
	−3.66				−3.87			
Catholics		1.737				178.653		
		4.00				4.63		
Cath-Prot Ratio			0.228				21.089	
			3.34				4.85	
Religiosity				−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 presents univariate sorting results for the primary religion variables considered in our study. 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. The sorting variables are PROT, defined as the proportion the county population that is Protestant; CATH, defined as the proportion of Catholic adherents; CPRATIO, defined as CATH/PROT; and REL, defined as the proportion of county residents adhering to any religion. Panel A shows the mean portfolio weights of lottery-type and non-lottery-type stocks held in institutional portfolios. Panel B presents the quintile means of the Black-Scholes value of per employee option grants to non-executive employees and the mean first day returns for IPOs (offer price to closing price on the first trading day). All variables are defined in Table 1. The sample period is from January 1980 to December 2005, except for the ESO sample, which spans from January 1992 to December 2005.

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	$10,972	$1,897	$1,798	$6,167	20.05%	14.69%	13.79%	17.58%
Q2	$3,528	$3,445	$2,444	$7,063	19.09%	15.41%	15.26%	20.76%
Q3	$2,652	$6,946	$2,792	$2,082	16.62%	20.41%	16.53%	14.60%
Q4	$2,214	$4,621	$8,337	$1,833	14.32%	17.21%	19.80%	14.56%
High	$1,461	$3,932	$5,413	$3,692	13.85%	16.14%	18.46%	16.39%

TABLE 4

Institutional Portfolio Lottery Weight Regression Estimates

This table presents estimates from pooled 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 are those which went public in the last one quarter and non-local IPOs are those which are located at least 250 miles away from the institutional location. The dependent variable in Panel C is the proportion of the institution's portfolio held in lottery-type stocks, while Panel D presents corresponding results for the portfolio weight in non-lottery-type stocks. Both dependent variables and all independent variables have been previously defined in Table 1. Each regression also includes a set of dummy variables for each quarter and institution type. Because institution types reported by Thomson Financial are unreliable after 1997, we use types 1 (banks) and 2 (insurance companies) and combine types 3 (investment companies), 4 (independent investment advisors), and 5 (others), which are the most problematic types, into a single group. In Panels C and D, for conciseness, estimates for the control variables are suppressed and 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). The main estimates from Panel A are reprinted as the "Baseline". Small (large) institutions are those below (above) the median portfolio size. Concentrated (diversified) institutions are those above (below) the median portfolio concentration. Banks and insurance companies are considered "Conservative", while investment companies, independent investment advisors and others are considered more "Aggressive". The sample period is from January 1980 to December 2005. Robust t-statistics, clustered by institution, are reported below the coefficient estimates (Panels A and B) or to the right of the coefficient estimates (Panels C and D).

TABLE 4 (Continued)
Institutional Portfolio Lottery Weight Regression Estimates

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

Panel A: Full Sample Estimates

	Lottery Weight				Non-Lottery Weight			
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Protestants	−0.038				0.043			
	−2.83				2.84			
Catholics		0.035				−0.042		
		3.24				−3.56		
Cath-Prot Ratio			0.004				−0.004	
			4.83				−3.76	
Religiosity				0.037				−0.046
				3.32				−3.80
Portfolio Size	−0.216	−0.217	−0.221	−0.213	0.207	0.208	0.212	0.203
	−3.89	−3.97	−4.17	−3.80	3.65	3.75	3.92	3.55
Portfolio Concentration	0.125	0.126	0.124	0.125	−0.107	−0.108	−0.106	−0.107
	6.75	6.80	6.76	6.75	−4.71	−4.76	−4.70	−4.73
Total Population	0.000	0.000	−0.000	0.000	−0.000	0.000	0.000	−0.000
	0.20	0.01	−0.14	0.44	−0.07	0.22	0.24	−0.28
Education	0.140	0.140	0.133	0.140	−0.141	−0.139	−0.134	−0.131
	8.63	8.57	7.87	7.81	−8.20	−8.12	−7.46	−7.24
Male-Female Ratio	0.154	0.204	0.204	0.238	−0.146	−0.205	−0.200	−0.248
	3.36	4.45	4.44	5.03	−3.14	−4.35	−4.26	−5.08
Married	0.037	0.026	0.033	0.019	−0.044	−0.033	−0.040	−0.023
	1.64	1.25	1.59	0.89	−1.93	−1.52	−1.84	−1.09
Minority	0.053	0.059	0.056	0.052	−0.057	−0.065	−0.059	−0.056
	3.30	3.58	3.48	3.35	−3.38	−3.74	−3.54	−3.45
Age	0.191	0.210	0.242	0.240	−0.201	−0.233	−0.261	−0.270
	3.20	3.68	4.11	4.28	−3.31	−3.78	−4.24	−4.47
Urban	0.016	0.015	0.016	0.023	−0.017	−0.015	−0.019	−0.025
	1.55	1.45	1.70	2.38	−1.60	−1.43	−1.81	−2.48
Quarter Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Institution Type Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.143	0.143	0.145	0.143	0.163	0.163	0.164	0.163
Number of Insti-Quarter Obs	120,978	120,978	120,978	120,978	120,978	120,978	120,978	120,978

TABLE 4 (Continued)

Institutional Portfolio Lottery Weight Regression Estimates

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

Panel B: Institutional Regression Estimates with IPO Weights

	All IPOs				Non-Local IPOs			
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Protestants	−0.353				−0.150			
	−3.50				−2.14			
Catholics		0.376				0.170		
		4.40				2.89		
Cath-Prot Ratio			0.028				0.014	
			4.26				3.21	
Religiosity				0.202				0.111
				2.34				1.92
Portfolio Size	−1.110	−1.123	−1.131	−1.073	−0.674	−0.681	−0.687	−0.659
	−4.40	−4.64	−4.76	−4.20	−4.12	−4.27	−4.40	−3.99
Portfolio Concentration	0.599	0.607	0.595	0.601	0.217	0.221	0.215	0.218
	4.04	4.08	4.03	4.04	2.62	2.65	2.60	2.62
Total Population	−0.012	−0.016	−0.013	−0.009	−0.002	−0.003	−0.003	−0.001
	−1.78	−2.15	−1.88	−1.35	−0.37	−0.65	−0.51	−0.10
Education	0.006	0.006	0.006	0.006	0.003	0.002	0.002	0.002
	5.06	4.80	4.41	4.43	2.84	2.67	2.37	2.35
Male-Female Ratio	1.509	2.027	1.895	2.033	1.131	1.361	1.310	1.398
	3.85	4.91	4.63	5.19	4.08	4.66	4.52	4.99
Married	0.136	0.048	0.079	−0.018	0.018	−0.018	−0.001	−0.052
	0.67	0.25	0.42	−0.10	0.13	−0.14	−0.01	−0.40
Minority	0.414	0.491	0.413	0.385	0.198	0.234	0.201	0.189
	2.80	3.23	2.85	2.70	1.95	2.20	2.02	1.90
Age	0.009	0.011	0.013	0.013	0.006	0.007	0.008	0.008
	1.75	2.22	2.74	2.76	1.80	2.15	2.53	2.54
Urban	0.076	0.051	0.101	0.147	0.056	0.042	0.063	0.086
	1.26	0.81	1.69	2.35	1.30	0.93	1.45	1.88
Quarter Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Institution Type Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.017	0.017	0.017	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	−2.83	0.035	3.24	0.004	4.83	0.037	3.32	120,978
Institutional Characteristics									
Small Institutions	−0.030	−1.78	0.028	1.94	0.004	3.76	0.043	2.94	60,513
Large Institutions	−0.037	−2.66	0.033	2.92	0.003	3.48	0.030	2.42	60,465
Concentrated	−0.053	−2.99	0.040	2.57	0.006	4.39	0.046	2.80	60,491
Diversified	−0.014	−0.97	0.002	1.74	0.002	2.33	0.024	2.09	60,482
Aggressive	−0.067	−3.75	0.050	3.54	0.005	4.77	0.041	2.78	96,358
Conservative	0.028	2.51	−0.010	−1.16	−0.001	−1.42	0.003	0.37	24,440
Time of Year									
Last Quarter	−0.051	−3.79	0.042	3.91	0.005	5.41	0.038	3.33	31,940
First Three Quarters	−0.033	−2.43	0.032	2.94	0.004	4.53	0.037	3.26	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	2.84	−0.042	−3.56	−0.004	−3.76	−0.046	−3.80	120,978
Institutional Characteristics									
Small Institutions	0.029	1.67	−0.032	−2.16	−0.004	3.67	−0.054	−3.52	60,513
Large Institutions	0.050	3.01	−0.044	−3.32	−0.004	−3.43	−0.036	−2.51	60,465
Concentrated	0.057	2.48	−0.051	−2.82	−0.006	−4.09	−0.063	−3.44	60,491
Diversified	0.018	1.21	−0.022	−1.88	−0.002	−2.32	−0.025	−2.06	60,482
Aggressive	0.071	3.49	−0.053	−3.45	−0.005	−4.47	−0.047	−2.98	96,358
Conservative	−0.018	−1.45	−0.009	−0.84	0.000	0.03	−0.021	−1.72	24,440
Time of Year									
Last Quarter	0.064	3.84	−0.049	−3.76	−0.005	−5.08	−0.051	−3.57	31,940
First Three Quarters	0.036	2.34	−0.039	−3.33	−0.004	−4.41	−0.044	−3.70	89,038

TABLE 5

Robustness Checks: Institutional Portfolio Weight Regression Estimates

This table presents several alternative versions of the institutional holdings regressions as robustness checks. We report results using portfolio weights in lottery or non-lottery type stocks as the dependent variable. For conciseness, we focus on the estimate for the Cath-Prot Ratio (CPRATIO). The main estimates from Table 4, Panel A (columns (3) and (7)) are reprinted as "baseline". 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 designates lottery stocks as those with below median price in addition to above median volatility and skewness. The "Include Mormons and Jews" estimate extends the PROT and CATH measures to include Mormons and Jews, respectively. Lottery sales are inflation-adjusted per-capita state-level lottery sales. "Conservatives" denotes banks and insurance companies. The sample period is from January 1980 to December 2005. Robust t-statistics, clustered by institution, are reported to the right of the coefficient estimates.

	Lottery Weight				Non-Lottery Weight			
Test	Est.	t-stat	N	Adj. R^2	Est.	t-stat	N	Adj. R^2
Baseline	0.004	4.83	120,978	0.145	−0.005	−4.71	120,978	0.164
Basic Robustness								
Control for Industry Concentration	0.004	4.65	120,978	0.149	−0.004	−4.60	120,978	0.165
Control for Religiosity	0.004	3.97	120,978	0.149	−0.004	−3.83	120,978	0.165
2SLS, Lagged Religion	0.004	4.27	114,885	0.146	−0.004	−4.14	114,885	0.158
Alternative Lottery Stock Definition	0.003	3.78	120,978	0.170	−0.004	−3.44	120,978	0.175
No Institution Type Dummies	0.004	5.21	120,978	0.133	−0.005	−5.10	120,978	0.156
Use CPDIFF instead of CPRATIO	0.003	3.60	120,978	0.144	−0.004	−3.76	120,978	0.163
Include Mormons and Jews	0.004	5.91	120,978	0.147	−0.004	−5.71	120,978	0.165
Use Lottery Sales instead of CPRATIO	0.001	0.80	94,026	0.142	−0.002	−1.26	94,026	0.151
Use Lottery Sales and CPRATIO	−0.004	−3.00			0.004	2.51		
(CPRATIO Estimate)	0.007	5.56	94,026	0.148	−0.007	−5.40	94,026	0.155
Sub-Periods								
1980-1992	−0.003	−2.80	38,496	0.147	0.004	2.89	38,496	0.186
1980-1992, Excl Conservatives	−0.002	−1.46	24,358	0.123	0.003	1.97	24,358	0.146
1993-2005	0.005	5.26	82,482	0.134	−0.006	−5.32	82,482	0.149
Geography-Based Sub-Samples								
Exclude California	0.003	3.84	107,057	0.139	−0.004	−3.89	107,057	0.164
Exclude North-East	0.009	4.04	66,463	0.145	−0.009	−3.96	66,463	0.158
Exclude Mid-West	0.004	4.48	97,150	0.142	−0.004	−4.08	97,150	0.162
Exclude South	0.003	2.84	98,818	0.157	−0.003	−2.83	98,818	0.174
Exclude West	0.003	3.76	100,503	0.142	−0.004	−3.92	100,503	0.165

TABLE 6

Employee Stock Option Regression Estimates

This table reports marginal effects 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. Panels A and B report full sample estimates, while Panel C report estimates for different subsamples. In Panels B and C, for conciseness, estimates for the control variables are suppressed and each row presents estimates for the religion measures from each of four separate regressions corresponding to specifications (5) to (8) in Panel A. In Panel B, we consider an alternative measure of option grants (number of option grants per employee) and an alternative estimation method (OLS). In Panel C, the main estimates from specifications (5) to (8) in Panel A are reprinted as the "Baseline". The high (low) volatility subsamples consist of firms with above (below) median monthly return volatility measured over the prior 60 months (as reported in ExecuComp). 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 annual income (median is based on the sample of firm observations). High and low education samples are similarly defined 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, clustered by firm, are reported below the coefficient estimates.

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

Panel A: ESO Regression Estimates for the Full Sample

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Protestants	−2.158				−1.362			
	−5.41				−2.87			
Catholics		0.908				0.764		
		2.96				1.81		
Cath-Prot Ratio			0.104				0.092	
			4.56				3.32	
Religiosity				−0.368				−0.001
				−1.02				−0.00
Ln(Sales)	−0.301	−0.299	−0.298	−0.296	−0.302	−0.302	−0.299	−0.302
	−10.80	−10.63	−10.62	−10.47	10.92	10.86	10.78	10.85
Tobin's Q	0.194	0.198	0.196	0.197	0.185	0.187	0.185	0.187
	8.65	8.73	8.73	8.74	8.51	8.53	8.54	8.56
R&D Expenses	6.025	6.442	6.226	6.574	5.407	5.532	5.380	5.645
	6.15	6.46	6.34	6.46	5.82	5.93	5.85	5.98
Total Population					0.012	0.013	0.005	0.039
					0.40	0.40	0.16	1.27
Education					0.021	0.021	0.019	0.023
					3.71	3.60	3.29	3.93
Male-Female Ratio					4.589	5.917	6.103	5.297
					3.20	4.11	4.30	3.30
Married					1.745	1.572	1.484	1.711
					2.60	2.33	2.21	2.53
Minority					0.738	0.890	0.717	0.734
					1.73	2.03	1.68	1.66
Age					0.019	0.031	0.023	0.043
					0.75	1.17	0.87	1.74
Urban					0.556	0.794	0.796	1.027
					1.17	1.71	1.76	2.31
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.092	0.091	0.091	0.091	0.095	0.095	0.095	0.095
Number of Firm-Year Obs	14,379	14,379	14,379	14,379	14,379	14,379	14,379	14,379

TABLE 6 (Continued)

Employee Stock Option Regression Estimates

Panel B: Full Sample Estimates, Alternative Specifications

Test	PROT	z-stat	CATH	z-stat	CPRATIO	z-stat	REL	z-stat	N
Dep Var: Num of Options	−0.943	−2.59	0.724	2.69	0.061	3.33	0.176	0.50	14,379
Full Sample: OLS Estimation	−0.956	−3.01	0.455	1.77	0.068	4.21	−0.198	−0.60	8,440

Panel C: Estimates for Sub-Samples Based on Local Characteristics and Firm Characteristics

Sub-Sample	PROT	z-stat	CATH	z-stat	CPRATIO	z-stat	REL	z-stat	N
Baseline	−1.362	−2.87	0.764	1.81	0.092	3.32	−0.001	−0.00	14,379
Firm Characteristics									
High Volatility Firms	−2.342	−3.30	1.624	2.99	0.117	3.27	0.141	0.21	7,172
Smaller Firms	−1.758	−2.51	1.057	1.78	0.103	2.61	0.055	0.08	7,186
Low Volatility Firms	−0.116	−0.20	0.115	0.26	0.027	0.85	0.151	0.27	7,207
Larger Firms	−0.617	−1.00	0.223	0.41	0.048	1.34	−0.021	0.04	7,193
Location Characteristics									
High Income	−4.066	−4.69	2.830	4.87	0.124	3.56	1.799	2.30	6,993
High Education	−4.075	−2.20	2.593	2.37	0.133	2.27	0.881	1.19	7,106
Low Income	−0.453	−0.85	−0.135	−0.25	0.039	0.90	−0.833	−1.40	7,386
Low Education	−0.005	−0.01	−0.633	−1.22	−0.012	−0.29	−1.095	−1.71	7,273

TABLE 7

Robustness Checks: ESO Regression Estimates

This table presents several alternative versions of the employee stock option regressions as robustness checks. For conciseness, we focus on the marginal effect estimate for the Cath/Prot Ratio. The CPRATIO estimate from Table 6, Panel A (coulmn (3)) is reprinted as "baseline". The two-stage least squares (2SLS) estimate uses an instrumental variable Tobit specification with the three-year lagged value of the religions variables 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). The "Include Mormons and Jews" estimate extends the PROT and CATH measures to include Mormons and Jews, respectively. The "Binary dependent variable" specifications report the results of logit regressions where the dependent variable equals 1 if the firm has a broad-based employee stock option plan, 0 otherwise. The sample period is from January 1992 to December 2005. Robust z-statistics, clustered by firm, are reported to the right of the coefficient estimates.

Test	Estimate	z-statistic	N	Pseudo R^2
Baseline	0.092	3.32	14,379	0.095
Basic Robustness				
Control for Religiosity	0.110	3.64	14,379	0.096
2SLS, Lagged Religion	0.090	3.50	14,379	0.105
No Industry Dummies	0.123	4.11	14,379	0.074
Additional Control Variables	0.073	2.48	10,675	0.096
Use C−P instead of C/P	0.086	2.59	14,379	0.095
Include Mormons and Jews	0.076	3.06	14,379	0.095
Binary Dependent Variable	0.005	1.84	14,379	0.212
Binary Dep Var w/o Industry Dummies	0.010	1.99	14,379	0.175
Control for CEO Option Grant	0.083	3.12	14,379	0.099
Sub-Periods				
1993 Sample Cross-Sectional	0.167	3.26	863	0.111
2000 Sample Cross-Sectional	0.141	2.75	1,098	0.099
1992-2000 Sub-Sample	0.084	2.69	9,046	0.101
2001-2005 Sub-Sample	0.093	2.61	5,333	0.085
Geography-Based Sub-Samples				
Exclude California	0.052	2.02	11,912	0.076
Exclude North-East	0.125	2.06	10,857	0.097
Exclude Mid-West	0.071	2.50	11,026	0.103
Exclude South	0.056	1.75	10,457	0.110
Exclude West	0.052	2.21	10,797	0.072
Other Tests				
Exclude New Economy Firms	0.052	2.02	11,912	0.076

TABLE 8
Employee Stock Option Regression Estimates with Neighborhood Controls

This table reports marginal effects from Tobit regressions of employee stock option grants on the religion measure (CPRATIO) for the county in which the institution is located, local labor market and social interaction variables, and other control variables. OLS estimates are presented in columns (5) and (6). Stock option grants are measured as the natural logarithm of the Black-Scholes value of per-employee option grants to non-executive employees. The religion variable has been previously defined in Table 1. 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 the local return index computed using the Pirinsky and Wang (2006) method; State-level non-compete enforceability index is from Garmaise (2006); 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; and Option grants at other firms in the MSA is the average Black-Scholes value of option grants at other firms in the MSA. All firm-level controls and demographic controls employed in Table 6 (column (3)) are included in all specifications. For brevity, the coefficient estimates of those variables are suppressed. Robust Tobit z-statistics or OLS t-statistics, clustered by firm, are reported below the coefficient estimates.

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

							MSA CPRATIO	
					OLS	OLS	Low	High
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Cath-Prot Ratio		0.074		0.060		0.078		
		2.69		2.02		2.28		
Tight Labor Market Dummy	0.087	0.081	0.069	0.070	0.158	0.161	0.317	−0.043
	1.05	0.98	0.80	0.80	1.66	1.67	1.72	−0.33
Local Beta	0.062	0.067	0.065	0.070	0.097	0.105	0.035	0.096
	2.71	2.98	2.75	3.01	3.35	3.63	0.75	2.18
Non-Compete Enforceability Index	−0.080	−0.059	−0.043	−0.032	−0.063	−0.049	0.026	−0.005
	−2.73	−1.96	−1.38	−1.00	−1.79	−1.37	0.45	−0.12
Median Market-Adj MSA Return	−0.017	0.003	−0.109	−0.100	−0.173	−0.157	−0.229	0.042
	−0.10	0.02	−0.63	−0.57	−0.83	−0.76	−0.84	0.17
Industry Cluster Dummy	0.131	0.068	0.115	0.071	0.162	0.107	−0.002	0.152
	1.27	0.64	1.06	0.65	1.32	0.87	−0.01	0.82
Option Grants at Other Firms in MSA			0.071	0.053	0.104	0.081	−0.019	0.143
			2.39	1.70	3.10	2.33	−0.52	1.96
Coefficient estimates of other variables have been suppressed.								
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.095	0.096	0.097	0.098	0.430	0.434	0.072	0.117
Number of Firm-Year Obs	12,444	12,444	11,939	11,939	11,939	11,939	5,591	6,348

TABLE 9

IPO First Day Return and Turnover Regression Estimates

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

TABLE 9 (Continued)

IPO First Day Return and Turnover Regression Estimates

Panel A: Dependent Variable is the First Day IPO Return

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Protestants	−0.056				−0.037			
	−2.84				−1.57			
Catholics		0.013				0.032		
		0.73				1.39		
Cath-Prot Ratio			0.004				0.005	
			2.65				2.70	
Religiosity				−0.044				−0.017
				−1.99				−0.64
Ln(Proceeds)	−0.002	−0.002	−0.002	−0.002	−0.002	−0.002	−0.002	−0.002
	−0.41	−0.39	−0.37	−0.30	−0.39	−0.38	−0.31	−0.41
Underwriter Rank	0.007	0.007	0.007	0.007	0.006	0.006	0.006	0.006
	4.14	4.24	4.17	4.16	3.85	3.82	3.75	3.89
Underwriter Spread	0.030	0.031	0.030	0.031	0.031	0.031	0.031	0.031
	5.20	5.20	5.21	5.24	5.12	5.11	5.13	5.12
Offer Price Revision	0.554	0.554	0.553	0.553	0.551	0.551	0.550	0.552
	14.21	14.20	14.20	14.22	14.15	14.13	14.13	14.16
Technology Dummy	0.043	0.044	0.043	0.043	0.042	0.042	0.041	0.042
	3.73	3.78	3.73	3.70	3.59	3.59	3.52	3.61
Pre-IPO Market Return	11.602	11.639	11.584	11.666	11.562	11.554	11.501	11.601
	7.00	7.02	6.99	7.04	6.99	6.99	6.96	7.01
Ln(1 + Firm Age)	−0.012	−0.012	−0.012	−0.012	−0.010	−0.011	−0.011	−0.010
	−4.39	−4.51	−4.50	−4.40	−3.88	−3.93	−3.93	−3.86
Total Population					−0.001	−0.001	−0.002	0.000
					−0.25	−0.39	−0.71	0.23
Education					0.046	0.043	0.035	0.059
					1.13	1.06	0.84	1.44
Male-Female Ratio					0.193	0.254	0.259	0.187
					2.11	2.78	2.89	1.78
Married					0.012	0.005	−0.003	0.011
					0.24	0.09	−0.05	0.22
Minority					0.088	0.093	0.090	0.082
					2.73	2.83	2.81	2.56
Age					0.003	0.003	0.003	0.003
					1.87	2.02	1.76	2.27
Urban					−0.023	−0.019	−0.024	−0.014
					−1.01	−0.85	−1.05	−0.63
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.393	0.393	0.393	0.393	0.395	0.395	0.396	0.395
Number of IPOs	6,254	6,254	6,254	6,254	6,254	6,254	6,254	6,254

TABLE 9 (Continued)

IPO First Day Return and Turnover Regression Estimates

Panel B: Dependent Variable is the First Day IPO Turnover

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Protestants	−0.027				−0.052			
	−1.65				−2.53			
Catholics		0.025				0.032		
		1.76				1.85		
Cath-Prot Ratio			0.003				0.003	
			2.04				2.18	
Religiosity				0.016				−0.006
				0.89				−0.27
Coefficient estimates of other variables have been suppressed.								
Demographic Controls	No	No	No	No	Yes	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.251	0.251	0.251	0.251	0.252	0.252	0.252	0.252
Number of IPOs	6,100	6,100	6,100	6,100	6,100	6,100	6,100	6,100

TABLE 9 (Continued)

IPO First Day Return and Turnover Regression Estimates

Panel C: IPO 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	−1.57	0.032	1.39	0.005	2.70	−0.017	−0.64	6,254
Market Participation Proxy									
High Income	−0.116	−2.06	0.101	2.17	0.009	3.08	0.036	0.68	3,149
High Income, 1993-2005	−0.145	−2.39	0.115	2.28	0.011	3.33	0.033	0.59	2,760
High Education	−0.043	−0.81	0.081	1.77	0.008	2.64	0.048	0.98	3,154
High Education, 1993-2005	−0.103	−1.50	0.104	1.70	0.011	2.89	0.042	0.68	2,297
High Part States, 1998-2005	−0.570	−2.80	0.184	1.24	0.014	2.01	−0.026	−0.15	718
Low Education	−0.022	−0.88	−0.013	−0.56	0.001	0.33	−0.072	−2.58	3,100
Low Income	−0.014	−0.58	−0.013	−0.56	−0.000	−0.16	−0.045	−1.68	3,105
Low Part States, 1998-2005	0.036	0.32	−0.062	−0.53	0.005	0.53	−0.163	−1.39	719
Firm Characteristics and Retail Clientele									
No Min $5 Price Filter	−0.043	−1.87	0.035	1.56	0.006	2.84	0.017	0.41	6,653
Price Below Median	−0.116	−2.06	0.101	2.17	0.009	3.08	0.036	0.68	3,149
Small IPOs	−0.066	−1.82	0.082	2.61	0.008	2.90	0.029	0.84	3,005
High First Day Turnover	−0.073	−1.84	0.054	1.45	0.008	2.77	−0.021	−0.49	3,265
Price Above Median	−0.014	−0.58	−0.013	−0.56	−0.000	−0.16	−0.045	−1.68	3,105
Large IPOs	−0.017	−0.54	−0.019	−0.58	0.003	1.03	−0.061	−1.62	3,249
Low First Day Turnover	0.020	0.77	−0.001	−0.40	−0.000	−0.12	−0.014	−0.49	2,989
Local Bias									
High Retail Local Bias	−0.006	−0.16	0.071	1.90	0.010	2.97	0.052	1.06	2,746
Low Retail Local Bias	0.014	0.39	−0.013	−0.41	0.001	0.40	−0.031	−0.93	3,508
Local Bias and Income									
Low Income, Low LB	0.016	0.43	−0.055	−1.71	−0.003	−1.03	−0.060	−1.54	1,753
Low Income, High LB	−0.042	−1.29	0.051	1.44	0.004	1.14	−0.025	−0.59	1,352
High Income, Low LB	−0.074	−0.94	0.058	0.94	0.005	1.22	0.022	0.34	1,755
High Income, High LB	0.069	0.55	0.121	1.25	0.021	2.56	0.128	1.16	1,394

TABLE 10

Robustness Checks: IPO First Day Return Regression Estimates

This table reports several alternative versions of the IPO regressions as robustness checks. For conciseness, we focus on the estimate for the Cath-Prot Ratio (CPRATIO). The CPRATIO estimate from Table 9, Panel A (column (7)) is reprinted as "baseline". The two-stage least squares (2SLS) estimate uses an instrumental variable Tobit specification with the three-year lagged value of the religions variables as an instrument for the concurrent value. The "Include Mormons and Jews" estimate extends the PROT and CATH measures to include Mormons and Jews, respectively. Lottery sales are inflation-adjusted per-capita state-level lottery sales. The sample period is from January 1980 to December 2005. Robust t-statistics are reported to the right of the coefficient estimates.

Test	Estimate	t-statistic	N	Adj R^2
Baseline	0.005	2.70	6,254	0.395
Basic Robustness				
Control for Religiosity	0.007	3.44	6,254	0.395
2SLS, Lagged Religion	0.005	2.61	6,081	0.388
No Industry Dummies	0.006	2.80	6,316	0.389
Use CPDIFF instead of CPRATIO	0.006	2.10	6,254	0.395
Include Mormons and Jews	0.004	2.18	6,254	0.395
Use Lottery Sales instead of CPRATIO	0.005	1.24	4,171	0.402
Use Lottery Sales and CPRATIO	0.001	0.24		
(CPRATIO Estimate)	0.005	1.85	4,171	0.402
Sub-Periods				
1980-1992	0.001	0.26	2,482	0.252
1980-1992, Price Below Median	0.007	1.55	1,682	0.157
1980-1992, High Turnover	0.008	1.78	1,223	0.284
1993-2005	0.008	2.81	3,760	0.409
Geography-Based Sub-Samples				
Exclude California	0.002	1.20	4,807	0.359
Exclude California, 1993-2005	0.005	1.66	2,444	0.406
Exclude California, High Retail LB	0.007	1.88	2,299	0.324
Exclude North-East	0.013	3.09	4,575	0.405
Exclude Mid-West	0.006	2.64	5,311	0.407
Exclude South	0.005	2.17	4,636	0.408
Exclude West	0.002	1.10	4,240	0.353
Exclude West, 1993-2005	0.005	1.63	2,429	0.374
Exclude West, High Retail LB	0.007	1.85	1,204	0.339
More Urban	0.009	2.49	3,126	0.396
Less Urban	−0.000	−0.15	3,128	0.403

TABLE 11

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

This table reports the estimates from monthly Fama-MacBeth cross-sectional regression, where the monthly stock return is the dependent variable. The main independent variable is the lottery-type stock indicator, defined at the end of the previous month. PROT is the proportion of county residents that adhere to the Protestant faith, CATH is the proportion of Catholic adherents, CPRATIO is the ratio of Catholics to Protestants, and REL is the proportion of the county population adhering to any religion. 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. The idiosyncratic volatility in month t is defined as the standard deviation of the residual from the 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. 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 code 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 in smaller font below the estimates.

TABLE 11 (Continued)
Lottery-Stock Premium: Fama-MacBeth Cross-Sectional Regression 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

TABLE 12

Robustness Checks: Lottery Stock Premium Regression Estimates

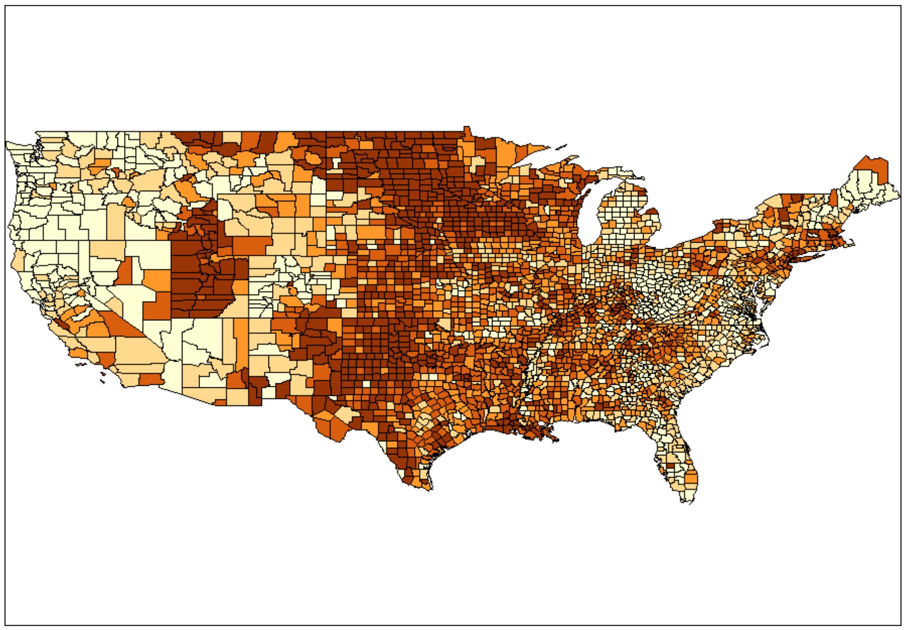
This table reports alternative versions of the monthly Fama-MacBeth cross-sectional regressions from Table 11 as robustness checks. For conciseness, we focus on the estimate of the Lottery Stock × High CPRATIO interaction term. The interaction estimate from CPRATIO column in Table 11 is reprinted as "baseline". The "Include Mormons and Jews" estimate extends the PROT and CATH measures to include Mormons and Jews, respectively. Characteristic-adjusted returns are computed following Daniel, Grinblatt, Titman and Wermers (1997). 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 code 10 and 11 are included in the analysis. The sample period is from January 1980 to December 2005. The t-statistics for the coefficient estimates are shown in smaller font to the right of the coefficient estimates.

Test	Interaction	t-statistic	Avg N	Avg Adj R^2
Baseline	−0.053	−2.87	4,205	0.059
Basic Robustness				
Use CPDIFF instead of CPRATIO	−0.050	−2.74	4,205	0.059
Use Ln(CPRATIO) instead of CPRATIO	−0.054	−2.97	4,205	0.059
Include Mormons and Jews	−0.052	−2.74	4,205	0.058
Use Char-Adj Returns	−0.052	−2.40	4,063	0.044
Sub-Periods				
1980-1992 Sub-Sample	−0.038	−1.84	3,259	0.056
1993-2005 Sub-Sample	−0.081	−3.07	5,155	0.062
Geography-Based Sub-Samples				
Exclude California	−0.053	−2.73	3,869	0.059
Exclude North-East	−0.040	−2.09	3,168	0.060
Exclude Mid-West	−0.067	−3.24	3,429	0.062
Exclude South	−0.044	−2.12	3,299	0.060
Exclude West	−0.058	−2.87	3,311	0.061

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.

Panel A: Religiosity Across the U.S.



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

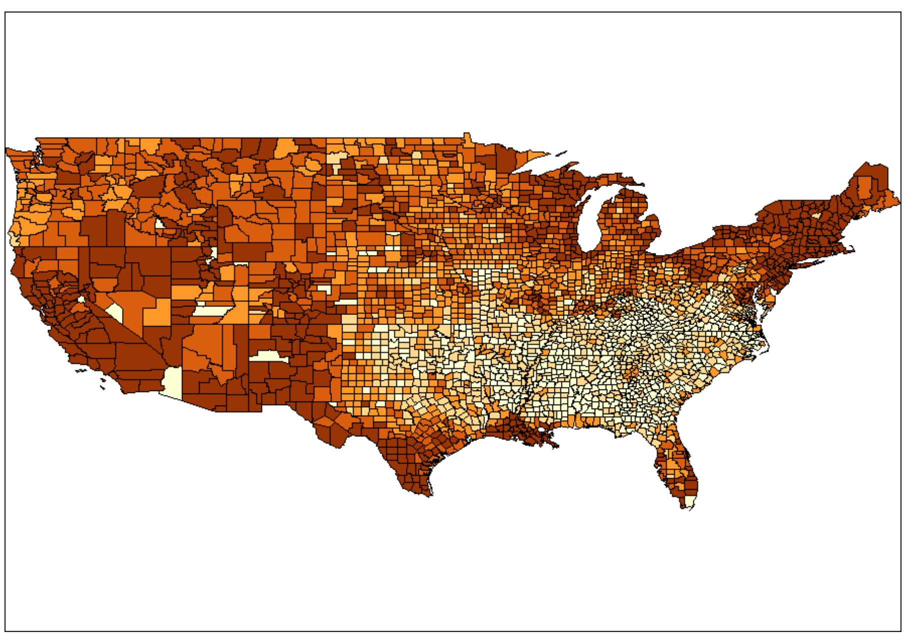


FIGURE 2
Religious Beliefs and Retail Investor Preference for Lottery-Type Stocks

This figure shows the average portfolio weights in lottery-type stocks held by retail investors at a large discount brokerage house during the 1991 to 1996 period. Investors are grouped into quintiles based on one of three religion measures associated with the county of investor's residence: PROT, CATH, and CPRATIO. The figure shows the equal-weighted average lottery stock weights for each religion quintile. Lottery-type stocks are defined as stocks with below-median price, above-median idiosyncratic volatility, and above-median idiosyncratic skewness. 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 CATH to PROT.