

Internet Appendix

Deviations from Norms and Informed Trading

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In this appendix, we present background material and results from additional tests to further support the main results reported in the paper. The sections are presented in the order they are referenced in the main text.

A.I. Religion and Attitudes Toward Gambling and Sin Industries

The gambling views typical of many Protestant churches are expressed in the United Methodist Church's 2004 *Book of Resolutions*: "Gambling is a menace to society, deadly to the best interests of moral, social, economic, and spiritual life, and destructive of good government. As an act of faith and concern, Christians should abstain from gambling and should strive to minister to those victimized by the practice."

The position of the Catholic Church on gambling is summarized in the *New Catholic Encyclopedia*: "A person is entitled to dispose of his own property as he wills. . . so long as in doing so he does not render himself incapable of fulfilling duties incumbent upon him by reason of justice or charity. Gambling, therefore, though a luxury, is not considered sinful except when the indulgence in it is inconsistent with duty" (O'Hare (2002)). Further, the Catechism of the Catholic Church states: "Games of chance (card games, etc.) or wagers are not in themselves contrary to justice. They become morally unacceptable when they deprive someone of what is necessary to provide for his needs and those of others. The passion for gambling risks becoming an enslavement. Unfair wagers and cheating at games constitute grave matter, unless the damage inflicted is so slight that the one who suffers it cannot reasonably consider it significant" (2413).¹

¹See Thompson (2001, pp. 317–324) for a summary of the gambling views of major religious denominations in the United States.

Similarly, the Southern Baptist Convention (SBC), the governing body of largest Protestant denomination, has issued resolutions not only discouraging their use, but also expressing “total opposition to the manufacturing, advertising, distributing, and consuming of alcoholic beverages.” Similarly, the SBC has called on tobacco farmers to cease tobacco production and switch to other crops while calling on Congress to eliminate any subsidies to tobacco growers. Other major denominations such as the United Methodists and Latter-Day Saints also maintain positions against alcohol and tobacco.

In contrast, the Catholic Church does not prohibit moderate use of alcohol or tobacco. For example, the *New Catholic Encyclopedia* explains that drunkenness is “no sin at all if there is sufficient reason for the indulgence, e.g., an acute attack of melancholy, a special occasion calling for something unusual in the way of festivity and joviality” (Meagher (2002)).

A.II. An Illustrative Example

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.

To see this logic more clearly, consider an investor who, in addition to having access to the risk-free security and the market, receives a mispricing signal regarding an individual security i . To keep the example simple, we assume that stock returns are generated from a one-factor model in which all covariance is due to market risk, and that the investor is a price-taker.

The investor holds prior beliefs that security i is not mispriced (i.e., $\alpha_i = 0$) and has idiosyncratic volatility σ_i . The mispricing signal s is equal to the true alpha plus noise, which has a standard deviation of σ_s . Upon receiving the mispricing signal, the investor updates his beliefs about the security to α_i^* . For simplicity, we do not explicitly model the updating process here,

but take the posterior alpha α_i^* as given.

The investor can repack security i into a hedge position that bears no market risk by holding security i and shorting the appropriate amount of the market portfolio. The return on the hedge position r_i can then be written as

$$r_i = \alpha_i^* + r_f + \varepsilon,$$

where $\varepsilon \sim N(0, \sigma_i)$. The total variance of the investor's portfolio, σ_p^2 , can be written as

$$\sigma_p^2 = x_m^2 \sigma_m^2 + x_i^2 \sigma_i^2,$$

where x_m is the portfolio weight allocated to the market and x_i is the weight allocated to the hedge position. The investor's budget constraint then implies that the investor's allocation to the risk-free security is $x_f = 1 - x_m - x_i$.

The investor may be one of two types: those who are subject to norms against holding certain “taboo” securities such as sin stocks or lottery-like stocks, and those who are unconstrained. We model the effect of norms as a fixed cost to holding a taboo security, which we denote as c_i . The security about which the investor receives a signal may be either a taboo security or not, and is determined exogenously (i.e., the investor does not get to choose this). In a more complicated model, a norm-constrained investor may choose to allocate information-gathering effort primarily to non-taboo securities. For our purposes, we simply require that there is some possibility that the investor receives a mispricing signal about a taboo security.

Assuming a mean-variance investor with risk aversion λ , the utility of an unconstrained investor, or of an investor who receives a mispricing signal regarding a non-taboo security, is defined as

$$U = x_f r_f + x_m E(r_m) + (\alpha_i^* + r_f) x_i - \frac{\lambda}{2} \sigma_p^2.$$

For a norm-constrained investor who receives a mispricing signal regarding a taboo security, utility is defined as

$$U = \begin{cases} x_f r_f + x_m E(r_m) + (\alpha_i^* + r_f)x_i - \frac{\lambda}{2}\sigma_p^2, & \text{if } x_i \leq 0, \\ x_f r_f + x_m E(r_m) + (\alpha_i^* + r_f)x_i - \frac{\lambda}{2}\sigma_p^2 - c_i, & \text{if } x_i > 0. \end{cases}$$

The optimal portfolio weights are solved by setting the first-order condition to zero, and using the budget constraint that individual weights must sum to one. For an unconstrained investor, or an investor who receives a signal regarding a non-taboo security, the optimal weights are

$$x_m = \frac{E(r_m) - r_f}{\lambda\sigma_m^2},$$

$$x_i = \frac{\alpha_i^*}{\lambda\sigma_i^2}.$$

For a norm-constrained investor who receives a signal regarding a taboo security, the weight in the market portfolio remains the same, but the weight in the hedge portfolio for security i now depends on the magnitude of c_i . Specifically, the norm-constrained investor will only hold the mispriced taboo security if the utility derived from holding the security outweighs the cost of violating the norm. Substituting the optimal weight $\alpha_i^*/\lambda\sigma_i^2$ into the utility function yields the condition $(\alpha_i^{*2} + r_f\alpha_i^*)/2\lambda\sigma_i^2 > c_i$, so that the norm-constrained investor's optimal weight in the mispriced taboo security is

$$x_i = \begin{cases} 0 & \text{if } \frac{\alpha_i^{*2} + r_f\alpha_i^*}{2\lambda\sigma_i^2} \leq c_i, \\ \frac{\alpha_i^*}{\lambda\sigma_i^2} & \text{if } \frac{\alpha_i^{*2} + r_f\alpha_i^*}{2\lambda\sigma_i^2} > c_i. \end{cases}$$

We can now compare the expected return on taboo securities between a norm-constrained investor and an unconstrained investor. For an unconstrained investor, the expected return is $E(\alpha_i^* + r_f)$. The expected return for a norm-constrained investor is obtained after rearranging the

condition for holding the security and is given by $E(\alpha_i^* + r_f | \alpha_i^* > \sqrt{2c_i \lambda \sigma_i^2 + r_f^2} - r_f) > E(\alpha_i^* + r_f)$. Thus, for any distribution of true values of α_i , the extra hurdle imposed by the norms implies that relative to an unconstrained investor, a norm-constrained investor would on average earn a higher abnormal return ex post on a taboo stock which he chooses to hold.

There are two key takeaways from this example. The first is the stylized fact that norm-constrained investors earn higher abnormal returns ex post on trades that violate norms. This pattern occurs because norm-constrained investors only invest in a mispriced taboo security when the mispricing signal is strong enough that the expected benefits outweigh the costs of violating their norms and constraints.

Second, those costs of violating norms must be relatively fixed such that they generate a hurdle or threshold for investing. If the costs were linear in the amount of the taboo security held, a norm-constrained investor would simply hold less of the security than an unconstrained investor, given the same signal. The abnormal return on the total taboo portfolio would thus be lower for the norm-constrained investor because their informed position would be smaller relative to the uninformed taboo holdings in their benchmark portfolio. By a similar argument, the prediction that investors would earn higher ex post returns on stocks they normally avoid does not necessarily hold for investors with specialized investment skill holding stocks outside their area of expertise, nor could it arise from differences in risk aversion.

A.III. Expected Idiosyncratic Skewness Estimation

We estimate EISKEW for each stock following the approach of Chen et al. (2001) and Boyer et al. (2010). This method uses firm-level variables to predict idiosyncratic skewness in the cross-section. The key predictors of idiosyncratic skewness include lagged skewness and idiosyncratic volatility, as well as momentum and turnover (motivated by Chen et al. (2001) and Hong and Stein (2003)), firm size, and industry. We compute idiosyncratic volatility as the standard deviation of the residuals from four-factor regressions, which includes the three Fama and French

(1993) factors plus the Carhart (1997) momentum factor. The factor models are estimated using daily returns over the prior six months.

Similarly, we compute idiosyncratic skewness as

$$idioskew_{i,t} = \frac{1}{N(t)} \frac{\sum_{d \in S(t)} \varepsilon_{i,d}^3}{idiovola_{i,t}^3}, \quad (\text{A1})$$

where $S(t)$ is the set of trading days in the previous six months, $N(t)$ is the number of trading days in $S(t)$, $\varepsilon_{i,d}^3$ is the residual on day d from the four-factor regression estimated over $S(t)$, and $idiovola_{i,t}$ is the idiosyncratic volatility of stock i as defined above.

To estimate expected idiosyncratic skewness, we first estimate separate cross-sectional regressions at the end of each month t :

$$idioskew_{i,t} = \beta_{0,t} + \beta_{1,t-T} idioskew_{i,t-T} + \beta_{2,t-T} idiovola_{i,t-T} + \lambda'_t \mathbf{X}_{i,t-T} + \varepsilon_{i,t}, \quad (\text{A2})$$

where $T = 6$ months and $\mathbf{X}_{i,t-T}$ is a vector of firm-specific variables observed at the end of month $t - T$. These include

- $mom_{i,t-T}$, defined as the cumulative return of stock i over months $t - T - 12$ to $t - T - 1$;
- $turn_{i,t-T}$, defined as the average daily share turnover of the firm during months $t - T - 2$ through $t - T$;
- dummy variables for small and medium-sized firms, from a grouping of firms into three equal-sized bins based on market capitalization;
- industry dummies based on the Fama and French (1997) 48 industry classification scheme;
- and
- a NASDAQ dummy and $NASDAQ \times turn_{i,t-T}$, where $NASDAQ = 1$ if the firm's stock trades on the NASDAQ exchange.

Each month, we estimate the coefficients of the above regression on the cross-section of stocks. We then use those estimates with the current values of the firm-specific variables to predict expected skewness over the subsequent 6 months. This approach produces monthly, stock-by-stock measures of ex ante skewness based on information available at the time.

A.IV. Institutional Ownership and Lottery Stock Premium

In this section, we provide evidence from a related economic setting, which is consistent with our broad conjecture that deviations from norms may be induced by superior information. This test is motivated by the evidence in Kumar (2009) who shows that institutions underweight lottery-type stocks, while retail investors overweight them. In light of this evidence, we expect that lottery-type stocks that institutions hold in spite of their aversion toward them would earn higher returns. Institutions are unlikely to deviate from their norms and constraints unless they are able to identify very attractive lottery-type stocks.

Figure A1 shows the quarterly, characteristic-adjusted returns to the aggregate portfolios of individual and institutional investors. Consistent with this conjecture, we find that returns to lottery stocks held by institutions perform better. Institutional investors earn positive characteristic-adjusted return on their holdings of lottery stocks, while individual investors earn negative abnormal returns on their lottery stock holdings.² Thus, institutions appear to be able to “cherry pick” lottery stocks that ultimately yield high returns.

This pattern is notable because, on average, high EISKEW stocks earn low average returns (Kumar, 2009; Boyer et al., 2010). The reversal in the negative relation between EISKEW and average return among stocks held by institutions is consistent with our broad hypothesis. Institutional investors’ general aversion to holding lottery stocks leads them to require stronger

²Although the positive abnormal return earned by institutions is of greater magnitude than the negative abnormal return experienced by individuals on their lottery stock holdings, the overall average return to lottery stocks is low, which reflects the known finding that individuals hold a disproportionate share of lottery stocks.

information signals to induce trading.

A.V. Skewness Preferences or Attitudes Toward Risk?

We interpret our results in Tables 3 and 4 in the main text as evidence that gambling norms influence institutions' decisions to act on favorable information regarding lottery-like stocks. Golec and Tamarkin (1998) show that gamblers are attracted to skewness rather than risk, and the finance literature has typically associated gambling with a preference for skewness.³ However, because skewness and volatility measures are correlated, it is natural to ask whether our findings truly reflect attitudes toward skewness or risk.

To investigate this possibility, we repeat our analysis and control for risk aversion when we sort institutions based on their past lottery stock allocations. Specifically, we measure institutional portfolio betas as a measure of their revealed risk preferences. We then perform a double sort, first on past four-quarter average portfolio beta and then on past lottery stock holdings. We use these risk aversion-adjusted quintiles of past lottery stock holding to form our portfolios. In unreported results, we find an identical pattern of abnormal returns. Specifically, lottery stocks held by the most gambling averse investors earn high abnormal returns. This pattern suggests that our main results are driven primarily by attitudes toward skewness rather than the risk preferences of institutions.

A.VI. Skewness Preferences over Time

In Table 4 of the main text, we 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. To investigate the reasons behind this result, we examine whether the degree of cross-sectional heterogeneity in expected skewness and institutions' willingness to

³See, 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).

hold lottery stocks vary over time. Figure A2, Panel A plots the monthly difference between the average expected idiosyncratic skewness (EISKEW) of stocks in the highest quintile of EISKEW and that of stocks in the lowest quintile. There is no clear time-series pattern in the cross-sectional variation in expected skewness.

Figure A2, Panel B plots the quarterly difference in mean portfolio allocations to lottery stocks between institutions in the highest quintile of past lottery weights and those in the lowest past lottery weights quintile. Here, we observe a substantial increase in the spread in lottery weights between the gambling-averse and gambling-tolerant institutions. This evidence suggests that institutions' willingness to hold stocks with higher expected skewness has increased over time. Our findings are consistent with the evidence in Bennett et al. (2003), who show that institutional preference for investing in small, volatile stocks have increased due to competition among institutions. A similar mechanism could also induce institutions to violate norms in search of "greener pastures".

A.VII. An Alternative Explanation: Specialization

An alternative explanation for our findings is that, for various reasons, investors specialize and restrict their attention to certain subsets of stocks. If investors have expertise within a particular subset of stocks, they may be less confident in evaluating stocks outside that area and require a stronger information signal to induce trade in those other stocks. For example, institutions may avoid illiquid stocks due to high trading costs and would only invest in them when they are able to identify illiquid stocks with very high expected returns. Similarly, they may specialize in larger and less volatile stocks and would invest in smaller and high volatility stocks only when they are expected to yield high excess returns in the future.

This is a more general hypothesis, which may apply to style investing, industry specialization, and other dimensions along which investors may specialize or restrict their attention. The specialization conjecture is not necessarily inconsistent with our broad conjecture but it differs

slightly from the main hypothesis proposed in this paper in that higher threshold for trading arises from the investors' own specialized expertise and confidence in evaluating certain subsets of stocks, as opposed to external costs to holding certain stocks imposed by institutional or social norms.

If some investors specialize along the dimension of expected skewness, then this alternative story would also predict higher abnormal returns *ex post* when investors deviate from their typical behavior. However, this story would predict a symmetric effect. That is, we should observe that investors who favor lottery stocks should earn high abnormal returns when they deviate and hold low-skewness stocks, as well as high abnormal returns to lottery stocks held by gambling-averse investors.

Since our results are asymmetric and only present among lottery stocks held by gambling-averse investors suggests that our results are more likely to be driven by specific costs to holding lottery-like stocks, rather than a higher threshold for investing outside an institution's area of expertise. The evidence obtained using sin stocks also displays this asymmetric effect. This finding is corroborated further by the results presented later using a religion-based measure, which specifically captures variation in the degree to which institutions are subject to norms against gambling. It would be very difficult to explain with the specialization framework why institutions in high CPRATIO regions are systematically more likely to specialize in certain styles and deviate from those styles when they have superior information.

A.VIII. Institutional Ownership and Sin Stock Premium

Similar to our analysis with the lottery stock premium in Section A.IV, we examine the cross-sectional variation in sin stock premium as the level of institutional ownership changes. Because institutions in aggregate exhibit an aversion to holding sin stocks (Hong and Kacperczyk, 2009), they are likely to hold these stocks only when they have favorable information such that the benefit to investing in a sin stock outweighs the cost of violating the norm. Thus, our broad

norms hypothesis predicts that the sin stock premium would be higher among stocks with higher institutional ownership.

Similar to the evidence presented in Figure A1 in the context of lottery stocks, we find that sin stocks with high institutional ownership outperform those with low institutional ownership. Specifically, sin stocks in the highest quintile of institutional ownership earn mean characteristic-adjusted return of 0.27% per month, while those in the lowest quintile of institutional ownership earn -0.32% per month. This evidence indicates that as with lottery stocks, institutions are able to “cherry pick” sin stocks that yield higher abnormal returns.

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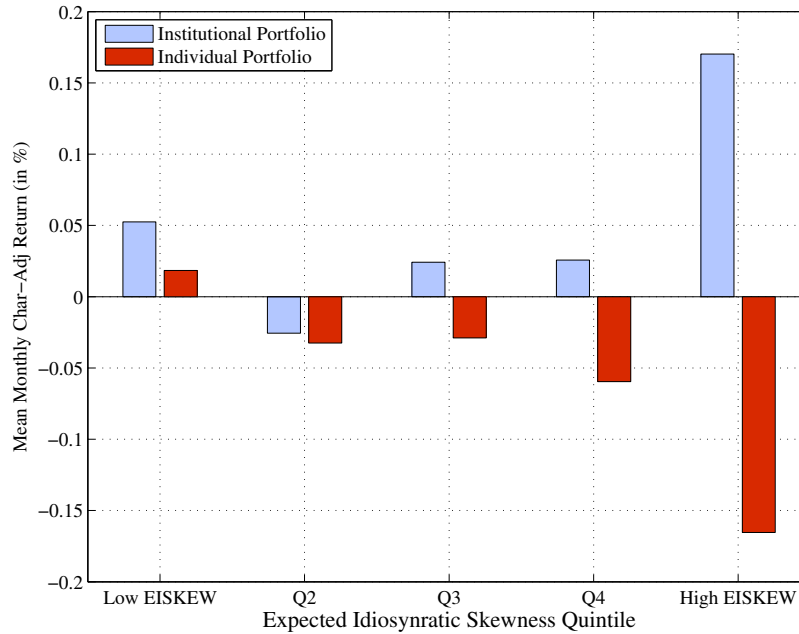
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FIGURE A1

Returns to institutional and individual portfolios by EISKEW quintiles.

Panel A shows the mean monthly characteristic-adjusted returns to the aggregate portfolios of institutional and individual investors within each quintile of expected idiosyncratic skewness (EISKEW). Returns are value-weighted by the value of each stock owned by institutions (individuals). Panel B shows the monthly, value-weighted raw and characteristic-adjusted returns for lottery stocks sorted by institutional ownership. The sample period is from 1980 to 2009.

Panel A. Institutional and Individual Portfolio Returns, Sorted by EISKEW



Panel B. Lottery Stock Returns, Sorted by Institutional Ownership

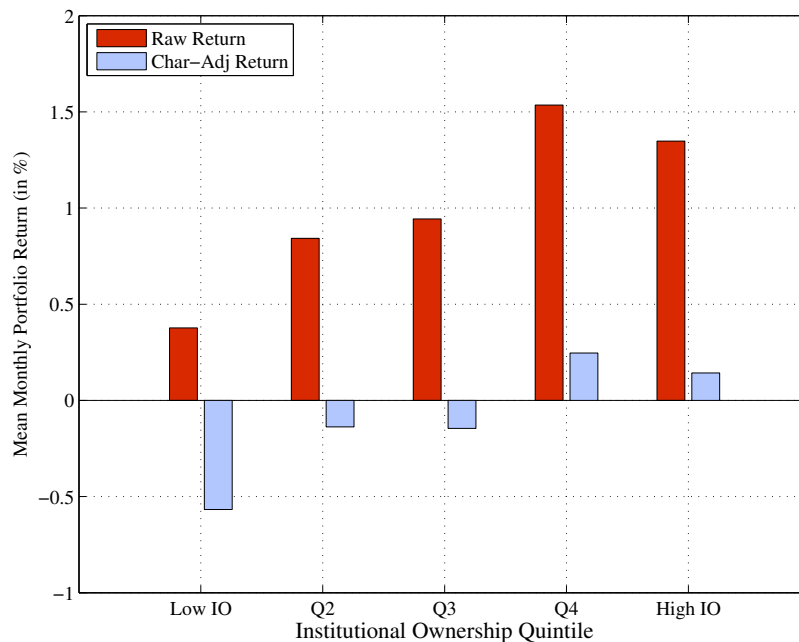
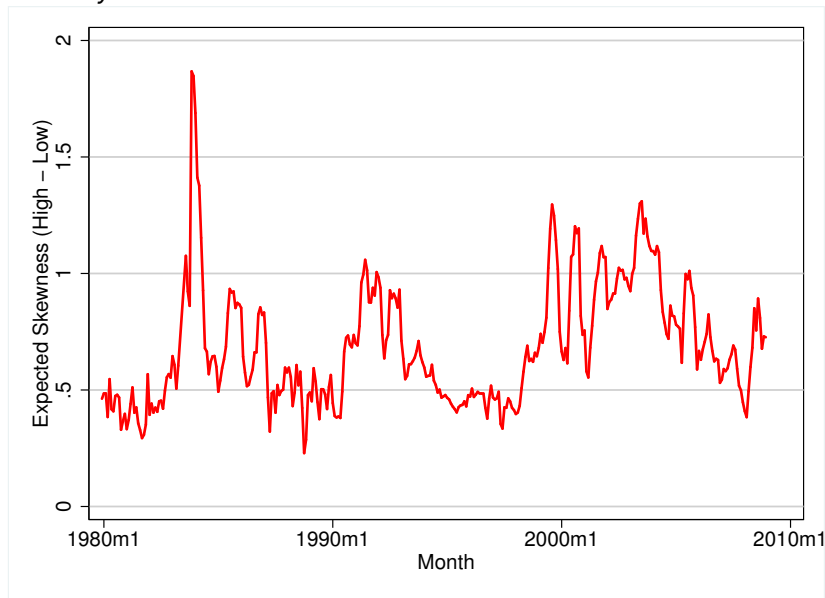


FIGURE A2

Cross-Sectional variation in EISKEW and lottery weights over time.

This figure shows how cross-sectional variation in expected skewness and in institutions' portfolio allocations to lottery stocks varies over the sample period. Panel A plots the monthly difference between the average expected idiosyncratic skewness (EISKEW) of stocks in the highest quintile of EISKEW and that of stocks in the lowest quintile. Panel B plots the quarterly difference in mean portfolio allocation to lottery stocks between institutions in the highest quintile of past lottery weight and those in the lowest quintile. The sample period is from 1980 to 2009.

Panel A: Expected Idiosyncratic Skewness



Panel B: Institutional Lottery Weights

