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Deviations from Norms and Informed Trading

Alok Kumar and Jeremy K. Page*

Abstract

Investment managers are subject to personal and institutional norms that can constrain their investment choices. We conjecture that norm-constrained investors deviate from such norms only when they have compelling information, and we predict that deviating investments earn relatively high abnormal returns ex post. Consistent with our conjecture, we find that institutions averse to holding lottery-like stocks or sin stocks earn relatively high abnormal returns when they choose to hold such stocks. We find similar but weaker results for deviations from broader style categories. Overall, our evidence indicates that deviations from established institutional or social norms signal informed investing.

I. Introduction

Institutional investment managers often face constraints on their investment decisions, which may require managers to either hold or avoid stocks with certain characteristics (e.g., Del Guercio (1996), Almazan, Brown, Carlson, and Chapman (2004)). These may be explicit or understood constraints or mandates imposed by the institution, personal convictions of the investment manager (e.g., Hong and Kostovetsky (2012)), or even social norms that either promote or discourage holding the stocks of certain types of companies (e.g., Hong and Kacperczyk (2009), Kumar, Page, and Spalt (2011), and Chava (2014)). Together, these constraints and norms provide a set of implicit and explicit rules that help guide individuals' overall behavior. Implicitly, the violation of these constraints imposes some perceived costs. Therefore, unless the perceived benefits associated with deviations are significant, sophisticated individuals are likely to conform to norm-induced rules. We use this insight to conjecture that observed deviations from norms can provide unique insights into the hidden personal beliefs and information sets of individuals.

*Kumar, akumar@miami.edu, School of Business Administration, University of Miami, PO Box 248027, Coral Gables, FL 33124; Page, jeremy.page@byu.edu, Marriott School of Management, Brigham Young University, 685 TNRB, Provo, UT 84602. We thank Andres Almazan, Brian Boyer, Stephen Brown (the editor), Vidhi Chhaochharia, John Griffin, Umit Gurun, Andy Koch, George Korniotis, Bob Parrino, Clemens Sialm, Oliver Spalt, Sheridan Titman, Keith Vorkink, Malcolm Wardlaw, Jeffrey Wurgler (the referee), and seminar participants at Brigham Young University, University of Texas at Austin, University of Miami, and University of Washington for helpful discussions and valuable comments. We are responsible for all remaining errors and omissions. An earlier version of the paper circulated under the title "Social Norms and Informed Trading."

We apply this broad idea to study the investment behavior of institutional investors. We focus on institutional portfolio managers as a class of potentially informed investors who constitute a large portion of equity ownership and trading volume. We conjecture that relatively sophisticated institutional investors would deviate from their investment norms only when the potential benefits are high and they have compelling reasons to violate those norms. Ex post, norm-constrained sophisticated investors should therefore earn higher abnormal returns on holdings that deviate from norms.[1]

For example, consider the manager of a public pension fund who avoids holding "sin stocks" because of the negative public perception of funding companies that promote vice.[2] Now, suppose that manager receives information indicating that the stock of R. J. Reynolds (a prominent tobacco company) is going to appreciate substantially over the next period. Because social norms with respect to sin stocks impose an extra cost to holding R. J. Reynolds stock, that manager would require a stronger information signal to induce her to act on that information. If one then observes this manager taking a significant position in a stock like R. J. Reynolds, it is likely that the manager's trade reflects a relatively strong information signal.

While this hypothesis would apply to investment constraints in general, it is difficult to directly observe the constraints faced by investment managers. We therefore test our key prediction with respect to two sets of social norms that recent research has shown to influence institutional portfolios: norms against gambling and norms against holding sin stocks. In particular, Kumar et al. (2011) show that variation in social norms regarding the moral acceptability of gambling predicts investors' propensity to hold lottery-like stocks with high skewness and volatility. Similarly, Hong and Kacperczyk (2009) find that institutional investors exhibit an aversion to holding "sin stocks" such as alcohol, tobacco, and gaming companies, and they also demonstrate that this reluctance to hold sin stocks affects equilibrium prices. In other related settings, prior research examines investors' preferences for firms that exhibit higher corporate social responsibility (Heinkel, Kraus, and Zechner (2001), Chava (2014)) and stock preferences based on political values (Hong and Kostovetsky (2012)).[3]

In contrast to these earlier studies, which demonstrate that norms and values can influence investors' portfolio choices and impact equilibrium returns, we examine the implications of norms for investment performance and performance evaluation. We rely on the previous evidence and do not directly investigate why social norms affect investment decisions. As prior research has shown, return

[1]When investors are less sophisticated, they may deviate from norms due to their behavioral biases and subsequently experience worse performance. See Korniotis and Kumar (2013) for related evidence.

[2]Following Hong and Kacperczyk (2009), we define sin stocks as stocks of publicly traded companies that produce alcohol, tobacco, or gaming. Similarly, motivated by Kumar et al. (2011), stocks with high expected idiosyncratic skewness are identified as lottery-type stocks.

[3]To operationalize our key conjecture, motivated by the recent literature on the portfolio decisions of institutional investors, we focus on social norms. However, our core idea applies to other broader economic settings. For example, due to their personal tastes and preferences, institutions may focus on a certain specific style or industry and would deviate from their typical investment behavior only when they have superior information.

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premiums to groups of stocks such as sin stocks or stocks with high expected skewness can arise from widespread social norms or investor tastes.[4] If performance evaluation models properly adjust for "style," then there would be no further implication of such tastes and preferences for abnormal portfolio performance.

However, if investors have access to private information, then institutional or social norms against holding certain types of stocks can influence their decision to take advantage of that information, thereby impacting observed performance. In particular, when an investor obtains information about a security, norms against holding securities with certain characteristics can influence her threshold for trading on that information. Thus, conditioning on investors' sensitivity to norms can help identify trades that are likely to be informed. This is our key identification strategy.

In our empirical analysis, we examine the returns to institutional investors' stock holdings, conditional on the institutions' sensitivity to norms. Specifically, we measure the degree to which institutions are subject to norms by observing their portfolio allocations to lottery-like stocks and sin stocks in previous periods. We then compare the returns to lottery stock and sin stock investments of norm-constrained and unconstrained institutions to examine whether violations of norms predict the performance of institutional investors' holdings.

Consistent with our main hypothesis, we find that the portfolio of lottery stocks held by the most gambling-averse institutions earns an average characteristic-adjusted return of 2.73% per quarter (t-statistic = 2.39), and the difference in the abnormal returns between lottery stocks held by gambling-averse institutions and those held by gambling-tolerant institutions is large and statistically significant (2.01 percentage points per quarter, t-statistic = 2.14). In contrast, conditioning on gambling preferences yields no discernible difference in performance among institutional holdings of stocks with lower expected idiosyncratic skewness (EISKEW).

These results strengthen when we focus on the holdings of more aggressive institutional types who are more likely to be informed, and they are robust to controlling for industry specialization. Furthermore, our results are somewhat stronger for more concentrated institutions, for larger institutions, and in the latter part of the sample period. In addition, we study returns following significant trades by gambling-averse versus those by gambling-tolerant institutions and find results consistent with our holdings-based tests. Overall, the evidence is consistent with gambling-averse institutions requiring stronger information signals to induce them to trade stocks with high skewness.

In the next set of tests, we analyze institutions' holdings of "sin stocks" to provide complementary evidence using another set of social norms. Hong and Kacperczyk (2009) argue that social norms against funding businesses that promote vice lead institutions to avoid sin stocks, defined as stocks of publicly traded companies that produce alcohol, tobacco, or gaming. They provide

[4]See Heinkel et al. (2001), Fama and French (2007), Mitton and Vorkink (2007), and Barberis and Huang (2008) for theoretical treatment of the price impact of investor tastes. See Boyer, Mitton, and Vorkink (2010) and Kumar et al. (2011) for empirical evidence of the price impact of investor tastes for gambling, and Hong and Kacperczyk (2009) for evidence on the impact of investors' reluctance to hold sin stocks.

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evidence that institutions generally avoid sin stocks and underweight them in the aggregate. They also show that sin stocks earn higher-than-expected average returns due to their relative neglect by institutional investors.

Analogous to the previous evidence with respect to gambling preferences, we find that the sin stock positions of the institutions most averse to holding them earn significantly higher returns than those held by more tolerant institutions. These results are robust to controlling for industry specialization, and they are stronger for large institutions and those with more concentrated portfolios. Overall, the analysis of sin stock holdings corroborates the evidence obtained using lottery-type stocks.

As an alternative to using past portfolio allocations to identify which institutions are constrained by these social norms, we conduct further analysis using geographic variation in religious composition to proxy for variation in social norms. Specifically, we use the ratio of Catholic adherents to Protestant adherents (CPRATIO) in each county of the United States. This measure is motivated by the observation that the major Protestant denominations prohibit gambling, while the Catholic church maintains a tolerant position on moderate gambling. The predictive power of religious background for gambling behavior in investment settings has been established in a variety of settings, including various financial market settings (e.g., Kumar (2009), Kumar et al. (2011)).[5]

By the same argument, local religious concentration may capture variation in investors' willingness to hold gaming stocks. In addition, several major Protestant denominations proscribe the use of alcohol and/or tobacco, and in some cases even discourage involvement with their respective industries, while the Catholic church is more tolerant of both.[6] CPRATIO is thus likely to be useful for capturing the local variation in norms against holding sin stocks as well. While the CPRATIO measure is more indirect and noisier than those based on past stock holdings, it has the advantage of specifically capturing variation in social norms related to gambling and sin industries while being relatively exogenous to the investors' information set.

We find that, conditioning on local CPRATIO, the portfolio of lottery stocks held by the most gambling-averse (low-CPRATIO) institutions earns an average characteristic-adjusted return of 2.68% per quarter (t-statistic = 2.29). Similarly, we find that sin stocks held by low-CPRATIO institutions earn high abnormal returns, although this evidence is weaker. These performance estimates using CPRATIO confirm the previous findings using an entirely different proxy for social norms. The stylized result that norm-constrained investors earn high abnormal returns on stocks that deviate from norms thus appears to be fairly robust.

In our last set of tests, we examine whether our results generalize to broader stock categories. While we argue that sin stocks and lottery stocks provide a

[5]For example, Kumar (2009) shows that, all else being equal, individual investors located in regions with a high concentration of Catholics invest more in stocks with lottery features (i.e., low prices, high idiosyncratic volatility, and high idiosyncratic skewness). Similarly, the evidence in Kumar et al. (2011) indicates that institutional investors located in regions with a high Catholic-Protestant ratio invest disproportionately more in lottery-type stocks including initial public offerings (IPOs).

[6]We summarize the views and attitudes of different religious denominations toward gambling and sin industries in Section A.I of the Internet Appendix (available at www.jfqa.org).

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cleaner setting for testing our deviations hypothesis, it is natural to ask whether the same predictions hold for institutions specializing in certain investment styles such as size, value/growth, or momentum. Because deviating from a preferred style does not impose the same sort of cost as deviating from norms against holding sin stocks or lottery stocks, deviations from such style preferences may not be as informative as deviations from the norms we consider in our main analysis. Nevertheless, we find some evidence in support of our deviations hypothesis using portfolios based on size, momentum, volatility, and, to a lesser extent, book-to-market ratio. Although the evidence in these cases is predictably weaker, the results provide additional support for our key hypothesis, which posits that investors deviate from existing norms only when they have compelling information.

The remainder of the paper is organized as follows: Section II summarizes the related literature and motivates the key hypotheses. Section III discusses the data and sample construction. In Sections IV and V, we present our main results. We present additional evidence in Sections VI and VII. We conclude in Section VIII with a brief discussion. In an Internet Appendix, we present background material and results from additional tests to further support the main results reported in the paper.

II. Testable Hypotheses and Related Literature

Our key conjecture is that institutional or social norms, such as those against gambling or against holding sin stocks, pose additional holding costs that can impact the trading decisions and performance of informed investors. Institutional investors that are subject to such norms and constraints would require a stronger information signal or conviction about a lottery stock or sin stock to overcome those costs.

For example, although a typical institution is likely to avoid low-priced lottery-type stocks due to prudent-man rules and other institutional constraints (e.g., Del Guercio (1996)), some institutions might gravitate toward these lottery-type stocks because they provide "cheap bets" and offer good opportunities for exploiting information asymmetry. In particular, the institutional attraction for smaller, low-priced lottery-type stocks might increase over time as competition in other market segments increases (e.g., Bennett, Sias, and Starks (2003)). In this setting, cross-sectional variation in institutions' tastes for gambling could be used to identify stock positions that are likely to reflect stronger information signals.

Thus, we would observe high abnormal returns ex post if institutions in fact have access to superior information but are subject to institutional or social norms against holding certain stocks. The specific prediction is that gambling-averse institutions would earn high abnormal returns on the set of lottery stocks that they choose to hold. Similarly, the set of sin stocks held by those institutions most subject to norms against holding them would earn higher abnormal returns. We note that it is not necessary in our setting to distinguish between a manager's own preferences and external norms. For example, a manager may not personally be opposed to holding sin stocks but may still feel compelled to avoid them due to public perception. Whether the norm arises from personal conviction or external

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constraints, our prediction requires simply that the manager perceives a cost to violating the norm.

In contrast, we do not necessarily expect high abnormal returns when institutions that tend to favor lottery stocks hold non-lottery stocks with low expected skewness. It is unlikely that there are institutional or social norms restricting these more gambling-tolerant institutions from holding low-skewness stocks, and their decision to hold some low-skewness stocks would therefore be less informative than the decision of a gambling-averse institution to hold lottery stocks. In Section A.II of the Internet Appendix, we explain this logic further using an example.

Our broad idea is related to the growing literature in finance that uses new ways to identify informed trading and investment skill. Perhaps the closest paper to ours is Cohen, Polk, and Silli (2010), which identifies the stock in each mutual fund portfolio that is most overweighted relative to the market or to a proxy for the fund's benchmark, and finds that these "best ideas" earn significant abnormal returns. While our paper is similar in spirit, in that it focuses on subsets of institutional stock positions that are more likely to reflect information, the use of investors' tastes and preferences to identify potential informed trades is novel. Furthermore, our paper differs in that the hypothesis refers to certain groups of stocks within an investor's portfolio rather than single stock picks, and thus it may apply to larger components of the portfolio.

Another closely related strand of literature seeks to predict fund performance by measuring deviations of the fund's portfolio weights from various benchmarks. These papers argue that managers who choose to deviate from a diversified benchmark portfolio may have superior skill or information. For example, Kacperczyk, Sialm, and Zheng (2005) measure the degree to which mutual funds concentrate their holdings in certain industries, and they find that industry concentration is positively related to return performance. Cremers and Petajisto (2009) match mutual funds to their most relevant benchmark indices and construct an "active share" measure to capture the share of portfolio holdings that differ from the benchmark index. They find that the funds with the highest active share significantly outperform benchmarks and exhibit performance persistence. A similar study by Titman and Tiu (2011) uses R^2 with respect to systematic factors to measure the degree to which hedge funds deviate from diversified portfolios and finds that hedge funds with lower R^2 values exhibit higher performance measures. In contrast to these studies, which use broad measures of concentration or active management to identify better-informed managers, we identify specific types of investments that are likely to be motivated by superior information.

Our paper is also related to the growing literature on the role of investor tastes and preferences for portfolio choice and asset prices. Mitton and Vorkink (2007) and Barberis and Huang (2008) show, using very different frameworks, how investors' preferences for skewness can lead to even idiosyncratic skewness being priced in the cross section. Heinkel et al. (2001) model the effect of green investment on firms' cost of capital and corporate decision making, and Fama and French (2007) propose a general framework for introducing tastes into a capital asset pricing model (CAPM) setting.

Empirical studies of the price impact of investor tastes include Bennett et al. (2003), who study changes over time in institutional preferences for small, volatile

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stocks, and the impact of those changing preferences on stock prices. Boyer et al. (2010) use estimates of expected idiosyncratic skewness to show that idiosyncratic skewness is negatively related to returns, while Kumar et al. (2011) show that the negative premium on lottery-like stocks varies with a measure of local demand for skewness. Similarly, Hong and Kacperczyk (2009) show that sin stocks earn positive abnormal returns due to their neglect by institutional investors, while Hong and Kostovetsky (2012) show that fund managers' political values influence their portfolio choices.

Finally, the economic intuition behind our main hypothesis is related to the seminal work by Becker (1957) on the economics of discrimination. He argues that an employer with a taste for discrimination must be compensated for the disutility of hiring a minority employee, and thus will hire a minority only if that individual is exceptionally productive. Ex post, we should observe that minority employees are more productive than other employees.

Ben-David, Glushkov, and Moussawi (2010) make a similar argument to interpret their finding that hedge fund trades are most informative among stocks with high idiosyncratic risk. In contrast to their paper, we focus on cross-sectional differences across institutions in their gambling preferences, which allows us to test directly the argument that deviation from an investor's tastes is a signal of information-motivated trading.

III. Data and Sample Construction

A. Institutional Investor Data

The primary data for our study consist of quarterly holdings of 13F institutions obtained from Thomson Reuters. The database includes end-of-quarter stock holdings of all institutions that file form 13F with the Securities and Exchange Commission (SEC) from 1980 to 2008.[7] To identify institutional location (ZIP code), we use the *Nelson's Directory of Investment Managers* and search the SEC documents as well as Web sites of institutional managers.

We also use institutional classifications developed in Bushee and Noe (2000) to further define the sample. Because we want a relatively homogeneous sample of active institutions that are more likely to have information, we exclude passive institutions that are classified as "quasi-indexers" on the basis of their diversification and turnover.[8] In some cases, we focus on subsamples based on institutional investor types. Because the type codes provided by Thomson Financial are not reliable after 1997, we use the type codes provided by Professor Brian Bushee, which maintain the 1997 code for institutions that remain in the sample, and we manually assign codes for institutions that enter the sample later.

Beyond the institutional data sets, several other standard data sets are used in this study. We obtain monthly prices, returns, shares outstanding, and monthly

[7]Institutions with more than $100 million under management are required to file a form 13F with the SEC and report common stock positions of more than 10,000 shares or more than $200,000 in value.

[8]Quasi-indexers hold well-diversified portfolios and trade infrequently.

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volume turnover data from the Center for Research in Security Prices (CRSP) and quarterly book value of common equity data from Compustat. The exchange code and the share code for all stocks are also obtained from CRSP. Lastly, the daily time series of the three Fama-French (1993) factors and the momentum factor are from Professor Kenneth French's data library (available at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html).

B. Lottery-Like Stocks

Motivated by Barberis and Huang (2008), we assume that stocks with high positive skewness would be perceived as gambling instruments. Specifically, we identify stocks in the highest quintile of EISKEW as lottery-type stocks. We estimate EISKEW for each stock following the approach of Chen, Hong, and Stein (2001) and Boyer et al. (2010). This method uses firm-level variables to predict idiosyncratic skewness in the cross section. A detailed explanation of the method used to estimate the expected idiosyncratic skewness of each stock may be found in Section A.III of the Internet Appendix.

We use the ex ante measure of idiosyncratic skewness because realized skewness is unstable over time (Harvey and Siddique (2000)). Furthermore, it is ex ante skewness rather than past realized skewness that should drive the decisions of sophisticated investors who exhibit a preference for gambling.[9]

C. Sin Stocks

We follow the Hong and Kacperczyk (2009) definition of sin stocks. Using the 48-industry classification of Fama and French (1997), we identify stocks in industry groups 4 (beer or alcohol) and 5 (smoke or tobacco) as sin stocks. Because gaming stocks are combined with hotel stocks and other entertainment firms in the Fama-French classification, they are defined separately using North American Industry Classification System (NAICS) classifications. Specifically, gaming stocks are identified as those with NAICS codes of 7132, 71312, 713210, 71329, 713290, 72112, or 721120. A stock is considered a sin stock if it falls into any one of these three industry groups (i.e., alcohol, tobacco, or gaming).

D. Measures of Sensitivity to Norms

We employ two distinct proxies to capture institutional preference for investing in lottery-type stocks and sin stocks.

First, in the main analysis we measure an institution's preference for certain groups of stocks using historical portfolio allocations to those stocks. For example, we compute the average portfolio weight in lottery stocks over the previous four quarters to measure institutional tolerance for gambling. Similarly,

[9]We obtain qualitatively similar results when we use a "lottery index" in place of the EISKEW measure. Motivated by Kumar (2009), the lottery index is constructed by the stock's cross-sectional ranks in idiosyncratic skewness and idiosyncratic volatility, and it is meant to capture a stock's attractiveness to investors with a taste for lottery-like payoffs. As lagged idiosyncratic skewness and volatility are the two key predictors of EISKEW, the two measures are closely related.

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we measure an institution's willingness to hold sin stocks by computing its average portfolio weight in sin stocks over the previous four quarters.

To identify gambling-tolerant and gambling-averse institutions, we sort institutions into five equal-sized bins based on their past allocations to lottery stocks. Institutions in the lowest (highest) lottery stock weight quintile are identified as gambling averse (gambling tolerant). For the few quarters in which more than 20% of firms allocated zero weight to lottery stocks over the prior four quarters, we assign all institutions with zero past weight in lottery stocks into the lowest bin and divide the remaining institutions into four equal-sized groups assigned to bins two to five. Similarly, we identify institutional preference for sin stocks by sorting institutions into five equal-sized bins based on their past allocations to sin stocks. Institutions in the lowest (highest) sin stock weight quintile are identified as sin stock-averse (sin stock-tolerant).

Second, we consider an alternative proxy for institutional willingness to hold lottery stocks or sin stocks. Motivated by the evidence in Kumar et al. (2011), we use county-level geographical variation in religious composition across the United States as a proxy for local gambling attitudes. This measure is motivated by the observation that the major Protestant denominations prohibit gambling, while the Catholic church maintains a tolerant position on moderate gambling. Similarly, local religious composition can be used to identify institutional preference for sin stocks.[10]

Catholic versus Protestant religious background is well established as a key predictor of gambling behavior in the empirical gambling literature (see, e.g., Berry and Berry (1990), Martin and Yandle (1990), Ellison and Nybroten (1999), Diaz (2000), and Hoffman (2000)). Furthermore, recent studies in the finance literature have documented that religion-induced gambling attitudes carry over into financial decisions.[11] In particular, Kumar et al. (2011) find that local religious composition predicts institutional investors' portfolio allocation to stocks with high idiosyncratic risk and skewness, which are the key predictors of expected idiosyncratic skewness.[12]

We collect data on religious membership from the "Churches and Church Membership" files maintained by the Association of Religion Data Archives (ARDA). The data set, compiled by Glenmary Research Center, contains county-level membership statistics for 133 Judeo-Christian church bodies, available 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 values for intermediate years and use the 2000 levels for all subsequent years.

[10] See Section A.I of the Internet Appendix for a summary.

[11] Golec and Tamarkin (1998) use horse track betting data to show that gamblers crave skewness, not risk. Based on their insight, it has been common in the finance literature to equate gambling preferences with a preference for skewness. See, for example, Mitton and Vorkink (2007), Barberis and Huang (2008), Kumar (2009), Schneider and Spalt (2013), Boyer and Vorkink (2014), and Green and Hwang (2011).

[12] See Kumar et al. (2011) for an extensive set of tests that show that the CPRATIO measure reflects the effects of religion-based social norms and does not merely proxy for other geographical characteristics (e.g., urban, financial center, level of trust, political orientation, etc.) that may influence investment decisions.

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The specific measure we use is the Catholic to Protestant ratio (CPRATIO) in the county where the institution is located.[13] We use this measure as a proxy for gambling preferences based on the assumption that the gambling attitudes of the prevailing local religious group give rise to social norms that influence the behavior of individuals in the area, including institutional managers and their local clients. Based on a similar logic, we also use CPRATIO as a proxy for institutional aversion to sin stocks.

E. Summary Statistics

Table 1 presents summary statistics of the institutional investor portfolios in the sample. The main sample includes 81,003 institution-quarter observations for 5,117 unique institutions. The typical institution holds a $317m (mean is $2.42b) portfolio, which contains 90 stocks (mean is 217). As expected, there is significant cross-sectional variation in institutional characteristics. About 10% of portfolios are quite small (less than $5m in size) and contain very few stocks (less than 13).

A very small proportion of the typical institutional portfolio is invested in lottery stocks and sin stocks. When we examine the holdings of all institutions, the typical institution holds only about 0.09% (mean is 2.70%) of its portfolio in stocks that are in the highest quintile of the EISKEW (i.e., lottery-like stocks). But among those that have a positive weight in lottery stocks (about 63% of all

TABLE 1

Summary Statistics: Institutional Investor Portfolios

Table 1 presents summary statistics for the main sample of institutional investor portfolios. Portfolio measures are derived from quarterly data on institutional holdings from the Thomson Reuters 13F database, and observations are at the institution-quarter level. The sample excludes institutions that are identified as "Quasi-Indexers" according to the Bushee and Noe (2000) classification scheme. Lottery stock weight is the weight allocated to stocks that are in the top quintile of expected idiosyncratic skewness. Sin stock weight is the portfolio weight allocated to sin stocks as defined in Hong and Kacperczyk (2009). CPRATIO is the ratio of Catholics to Protestants in the county where the institution is located. Assets is the total dollar value of equity holdings in an institution's portfolio. Portfolio concentration is the Herfindahl index of portfolio weights of stocks in a portfolio. Industry concentration is the sum of squared deviations of portfolio industry weights from market industry weights, as defined in Kacperczyk et al. (2005). Turnover is dollar value of shares traded divided by the value of shares held. Lottery stock turnover is measured in a similar way by including only stocks that are in the highest quintile of EISKEW. Sin stock turnover is defined in an analogous manner. The sample period is from the first quarter of 1980 to the last quarter of 2008.

			Percentile			Percentile	
Measure	Mean	SD	10th	25th	Median	75th	90th
Lottery stock weight (%)	2.70	8.95	0.00	0.00	0.09	1.41	6.43
Sin stock weight (%)	1.40	3.73	0.00	0.00	0.41	1.62	3.36
CPRATIO	3.25	2.20	0.43	1.18	3.25	5.23	6.12
Assets ($ billions)	2.42	14.38	0.05	0.12	0.32	1.15	3.97
No. of stocks in portfolio	216.75	403.99	13.00	39.00	90.00	211.00	520.00
Portfolio concentration (HHI)	9.82	19.50	0.87	1.58	2.92	6.90	24.34
Industry concentration	14.98	21.72	0.96	2.23	5.70	15.99	48.11
Portfolio turnover (%)	7.93	7.81	0.00	1.20	6.26	12.28	18.26
Lottery stock turnover (%)	2.98	7.22	0.00	0.00	0.00	1.97	10.47
Sin stock turnover (%)	3.33	7.90	0.00	0.00	0.00	2.50	11.23
No. of obs.	81,003						
No. of institutions	5,117						

[13]Because of the way their views on gambling align with those of Catholics and Protestants, we include the local Jewish population with Catholic residents and Latter-Day Saints with the Protestant population. The two groups could thus be thought of more broadly as religious groups that are tolerant of gambling versus those that oppose it.

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observations), the mean and median allocations to lottery stocks are 4.29% and 0.78%, respectively. In comparison, the mean weight of lottery-type stocks in the aggregate market portfolio is 1.12%.

Similarly, when we consider the full sample of institutions, the mean and median portfolio weights in sin stocks are 1.40% and 0.41%, respectively. As expected, among the subsample of institutions with positive weight in sin stocks, the mean and median portfolio weights in sin stocks are 2.21% and 1.22%, respectively. Relative to the mean weight of sin stocks in the market portfolio (2.35%), the majority of institutions underweight sin stocks.

Among other portfolio attributes, we find that there is significant cross-sectional variation in both portfolio and industry concentration measures.[14] Furthermore, the typical fund turns over 6.26% of its portfolio per quarter (mean is 7.93%), and there is substantial variation in turnover across institutions.[15] Examining the mean CPRATIO, we observe that institutions are located in regions with high Catholic concentration, perhaps because of their primarily urban locations.

IV. Gambling Norms and Portfolio Performance

In this section, we test our main conjecture using institutional investments in lottery-type stocks.[16]

A. Characteristics of Portfolios Sorted by Past Weight in Lottery Stocks

To begin, Table 2 presents the means of various portfolio measures for institutions sorted by their past portfolio allocations to lottery stocks. The portfolio measures are averaged cross-sectionally in each quarter, and the table displays the time-series averages of the cross-sectional means. We find that the average lottery weight increases monotonically from 0.88% for the most gambling-averse institutions (lowest prior lottery weight quintile) to 6.14% for the most gambling-tolerant (highest quintile) institutions. Compared to the 1.12% weight of lottery-type stocks in the aggregate market portfolio, gambling-tolerant institutions significantly overweight those stocks, while gambling-averse institutions mildly underweight them.

[14] We measure portfolio concentration using the Herfindahl index (the sum of squared portfolio weights), while industry concentration is the sum of squared deviation of portfolio weights from the market weights of 10 industries. Both concentration measures are multiplied by 100 to improve readability.

[15] Portfolio turnover is defined as

$$\text{TURNOVER}_{k,t} = \frac{\min(\text{BUY}_{k,t}, \text{SELL}_{k,t})}{\sum_{i=1}^{N_k} \frac{S_{k,i,t}P_{i,t} + S_{k,i,t-1}P_{i,t-1}}{2}},$$

where $\text{BUY}_{k,t} = \sum_{i=1, S_{k,i,t} > S_{k,i,t-1}}^{N_k} |S_{k,i,t}P_{i,t} - S_{k,i,t-1}P_{i,t-1} - S_{k,i,t-1}\delta P_{i,t}|$ and $\text{SELL}_{k,t} = \sum_{i=1, S_{k,i,t} \le S_{k,i,t-1}}^{N_k} |S_{k,i,t}P_{i,t} - S_{k,i,t-1}P_{i,t-1} - S_{k,i,t-1}\delta P_{i,t}|$. $P_{i,t}$ is the share price for stock i at the end of quarter t and $S_{k,i,t}$ is the number of shares of stock i held by investor k at the end of quarter t. We adjust prices and shares for the effects of splits and stock dividends using the CRSP price and share adjustment factors.

[16] Results from additional tests reported in Sections A.V–A.VII of the Internet Appendix show that our results are induced mainly by attitudes toward skewness rather than risk and, furthermore, our evidence is inconsistent with the specialization-based explanation for our findings.

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TABLE 2

Institutional Gambling Preferences and Portfolio Characteristics

Table 2 presents averages of various portfolio measures for institutions sorted by their average portfolio weight allocated to lottery stocks over the prior four quarters. Stocks in the top quintile of expected idiosyncratic skewness (EISKEW) are identified as lottery stocks. Other variables have been previously defined in Table 1. The sample period is from the first quarter of 1980 to the last quarter of 2008.

	Quintiles of Prior Lottery Stock Weight				
Measure	Gambling Averse	Q2	Q3	Q4	Gambling Tolerant
Lottery stock weight (%)	0.88	0.82	1.09	1.79	6.14
Assets ($ billions)	1.29	4.25	4.27	2.06	0.86
No. of stocks in portfolio	119.77	341.39	360.43	279.94	164.57
Portfolio concentration (HHI)	16.66	5.09	4.59	5.16	10.44
Industry concentration	19.87	7.47	8.03	9.99	16.63
Portfolio turnover (%)	5.92	8.54	8.92	8.97	7.37
Lottery stock turnover (%)	0.92	2.30	2.92	3.10	2.82
No. of institutions	219.43	86.37	99.05	117.30	138.07
% of aggregate portfolio	22.09	24.00	26.45	16.83	8.90

Institutions in the extreme quintiles of prior lottery weight tend to be smaller and have more concentrated portfolios. Furthermore, portfolio turnover is lower for the most gambling-averse institutions, both overall and among lottery stocks in particular. This finding is consistent with the hypothesis that institutions that are relatively averse to gambling are more reluctant to trade lottery stocks and therefore would require a stronger information signal to trade.

B. Deviations from Gambling Norms and Portfolio Performance: Baseline Estimates

If gambling-averse institutions have access to superior information but require a stronger information signal to induce them to trade lottery stocks, then we should observe that the lottery stocks they choose to hold earn higher abnormal returns. This is the main hypothesis of the paper, and we test it by examining the returns to institutional stock holdings, conditional upon the level of EISKEW and the gambling tolerance of institutions.

Specifically, we divide each institution's stock holdings into five subportfolios according to the quintiles of EISKEW to which the stocks belong. We then aggregate the subportfolios of the institutions in each quintile of past lottery stock holdings. Thus, for each set of institutions grouped by their past lottery stock holdings, we have portfolios of their aggregate holdings of stocks in each quintile of EISKEW. This yields 25 portfolios, the sum of which is the aggregate portfolio of all institutional stock holdings.

We compute quarterly value-weighted portfolio returns for each of the 25 portfolios. The portfolio returns are characteristic-adjusted portfolio returns following the Daniel, Grinblatt, Titman, and Wermers (1997) approach, where the quarterly return of each stock is in excess of the quarterly return of a portfolio of stocks with comparable size, book-to-market, and past returns. Thus, the return of a given portfolio represents the return of the aggregate portfolio of stocks in a certain EISKEW quintile held by the group of institutions in a certain lottery weight quintile.

Table 3 presents the mean quarterly returns of the double-sorted portfolios. The first column reports the returns to stock holdings in each quintile of EISKEW

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TABLE 3

Institutional Gambling Norms and Portfolio Performance

Table 3 presents quarterly returns of portfolios defined using institutional stock holdings and past weight in lottery stocks. Lottery stocks are defined as those in the highest quintile of expected idiosyncratic skewness (EISKEW). The portfolio returns are characteristic-adjusted following the Daniel et al. (1997) approach. Returns are expressed in percentages and weighted by the value of the institutional holdings. The table gives the value-weighted return to institutions' holdings of stocks in each quintile of EISKEW, for institutions in each quintile of past lottery stock weight. Panel A gives returns to holdings of all institutions, excluding those classified as "quasi-indexers" according to the Bushee and Noe (2000) classification scheme. We report returns based on all holdings, as well as on "fresh" holdings, those in which the institution increased its portfolio weight over the prior quarter. Panel B gives portfolio returns for variations on the analysis in Panel A. First, we limit the sample to the fresh holdings of more aggressive institution types (types 3, 4, and 5). Next, we assign stocks to EISKEW quintiles based on a double sort of industry and EISKEW. Portfolios are rebalanced each quarter. The *t*-statistics are reported below the mean returns in parentheses. The sample period is from the first quarter of 1980 to the last quarter of 2008.

	Quintiles of Prior Lottery Stock Weight					
EISKEW Quintiles	Gambling Averse Q1	Q2	Q3	Q4	Gambling Tolerant Q5	Q5 − Q1
Panel A. All Institutions, Excluding Quasi-Indexers						
All Holdings						
Q1 (non-lottery)	0.08	0.37	0.11	0.18	0.12	0.03
	(0.41)	(2.19)	(0.69)	(1.18)	(0.77)	(0.20)
Q2	0.07	0.54	0.26	0.40	0.03	−0.04
	(0.40)	(1.58)	(1.03)	(1.87)	(0.14)	(−0.21)
Q3	0.42	0.44	0.18	0.43	0.17	−0.25
	(1.11)	(1.12)	(0.49)	(1.10)	(0.61)	(−0.90)
Q4	0.73	0.13	0.58	0.27	0.01	−0.72
	(1.25)	(0.24)	(1.15)	(0.65)	(0.03)	(−1.49)
Q5 (lottery)	2.07	0.79	0.96	0.77	0.82	−1.26
	(1.84)	(0.84)	(1.34)	(1.20)	(1.20)	(−1.38)
L − NL						−1.29
						(−1.42)
Fresh Holdings						
Q1 (non-lottery)	0.08	0.20	−0.01	0.07	0.13	0.04
	(0.36)	(1.03)	(−0.07)	(0.35)	(0.68)	(0.24)
Q2	0.12	0.61	0.29	0.49	0.15	0.03
	(0.58)	(1.13)	(0.77)	(1.75)	(0.55)	(0.14)
Q3	0.37	0.48	0.17	0.29	0.14	−0.23
	(0.94)	(1.17)	(0.42)	(0.67)	(0.49)	(−0.78)
Q4	0.20	0.59	0.73	0.39	0.13	−0.07
	(0.34)	(1.11)	(1.39)	(0.87)	(0.27)	(−0.13)
Q5 (lottery)	2.73	1.91	1.15	1.20	0.67	−2.07
	(2.39)	(1.91)	(1.50)	(1.71)	(1.00)	(−2.14)
L − NL						−2.11
						(−2.17)
Panel B. Additional Tests (Fresh Holdings)						
Aggressive Institutions (Types 3, 4, and 5)						
Q1 (non-lottery)	0.09	0.31	0.05	0.22	0.28	0.20
	(0.36)	(1.47)	(0.26)	(1.12)	(1.41)	(0.83)
Q5 (lottery)	3.23	2.20	1.60	1.20	0.87	−2.36
	(2.85)	(2.07)	(1.97)	(1.69)	(1.28)	(−2.48)
L − NL						−2.55
						(−2.68)
Control for Industry						
Q1 (non-lottery)	0.17	0.30	0.19	0.22	0.10	−0.07
	(0.74)	(1.42)	(0.89)	(1.24)	(0.56)	(−0.35)
Q5 (lottery)	3.06	0.95	0.82	0.72	0.27	−2.80
	(2.66)	(1.22)	(1.27)	(1.28)	(0.54)	(−2.81)
L − NL						−2.73
						(−2.70)

by the most gambling-averse institutions, while the fifth column reports the returns of stocks held by the most gambling-tolerant institutions. Panel A reports the quarterly returns to portfolios of stocks held by active institutions, where the set of active institutions is defined by excluding those institutions classified as "quasi-indexers" according to the Bushee and Noe (2000) classification scheme.

The portfolio of lottery stocks held by the most gambling-averse institutions contains 113 stocks with an aggregate size of about \$900 million, whereas most of the other portfolios contain 400 to 800 stocks with aggregate value ranging from \$3 billion to over \$200 billion. Thus, while the lottery stock portfolio held by gambling-averse institutions is small as expected relative to the other portfolios obtained from the sorting procedure, it still contains a reasonable number of stocks for inference.

We find that the portfolio of lottery stocks held by the most gambling-averse institutions earns an average abnormal return of 2.07% per quarter (t-statistic = 1.84), which is economically large and substantially larger than the abnormal performance of any other cell. The difference in average returns of lottery-type stocks held by gambling-averse institutions and those held by gambling-tolerant institutions is large (1.26 percentage points per quarter), but the estimate is not statistically significant (t-statistic = −1.38). This evidence indicates that gambling-averse institutions are able to identify a better subset of lottery-type stocks from the full set of lottery stocks.

Assuming that information obtained by institutions is relatively short lived, it may be more informative to examine the returns to stocks recently purchased by institutions, since their holdings may include stock positions that are stale. Thus, in the lower section of Panel A in Table 3, we report the returns of portfolios consisting of institutions' "fresh" holdings, defined following Cohen et al. (2010) as those stocks in which the institution increased its portfolio weight over the previous quarter.

As expected, the results are stronger when we focus on fresh positions of institutions. The fresh holdings of lottery stocks by the most gambling-averse institutions earn an average abnormal return of 2.73% per quarter (t-statistic = 2.39). In addition, the difference in abnormal returns between lottery stocks held by gambling-averse institutions and those held by gambling-tolerant institutions is large and statistically significant (2.01 percentage points per quarter, t-statistic = 2.14). In contrast, conditioning on gambling preferences yields no discernible difference in performance among institutions' holdings of stocks with lower EISKEW. These findings are consistent with our conjecture that gambling-averse institutions would require stronger information signals to induce them to trade stocks with high skewness.

It is also interesting to note that the returns to lottery stock holdings are relatively high across all quintiles of institutions. This is notable because on average, high EISKEW stocks earn low average returns (Kumar (2009), Boyer et al. (2010)). We interpret this finding as consistent with our hypothesis at a broader, individual versus institutional investor level. While we focus on differences between institutions, institutions as a group are more averse than individuals to holding lottery stocks, which would lead them to require stronger information

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signals to induce trading. Section A.II of the Internet Appendix explores this issue further.

C. Basic Robustness Checks

Panel B of Table 3 reports results of two variations on our basic portfolio tests. For brevity, we report on the results for fresh holdings of the highest and lowest quintiles of lottery stocks. First, we repeat the analysis focusing on investment companies, individual investment advisors, and other institutions (types 3, 4, and 5 in the Thompson Reuters database), which previous research has shown to be more aggressive, and more likely to be informed (e.g., Bennett et al. (2003), Lewellen (2011)). The results are qualitatively similar to the baseline results reported in Panel A of Table 3, and somewhat stronger.

Specifically, the lottery stocks held by the most gambling-averse institutions earn an average abnormal return of 3.23% per quarter (t-statistic = 2.85). In addition, the difference in abnormal returns between lottery stocks held by gambling-averse institutions and those held by gambling-tolerant institutions is again large and significant, both economically and statistically (differential = 2.36 percentage points per quarter, t-statistic = 2.48).

Second, we repeat the previous analysis controlling for industry. As Zhang (2006) demonstrates, industry is an important predictor of individual stock skewness, and it is possible that variation in the observed gambling preferences of institutions to some extent reflects industry specialization by institutional investors. While industry specialization could indirectly generate variation in lottery stock holdings, it is unlikely to produce the patterns we observe in abnormal returns, since specialized investors likely have greater investment skill within their industry focus.

To control for industry, we assign stocks to EISKEW quintiles based on their rankings *within* each of the 10 Fama and French (1997) industry groups. We use this industry-adjusted EISKEW both for classifying stock holdings in the portfolio sorts, as well as in computing lagged portfolio weights in lottery stocks for measuring institutional gambling preferences. The abnormal return to lottery stock holdings by gambling-averse institutions is slightly stronger (3.06% per quarter, t-statistic = 2.66) than the baseline results reported in Panel A. Since our results remain similar when we use industry-adjusted EISKEW measures, our findings are likely to reflect genuine preferences for skewness, and not simply industry specialization.

D. Additional Subsample Results

Table 4 repeats the analysis in Table 3 for various subsets of the institutional sample defined by key institutional characteristics. For brevity, we report only the returns using fresh positions, and only for stocks in the lowest and highest quintiles of EISKEW.

First, we report subsamples based on institution size, splitting the sample at the median portfolio size in each time period. The returns to institutional holdings

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TABLE 4

Institutional Gambling Norms and Portfolio Performance: Subsample Results

Table 4 presents quarterly returns of portfolios defined using institutional stock holdings and past weight in high EISKEW stocks. Three subsamples are considered. Panel A gives returns to stocks holdings of subsamples based on institution portfolio size (assets above/below median). Panel B gives subsamples based on portfolio concentration (above/below median). Panel C reports returns for subperiods (1980–1994 and 1995–2008). The portfolio returns are characteristic-adjusted following the Daniel et al. (1997) approach, where the return of each stock is in excess of the return of a portfolio of stocks with comparable size, book-to-market, and past returns. Returns are expressed in percentages and weighted by the value of the institutional holdings. Other details of the portfolio performance method are identical to those in Table 3. Portfolios are rebalanced each quarter. The *t*-statistics are reported below the mean returns in parentheses. The sample period is from the first quarter of 1980 to the last quarter of 2008.

	Quintiles of Prior Lottery Stock Weight					
EISKEW Quintiles	Gambling Averse Q1	Q2	Q3	Q4	Gambling Tolerant Q5	Q5 − Q1
Panel A. Small Institutions (Assets ≤ Median)						
Q1 (non-lottery)	0.27	0.16	−0.12	0.33	−0.04	−0.31
	(1.19)	(0.69)	(−0.55)	(1.54)	(−0.22)	(−1.30)
Q5 (lottery)	1.46	0.34	0.77	2.93	1.13	−0.34
	(0.76)	(0.24)	(0.68)	(1.58)	(1.46)	(−0.18)
L − NL						−0.02
						(−0.01)
Panel B. Large Institutions (Assets > Median)						
Q1 (non-lottery)	0.05	0.20	−0.01	0.06	0.21	0.16
	(0.21)	(0.98)	(−0.04)	(0.29)	(1.06)	(0.80)
Q5 (lottery)	2.62	2.18	1.17	1.18	0.64	−1.98
	(2.35)	(2.13)	(1.51)	(1.63)	(0.91)	(−2.09)
L − NL						−2.14
						(−2.26)
Panel C. Diversified Institutions						
Q1 (non-lottery)	0.13	0.22	−0.03	0.03	0.02	−0.11
	(0.52)	(1.05)	(−0.13)	(0.16)	(0.09)	(−0.58)
Q5 (lottery)	2.05	1.98	1.21	1.19	0.64	−1.41
	(1.88)	(1.87)	(1.54)	(1.62)	(0.95)	(−1.62)
L − NL						−1.30
						(−1.48)
Panel D. Concentrated Institutions						
Q1 (non-lottery)	0.21	0.15	0.42	0.39	0.52	0.31
	(0.73)	(0.56)	(1.38)	(1.55)	(1.76)	(0.92)
Q5 (lottery)	2.91	0.78	1.18	1.99	1.29	−1.62
	(1.52)	(0.62)	(0.83)	(1.65)	(1.47)	(−0.87)
L − NL						−1.94
						(−1.01)
Panel E. 1980–1994						
Q1 (non-lottery)	0.15	0.20	0.04	0.20	−0.07	−0.21
	(0.51)	(0.82)	(0.17)	(0.86)	(−0.26)	(−0.84)
Q5 (lottery)	0.12	2.44	0.81	1.07	0.46	0.34
	(0.11)	(2.03)	(0.98)	(1.43)	(0.77)	(0.33)
L − NL						0.55
						(0.53)
Panel F. 1995–2008						
Q1 (non-lottery)	0.01	0.21	−0.08	−0.08	0.33	0.32
	(0.04)	(0.66)	(−0.26)	(−0.26)	(1.23)	(1.22)
Q5 (lottery)	5.49	1.36	1.50	1.34	0.89	−4.60
	(2.81)	(0.83)	(1.14)	(1.10)	(0.73)	(−2.88)
L − NL						−4.91
						(−3.08)

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in the two subsamples suggest that the results are driven primarily by larger institutions. This evidence may reflect the fact that larger institutions are more likely to face "prudent-man" restrictions as in Del Guercio (1996) that limit their investments in stocks with high expected idiosyncratic skewness. Thus, there may be both greater variation in gambling preferences and higher hurdles among larger institutions.

That the results are strongest among larger institutions is also consistent with larger institutions having greater resources for information acquisition, as well as broader investment scopes that could result in managers obtaining information regarding stocks that fall beyond the purview of their preferences or investment mandate. Since the prediction that the lottery stock holdings of gambling-averse investors earn higher abnormal returns depends on investors having information or skill, this is also consistent with the model of Berk and Green (2004) in which the most skilled managers ultimately attract the largest portfolios.

Second, we report portfolio returns for subsamples based on portfolio concentration, again splitting the sample at the median value of portfolio concentration in each time period, as measured by the Herfindahl index of portfolio weights. Kacperczyk et al. (2005), Ivković, Sialm, and Weisbenner (2008), Kacperczyk, Van Nieuwerburgh, and Veldkamp (2013)), Korniotis and Kumar (2010), and others have shown that portfolio concentration is associated with superior information or investment skill. Since the hypothesis in this paper depends upon investors having access to information, the results should be stronger among investors who are more likely to be informed. The point estimates in Panel B of Table 4 are consistent with the impact of norms in both subsamples and somewhat stronger for more concentrated institutions, but the statistical significance in the two subgroups is only marginal.

Finally, we also report subperiod results for the 1980–1994 and the 1995–2008 sample periods. The subperiod returns suggest that the results are primarily driven by the latter part of the sample period. In Section A.IV of the Internet Appendix, we provide some evidence of a substantial increase in the spread of lottery weights between the gambling-averse and gambling-tolerant institutions. This suggests that as a group, institutions' willingness to hold stocks with higher expected skewness has increased over time, thus amplifying the cross-sectional variation in gambling tolerance between institutions. Our findings are consistent with the evidence of Bennett et al. (2003), who show that institutional preference for investing in small, volatile stocks has increased due to competition among institutions. A similar mechanism could also induce institutions to increasingly violate norms in search of "greener pastures."

Overall, the portfolio returns in Tables 3 and 4 provide robust support to our conjecture that lottery stocks held by gambling-averse investors would earn high abnormal returns. This finding is consistent with a model in which informed investors with a distaste for holding high-skewness lottery stocks require stronger information signals to trade those stocks. Thus, institutions appear to have access to superior information, but their decision to act on that information is influenced by institutional or social norms against gambling.

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E. Performance Estimates Using Trade Portfolios

To provide further evidence on the information content of institutional trades, conditional on investors' gambling preferences, we examine portfolios of stocks purchased and sold by gambling-averse and gambling-tolerant institutions. Similar in spirit to focusing on fresh holdings in the previous sections, this analysis is intended to identify the information content of institutional trades more directly by studying significant purchases and sales.

Each quarter, stocks are sorted into quintiles based on the change in ownership by institutions with low (high) past weights in lottery stocks over the preceding quarter. The stocks in the top quintile of institutional ownership change are placed in the "Buy" portfolio, while stocks in the lowest quintile of change in ownership are placed in the "Sell" portfolio. The "Buy" and "Sell" stocks are further divided into five portfolios based on quintiles of EISKEW. For each quintile of EISKEW, we compute the returns over the subsequent quarter of the "Buy" portfolio, the "Sell" portfolio, and the "Buy − Sell" portfolio. Returns are value weighted by the magnitude of the trade (market value × change in % ownership).

Table 5 presents quarterly characteristic-adjusted returns following trades by institutional investors. Panel A reports the returns to portfolios based on the trades of gambling-averse institutions, while Panel B reports returns to portfolios

TABLE 5

Institutional Gambling Norms and Performance of Trade-Based Portfolios

Table 5 presents quarterly returns of portfolios defined using trades by institutional investors. The portfolio returns are characteristic-adjusted following the Daniel et al. (1997) approach, where the return of each stock is in excess of the return of a portfolio of stocks with comparable size, book-to-market, and past returns. Returns are expressed in percentages and weighted by the value of the institutional holdings. Each quarter, stocks are sorted into quintiles based on the change in institutional ownership over the preceding quarter. Stocks in the top quintile of institutional ownership change are placed in the "Buy" portfolio, while stocks in the lowest quintile of change in ownership are placed in the "Sell" portfolio. The "Buy" and "Sell" portfolios are further sorted into quintiles based on EISKEW. For each quintile of EISKEW, we compute the return over the quarter following trade for the "Buy" portfolio, the "Sell" portfolio, and the "Buy − Sell" portfolio. Returns are value weighted by the magnitude of the trade (market value × change in % ownership). Panel A reports the returns of portfolios based on the trades of institutions with low past weight in high EISKEW stocks (gambling-averse institutions), while Panel B reports returns for portfolios based on trades by high past EISKEW weight (gambling-tolerant institutions). Portfolios are rebalanced each quarter. The *t*-statistics are reported below the mean returns in parentheses. The sample period is from the first quarter of 1980 to the last quarter of 2008.

	Quintiles of EISKEW				
Portfolio	Non-Lottery Q1	Q2	Q3	Q4	Lottery Q5
Panel A. Aggregate Trade Portfolios of Gambling-Averse Institutions					
Buy	0.26	0.41	0.07	0.42	2.51
	(0.96)	(1.07)	(0.15)	(0.54)	(1.90)
Sell	0.00	0.35	0.45	0.98	−0.06
	(−0.01)	(1.17)	(1.02)	(1.50)	(−0.05)
Buy − Sell	0.26	0.06	−0.38	−0.56	2.57
	(0.72)	(0.14)	(−0.63)	(−0.71)	(1.68)
Panel B. Aggregate Trade Portfolios of Gambling-Tolerant Institutions					
Buy	0.22	−0.16	−0.24	−0.01	1.27
	(0.78)	(−0.50)	(−0.66)	(−0.03)	(1.49)
Sell	−0.48	−0.08	0.13	−0.39	0.99
	(−1.67)	(−0.26)	(0.31)	(−0.78)	(1.07)
Buy − Sell	0.70	−0.08	−0.37	0.38	0.28
	(1.81)	(−0.20)	(−0.81)	(0.73)	(0.25)

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of stocks traded by gambling-tolerant institutions. We find that the return on lottery stocks purchased by gambling-averse institutions is 2.51% (t-statistic = 1.90). The buy-sell return differential for lottery stocks traded by gambling-averse institutions is 2.57 percentage points per quarter, but it is weaker statistically (t-statistic = 1.68).

In contrast, neither the buy portfolio return nor the buy-sell return differential is significant for stocks in lower quintiles of EISKEW, and they are not significant in any quintile of EISKEW for the trade portfolios-based ownership changes among gambling-tolerant institutions. This pattern provides further evidence that the trades of lottery stocks by the most gambling-averse institutions reflect stronger information signals.

V. Sin Stock Norms and Portfolio Performance

Our evidence thus far suggests that investors constrained by norms against gambling earn higher abnormal returns when they choose to invest in lottery-like stocks. This evidence is consistent with our conjecture that informed investors require stronger information signals to deviate from norms. In this section, to provide additional evidence on our general hypothesis, we examine the effects of investors' aversion to sin stocks (Hong and Kacperczyk (2009)).

Applying the norms hypothesis to the context of sin stocks, we predict that an aversion to holding sin stocks would induce investors to require a stronger information signal before they deviate from their preference of avoiding those stocks. Thus, institutions with stronger aversion to holding sin stocks would earn higher abnormal returns when they choose to hold those stocks. We test this hypothesis using the institutional investor holdings data.

A. Characteristics of Portfolios Sorted by Past Weight in Sin Stocks

To examine whether the sin stock holdings of sin stock-averse institutions outperform those of institutions that are more tolerant of sin stocks, we identify institutional preferences for sin stocks by looking at their past portfolio allocations to sin stocks. Similar to the measure of gambling preferences described in Section III.D, we compute the average portfolio weight in sin stocks over the previous four quarters to measure sin stock preferences of institutions.

Before presenting the performance results, in Table 6, we present the means of various portfolio measures for institutions sorted using their past portfolio allocations to sin stocks. The portfolio measures are averaged cross-sectionally in each quarter, and the table displays the time-series averages of the cross-sectional means. Sin stock weight is the current portfolio weight in sin stocks.

We find that the average sin stock weight increases monotonically from 0.20% for the most sin stock-averse institutions in the lowest prior sin stock weight quintile to 4.35% for the most sin stock-tolerant institutions in the highest quintile. Institutions in the low sin stock weight categories are smaller and have more concentrated portfolios. Also, portfolio turnover is lower for the most sin stock-averse institutions.

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TABLE 6

Institutional Sin Stock Norms and Portfolio Characteristics

Table 6 presents averages of various portfolio measures for institutions sorted by their average portfolio weight allocated to sin stocks over the prior four quarters. Sin stock weight is the portfolio in sin stocks (stocks in the alcohol, tobacco, or gaming industries, as defined in Hong and Kacperczyk (2009)). Assets is the total dollar value of equity holdings in the institution's portfolio. Portfolio concentration is the Herfindahl index of portfolio weights of stocks in the portfolio. Industry concentration is the sum of squared deviations of portfolio industry weights from market industry weights, as defined in Kacperczyk et al. (2005). Portfolio turnover is dollar value of shares traded divided by the value of shares held, while sin stock turnover is the turnover of sin stocks in the institution's portfolio. The sample period is from the first quarter of 1980 to the last quarter of 2008.

	Quintiles of Prior Sin Stock Weight				
Measure	Sin Stock Averse Q1	Q2	Q3	Q4	Sin Stock Tolerant Q5
Sin stock weight (%)	0.20	0.45	1.00	1.65	4.35
Assets ($ billions)	0.58	1.12	2.33	4.68	2.29
No. of stocks in portfolio	58.35	150.74	305.10	401.44	227.44
Portfolio concentration (HHI)	25.29	12.25	4.94	3.76	4.65
Industry concentration	30.54	17.86	6.92	5.42	6.99
Portfolio turnover (%)	4.19	6.91	8.32	9.21	8.77
Sin stock turnover (%)	0.39	1.54	3.22	4.43	3.66
No. of institutions	83.55	236.32	117.52	122.60	139.17
Percentage of aggregate portfolio	9.44	16.64	20.87	34.97	20.54

B. Deviations from Sin Stock Norms and Portfolio Performance: Baseline Results

In this section, we test our key conjecture within the set of institutional investors, conditioning on their observed sensitivity to norms against holding sin stocks. Section A.VIII of the Internet Appendix provides additional results using sin stocks, which are also consistent with our broad conjecture.

Panel A of Table 7 reports the performance estimates of sin stock and nonsin stock holdings of institutions sorted by their past portfolio allocation to sin stocks. The method used for estimating the returns of double-sorted portfolios is similar to the method used in the context of lottery-type stocks (see Section IV.B).

We find that the sin stocks held by the most sin stock-averse institutions exhibit a mean return of 2.01% per quarter (t-statistic $= 2.34$). This is 0.92 percentage points higher than the returns earned by sin stocks held by the most sin stock-tolerant institutions, though the difference is not statistically significant (t-statistic $= -1.28$). As before, focusing on fresh stock positions, the results become stronger. In particular, the difference in sin stock returns between the most averse institutions and the most tolerant increases to 1.41 percentage points per quarter (t-statistic $= 1.92$). These results are consistent with our findings using lottery-type stocks and support our main conjecture.

As with the results for lottery stock holdings, we find that the portfolio of sin stocks held by sin stock-averse institutions is relatively small. It contains about 14 stocks on average, compared to about 50 unique stocks on average in the portfolios of the most sin stock-tolerant investors. The average aggregate weight of the portfolio is about $120 million. In spite of the small size of this portfolio and the potential noise that this small size would generate, we find that its abnormal returns are consistently large enough to yield statistically significant and economically meaningful results.

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TABLE 7

Institutional Sin Stock Norms and Portfolio Performance

Table 7 presents quarterly returns of portfolios defined using institutional stock holdings and past weight in sin stocks. The portfolio returns are characteristic-adjusted following the Daniel et al. (1997) approach. Returns are expressed in percentages and weighted by the value of the institutional holdings. Sin stocks are defined as those in industries 4 (alcohol) and 5 (tobacco) of the Fama and French (1997) 48 industry classifications, as well as stocks of gaming companies. The table gives the value-weighted returns of institutions' holdings in sin stocks and non-sin stocks, for institutions in each quintile of past sin stock weight. Panel A gives returns to holdings of all institutions, excluding those classified as "quasi-indexers" according to the Bushee and Noe (2000) classification scheme. We present results for all holdings first, followed by portfolios formed from "fresh" holdings, in which the institution increased its portfolio weight over the prior quarter. Panel B reports the fresh holdings returns from additional tests. First, we augment the characteristic adjustment with an additional adjustment for the sin stock premium identified in Hong and Kacperczyk (2009). Next, we report the returns of stocks held by institution types 1, 2, and 5 that are more likely to be sensitive to social norms. Finally, we sort institutions into quintiles based on difference between their actual sin stock weight and expected sin stock weight given their industry weightings. Portfolios are rebalanced each quarter. The *t*-statistics are reported below the mean returns in parentheses. The sample period is from the first quarter of 1980 to the last quarter of 2008.

	Quintiles of Prior Sin Stock Weight					
Sin Stock Category	Sin Stock Averse Q1	Q2	Q3	Q4	Sin Stock Tolerant Q5	Q5 − Q1
Panel A. Aggregate Trade Portfolios of Gambling-Averse Institutions						
All Holdings						
Non-sin stocks	−0.04	0.23	0.15	0.15	0.18	0.23
	(−0.31)	(1.79)	(1.35)	(2.02)	(2.26)	(1.48)
Sin stocks	2.01	1.01	1.06	1.13	1.09	−0.92
	(2.34)	(1.62)	(1.79)	(1.88)	(1.85)	(−1.28)
Sin − Non-sin						−1.14
						(−1.55)
Fresh Holdings						
Non-sin stocks	−0.06	0.28	0.16	0.10	0.13	0.19
	(−0.30)	(1.41)	(0.84)	(0.74)	(0.95)	(1.03)
Sin stocks	2.06	0.92	0.98	1.27	0.65	−1.41
	(2.36)	(1.41)	(1.62)	(2.04)	(1.04)	(−1.92)
Sin − Non-sin						−1.60
						(−2.13)
Panel B. Additional Tests (Fresh Holdings)						
All Institutions, Sin Stock Premium and Characteristic-Adjusted Returns						
Non-sin stocks	−0.06	0.28	0.16	0.10	0.13	0.19
	(−0.30)	(1.44)	(0.87)	(0.75)	(0.97)	(1.03)
Sin stocks	1.28	0.13	0.19	0.48	−0.14	−1.41
	(1.70)	(0.41)	(0.76)	(1.69)	(−0.44)	(−1.92)
Sin − Non-sin						−1.60
						(−2.13)
Institution Types 1, 2, and 5, Sin Stock Premium and Characteristic-Adjusted Returns						
Non-sin stocks	−0.59	−0.04	0.00	0.06	−0.01	0.58
	(−2.00)	(−0.15)	(−0.01)	(0.42)	(−0.07)	(1.89)
Sin stocks	3.00	−0.18	0.19	0.63	−0.64	−3.57
	(2.83)	(−0.42)	(0.68)	(2.05)	(−1.57)	(−2.98)
Sin − Non-sin						−4.09
						(−3.24)
All Institutions, Sin Stock Premium and Characteristic-Adjusted Returns, Industry-Adjusted Sin Stock Preferences						
Non-sin stocks	0.14	0.14	0.19	0.09	0.10	−0.04
	(0.97)	(0.85)	(0.99)	(0.66)	(0.74)	(−0.39)
Sin stocks	0.59	0.49	0.48	0.47	−0.05	−0.64
	(2.39)	(1.15)	(1.28)	(1.53)	(−0.15)	(−1.77)
Sin − Non-sin						−0.60
						(−1.68)

C. Basic Robustness Checks

In Panel B of Table 7, we present results of three variations on the baseline portfolio tests in Panel A. For brevity we report only results for portfolios based on fresh holdings. First, we adjust the portfolio returns from Panel A to remove

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the positive return premium on sin stocks highlighted by Hong and Kacperczyk (2009), which they argue is due to their neglect by institutional investors subject to social norms. This sin stock premium is clearly evident in the returns reported in Panel A of Table 7, as the returns to institutional sin stock holdings are between 0.52 percentage points and 2.12 percentage points higher per quarter than the returns to their non-sin stock holdings. To ensure that our results do not merely reflect the positive sin stock premium, we augment the characteristic-adjustment method and subtract the characteristic-adjusted return of the portfolio of all sin stocks from the characteristic-adjusted return of each individual sin stock held by institutions. The results remain qualitatively similar, with a mean return of 1.22% per quarter for sin stocks held by the most averse institutions (1.28% using fresh holdings only), though the statistical significance weakens (t-statistic = 1.69). Of course, the performance differential between sin stock-tolerant and sin stock-averse portfolios is not affected by this level adjustment and remains economically as well as statistically significant. In contrast to the results for sin stocks, there is little difference in the performance of non-sin stock holdings between sin stock-averse and sin stock-tolerant institutions. This evidence suggests that the performance difference among sin stocks held by sin stock-averse and sin stock-tolerant institutions is driven by differences in the degree to which institutions are subject to norms against holding those stocks.

Next, we examine portfolio returns based on holdings of the subset of institution types 1, 2, and 5. Hong and Kacperczyk (2009) argue that banks, insurance companies, and other institutions (types 1, 2, and 5) are more likely to be subject to social norms against investing in firms that promote vice. They show that these institutions underweight sin stocks on average, while there is no significant underweighting on average by institution types 3 and 4, which include mutual funds and hedge funds. Conditioning on observed sin stock preferences should thus be most relevant within the set of institutions that are more likely to be influenced by social norms. As expected, the results are considerably stronger among institutions that face stronger social norms. Among this subset of institutions, sin stocks held by the most sin stock-averse institutions exhibit abnormal returns of 2.80% per quarter (t-statistic = 2.77), 2.58 percentage points higher than those held by the most tolerant institutions (t-statistic = 2.29). Similarly, the fresh sin stock holdings of sin stock-averse institutions earn abnormal returns of 3.00% per quarter (t-statistic = 2.83), which is 3.57 percentage points higher then the returns to fresh holdings by sin stock-tolerant institutions (t-statistic = 2.98).

Finally, because sin stocks are defined based on industry classification, it is possible that the institutions' observed tolerance for holding sin stocks is driven partly by industry preferences and specialization rather than by an aversion to sin stocks. To ensure that our results do not merely reflect industry preferences of institutions, we repeat the previous analysis after accounting for potential industry specialization. These results are qualitatively similar to the baseline results reported in Panel A of Table 7, and they remain statistically significant, suggesting that our findings are more likely to reflect genuine aversion to holding sin stocks rather than broader industry specialization.

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D. Additional Subsample Results

Table 8 repeats the analysis in Table 7 for various institutional subsamples defined using different institutional characteristics. For brevity, we report only the returns using fresh positions.

First, we report the results for subsamples based on institutional size, where we split the sample at the median portfolio size in each time period. As with lottery-stock holdings, the returns to institutional holdings in the two subsamples suggest that the results are driven primarily by larger institutions. This finding is consistent with larger institutions being more likely to face greater public scrutiny for their sin stock holdings, so that there is more power to detect the effect of norms against sin stocks within this sample of larger institutions.

TABLE 8

Institutional Sin Stock Norms and Portfolio Performance: Subsample Results

Table 8 presents quarterly returns of portfolios defined using institutional stock holdings and past weight in sin stocks. Three subsamples are considered. Panel A gives returns to stocks holdings of subsamples based on institution portfolio size (assets above/below median). Panel B gives subsamples based on portfolio concentration (above/below median). Panel C reports returns for subperiods (1980–1994 and 1995–2008). The portfolio returns are characteristic-adjusted following the Daniel et al. (1997) approach, where the return of each stock is in excess of the return of a portfolio of stocks with comparable size, book-to-market, and past returns. Returns are expressed in percentages and weighted by the value of the institutional holdings. Other details of the portfolio performance method are identical to those in Table 7. Portfolios are rebalanced each quarter. The *t*-statistics are reported below the mean returns in parentheses. The sample period is from the first quarter of 1980 to the last quarter of 2008.

	Quintiles of Prior Sin Stock Weight					
Sin Stock Category	Sin Stock Averse Q1	Q2	Q3	Q4	Sin Stock Tolerant Q5	Q5 − Q1
Panel A. Assets ≤ Median						
Non-sin stocks	−0.24	0.40	0.02	−0.13	−0.06	0.18
	(−0.67)	(1.71)	(0.08)	(−0.55)	(−0.20)	(0.42)
Sin stocks	1.69	−0.18	1.38	0.92	1.03	−0.88
	(1.12)	(−0.20)	(1.88)	(1.46)	(1.27)	(−0.56)
Sin − Non-sin						−1.68
						(−1.04)
Panel B. Assets > Median						
Non-sin stocks	−0.59	−0.05	0.00	0.06	0.01	0.61
	(−1.90)	(−0.19)	(−0.03)	(0.43)	(0.07)	(1.88)
Sin stocks	3.31	−0.16	0.16	0.63	−0.76	−4.01
	(2.43)	(−0.36)	(0.57)	(2.05)	(−1.73)	(−2.80)
Sin − Non-sin						−4.50
						(−3.00)
Panel C. Diversified						
Non-sin stocks	0.09	−0.08	−0.03	−0.07	0.03	−0.06
	(0.44)	(−0.52)	(−0.21)	(−0.57)	(0.19)	(−0.26)
Sin stocks	2.65	0.75	0.15	0.63	−0.54	−3.04
	(2.03)	(1.00)	(0.47)	(1.90)	(−1.14)	(−2.18)
Sin − Non-sin						−2.73
						(−1.96)
Panel D. Concentrated						
Non-sin stocks	−0.69	−0.19	0.51	0.50	−0.02	0.67
	(−1.68)	(−0.36)	(0.77)	(0.98)	(−0.07)	(1.30)
Sin stocks	3.54	−0.56	−0.20	0.95	−0.01	−3.08
	(2.58)	(−0.92)	(−0.37)	(1.42)	(−0.02)	(−2.03)
Sin − Non-sin						−3.66
						(−2.12)

(continued on next page)

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TABLE 8 (continued)
Institutional Sin Stock Norms and Portfolio Performance: Subsample Results

Sin Stock Category	Quintiles of Prior Sin Stock Weight: Sin Stock Averse Q1	Q2	Q3	Q4	Sin Stock Tolerant Q5	Q5 − Q1
Panel E. 1980–1994						
Non-sin stocks	−0.26 (−0.86)	0.12 (0.75)	0.09 (0.57)	0.21 (1.10)	0.01 (0.03)	0.27 (0.70)
Sin stocks	2.96 (3.04)	1.15 (2.33)	0.84 (2.16)	0.94 (2.36)	−0.12 (−0.21)	−3.09 (−2.71)
Sin − Non-sin						−3.35 (−2.70)
Panel F. 1995–2008						
Non-sin stocks	−0.93 (−1.82)	−0.20 (−0.41)	−0.09 (−0.40)	−0.10 (−0.48)	−0.03 (−0.14)	0.89 (1.85)
Sin stocks	3.04 (1.50)	−1.52 (−2.26)	−0.47 (−1.25)	0.31 (0.68)	−1.17 (−2.02)	−4.15 (−1.83)
Sin − Non-sin						−4.98 (−2.12)

Next, we report portfolio returns for subsamples based on portfolio concentration, again splitting the sample at the median value of portfolio concentration in each time period. The portfolio concentration is measured by the Herfindahl index of portfolio weights. Similar to the findings from the lottery stock setting, the effect of norms is evident in both subsamples, but it is slightly stronger for institutions with more concentrated portfolios. This evidence is consistent with prior research that associates portfolio concentration with superior information or skill (e.g., Kacperczyk et al. (2005), Ivković et al. (2008), Kacperczyk et al. (2013), Korniotis and Kumar (2010), and others).

Finally, we report subperiod results for the 1980–1994 and the 1995–2008 sample periods. With sin stock holdings, the performance effects of norms are present in both the early and the latter parts of the sample period. Overall, the portfolio return estimates reported in Tables 7 and 8 provide fairly robust support to our prediction that sin stocks held by sin stock-averse investors earn high abnormal returns. These results are consistent with the evidence from lottery stocks and suggest that institutions have access to superior information, but their decision to act on that information is constrained by norms.

VI. Local Religion and Portfolio Performance

In the analysis thus far, we have used past holdings of lottery stocks or sin stocks to measure institutional norms and constraints. While these holdings-based measures accurately capture variation in investors' actual tendency to hold lottery stocks or sin stocks, it is possible that the cross-sectional variation arises from other sources besides institutional or social norms. For example, industry specialization or specialization along other dimensions could also generate variations in lottery stock and sin stock holdings. In this section, we provide

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additional evidence to support our norms hypothesis by using an exogenous measure of institutional preferences that specifically captures variation in social norms.

To define this alternative measure, we use the geographic variation in religious composition, specifically CPRATIO in each county of the United States. This measure is motivated by the observation that the major Protestant denominations prohibit gambling, while the Catholic church maintains a tolerant position on moderate levels of gambling. The predictive power of religious background for gambling behavior has been well established in several settings, including various financial market settings (e.g., Kumar (2009), Kumar et al. (2011)).

By the same argument, the ratio of Catholics to Protestants may also capture variation in investors' willingness to invest in gaming stocks, which is one of the categories of sin stocks. In addition, some major Protestant denominations discourage alcohol consumption and, to a lesser extent, tobacco use, while the Catholic church is more tolerant of both activities. CPRATIO may therefore capture variation in norms against holding sin stocks, though the relation may be weaker than with gambling attitudes. Overall, while the CPRATIO measure may be more indirect and noisier than the holdings-based measures, it has the advantage of specifically capturing variation in social norms while being relatively exogenous to the investors' information sets.[17]

A. Characteristics of CPRATIO-Sorted Portfolios

We use the CPRATIO in the county where the institution is located as a proxy for local gambling attitudes, or attitudes against the vices promoted by sin stock companies. Panel A of Table 9 presents the means of various portfolio measures for institutions sorted by CPRATIO. The portfolio measures are averaged cross-sectionally in each quarter, and the table displays the time-series averages of the cross-sectional means. Lottery weight is the current portfolio weight in stocks that are in the top quintile of EISKEW.

We find that the average lottery weight increases nearly monotonically from 1.64% among low-CPRATIO (gambling-averse) institutions to 2.56% among high-CPRATIO (gambling-tolerant) institutions. Similarly, we find that institutional portfolio weight in sin stocks increases from 1.34% among low-CPRATIO institutions to 1.54% among high-CPRATIO institutions. Since the large financial centers tend to have higher CPRATIOs, institutional portfolios are somewhat larger and more diversified in higher-CPRATIO quintiles. Portfolio turnover is increasing in CPRATIO, both overall and among lottery stocks in particular. This evidence is consistent with the hypothesis that institutions that are relatively averse to gambling are more reluctant to trade lottery stocks and, therefore, would require a stronger information signal to trade.

[17] Section A.I of the Internet Appendix provides additional discussion on religious attitudes toward gambling and sin industries.

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TABLE 9

Local Religion and Portfolio Characteristics

Table 9 presents averages of various portfolio measures for institutions sorted by the ratio of Catholics to Protestants (CPRATIO) in the county where the institution is located. All variables have been previously defined in Tables 2 and 6. Panel B gives coefficient estimates from regressions of institutional portfolio weights in lottery stocks and sin stocks and of portfolio turnover on CPRATIO and other institutional characteristics. Standard errors are clustered by county. The sample period is from the first quarter of 1980 to the last quarter of 2008.

Panel A. Portfolio Characteristics by CPRATIO

	Quintiles of CPRATIO				
Characteristic	Protestant	Q2	Q3	Q4	Catholic
Lottery stock weight (%)	1.64	1.74	2.50	2.28	2.56
Sin stock weight (%)	1.34	1.48	1.47	1.62	1.54
CPRATIO	0.35	1.18	2.61	3.62	4.95
Assets ($ billions)	1.53	1.83	1.54	3.27	2.41
No. of stocks in portfolio	169.30	211.78	205.17	255.29	236.31
Portfolio concentration (HHI)	13.05	9.31	10.19	8.23	8.66
Industry concentration	15.66	12.90	15.78	11.91	13.08
Portfolio turnover (%)	5.91	7.06	7.75	8.46	8.33
Lottery stock turnover (%)	1.68	2.28	2.47	2.63	2.72
Sin stock turnover (%)	2.50	3.05	3.28	3.59	3.59
No. of institutions	104.38	106.74	112.06	100.13	190.17
% of aggregate portfolio	11.55	14.26	11.81	24.52	29.58

Panel B. Multivariate Regression Estimates

	Dependent Variable				
	Lottery Weight	Sin Stock Weight	Turnover	Lottery Turnover	Sin Stock Turnover
Variable	1	2	3	4	5
CPRATIO	0.0020	0.0009	0.0031	0.0010	0.0002
	(5.34)	(2.74)	(7.52)	(3.75)	(0.50)
ln(Assets)	−0.0075	−0.0001	0.0057	0.0039	0.0064
	(−9.27)	(−0.50)	(9.28)	(10.02)	(15.28)
Portfolio concentration	0.0410	0.0107	−0.1106	0.0020	0.0351
	(3.53)	(2.12)	(−22.32)	(0.51)	(3.18)
Industry concentration	0.0206	−0.0196	0.0141	−0.0116	−0.0551
	(2.15)	(−13.70)	(2.25)	(−3.91)	(−7.18)
Turnover	0.0210	0.0018		0.2328	0.3041
	(2.13)	(0.45)		(29.34)	(30.20)
Time effects	Yes	Yes	Yes	Yes	Yes
N	67,596	67,596	67,596	45,679	45,593
Adj. R^2	0.1572	0.0169	0.1361	0.1343	0.1318

B. Portfolio Holdings and Trading Regression Estimates

To confirm that CPRATIO captures variation in institutional willingness to hold both lottery stocks and sin stocks, Panel B of Table 9 reports estimates from panel regressions of lottery weight, sin stock weight, and trading measures on CPRATIO and other institutional characteristics. Since CPRATIO and institutional ownership of high-skewness stocks both exhibit long-term secular trends that may be unrelated, the regressions include time fixed effects so that identification comes from the cross section. Furthermore, since CPRATIO is defined at the county level, the *t*-statistics are based on standard errors clustered at the county level.

The dependent variable in regression 1 of Table 9 is the portfolio weight in lottery stocks, defined as stocks in the highest EISKEW quintile. The estimates indicate that CPRATIO is significantly positively related to the weight in lottery stocks, consistent with our conjecture that CPRATIO would capture

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institutional preferences for holding stocks with lottery-like payoffs. In economic terms, moving from the 25th to the 75th percentile of CPRATIO is associated with a 0.81-percentage-point increase in the portfolio weight allocated to lottery stocks. This estimate is about half of the interquartile range of lottery weight and represents a 30-percentage-point increase relative to the average portfolio weight in lottery stocks. Not surprisingly, smaller and more concentrated institutions that trade more frequently put more weight in lottery stocks.

Specification 2 of Table 9 replaces the dependent variable with the institution's portfolio weight in sin stocks. Again, we find that sin stock holdings are higher in regions with high CPRATIO. In this instance, moving from the 25th to the 75th percentile of CPRATIO is associated with a 0.36-percentage-point increase in sin stock weight, which is a 26-percentage-point increase relative to the sample mean.

Specifications 3 and 4 of Table 9 test the prediction that investors with stronger gambling preferences will trade more, particularly among stocks with high expected skewness, because they are willing to trade lottery stocks on weaker information signals than more gambling-averse investors would require. Because investors will behave similarly among stocks with low idiosyncratic risk and skewness, we should observe higher overall turnover, but the difference in trading volume should be especially pronounced among lottery stocks.

In regression 3 of Table 9, the dependent variable is overall portfolio turnover, as defined in footnote 12. Consistent with the prediction, turnover is significantly higher for institutions in high-CPRATIO areas. A change in CPRATIO from the 25th percentile to the 75th percentile is associated with a 1.10-percentage-point increase in portfolio turnover, or about 10% of the interquartile range of portfolio turnover. Furthermore, regression 4 shows that, controlling for overall portfolio turnover, institutions in higher-CPRATIO areas trade more frequently among lottery stocks. In contrast, the evidence in column 5 indicates that CPRATIO is not significantly related to turnover among sin stocks.

Collectively, these holdings and trading regression estimates indicate that institutions in high-CPRATIO areas put relatively greater weight in lottery stocks and sin stocks, and trade more aggressively. Thus, CPRATIO does a reasonable job of capturing geographical variation in institutional preferences for holding stocks with lottery-like payoffs and in their willingness to trade those stocks. In addition, CPRATIO is correlated with institutional willingness to hold sin stocks.

It is natural to ask whether the observed effect of CPRATIO truly reflects variation in local social norms, or whether it merely proxies for some other characteristic that varies geographically and predicts institutions' willingness to hold lottery stocks and sin stocks. This issue is addressed extensively in Kumar et al. (2011), and we do not attempt to re-establish this relation.[18] For the purposes of

[18]They conduct a battery of robustness tests and alternative specifications to establish the robustness of the CPRATIO's effect on lottery stock holdings. For example, the relation is robust to controls for other demographic characteristics such as urban/rural, total population, education, or racial and ethnic composition, and generally dominates the effects of these variables in regressions. The effect of CPRATIO is not driven by a big city or financial center effect, and it is robust within regional subsamples (i.e., it is not driven by any one region such as the Northeast or California). In addition, they use difference-in-difference regressions to show that the effect is strongly evident even when controlling for unobserved county heterogeneity.

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our paper, the important point is that CPRATIO captures variation in institutions' willingness to hold lottery stocks, which the regressions reported in Table 9 confirm.

C. Returns to Portfolios Sorted by CPRATIO

Panel A of Table 10 reports the quarterly, characteristic-adjusted mean returns to stock holdings by institutions in each CPRATIO quintile. The results are qualitatively similar to those reported in Table 3. We find that the portfolio of lottery stocks held by the most gambling-averse (low-CPRATIO) institutions earns an average abnormal return of 1.47% per quarter (t-statistic = 1.90). Focusing on fresh positions, the lottery stocks held by the most gambling-averse institutions

TABLE 10

Local Religion and Portfolio Performance

Table 10 presents quarterly returns of portfolios based on institutional stock holdings and the ratio of Catholics to Protestants (CPRATIO) in the county where the institution is located. The portfolio returns are characteristic-adjusted following the Daniel et al. (1997) approach, where the return of each stock is in excess of the return of a portfolio of stocks with comparable size, book-to-market, and past returns. Returns are expressed in percentages and weighted by the value of the institutional holdings. The table gives the value-weighted return to institutions' holdings of stocks in each quintile of EISKEW (Panel A), for institutions in each quintile of CPRATIO. In Panel B, we consider sin stock and non-sin stock categories. The first section of the table gives returns to the entire set of stocks held in each quintile of EISKEW, while the second section reports the returns to "fresh" holdings, those in which the institution increased its portfolio weight over the prior quarter. Portfolios are rebalanced each quarter. The t-statistics are reported below the mean returns in parentheses. The sample period is from the first quarter of 1980 to the last quarter of 2008.

	CPRATIO Quintiles					
Stock Category	Protestant Q1	Q2	Q3	Q4	Catholic Q5	Q5 − Q1
Panel A. Lottery Stock Holdings of Institutions Sorted by CPRATIO						
All Holdings						
Q1 (non-lottery)	0.06	0.09	0.28	0.19	0.28	0.22
	(0.27)	(0.45)	(1.33)	(1.10)	(1.54)	(1.80)
Q5 (lottery)	1.47	0.84	1.79	1.29	1.11	−0.36
	(1.90)	(1.08)	(1.68)	(1.66)	(1.44)	(−0.52)
L − NL						−0.58
						(−0.83)
Fresh Holdings						
Q1 (non-lottery)	0.01	−0.10	0.38	0.15	0.28	0.26
	(0.05)	(−0.43)	(1.51)	(0.69)	(1.36)	(2.05)
Q5 (lottery)	2.68	1.26	1.82	1.24	0.98	−1.70
	(2.29)	(1.38)	(1.75)	(1.52)	(1.26)	(−1.67)
L − NL						−1.96
						(−1.93)
Panel B. Sin Stock Holdings of Institutions Sorted by CPRATIO						
All Holdings						
Non-sin stocks	0.01	−0.03	0.12	−0.19	0.06	0.06
	(0.07)	(−0.23)	(1.67)	(−1.15)	(0.62)	(0.30)
Sin stocks	1.18	0.23	0.28	0.18	0.26	−0.92
	(2.68)	(0.58)	(0.75)	(0.48)	(1.08)	(−1.88)
Sin − Non-sin						−0.97
						(−1.99)
Fresh Holdings						
Non-sin stocks	−0.24	−0.27	0.07	−0.24	0.14	0.38
	(−1.22)	(−1.34)	(0.54)	(−1.33)	(0.80)	(1.53)
Sin stocks	0.58	0.64	0.27	0.19	0.15	−0.43
	(1.17)	(1.39)	(0.64)	(0.35)	(0.43)	(−0.70)
Sin − Non-sin						−0.81
						(−1.33)

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earn an average abnormal return of 2.68% per quarter (t-statistic = 2.29), and the difference in abnormal returns between lottery stocks held by gambling-averse institutions and those held by gambling-tolerant institutions is economically large but only marginally significant statistically (differential = 1.70 percentage points per quarter, t-statistic = 1.67).

In Panel B of Table 10, we examine the returns to sin stock holdings conditional on CPRATIO. We find that the portfolio of sin stocks held by institutions in the lowest quintile of CPRATIO earns an average characteristic-adjusted return of 1.18% per quarter (t-statistic = 2.68), compared to 0.26% per quarter for high-CPRATIO institutions. The return differential between low- and high-CPRATIO portfolios is also significant (differential = −0.92 percentage points, t-statistic = −1.88). The results with fresh holdings are statistically insignificant, but those results also portray the same qualitative picture.

The performance of lottery stock and sin stock holdings conditional on the level of local CPRATIO confirms the previous findings using an entirely different proxy for social norms. The stylized results that lottery stocks held by gambling-averse investors and sin stocks held by sin stock-averse investors earn relatively high abnormal returns thus appear to be fairly robust and support our key conjecture.

VII. Style Deviations and Portfolio Performance

In our main analysis, we have focused on two contexts, sin stocks and lottery stocks, where some institutions are subject to norms that impose perceived costs to managers who deviate from those norms. The advantage of these settings is that for managers subject to such norms, there is a clear cost to deviating that is unrelated to the expected returns of the proscribed category of stocks. While we believe that these types of norms provide a relatively clean setting for testing our deviations hypothesis, it is natural to ask whether we find a similar effect with respect to more broadly recognized styles or stock categories, such as size, value/growth, or momentum.

While these stock categories are broader than the settings we have focused on, they may not provide as useful a setting for testing our deviations hypothesis for two reasons. First, there is not a clear economic cost as in the case of deviating against norms that discourage holding sin stocks or lottery-type stocks. For a manager who prefers to invest in value stocks, holding an attractive growth stock does not involve the same sort of cost that is perceived by a manager who is subject to norms against holding sin stocks. For this reason, a value manager holding a growth stock may not be as strong a signal of information or conviction as a sin stock-averse manager who chooses to hold a tobacco stock.

Second, if a manager's style specialization is motivated by specialized skill within a certain style category, this may mask somewhat the effect of deviations. For example, if a manager is skilled at selecting growth stocks, we would expect the manager to exhibit good performance within his or her area of expertise. While the manager may also outperform when deviating from the area of expertise, it may be less apparent when compared to performance within the area of expertise.

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To examine whether style deviations from broad stock categories provide at least some evidence of informed trading, we report the returns of portfolios based on other styles and style preferences in Table 11. In particular, we report portfolio performance estimates based on size, book-to-market ratio, momentum, and total volatility. Given that a manager may specialize on either end of each of these style dimensions (e.g., small vs. large stocks, or value vs. growth stocks), we define the institutional categories somewhat differently. Whereas before we sorted institutions based on their prior portfolio weight in lottery stocks or sin

TABLE 11

Institutional Style Deviations and Portfolio Performance

Table 11 presents quarterly returns of portfolios defined using institutional stock holdings and past weight in stock categories defined by various popular style dimensions. Specifically, we sort stocks into quintiles based on size (market capitalization), book-to-market ratio, momentum (prior 12-month return, skipping the last month), and total volatility (measured using daily returns over the prior six months). We determine institutional style preferences by sorting institutions into quintiles based on their past portfolio weights of stocks in the highest and lowest quintiles of that style dimension. The portfolio returns are characteristic-adjusted following the Daniel et al. (1997) approach, where the return of each stock is in excess of the return of a portfolio of stocks with comparable size, book-to-market, and past returns. In Panel D, returns are additionally adjusted for volatility. Returns are expressed in percentages and weighted by the value of the institutional holdings. The table gives the value-weighted return to institutions' holdings of stocks in the lowest and highest quintiles of each style dimension, for institutions in each quintile of style preference. For brevity, we report only results based on "fresh" holdings, those in which the institution increased its portfolio weight over the prior quarter. Panel A gives returns to portfolios based on size, Panel B reports returns to portfolios formed on book-to-market, Panel C shows returns to portfolios formed on momentum, and Panel D gives returns to portfolios formed on total volatility. Portfolios are rebalanced each quarter. For the quintiles of past style preference, "Low" ("High") refers to institutions with the strongest prior portfolio weight in small (large) stocks, value (growth) stocks, loser (winner) stocks, and low-volatility (high-volatility) stocks in Panels A, B, C, and D, respectively. The *t*-statistics are reported below the mean returns in parentheses. The sample period is from the first quarter of 1980 to the last quarter of 2008.

	Quintiles of Past Style Preference					
Stock Category	Low Q1	Q2	Q3	Q4	High Q5	Q5 − Q1
Panel A. Deviations from Firm Size Category						
Q1 (small)	−0.16	0.11	1.28	−1.33	4.49	4.66
	(−0.24)	(0.17)	(1.66)	(−1.54)	(1.85)	(1.91)
Q5 (large)	0.22	0.35	0.19	0.05	0.00	−0.22
	(1.54)	(1.42)	(1.16)	(0.37)	(−0.01)	(−1.94)
Q5 − Q1						−4.88
						(−1.99)
Panel B. Deviations from Book-to-Market Category						
Q1 (value)	0.25	0.23	0.32	0.04	0.38	0.12
	(1.07)	(1.05)	(1.32)	(0.27)	(2.15)	(0.48)
Q5 (growth)	−0.12	−0.30	0.19	−0.03	0.08	0.19
	(−0.29)	(−0.89)	(0.79)	(−0.15)	(0.28)	(0.45)
Q5 − Q1						0.07
						(0.16)
Panel C. Deviations from Momentum Style						
Q1 (loser)	0.22	0.44	0.34	−0.06	−0.46	−0.68
	(0.53)	(1.24)	(0.74)	(−0.18)	(−1.14)	(−1.37)
Q5 (winner)	0.89	0.60	0.14	0.33	0.18	−0.72
	(3.12)	(2.10)	(0.66)	(1.85)	(0.88)	(−2.22)
Q5 − Q1						−0.04
						(−0.07)
Panel D. Deviations from Volatility-Based Style						
Q1 (low volatility)	0.03	−0.17	−0.16	−0.10	−0.07	−0.10
	(0.24)	(−1.53)	(−1.75)	(−0.98)	(−0.48)	(−0.58)
Q5 (high volatility)	2.37	1.22	0.81	1.81	0.59	−1.79
	(1.75)	(1.41)	(1.50)	(2.56)	(0.94)	(−1.31)
Q5 − Q1						−1.69
						(−1.22)

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stocks, we now sort institutions based on their portfolio weights in the stocks at both extremes of each style dimension. In the case of the size-based category, for example, we first assign institutions into quintiles based on their portfolio weight in the largest quintile of stocks, as well as their portfolio weight in the smallest quintile of stocks. We then subtract the small stock weight quintile from the large stock weight quintile to produce a score ranging from $1 - 5 = -4$ for institutions that underweight large stocks and overweight small stocks, to $5 - 1 = +4$ for institutions that overweight large stocks and underweight small stocks. We next sort institutions into quintiles of size preference based on this score. Aside from this more symmetrical measure of institutional preferences, our portfolio construction procedure is the same as in the previous tests. For brevity, we report only the results for portfolios based on fresh holdings, and only for stocks in the highest and lowest quintiles of each style dimension.

In Panel A of Table 11, we form portfolios based on size and on the institutions' preference for large or small stocks as described previously. Consistent with our informed deviations hypothesis, we find that institutions that specialize in large stocks earn an average quarterly abnormal return of 4.49% per quarter (t-statistic $= 1.85$), outperforming the small stocks held by institutions specializing in small stocks by 4.66 percentage points per quarter (t-statistic $= 1.91$). Similarly, the large stocks held by institutions specializing in small stocks outperform those held by large stock specialists, but the difference is smaller (difference $= 0.22$ percentage points, t-statistic $= 1.94$).

When we examine deviations from book-to-market and momentum styles, we do not find strong evidence of the deviation effect, though the returns on some of the portfolios are consistent with our hypothesis. For example, in Panel B of Table 11, we find that growth investors earn significantly positive abnormal returns on the value stocks they choose to hold. In fact, growth-oriented investors earn higher returns from their value stock holdings. However, this estimate is not significantly different from the returns to the value stocks held by value investors. Similarly, when we consider momentum investing, we find that winner stocks held by institutions specializing in past losers earn significantly positive abnormal returns, and they significantly outperform the winner stocks held by institutions specializing in winner stocks (see Panel C of Table 11).

Last, we find in Panel D of Table 11 that institutions that primarily hold low-volatility stocks earn relatively high abnormal returns when they choose to hold high-volatility stocks. However, the performance estimate is only marginally significant. Overall, when we form portfolios based on broader style categories, we continue to find returns consistent with our informed deviations hypothesis, even though, as expected, the evidence is not as strong or consistent as in our main settings of sin stocks and lottery stocks.

VIII. Summary and Conclusion

This paper proposes and tests the conjecture that sophisticated individuals deviate from established personal and institutional norms only when the perceived benefits are large. We apply this broad idea to the context of institutional investing and predict that norm-constrained investors would deviate from their norms when

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they have compelling information. Consequently, they should earn higher abnormal returns from those investments. We test this prediction using norms against gambling and holding sin stocks.

Consistent with our conjecture, we find that when gambling-averse institutions invest in lottery-type stocks, they earn higher abnormal returns on their holdings of lottery stocks, outperforming the holdings of gambling-tolerant institutions. Similarly, institutions that are averse to holding sin stocks earn higher abnormal returns on those they choose to hold. These findings are stronger among more aggressive institutions that are more likely to be informed, and they are robust to controlling for industry specialization. The same qualitative finding also holds using an alternative proxy for social norms based on the prevailing religious beliefs in the area where the institution is located. Collectively, our results provide novel evidence that institutional investors have access to superior information.

Our general norms-based hypothesis is likely to hold in yet other settings. For example, Hong and Kostovetsky (2012) show that political values can influence the portfolio choices of mutual fund managers. When a Democrat fund manager takes a significant position in a defense industry stock, which she would normally avoid based on her political values, that trade may reflect an especially strong information signal. Investor preferences for investing in firms that exhibit corporate social responsibility may provide another interesting setting. We intend to test our hypothesis in these other economic settings as we continue this line of research.

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