Skewness Preference and IPO Underpricing: International Evidence

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Abstract

This paper examines the impact of expected skewness on IPO underpricing based on a comprehensive set of 17,051 IPOs from 23 countries between 1990 and 2013. We find that IPOs with high expected skewness have significantly higher first-day return around the world, confirming the previous results based on U.S. IPOs. Such preference for skewness remains robust to estimation method or portfolio formation and is more pronounced in countries with relatively higher gambling propensity, a larger number of non-religious populations, and more individualistic culture. Finally, IPOs with high expected skewness underperform those with low expected skewness. Our results provide additional empirical support for skewness preference and pricing of lottery type assets in an international setting.

JEL Classifications: G32, G41

Keywords: IPO, Skewness Preference, Underpricing, International

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1. Introduction

While traditional literature on portfolio choice have mostly focused on mean-variance optimization, more recent studies point out that investors may care about higher moments of return distribution as well. For example, a growing literature documents that individual investors may exhibit preferences for skewness in return or more simply stocks with lottery-type payoffs. (Green and Hwang (2012), Kumar (2009), Bali, Cakici, Whitelaw (2011). These studies also exploit cross-sectional variation in investor characteristics, and document that skewness preference may well vary across individuals. For example, Kumar (2009) examines lottery-type stock demand within the U.S. and finds that individuals with socio-economic characteristics that are likely to induce gambling - namely poor, young, and less educated investors - prefer low priced stocks with high volatility and high skewness.

In this paper, we examine how country-level cultural dimensions may affect preferences for skewness and subsequently affect asset prices. There are a few reasons why we believe that skewness preference may vary at the country level. As reported in Kumar (2009), individual's gambling tendency may affect her preference for specific type of stock. If a country exhibits higher aggregate gambling tendencies than others, then preference for lottery-type stocks may be stronger in the former than in the latter. Kumar (2009) also documents that individual's religion may also affect her skewness preference. Specifically, he documents that catholic investors are more likely to prefer lottery-type stocks. Since (dominant) religion varies significantly across countries, this may also influence country-level skew preference.

Kumar (2009)'s approach relies on a dataset that provides detailed information on portfolio holdings at each investor level. Specifically, he defines stocks with certain characteristics as lottery-type ex ante, and examines whether individual investors (with certain characteristics) are

more likely to hold these stocks. Although he does examine the performance of portfolios with lottery-type stocks, a more direct asset pricing implication of skew preference has been documented in Bali et al. (2011) and Cheon and Lee (2017) who find that stocks with extreme positive returns exhibit lower expected return.

An alternative way of identifying the existence of skewness preference, as suggested by Green and Hwang (2012), is to examine the relationship between industry skewness and IPO return. They argue that firms in the same industry may exhibit similar characteristics and as such share common exposure to similar technological and regulatory shocks (Gabaix, 2009). Hence, IPOs from industries with high lagged skewness are more likely to have high expected skewness. Based on a sample of U.S. IPOs, they find that IPOs from industries with high lagged skewness experience significantly greater first-day returns, consistent with preference for skewness. In this study, we follow Green and Hwang (2012) and resort to the relationship between industry skewness and IPO underpricing as a measure of skewness preference in an international setting.

As outlined above, this paper draws upon two distinct strands in the existing literature. The first strand investigates the preference for skewness. An earlier study by Kraus and Litzenberger (1976) examine how a preference for positive skewness may be incorporated into the capital asset pricing model (CAPM) and suggest that people are generally excited about a positive skewed payoff distribution that features a small chance of winning a large amount combined with a high chance of losing a little. According to the prospect theory developed by Tversky and Kahneman (1992), investors' biased preference toward a low probability of winning eventually leads to overpricing and low subsequent returns of positively skewed stocks.[1]

[1] Based on prospect theory preferences (Tverskey and Kahneman, 2002; Barberis and Huang, 2008), Brunnermeier, Gollier, and Parker (2007) develop behavioral models in which the skewness of stock returns could be priced,

The second strand of the literature studies the role of investor sentiment in IPO markets. Ritter (1991) finds evidence of long-term reversals in IPO returns and concludes that periodic waves of optimism among individual investors might cause high initial returns and long-term reversals. Rajan and Servaes (1997), Derrien (2005) and Ljungqvist, Nanda, and Singh (2006) theoretically investigate IPO underpricing in the presence of overoptimistic investors for which other studies provide empirical support (Lee, Shleifer, and Thaler, 1991; Lowry, 2003; Dorn, 2003; Boutron, 2005; Cornelli, Goldreich, and Ljungqvist, 2006; Kumar and Lee, 2006).

Given these insights, we investigate the impact of expected skewness on IPO underpricing in financial markets around the world. Based on a comprehensive sample of 17,501 IPOs in 23 countries from 1990 to 2013, we first find that investors pay a high price for IPOs with relatively large expected skewness proxied by lagged industry skewness. For example, the average first day return from IPOs in the high expected skewness tertile is 10.0% points (6.7% points based on median) larger than those in the low expected skewness tertile. Moreover, first-day returns are monotonically increasing across portfolios sorted on the expected skewness measure. This result remains robust after controlling for other possible explanations based on the extant literature on the determinants of underpricing. Our findings are consistent with those of Green and Hwang (2012), and thus confirm that skewness preference in the IPO market is not only U.S.-specific, but rather reflects a global phenomenon.

We next repeat the analysis separately for several economic sub-regions; namely G7 countries, non-G7 countries, developed markets, and emerging markets. We find that the monotonic relationship between the first-day return and the expected skewness of portfolios still holds in all

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implying that the skewness of stocks could influence investors' portfolio decisions (Mitton and Vorkink, 2007; Boyer, Mitton, and Vorkink, 2010).

four economic sub-regions. These results further suggest that skewness preference at least in the IPO market is a universal phenomenon.

Our main empirical tests examine whether country-level cultural dimensions influence the preference for lottery-like payoffs in IPO markets of respective economies. We consider several variables to proxy for different dimensions of culture. First, we use the number of gambling properties in a country to capture the country-level gambling propensity. We also consider the proportion of the population with (any) religious beliefs. This is based on recent findings that investment decisions are related to the distribution of religious populations in a region (Kumar, Page, Spalt, 2011; Schneider and Spalt, 2016). Third, we use Hofstede's individualism measure as an additional variable that may reflect the relationship between investor overconfidence and the degree of individualism in a society (Markus and Kitayama, 1991; Barber and Odean, 2001; Chui, Titman, and Wei, 2010; Lucey and Zhang. 2010; Aggarwal, Kearney, and Lucey, 2012). Finally, we consider newspaper circulation, which proxies for the intensity of investors' attention (Fang and Peress, 2009). Our findings clearly indicate that overpaying for IPOs with high expected skewness is more pronounced in countries with relatively high gambling propensity, high non-religious population, and strong individualism traits.

Our last test examines whether such preference for skewness is priced over a longer-term. If the demand for lottery type assets increases due to skew preference, we expect those IPOs more subject to these preferences to underperform other benchmark stocks. We find that IPOs with high expected skewness earn a lower return compared to other benchmark portfolios or other IPOs with low expected skewness up to 36 months after the IPO.

Although IPO underpricing has long been discussed in the finance literature (Ibbotson, 1975; Stoll and Curley, 1970), relatively few studies examine the factors that may drive IPO underpricing

in an international context. For example, Loughran, Ritter, and Rydqvist (1994) confirm that IPOs provide abnormally positive first-day returns globally, but do not explore the determinants of global underpricing. Among the few, some studies focus on the cross-country differences in legal frameworks (Engelen and Van Essen, 2010; Banerjee, Dai, and Shrestha, 2011; Lin, Pukthuanthong, and Walker, 2013) and culture (Boulton, Smart, and Zutter, 2015) as the direct determinants of the level of IPO underpricing. We extend this literature by first identifying skewness preference as a key determinant of IPO underpricing in a global context, and then reexamining the role of culture as a secondary moderating factor that may affect the sensitivity of the primary relationship between skewness preference and underpricing.

To the best of our knowledge, this is the first study that documents how preference for skewness may affect IPO underpricing and its subsequent return in international financial markets, and how this relationship may be affected by various cultural dimensions.[2] The remainder of the paper proceeds as follows. Section 2 describes the data and defines the variables. Section 3 reports the base-line empirical results. Section 4 presents the effect of cross-cultural dimensions focusing on gambling tendencies. Section 5 explores several alterative hypotheses for our findings and conducts robustness tests. Finally, Section 6 provides a brief conclusion.

2. Data

[2] Two more related studies are Aissia (2014) who shows a similar effect for idiosyncratic skewness in the French IPO market, and Don and DeLisle (2015), who explore idiosyncratic expected skewness in seasoned equity offerings (SEO) in U.S.

2.1. IPO sample selection

To construct our IPO sample, we begin with a list of IPOs from 1990 through 2013 obtained from the Global New Issue Database provided by Thomson Financial Securities Data Company (SDC) Platinum. We select all IPOs where the "original IPO" flag is set to "yes." Because SDC has limited coverage for non-U.S. IPOs prior to 1990, we start our sample period from January 1990, which yields 48,137 initial observations. We then exclude those IPOs of private placements, IPOs with missing SEDOL identifiers, IPOs with missing offer prices, investment trusts, ADRs, and ADS. Finally, we retain only those IPOs with the following share types as reported in SDC; Class A Shares, Common Shares, Ordinary Shares, Ordinary/Common Shares, or Equity Shares.

We then match these IPO firms with Thompson Financial Datastream and keep only those IPOs with valid stock return information from Datastream. Since some of our analyses are implemented country by country, we require at least 100 IPOs from a given country during the whole sample period to be included in the sample.[3] After applying these filters, our final sample consists of 17,051 IPOs from 23 countries (Australia, Brazil, Canada, France, Germany, Greece, Hong Kong, India, Indonesia, Italy, Japan, South Korea, Malaysia, Norway, Philippines, Poland, Singapore, Sweden, Taiwan, Thailand, UK, and US) between January 1990 and December 2013.

2.2. Stock return filters and country-level variables

We start from the daily returns of all stocks in Datastream, including non-IPO stocks, between 1990 and 2013. We first exclude non-trading days from the sample, defined as days when more than 90 percent of stocks in a given exchange have zero returns, following Lee (2011) and Karolyi, Lee, and Van Dijk (2012). To prevent outliers, we follow Ince and Porter (2006) and set the daily return as missing if $R_{i,t}$ *

[3] We find very similar empirical results when we relax the inclusion criteria to at least 50 IPOs per country (33 countries).

$R_{i,(t-1)} - 1 \leq 0.5$, if at least one of the two returns is over 200%, or if the total return index for the previous (t-1) or current (t) day is less than or equal to 0.01. We also obtain trading volume, firm age, and market capitalization from Datasteam. Our final daily return series includes 50,125 unique stocks, including non-IPO stocks, from 23 countries.

We consider the following four country-level measures to proxy for various cultural dimensions that may affect aggregate skew preferences: number of gambling properties, atheist population, degree of individualism, and newspaper circulation. We obtain the number of gambling properties in each country, available from the CasinoCity website, to proxy for general gambling tendency in that economy.[4] The atheist population, which we obtain from Zuckerman (2007), is another cultural dimension that may be associated with skew preference.[5] We also resort to individualism from Hofstede (2001) as a potential proxy for overconfidence. Newspaper circulation, obtained from the United Nations Statistical Database, is used as a proxy for investor attention.[6]

We also include the following measures as additional country-level control variables: the prospectus liability index from La Porta, Lopez-de-Silanes, and Schleifer (2006), and GDP per capita from the World Bank.

2.3. Variable description

2.3.1. Skewness

We measure our expected skewness variable as in Green and Hwang (2012). Specifically, for an IPO firm *i* in country *k* during the month *t,* we calculate the expected skewness measure based on the following

[4] http://www.casinocity.com/casinos/ provides a detailed list of gaming properties including casinos, horse tracks, dog tracks, and racinos for 150 countries.

[5] Zuckerman (2007) provides a list of 137 countries with the percentage of people who identify themselves as atheists, agnostic, or non-believers in God.

[6] http://unstats.un.org

equation, which utilizes the cross-section of all stock returns within the same industry and country of the IPO firm:

$$\mathrm{SKEW}_{\mathrm{k,i,t}} = \frac{(P_{100-h} - P_{50}) - (P_{50} - P_h)}{(P_{100-h} - P_h)} \qquad \text{(Eq. 1)}$$

where P_j represents the jth percentile of the daily return distribution pooled across all stocks within the Fama and French (1997) 17-industry classification (FF17) of IPO stock i in country k over the three months preceding the IPO month t, and h denotes an arbitrary threshold percentile reflecting the tail of the distribution. The more extreme the positive returns on the industry are, i.e. the greater is the right skewness, the larger is the SKEW. The denominator serves to normalize the dispersion of the return distribution. We employ the 5th percentile as h, the threshold value for identifying the tail of the distribution.[7]

Unlike the traditional skewness measure based on the third central moment, Green and Hwang's (2012) skewness measure is based only on the tail of a distribution and thus better captures the skewness preference of investors who seek lottery-like payoffs. Furthermore, this expected skewness measure is extremely simple and easy to calculate.

There are few explanations for why IPO firms from highly skewed industries may be expected to exhibit highly skewed payoff distributions. According to Green and Hwang (2012), the rationale behind assigning industry-level estimates to the IPO in question is that companies within an industry share similar characteristics and are subject to the same technological and regulatory shocks. Gabaix (2009) also suggests that the tail of portfolio return behaves like the tails of stocks within the portfolio, and firms within a given industry respond in the same way to common shocks. Kelly and Jiang (2014) also argue that there are mathematic links between aggregate tail risks and firm-level tails.

[7] Kelly and Jiang (2014) propose the 5th percentile threshold parameter to define an extreme value. They argue that a very extreme threshold could add noise to the estimation when there are too few data points. Gabaix et al.(2006) also suggest a simple rule that fixes the 5th percentile threshold for the estimation of power-law models. We also find very similar results when we use 1st percentile as the threshold for identifying the tail.

2.3.2. Other variables

We calculate IPO underpricing as the first day closing price divided by the IPO offer price in the SDC. If the first day closing price is missing from the SDC, we set the first-day closing price as the second day, third day, or the first week closing price in the SDC. If we cannot obtain any appropriate closing price in the SDC, we define the first-day closing price as the first closing price in Datasteam within +0 to +60 days of the IPO issue date. To mitigate the effect of outliers, we winsorize all variables at the top and bottom 3 percent of observations.

We also consider additional control variables that have been identified in the previous literature as the determinants of underpricing. Firm age represents the number of years since establishment until the IPO and proxies for uncertainty (Field and Karpoff (2002) and Loughran and Ritter (2004). Log of Proceeds, a measure of offer size, is the natural logarithm of IPO proceeds in US dollars.[9] Pure Primary is an indicator for whether the offering consists of primary shares only. Market return is the previous one-month market index return in respective stock market.[10] Underpricing Dispersion is the standard deviation of IPO first-day returns over the previous three-months. Log GDP is the natural logarithm of the GDP per capita in US dollars. Log of market capitalization is the natural logarithm of the market capitalization in US dollars for each country.

We also include the following industry-level variables that may be related with the distribution of initial returns. Industry Volatility is the standard deviation of returns for the FF17 over the previous month. Industry return is the average industry returns for the FF17 of the previous month. Industry momentum is the cumulative industry return from *t*-8 to *t*-2. Industry turnover is the industry trading volume turnover of the previous month.

[9] Beatty and Ritter (1986) suggest a significant and positive relationship between the offer size and IPO underpricing.

[10] Ritter (1984) suggests that the mean IPO underpricing is higher in a hot market compared to that in a cold market.

2.4. Summary statistics

Table 1 provides the distribution of the first day return of our IPO sample for each country between 1990 and 2013. The first three columns of Table 1 present underpricing based on raw returns and the next three columns present those based on market-adjusted returns. CANADA has the highest average initial return on IPOs, with 68.5% based on raw return, followed by China (42.0%), and Germany (40.6%). The Philippines has the lowest average initial return on IPOs, equal to 10.8%, followed by Brazil (10.9%) and France (11.6%). The US has the largest number of IPOs in our sample with 3,511 IPOs, followed by Japan (1,925), and China (1,916).[11] The results based on medians and market adjusted returns also indicate that there is a significant amount of underpricing in IPOs across all countries in our sample, consistent with the survey results provided in Ritter (2003).

<Table 1>

Table 2 presents the average raw and market-adjusted initial returns on IPOs for each of the 17 industries in our sample. Mining and Minerals has the highest average initial return, 44.8% based on raw return, followed by Oil and Petroleum Products (39.0%). Again, average underpricing is substantial in all of the industries.

In the last three columns of Table 2, we sort all IPOs into three groups (Low, Middle, and High) based on their expected skewness as measured by SKEW in equation (1), and report the number of IPOs in each tercile. For all IPOs in a given country-month, we sort them into three portfolios in ascending order based on the 33rd and 66th percentiles of SKEW measure. As such, the number of IPOs in each tercile are different across industries. Most industries have at least 25% of their IPOs in the low-skewness portfolio and at least

[11] Greece has less than 100 IPOs in Table 1 because first closing price is missing in many cases.

20% in the high-skewness portfolio, except for Chemicals in the high-skewness portfolio (18%).

<Table 2>

3. Results

3.1. Portfolio analyses

Table 3 reports the median initial IPO return based on both raw return and market-adjusted return for each of the tertile portfolios formed by sorting on expected skewness. For each country-month, we sort all IPOs within that country-month by the expected skewness from equation (1) into three portfolios (Low, Middle, and High) in ascending order based on the 33rd and 66th percentiles. For small markets, each tertile portfolio could contain very few firms, so we create skewness portfolios across regions. We then calculate the median first day return over the whole sample, each economic region, and each geographic regions[12]. Low contains IPOs with the lowest expected skewness and High includes IPOs with the highest expected skewness. We also report the associated p-values from the Wilcox rank-sums tests where the null is that the difference in the medians between the high and low expected skewness portfolios is zero.

In Panel A, we first examine the initial returns on IPOs for the full sample of 23 countries. We find that the difference in median raw initial return between the high and low expected skewness tertiles is statistically significant. In fact, median initial return is monotonically increasing in expected skewness of

[12] In this study, stock markets are classified into developed and developing countries according to the International Finance Corporation (IFC) of the World Bank. A total of 23 markets are identified including 12 developed markets(Australia, Canada, France, Germany, Hong Kong, Italy, Japan, Norway, Singapore, Sweden, UK, and US) and 11 emerging markets (Brazil, China, Greece, India, Indonesia, Malaysia, Philippines, Poland, South Korea, Taiwan, and Thailand). G7 consists of Canada, France, Germany, Italy, Japan, the UK, and the US. We also categorize the countries into three regional groups: Brazil, Canada, and U.S. (AMERICA); Australia, China, Hong Kong, India, Indonesia, Japan, Malaysia, Philippines, South Korea, Singapore, Taiwan, and Thailand (ASIA); France, Germany, Greece, Italy, Norway, Poland, Sweden, and UK (EUROPE).

the IPO portfolio. Specifically, the difference in the raw median initial returns between the high and the low expected skew terciles is 6.7%, with a Wilcoxon p-value of <0.001. The difference in market-adjusted median initial returns is still positive and statistically significant. These results suggest that the expected skewness measure may explain IPO underpricing.

Panel B of Table 3 reports the median initial returns by economic region. We form regional portfolios by sorting IPO stocks into tertile portfolios within a country-month based on expected skewness and then compute the median underpricing of the tercile portfolio across countries in the same region. We consider two different disjoint subsamples; G7 vs. Non-G7 economies, and Developed vs. Emerging markets.

The results indicate that differences in both raw and market-adjusted initial returns between the high and low skewness portfolios are statistically significant across all economic regions. The effect of skewness on IPO underpricing is the strongest in emerging markets when we exclude China. The monotonic relationship between skew and underpricing exists not only for the full sample of all 23 countries, but also within the Non-G7, G7, Developed, and Emerging markets (both with and without CHINA).

In Panel C of Table 3, we report the results separately for three geographic regions, namely Europe, America, and Asia. We find that the difference in median initial returns between the high and low expected skewness portfolios is statistically significant in all three geographic regions. The difference is the smallest in Europe (5.0%) and largest in America (7.8%) based on raw returns. Again, initial returns are monotonically increasing in expected skewness in all geographic regions. We find very similar results when we use market-adjusted initial returns instead of raw returns.

<Table3>

In Table 4, we replicate the analysis in Table 3 by using average initial return for each tercile portfolio rather than median initial return. As in Table 3, we consider both raw initial returns and market-adjusted initial returns for tertile portfolios formed by sorting on expected skewness. The pattern reported in Table

4 is very much similar to those reported in Table 3 based on medians. For example, the average initial raw return among all IPOs in the sample is 36.8% for the high expected skewness portfolio and 26.8% for the low expected skewness portfolio, the difference of which (10.0%p) is statistically significant. We find similar results when returns are adjusted by market returns. The monotonic relationship across portfolios reported in Table 3 also holds in Table 4. In sum, the results from Tables 3 and 4 clearly indicate that a preference for skewness in the IPO market may be a global phenomen.

<Table 4>

Figure 1 provides an overview of the relationship between skewness preference and IPO underpricing in each of the 23 countries. In Panel A (B), we report the difference in median (mean) initial returns between high and low expected skewness portfolios. The results from Figure 1 suggests that skewness preference in IPO exists for most countries in our sample. For example, there are only two countries among 23 where underpricing in high expected skew portfolio is lower than low expected skew portfolio in Panel A. Among the remaining 21 countries, Germany, Japan, Malaysia, Poland, South Korea, Singapore, and Thailand exhibit a high minus low spread of over 10%p. Countries with positive spreads account for roughly 90% of all countries in our sample. We find similar results in Panel B, where positive spreads appear in 17 countries. The results from Figure 1 further confirm a strong relationship between skewness preference and IPO underpricing in most financial markets around the world.

<Figure 1>

3.2. Multivariate analysis

In this section, we further examine the relationship between underpricing and expected skewness in a multivariate framework after controlling for various factors that have identified in the previous literature to

affect underpricing. Specifically, we control for firm and deal characteristics (age, log of proceeds, and an indicator for primary shares only), market-level variables (market return, underpricing dispersion, log of market capitalizationand log of GDP), and industry-specific variables (industry volatility, industry return, industry momentum, and industry turnover). The details of these variables are as defined in Section 2. We also control for year, country, and industry fixed effects, sequentially.

Table 5 reports the results of the multivariate regressions where the dependent variable is IPO underpricing. The first three columns show the results for the raw initial returns and the remaining three columns report the results for the market-adjusted initial returns. *t*-stats based on White's (1980) heteroskedasticity consistent standard errors are reported in parentheses.

The results indicate that the coefficients of expected skewness are all positive and statistically significant at the 1 percent level, consistent with our hypothesis. For example, the estimated coefficient on skewness in column (1) is 0.294 (t-statistics = 4.31), indicating that a one-standard deviation increase in the expected skewness is associated with a 2.47% larger initial return. We obtain very similar coefficients when we replace raw return with market-adjusted return in columns (4) through (6). The economic significance of expected skewness on underpricing is comparable to that in Green and Hwang (2012) for the US stock market, who report an increase of 1.5% in initial return for a corresponding increase in expected skewness.

When we add country fixed effects in columns (2) and (5), the magnitude of the coefficient on expected skewness more than doubles. The magnitude of this coefficient remains virtually unchanged when we further control for industry characteristics and fixed effects in columns (3) and (6). These results suggest that our results are not driven by a specific country or an industry. Overall, Table 5 shows that the expected skewness has explanatory power distinct from the other variables identified in the existing literature on the determinants of underpricing, consistent with Green and Hwang (2012).

<Table 5>

We next implement a sub-sample analysis where we run the regressions separately for each economic and geographic region to further verify whether our results are driven by a certain region. We first consider two disjoint sets of economic regions; Emerging vs. Developed, and G7 vs. Non-G7 regions. Geographic regions are Europe, America, and Asia. To allow a direct comparison of the estimated coefficients, we standardize both the dependent and independent variables to zero mean and unit variance. Panel A reports the results based on raw returns while panel B reports those based on market adjusted returns.

The results from Table 6 indicate that the expected skewness preference is observed in all economic and geographic regions, consistent with the pooled analysis in Table 5.

For the economic regions, the coefficients on skewness range from 0.56 for Non-G7 countries to 0.084 for the G7. A one-standard deviation increase in the expected skewness is associated with a 0.075 and 0.084 standard deviation larger initial return for developed markets and G7 countries, respectively. Note that the magnitude of these estimates of the skewness preference effects for developed market IPOs is larger than that for developing market IPOs.

For all geographic regions, all coefficient estimations of skewness are positive and highly statistically significant, with the lowest t-statistic occurring for Europe at 1.76. The standardized coefficients indicate that a one-standard deviation increase in the skewness is associated with 0.039, 0.038, and 0.083 standard deviation larger initial returns for the Europe, America, and Asia, respectively. The skewness coefficient associated with Asia is more than double those associated with Europe and America.

In summary, the results from Table 6 suggest that a preference for expected skewness is a very general phenomenon that exists in different markets around the world, regardless of the level of economic development and geographic location.

<Table 6>

4. Cultural Dimensions: The Effect of Gambling Tendencies

Recent studies show that cultural dimensions affect investment decisions.[13] In this section, we exploit cross-country variations using four cultural dimension measures, namely, the number of gambling properties, atheist population, the degree of individualism (versus collectivism), and newspaper circulation.

We consider the number of gambling properties in a country divided by the geographic size in square kilometers to capture the country-level gambling propensity.[14] Accessibility to gabling properties would reflect the actual gambling environments in a country, which would likely affect investors' gambling type activity in the stock market.

The second cultural dimension is the demographics of atheism, measured as the percentage of the population identified as atheist, agnostic, or non-believer in God (from Zuckerman, 2007).[15] Recent studies suggest that the religious distribution is related to the long-shot bias of its inhabitants (Kumar, Page, Spalt, 2011; Schneider and Spalt, 2016). For example, Kumar, Page, and Spalt (2011) argue that religion-induced local cultural norms influence investor portfolio decisions. Schneider and Spalt (2016) also recently show that religious composition could predict overinvestment. These studies find that Catholics have a higher gambling propensity and are less risk-averse compared to Protestants based on US demographic data. Several recent papers also document the relationships between religious beliefs and risk-aversion. For example, Noussair, Trautmann, Kuilen, and Vellekoop (2012) and Leon and Pfeifer (2013) show that religious people are less willing to take risks than non-religious people based on Dutch and German survey data, respectively. Similarly, the Institute of Policy Studies (2014), a Singaporean think-tank housed in the National University of Singapore, reports that non-religious people feel less guilt from gambling than

[13] For example, Markus and Kitayama (1991), Barber and Odean (2001), Chui, Titman, and Wei (2010), Lucey and Zhang (2010), Kumar, Page, Spalt (2011), Aggarwal, Kearney, and Lucey (2012), and Schneider and Spalt (2016).

[14] The top countries with the highest gambling properties in our sample are the US, Australia, and France. The bottom countries are Indonesia, Taiwan, and Norway. Gambling in the bottom countries is illegal for the most part.

[15] The top countries ranked by non-religious population are Sweden, Japan, and Norway; the bottom countries were Thailand, Malaysia, and the Philippines.

religious people.[18] We thus assume that a country with a higher non-religious population is more likely to engage in gambling-like activities in the stock market.

Third, we use Hofstede's (2001) individualism index as a proxy for overconfidence[20]. Previous studies suggest that individualism may lead to overconfidence, resulting in excessive over-optimism towards future returns (Markus and Kitayama, 1991; Chui, Titman, and Wei, 2010). If so, investors in cultures with high individualism could exaggerate reactions to firm-specific news. We investigate whether the skewness preference in IPO markets is stronger in markets where investor individualism is high.

The last variable is newspaper circulation, measured as the logarithm of newspapers circulated per thousand inhabitants.[21] Previous studies use newspaper circulation to represent retail investor attention (Chan, 2003; Tetlock, 2007; Tetlock, Saar-Tsechansky, and Macskassy, 2008; Fang and Peress, 2009; and many others). A high national newspaper circulation represents a large number of investors with potential access to widely available information about the stock market, including recent IPO returns. Thus, we assume that retail investors in a country with a high national newspaper circulation generally pay more attention to stock markets and may be subject to more skewness preference relative to those in countries with lower national newspaper circulation.

In Table 7, we interact our main expected skewness variable with each of the cultural measures discussed above, and test whether skewness preference varies across different cultures. In this analysis, *Culture* is a dummy variable that takes a value of one if a country has an above-median value for each of the four culture measures. Since cultural dimension variables are held constant over the entire sample period for each country, we do not incorporate country fixed effects in this analysis.

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[18] The proportion of Singaporean residents "who believed gambling is almost/always wrong" is 59.2% of Buddhists, 74.0% of Catholics, 76% of Hindus, 90.8% of Muslims, 78.4% of Protestants, and only 61.2% of non-religious people.

[20] Generally, the US and many developed countries rank high in Hofstede's individualism index.

[21] The top countries ranked by newspaper circulation were Norway, Japan, Sweden, Korea, and the UK. The bottom countries were Indonesia, Brazil, China, India, and the Philippines.

The dependent variable is market-adjusted IPO first-day return. All variables are standardized to zero mean and a variance of one as in Table 6.

The results in Table 7 strongly suggest that cultural dimensions indeed affect the relationship between expected skewness and underpricing. In all models, the interaction term is positive and statistically significant. For example, in the first column, the interaction between gambling facilities and expected skewness is positive and statistically significant. We observe a similar result for the remaining three cultural variables. In summary, skewness preference in the IPO markets seems to be stronger in countries where there is more gambling properties, and people are less religious, more individualistic, and read more newspapers.

<Table 7>

5. Additional Evidence

5.1. Robustness tests

In this section, we examine whether our findings are sensitive to various alternative specifications. We first examine whether our results are affected by legal institutions. We use two measures of legal institutions.

The first measure is a common law dummy, a well-known measure of investor protection (La Porta, Lopez-de-Silanes, and Shleifer, 1998). Lin, Pukthuangthong, and Walker (2013) further demonstrate that the better investor protection in common law countries leads to higher litigation risk against the issuers, which would lead to a higher underpricing in common law countries relative to civil law countries. Our second measure is the prospectus liability index from La Porta, Lopez-de-Silanes, and Shleifer (2006). Banerjee, Dai, and Shrestha (2011) use the prospectus liability index to proxy for country-level accessibility to legal resources. They find a statistically significant positive relationship between the prospectus liability index and IPO first-day returns using a sample of IPOs in 16 countries. The results from Table 8 indicate that including legal institution variables does not affect our results. We also note that the coefficients on common law dummy in columns (1) and (2) and those on prospectus liability index in columns (3) and (4)

are all positive and significant at the 1 percent level, consistent with Lin, Pukthuangthong, and Waler (2013) and Banerjee, Dai, and Shrestha (2011).

<Table 8>

In Table 9, we cluster standard errors at the country level and rerun our regressions. The results suggest that the main results are again not affected. In the first column of Table 10, we follow Petersen (2009) and incorporate a two-way clustering of standard errors at both the firm-level and the year-level. We still observe a positive and significant coefficient of a similar magnitude on the expected skewness.

<Table 9>

In the remaining columns of Table 10, we implement additional robustness tests by discretizing our main explanatory variable, and excluding certain large countries from the sample. In columns (2) and (3) of table 10, we replace expected skewness, which is a continuous variable, with a dummy variable that equals one if stocks are in the top quartile of expected skewness, and zero otherwise. The coefficient on this dummy variable remains positive and significant, although the magnitude has decreased somewhat due to discretization. In the remaining columns (4) through (7), we exclude China and US from the sample, which are the two countries with the largest median underpricing and the largest number of IPOs in our sample, respectively. The results indicate that excluding these two largest countries from the sample does not affect our main findings.

<Table 10>

5.2. Long-term performance

So far, we have demonstrated that skewness preference in the IPO market is not simply a US specific phenomenon, but rather a global phenomenon, potentially affected by cultural dimensions. If such preference indeed affects asset prices though an increase in demand for lottery type stocks leading to a price premium, then we should observe a subsequent underperformance for stocks with high expected skewness.

In this subsection, we test whether an IPO with high expected skewness actually underperforms an IPO with low expected skewnessover alonger period. For each IPO in our sample, we first obtain the benchmark-adjusted abnormal return for longer buy-and-hold periods after the IPO as follows.

$$\mathrm{AR}_{\mathrm{i}}^{T} = \prod_{t=1}^{T}(1 + r_{i,t}) - \prod_{t=1}^{T}(1 + r_{b,t}) \qquad \text{(Eq. 2)}$$

where $\mathrm{AR}_{\mathrm{i}}^{T}$ is the T-period buy-and-hold abnormal return for firm *i* after the IPO (from 6 to 36 months), $r_{i,t}$ is the return for firm *i* in month *t* after the IPO, and $r_{b,t}$ is the benchmark return in month *t*. We consider three different types of benchmark portfolios: market-adjusted excess returns, industry-size adjusted excess returns, and size and book-to-market-adjusted returns.

First, we calculate market-adjusted excess returns using an equally-weighted market index in each country. Next, to compute industry-size adjusted excess returns, we group the all stock within a FF17 industry into quintiles based on firm size (market capitalization) in each country for each month. We measure the size of the IPO firm by the market value at the end of the issuing month. Finally, we double-sort all stocks in a country independently on their size and book-to-market ratio into 25 (5x5) portfolios each month. The size of the IPO firm is defined as the market value of equity at the end of the issuing month, and book-to-market ratio is the previous year's book equity divided by the market value of equity. If the previous year's book equity is not available, we use the book equity for year *t*. Based on breakpoints in each country, we allocate IPOs to one of the size and book-to-market portfolios.

Table 11 shows the long-term raw returns of IPO stocks up to 36 months following the IPO. Panel A reports the raw returns and panels B, C, and D report market-adjusted, industry-size adjusted, size and book-to-market adjusted abnormal returns, respective. We also report alphas from global Fama-French 3 factor

model in panel E.

The results suggest that IPOs with high expected skewness tend to earn lower returns than IPOs with low expected skewness. For example, panel A of Table 11 shows that the difference in 12- and 30-month raw returns between the high and low expected skewness IPOs is -3.4% and -16.4%, respectively. The underperformance of the high-skewness IPO becomes more pronounced as the holding period increases, while the return for the low-skewness IPO outperforms at longer horizons. For 36 months post-IPO, the high-skewness IPO return is -2.5%, while that for low-skewness IPO amounts up to 16.9%. The gap in the return between the high and low skewness IPO remains positive and statistically significant at the 1% level based on White's (1980) heteroscedasticity-consistent standard errors.

In panels B and C of Table 11, the market-adjusted return and industry-size adjusted return also tend to be lower for high skewness IPOs than for low skewness IPOs. For example, the differences in the market-adjusted return between high and low skewness are -5.5%, -12.9%, and -18.1% from 12 months to 36 months, all of which are highly significant. We observe a similar pattern in panel D where the return on high minus low portfolios is -4.1% after 12 months and -14.5% after 24 months.

In Panel E, we also report the global three factor alphas, where the test portfolio is the return difference between IPOs with high and low expected skewness. Following Amihud, Hameed, Kang, and Zhang (2015), we first construct the country-level risk factors by aggregating them for each country, with all returns converted to US dollars. The return on the global market portfolio (net of risk free rate), SMB (small minus big), and HML (high minus low) are the monthly value-weighted average of the country's market portfolio, SMB, and HML returns where the weights are the country's stock market capitalization at the end of the year. The risk-free rate is based on US T-bill returns. The alphas reported in panel E of Table 11 are all negative and significant after 12 months up to 36 months, consistent with the results from the earlier panels.

<Table 11>

In Table 12, we further examine the relationship between expected skewness of an IPO and long-term underperformance after controlling for additional firm, deal, and market-level characteristics in a multivariate regression. The dependent variables are 1-, 2-, and 3-year buy and hold returns. We include six control variables; Firm age, Log of Proceeds, Log GDP, Log of market cap, $\text{Market Return}_{t-1}$ (previous one-month market return for each stock market),and $\text{Market Return}_{t-2,t-12}$ (previous one-year market return for each stock market, excluding the previous month). The results indicate that coefficients on expected skewness remain significantly negative for all specifications, even after controlling for these six variables. In unreported tables where we replace the dependent variable with the market-adjusted abnormal return, we also find very similar results. Overall, the results in this subsection indicate that IPOs with high expected skewness significantly underperform their corresponding benchmark portfolios as well as IPOs with low expected skewness over a longer period. This finding provides additional support for the claim that skewness preference affects asset prices through increases in demand for lottery type stocks.

6. Conclusion

This study builds on the intersection of two important streams of recent research: preference for skewness discussed in the behavioral finance context, and IPO underpricing documented in international financial markets. Specifically, we test whether the preference for IPO's lottery-like features reported by Green and Hwang (2012) for a sample of US IPOs may also exist in other markets.

We find that first-day IPO returns are strongly related to a preference for skewness even in a global context. Our results remain robust to different sub-sample analyses as well as different econometric specifications.

We also find that cultural dimensions, especially potential preference for gambling may be related with the degree of skew preference. Specifically, we find that skew preference is stronger in countries where there are more gambling facilities, and people are less religious, more individualistic, and read more

newspaper. Finally, we examine long-term buy and hold returns following these IPOs, and find that those with high expected skewness indeed underperform those with low expected skewness.

From IPO literature's perspective, we provide an additional factor for global IPO underpricing that has not been explored in the previous literature. We also extend the recent growing research in skew preference by documenting that such preference also exists in non-U.S. markets.

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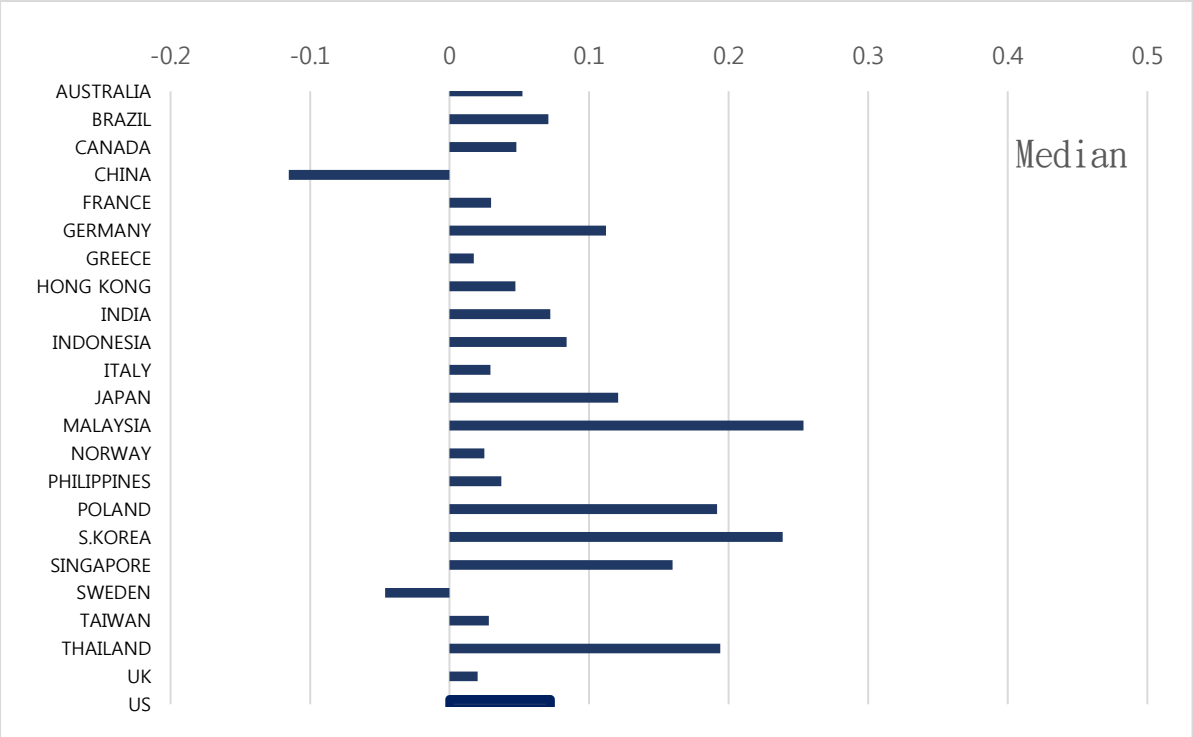
Figure 1. Differences in Underpricing between IPOs with High and Low Expected Skewness

This figure reports the country by country medians (panel A) and means (panel B) of differences in the first day returns between the high and the low expected skewness terciles. Expected skewness is calculated for a given firm-month for each of the Fama-French 17 industry within each of the 23 countries from 1990 to 2013 following Green and Hwang (2012). Stocks sorted into tercile portfolios within a given country.

Panel A. Median



Panel B. Mean

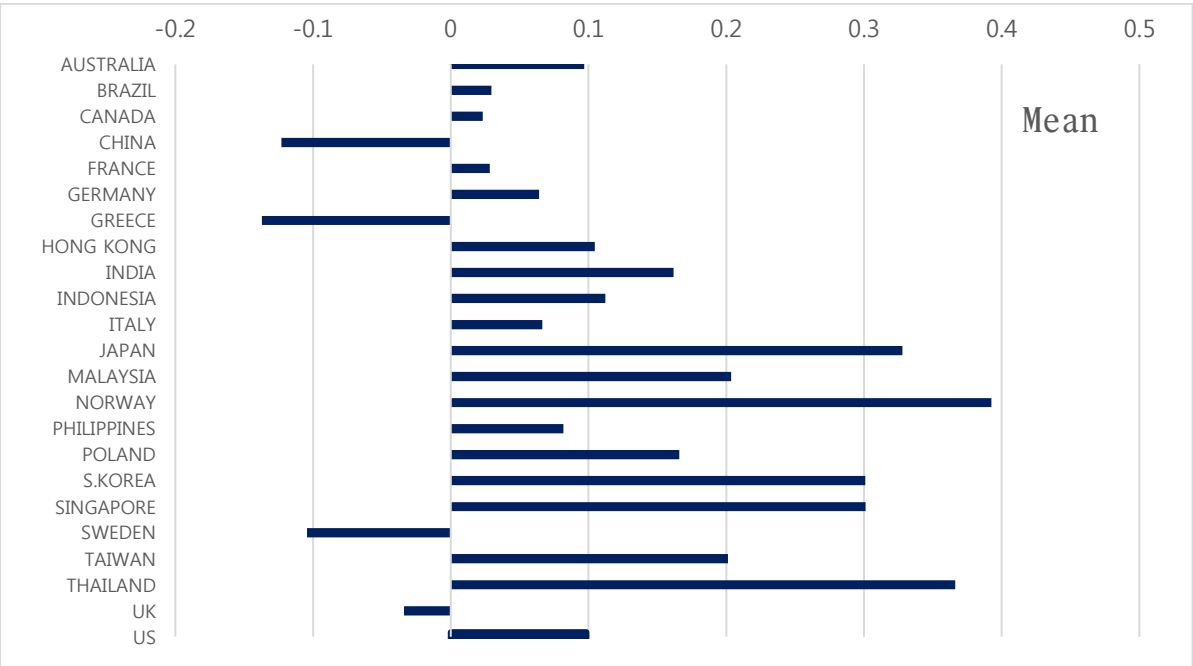


Table 1. Average Underpricing and Number of IPOs per Country

This table presents the descriptive statistics for 17,051 IPOs from 23 countries between 1990 and 2013. RAWRET is IPO underpricing defined as the first-day secondary market closing price divided by the final offer price minus one. ADJRET is the market-adjusted first-day returns. N is the number of IPO observations.

	RAWRET			ADJRET			
Countries	Mean	Median	STD	Mean	Median	STD	N
AUSTRALIA	0.275	0.070	0.738	0.275	0.070	0.737	1,573
BRAZIL	0.109	0.017	0.487	0.107	0.020	0.485	133
CANADA	0.685	0.208	1.043	0.683	0.208	1.041	1,312
CHINA	0.420	0.265	0.740	0.420	0.267	0.739	1,916
FRANCE	0.116	0.019	0.459	0.115	0.016	0.459	500
GERMANY	0.406	0.033	0.908	0.405	0.033	0.907	373
GREECE	0.188	0.005	0.646	0.187	0.011	0.648	55
HONG KONG	0.388	0.047	0.946	0.387	0.048	0.943	707
INDIA	0.292	0.088	0.726	0.292	0.080	0.724	393
INDONESIA	0.196	0.092	0.590	0.197	0.098	0.588	238
ITALY	0.147	0.019	0.587	0.148	0.021	0.585	161
JAPAN	0.282	0.051	0.737	0.282	0.053	0.736	1,925
S.KOREA	0.435	0.226	0.712	0.435	0.232	0.711	777
MALAYSIA	0.302	0.098	0.751	0.302	0.096	0.750	592
NORWAY	0.179	0.006	0.752	0.181	0.009	0.750	104
PHILIPPINES	0.108	0.000	0.709	0.109	0.005	0.708	105
POLAND	0.287	0.090	0.664	0.285	0.095	0.663	152
SINGAPORE	0.227	0.044	0.691	0.227	0.043	0.690	428
SWEDEN	0.147	0.000	0.710	0.150	0.009	0.708	101
TAIWAN	0.191	0.068	0.659	0.191	0.068	0.659	916
THAILAND	0.201	0.047	0.535	0.200	0.044	0.535	286
UK	0.197	0.088	0.443	0.197	0.088	0.442	793
US	0.195	0.071	0.397	0.195	0.072	0.397	3,511

Table 2. IPO Underpricing by FF17 Industries

This table presents average raw return, market-adjusted return, and number of IPOs by the Fama and French (1997) 17-industry classification (FF17). RAWRET is IPO underpricing defined as the first-day secondary market closing price divided by the final offer price minus one. ADJRET is the market-adjusted first-day returns. We categorize each IPO as Low, Medium, or High, based on expected skewness. Expected skewness is calculated for a given firm-month for each of the Fama-French 17 industry within each of the 23 countries from 1990 to 2013 following Green and Hwang (2012). Stocks sorted into tercile portfolios within a given country. The last three columns show the number of IPOs sorted on expected skewness.

		Underpricing		N			
				All	Expected Skewness (SKEW)		
		RAWRET	ADJRET		Low	Medium	High
1	Food	0.221	0.221	592	241	208	143
2	Mining and Minerals	0.448	0.447	1,353	400	450	503
3	Oil and Petroleum Products	0.390	0.389	604	211	196	197
4	Textiles, Apparel & Footwear	0.267	0.267	343	105	141	97
5	Consumer Durables	0.232	0.232	433	164	161	108
6	Chemicals	0.295	0.296	411	182	156	73
7	Drugs, Soap, Perfums, Tobacco	0.251	0.251	518	166	163	189
8	Construction and Construction Materials	0.276	0.276	930	309	363	258
9	Steel Works, etc.	0.314	0.315	339	129	120	90
10	Fabricated Products	0.251	0.252	172	68	57	47
11	Machinery and Business Equipment	0.310	0.310	2,146	759	770	617
12	Automobiles	0.253	0.252	295	103	98	94
13	Transportation	0.167	0.166	531	191	183	157
14	Utilities	0.291	0.291	240	93	67	80
15	Retail Stores	0.235	0.234	792	290	284	218

16	Banks, Insurance Companies, and Other Financials	0.219	0.219	2,146	759	734	653
17	Others: Wholesale and Services	0.340	0.340	5,206	2,020	1,672	1,514
	All			17,051	6,190	5,823	5,038

Table 3. IPO Underpricing and Expected Skewness: Test of Differences in Median Underpricing

This table reports the median first-day returns of IPOs classified as Low, Medium, or High, based on expected skewness. Expected skewness is calculated for a given firm-month for each of the Fama-French 17 industry within each of the 23 countries from 1990 to 2013 following Green and Hwang (2012). Stocks sorted into tercile portfolios within a given country. Medians are obtained across each region represented by each row. RAWRET is IPO underpricing defined as the first-day secondary market closing price divided by the final offer price minus one. ADJRET is the market-adjusted first-day returns. *p*-values are calculated using the Wilcoxon rank-sum test for the null that difference in the medians between high and low expected skewness IPOs is zero. ***, **, * represent 1%, 5%, 10% significance levels, respectively.

	RAWRET					ADJRET				
	Expected Skewness (SKEW)					Expected Skewness (SKEW)				
Expected Skewness	Low	Medium	High	DIFF	*p*-value	Low	Medium	High	DIFF	*p*-value
Panel A. All countries										
ALL	0.063	0.071	0.130	0.067***	(<0.001)	0.062	0.073	0.129	0.067***	(<0.001)
Panel B. Economic regions										
NON-G7	0.070	0.082	0.137	0.067***	(<0.001)	0.075	0.083	0.135	0.060***	(<0.001)
G7	0.050	0.062	0.127	0.077***	(<0.001)	0.052	0.062	0.126	0.074***	(<0.001)
Developed Markets	0.115	0.113	0.166	0.051***	(<0.001)	0.114	0.114	0.166	0.052***	(<0.001)
Emerging Markets	0.048	0.057	0.120	0.072***	(<0.001)	0.048	0.057	0.119	0.071***	(<0.001)
(excl. China)	0.040	0.086	0.156	0.116***	(<0.001)	0.041	0.086	0.161	0.120***	(<0.001)
Panel C. Geographic regions										
Europe	0.038	0.054	0.087	0.050***	(<0.001)	0.039	0.056	0.088	0.049***	(<0.001)
AMERICA	0.065	0.071	0.143	0.078***	(<0.001)	0.066	0.072	0.141	0.076***	(<0.001)
ASIA	0.069	0.080	0.140	0.071***	(<0.001)	0.068	0.082	0.140	0.072***	(<0.001)

Table 4. IPO Underpricing and Expected Skewness: Test of Differences in Mean Underpricing

This table reports the median first-day returns of IPOs classified as Low, Medium, or High, based on expected skewness. Expected skewness is calculated for a given firm-month for each of the Fama-French 17 industry within each of the 23 countries from 1990 to 2013 following Green and Hwang (2012). Stocks sorted into tercile portfolios within a given country. Medians are obtained across each region represented by each row. RAWRET is IPO underpricing defined as the first-day secondary market closing price divided by the final offer price minus one. ADJRET is the market-adjusted first-day returns. *t*-stats are estimated using the White's heteroskedasticity-consistent test for the null that difference in the means between high and low expected skewness IPOs is zero. ***, **, * represent 1%, 5%, 10% significance levels, respectively.

	RAWRET					ADJRET				
	Expected Skewness (SKEW)					Expected Skewness (SKEW)				
	Low	Medium	High	DIFF	*t*-stat	Low	Medium	High	DIFF	*t*-stat
Panel A. All countries										
ALL	0.268	0.281	0.368	0.100***	(7.39)	0.268	0.280	0.368	0.100***	(7.40)
Panel B. Economic regions										
NON-G7	0.288	0.285	0.374	0.086***	(4.34)	0.288	0.285	0.374	0.086***	(4.35)
G7	0.250	0.276	0.363	0.113***	(6.45)	0.248	0.275	0.362	0.114***	(6.46)
Developed Markets	0.247	0.272	0.362	0.114***	(7.15)	0.247	0.272	0.362	0.115***	(7.15)
Emerging Markets	0.310	0.295	0.383	0.073***	(2.97)	0.309	0.296	0.383	0.074***	(2.98)
(excl. China)	0.162	0.278	0.384	0.222***	(7.78)	0.162	0.278	0.383	0.222***	(7.78)
Panel B. Geographic regions										
Europe	0.217	0.190	0.237	0.0204	(1.32)	0.216	0.190	0.237	0.021	(1.22)
AMERICA	0.283	0.334	0.364	0.081***	(3.70)	0.282	0.333	0.363	0.082***	(3.70)
ASIA	0.271	0.280	0.401	0.129***	(6.70)	0.271	0.280	0.401	0.129***	(6.71)

Table 5. Firm-level Regressions: IPO Underpricing and Expected Skewness

This table shows the results of regressing IPO underpricing on expected skewness in the full sample of 17,051 IPOs from 23 countries between 1990 to 2013. RAWRET is IPO underpricing defined as the first-day secondary market closing price divided by the final offer price minus one. ADJRET is the market-adjusted first-day returns. Skewness is as defined in Tables 3 and 4. Firmage represents the age of the firm in years at the time of the IPO. Log of Proceeds is the natural logarithm of IPO proceeds in US dollars. Pure Primary is an indicator of whether the offering consists of primary shares only. Market return is the previous one-month market return for each stock market. IPO volatility is the standard deviation of IPO first-day return over the previous three-months. Log GDP is the natural logarithm of GDP per capita in US dollars. Log of market cap is the natural logarithm of the market capitalization in US dollars for each country. Industry Volatility is the standard deviation of returns for the FF17 industry category over the previous month. Industry Return is the average industry return for the FF17 of the previous month. Industry Momentum is the cumulative industry return from month *t*-8 to *t*-2. Industry Turnover is the industry trading volume turnover of the previous month. *t*-stats, reported in parentheses, are calculated using White's (1980) heteroskedasticity -consistent standard errors. ***, **, * represent 1%, 5%, 10% significance levels, respectively.

	RAWRET			ADJRET		
	(1)	(2)	(3)	(4)	(5)	(6)
Skewness	0.294***	0.624***	0.627***	0.296***	0.627***	0.629***
	(4.31)	(9.09)	(9.14)	(4.35)	(9.13)	(9.18)
Firmage	-0.008	0.009	0.007	-0.008	0.009	0.007
	(1.47)	(1.49)	(1.26)	(1.46)	(1.49)	(1.26)
Log of Proceeds	-0.052***	-0.089***	-0.088***	-0.052***	-0.089***	-0.088***
	(16.05)	(24.86)	(23.47)	(16.05)	(24.86)	(23.48)
Pure Primary	0.039***	-0.016	-0.012	0.040***	-0.016	-0.012
	(3.69)	(1.43)	(1.07)	(3.70)	(1.44)	(1.08)
Market Return	0.946***	0.947***	0.952***	0.944***	0.945***	0.950***
	(8.89)	(9.20)	(9.27)	(8.89)	(9.20)	(9.27)
IPO Volatility	0.599***	0.817***	0.798***	0.597***	0.816***	0.797***
	(25.63)	(27.22)	(26.79)	(25.62)	(27.23)	(26.79)
Log of GDP	-0.007	-0.097**	-0.108**	-0.007	-0.096**	-0.107**
	(1.45)	(2.27)	(2.56)	(1.47)	(2.25)	(2.54)
Log of Market Cap	0.022***	0.152***	0.156***	0.022***	0.152***	0.156***
	(9.35)	(7.47)	(7.73)	(9.40)	(7.48)	(7.74)
Industry Volatility			-0.011			-0.011
			(1.16)			(1.18)
Industry Return			-0.011**			-0.010**
			(2.12)			(2.03)
Industry Momentum			0.000			0.000
			(0.01)			(0.03)
Industry Turnover			0.000***			0.000***
			(5.87)			(5.86)
Intercept	-0.063	-1.047***	-1.065***	-0.065	-1.059***	-1.077***
	(0.89)	(4.05)	(4.10)	(0.91)	(4.10)	(4.14)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	No	Yes	Yes	No	Yes	Yes
Industry dummies	No	No	Yes	No	No	Yes

Observations	17,002	17,002	16,992	17,002	17,002	16,992
Adjusted R^2	0.120	0.162	0.164	0.120	0.162	0.164

Table 6. Firm-level Regressions: IPO Underpricing and Expected Skewness by Regions

This table shows the results of regressing IPO underpricing on expected skewness for various sub-samples; developed markets, emerging markets, G7, non-G7, Europe, America, and Asia. All variables are standardized to a zero mean and a unit variance. In panel A, the dependent variable is RAWRET, defined as the first-day secondary market closing price divided by the final offer price minus one. In panel B, the dependent variable is ADJRET, market-adjusted first-day returns. Skewness is as defined in Tables 3 and 4. Firmage represents the age of the firm in years at the time of the IPO. Log of Proceeds is the natural logarithm of IPO proceeds in US dollars. Pure Primary is an indicator of whether the offering consists of primary shares only. Market return is the previous one-month market return for each stock market. IPO volatility is the standard deviation of IPO first-day return over the previous three-months. Log GDP is the natural logarithm of GDP per capita in US dollars. Log of market cap is the natural logarithm of the market capitalization in US dollars for each country. *t*-stats, reported in parentheses, are calculated using White's (1980) heteroskedasticity -consistent standard errors. ***, **, * represent 1%, 5%, 10% significance levels, respectively.

Panel A: RAWRET

	Economic Region				Geographic Region		
	Emerging	Developed	G7	NON-G7	EUROPE	AMERICA	ASIA
Skewness	0.066***	0.075***	0.084***	0.056***	0.039*	0.038***	0.083***
	(4.69)	(7.47)	(7.85)	(4.81)	(1.76)	(2.67)	(7.76)
Firmage	0.053***	-0.006	0.003	0.030**	0.008	0.016	0.018
	(2.74)	-(0.62)	(0.22)	(2.18)	(0.37)	(0.85)	(1.44)
Log of Proceeds	-0.134***	-0.243***	-0.306***	-0.120***	-0.090***	-0.437***	-0.143***
	-(7.70)	-(22.74)	-(23.13)	-(9.47)	-(4.22)	-(19.92)	-(13.47)
Pure Primary	0.008	-0.009	-0.020**	0.015	-0.004	-0.017**	0.005
	(0.70)	-(1.02)	-(2.17)	(1.57)	-(0.18)	-(2.00)	(0.38)
Market Return	0.089***	0.058**	0.061***	0.080***	0.033	0.027*	0.090***
	(6.45)	(5.35)	(5.52)	(6.85)	(1.24)	(1.78)	(8.75)
IPO Volatility	0.347***	0.340***	0.395***	0.336***	0.214***	0.441***	0.374***
	(16.13)	(16.24)	(15.19)	(17.94)	(5.59)	(7.69)	(26.29)
Log of GDP	-0.573***	-0.056**	-0.033	-0.398***	0.218	-0.310	-0.218**
	-(5.06)	-(2.21)	-(1.02)	-(4.14)	(1.40)	-(1.55)	-(2.45)
Log of Market Cap	0.903***	-0.122	-0.157	0.720***	0.018	1.145**	0.612***
	(7.52)	-(1.17)	-(1.21)	(8.26)	(0.18)	(2.26)	(7.23)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,558	11,444	8,532	8,470	2,196	4,955	9,851
Adjusted R^2	0.182	0.170	0.226	0.125	0.076	0.266	0.161

Table 6. - *continued*

Panel B: ADJRET

	Economic Region				Geographic Region		
	Emerging	Developed	G7	NON-G7	EUROPE	AMERICA	ASIA
Skewness	0.066***	0.075***	0.084***	0.056***	0.039*	0.038***	0.083***
	(4.72)	(7.50)	(7.87)	(4.84)	(1.77)	(2.69)	(7.80)
Firmage	0.053***	-0.006	0.003	0.030**	0.009	0.016	0.018
	(2.74)	-(0.63)	(0.22)	(2.18)	(0.41)	(0.83)	(1.43)
Log of Proceeds	-0.135***	-0.243***	-0.306***	-0.120***	-0.089***	-0.438***	-0.143***
	-(7.72)	-(22.73)	-(23.12)	-(9.48)	-(4.18)	-(19.92)	-(13.48)
Pure Primary	0.008	-0.009	-0.021**	0.015	-0.004	-0.018**	0.005
	(0.69)	-(1.03)	-(2.18)	(1.57)	-(0.17)	-(2.06)	(0.40)
Market Return	0.089***	0.058***	0.062***	0.080***	0.033	0.027*	0.090***
	(6.44)	(5.39)	(5.58)	(6.83)	(1.26)	(1.82)	(8.75)
IPO Volatility	0.347***	0.340***	0.395***	0.336***	0.216***	0.443***	0.374***
	(16.16)	(16.24)	(15.20)	(17.96)	(5.64)	(7.73)	(26.28)
Log of GDP	-0.571***	-0.056**	-0.033	-0.397***	0.218	-0.308	-0.216**
	-(5.04)	-(2.19)	-(1.00)	-(4.13)	(1.40)	-(1.54)	-(2.43)
Log of Market Cap	0.904***	-0.120	-0.156	0.720***	0.017	1.152**	0.613***
	(7.52)	-(1.15)	-(1.20)	(8.26)	(0.18)	(2.27)	(7.24)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,558	11,444	8,532	8,470	2,196	4,955	9,851
Adjusted R2	0.182	0.169	0.226	0.125	0.076	0.266	0.161

Table 7. Effect of Cultural Dimensions

This table shows the regression results of IPO underpricing on expected skewness and cultural dimensions in the full sample of 17,051 IPOs from 23 countries between 1990 to 2013. All variables are standardized to a zero mean and a unit variance. We consider 4 country-level cultural dimensions; gambling tendency, religion, individualism, and newspaper circulation. Specifically, Gamble is the number of gambling properties in a country divided by the geographic size in square kilometers. Non-religious is the percentage of people who identify themselves as atheist, agnostic, or non-believer in God for each country (Zuckerman, 2007). Individualism represents Hofstede's individualism score for each country (Hofstede, 2001). Newspaper is the logarithm of newspaper circulation per thousand inhabitants. Culture is a dummy variable that takes a value of one if a country is above the median in these culture dimensions The dependent variable is market-adjusted IPO first-day return. Skewness is as defined in Tables 3 and 4. Firmage represents the age of the firm in years at the time of the IPO. Log of Proceeds is the natural logarithm of IPO proceeds in US dollars. Pure Primary is an indicator of whether the offering consists of primary shares only. Market return is the previous one-month market return for each stock market. IPO volatility is the standard deviation of IPO first-day return over the previous three-months. Log GDP is the natural logarithm of GDP per capita in US dollars. Log of market cap is the natural logarithm of the market capitalization in US dollars for each country. *t*-stats, reported in parentheses, are calculated using White's (1980) heteroskedasticity -consistent standard errors. ***, **, * represent 1%, 5%, 10% significance levels, respectively.

	Gamble	Non-religious	Individualism	Newspaper
Skewness	0.058***	0.054***	0.063***	0.027**
	(4.93)	(4.85)	(5.56)	(2.23)
Skewness x Culture	0.024**	0.028***	0.017*	0.061***
	(2.18)	(2.70)	(1.72)	(4.93)
Culture	0.297***	0.010	0.296***	-0.001
	(4.85)	(0.94)	(4.80)	-(0.13)
Firmage	0.014	0.014	0.014	0.014
	(1.47)	(1.50)	(1.49)	(1.55)
Log of Proceeds	-0.223	-0.223	-0.223	-0.223
	-(24.85)	-(24.85)	-(24.84)	-(24.85)
Pure Primary	-0.010	-0.010	-0.010	-0.010
	-(1.37)	-(1.40)	-(1.38)	-(1.41)
Market Return	0.075	0.074	0.075	0.074
	(9.12)	(9.11)	(9.16)	(9.13)
IPO Volatility	0.377	0.379	0.377	0.375
	(27.14)	(27.23)	(27.13)	(27.01)
Log of GDP	-0.173	-0.175	-0.168	-0.199
	-(2.43)	-(2.45)	-(2.35)	-(2.76)
Log of Market Cap	0.501	0.503	0.499	0.505
	(7.48)	(7.51)	(7.44)	(7.54)
Intercept	0.000	0.000	0.000	0.000
	-(7.03)	-(3.76)	-(7.14)	-(3.40)

Year dummies	Yes	Yes	Yes	Yes
Observations	17,002	17,002	17,002	17,002
Adjusted R^2	0.1626	0.1627	0.1625	0.1637

Table 8. Additional Control Variables: Legal Protection of Investor Rights

This table reports the results for regressions in which we additionally control for legal protection of investor rights; namely common law dummy and prospectus liability index from La Porta et al. (2006). The dependent variable is raw and market-adjusted IPO first-day return. Skewness is as defined in Tables 3 and 4. Firmage represents the age of the firm in years at the time of the IPO. Log of Proceeds is the natural logarithm of IPO proceeds in US dollars. Pure Primary is an indicator of whether the offering consists of primary shares only. Market return is the previous one-month market return for each stock market. IPO volatility is the standard deviation of IPO first-day return over the previous three-months. Log GDP is the natural logarithm of GDP per capita in US dollars. Log of market cap is the natural logarithm of the market capitalization in US dollars for each country. *t*-stats, reported in parentheses, are calculated using White's (1980) heteroskedasticity -consistent standard errors. ***, **, * represent 1%, 5%, 10% significance levels, respectively.

	RAWRET	ADJRET	RAWRET	ADJRET
	(1)	(2)	(3)	(4)
Skewness	0.314***	0.315***	0.360***	0.362***
	(4.59)	(4.61)	(5.28)	(5.32)
Common Law	0.093***	0.093***		
	(7.34)	(7.32)		
Prospectus Liability index			0.206***	0.205***
			(14.43)	(14.41)
Firmage	-0.005	-0.005	-0.004	-0.004
	(0.95)	(0.94)	(0.77)	(0.77)
Log of Proceeds	-0.053***	-0.053***	-0.059***	-0.059***
	(16.31)	(16.31)	(17.53)	(17.53)
Pure Primary	0.027***	0.027***	0.014	0.014
	(2.51)	(2.52)	(1.30)	(1.31)
Market Return	0.925***	0.923***	0.897***	0.895***
	(8.67)	(8.67)	(8.44)	(8.44)
IPO Volatility	0.612***	0.610***	0.634***	0.633***
	(26.02)	(26.01)	(26.85)	(26.84)
Log of GDP	-0.021***	-0.021***	-0.036***	-0.036***
	(4.03)	(4.05)	(6.77)	(6.78)
Log of Market Cap	0.030***	0.030***	0.025***	0.025***
	(11.69)	(11.73)	(10.67)	(10.72)
Intercept	-0.121*	-0.122*	-0.129*	-0.127*
	(1.69)	(1.71)	(1.76)	(1.74)
Year dummies	Yes	Yes	Yes	Yes
Observations	17,002	17,002	17,002	17,002
Adjusted R^2	0.123	0.123	0.134	0.133

Table 9.Standard Errors Adjusted for Clustering at the Country-Level

This table reports the results for regressions with robust standard error clustered at the country level. The dependent variable is raw and market-adjusted IPO first-day return. Skewness is as defined in Tables 3 and 4. Firmage represents the age of the firm in years at the time of the IPO. Log of Proceeds is the natural logarithm of IPO proceeds in US dollars. Pure Primary is an indicator of whether the offering consists of primary shares only. Market return is the previous one-month market return for each stock market. IPO volatility is the standard deviation of IPO first-day return over the previous three-months. Log GDP is the natural logarithm of GDP per capita in US dollars. Log of market cap is the natural logarithm of the market capitalization in US dollars for each country. Industry Volatility is the standard deviation of returns for the FF17 industry category over the previous month. Industry Return is the average industry return for the FF17 of the previous month. Industry Momentum is the cumulative industry return from month *t*-8 to *t*-2. Industry Turnover is the industry trading volume turnover of the previous month. . For readability, we multiply the coefficients of Industry Momentum and Industry Turnover 10^2 and 10^5, respectively. *t*-stats, reported in parentheses, are calculated using White's (1980) heteroskedasticity -consistent standard errors. ***, **, * represent 1%, 5%, 10% significance levels, respectively.

	RAWRET		ADJRET	
	(1)	(2)	(3)	(4)
Skewness	0.624***	0.627***	0.627***	0.629***
	(3.30)	(3.38)	(3.33)	(3.40)
Firmage	0.009	0.007	0.009	0.007
	(1.06)	(0.92)	(1.06)	(0.92)
Log of Proceeds	-0.089***	-0.088***	-0.089***	-0.088***
	-(3.02)	-(2.82)	-(3.01)	-(2.82)
Pure Primary	-0.016	-0.012	-0.016	-0.012
	-(1.39)	-(1.10)	-(1.40)	-(1.12)
Market Return	0.947***	0.952***	0.945***	0.950***
	(6.19)	(5.98)	(6.10)	(5.89)
IPO Volatility	0.817***	0.798***	0.816***	0.796***
	(7.68)	(7.49)	(7.72)	(7.52)
Log of GDP	-0.097	-0.108	-0.096	-0.107
	-(0.81)	-(0.88)	-(0.80)	-(0.87)
Log of Market Cap	0.152*	0.156*	0.152*	0.156*
	(1.86)	(1.91)	(1.86)	(1.92)
Industry Volatility		-0.011		-0.011
		-(1.13)		-(1.17)
Industry Return		-0.011*		-0.010*
		-(1.72)		-(1.66)
Industry Momentum		0.001		0.001
		(0.02)		(0.06)
Industry Turnover		0.005***		0.005***
		(9.88)		(9.85)
Intercept	-1.047	-1.065	-1.059	-1.077
	(1.64)	(1.72)	(1.66)	(1.74)
Year dummies	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes
Industry dummies	No	Yes	No	Yes

Observations	17,002	16,992	17,002	16,992
Adjusted R^2	0.165	0.168	0.165	0.168

Table 10. Additional Robustness Tests

This table shows regression results using different model specifications and an alternative sample composition. In column 1, *t*-statistics are based on two dimensional firm- and year-clustered standard errors (Petersen, 2009). Columns 2 and 3 use a Highskew dummy equal to one if stocks are in the top quartile of expected skewness. In columns 4 and 5, we use a 22-country sample excluding Chinese IPOs. Similarly, columns 6 and 7 are based on a 22-country sample excluding the U.S. The dependent variable is market-adjusted IPO first-day return. Skewness is as defined in Tables 3 and 4. Firmage represents the age of the firm in years at the time of the IPO. Log of Proceeds is the natural logarithm of IPO proceeds in US dollars. Pure Primary is an indicator of whether the offering consists of primary shares only. Market return is the previous one-month market return for each stock market. IPO volatility is the standard deviation of IPO first-day return over the previous three-months. Log GDP is the natural logarithm of GDP per capita in US dollars. Log of market cap is the natural logarithm of the market capitalization in US dollars for each country. Industry Volatility is the standard deviation of returns for the FF17 industry category over the previous month. Industry Return is the average industry return for the FF17 of the previous month. Industry Momentum is the cumulative industry return from month *t*-8 to *t*-2. Industry Turnover is the industry trading volume turnover of the previous month. . For readability, we multiply the coefficients of Industry Momentum and Industry Turnover 10^2 and 10^5, respectively. *t*-stats, reported in parentheses, are calculated using White's (1980) heteroskedasticity-consistent standard errors. ***, **, * represent 1%, 5%, 10% significance levels, respectively.

	Firm-Year clustered	Highskew Dummy		Excl. China		Excl. US	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Skewness	0.627***	0.095***	0.097***	0.809***	0.798***	0.603***	0.594***
	(6.16)	(8.29)	(8.40)	(10.88)	(10.78)	(8.27)	(8.08)
Firmage	0.009	0.008	0.007	0.008	0.006	0.011*	0.009
	(1.63)	(1.38)	(1.14)	(1.29)	(1.06)	(1.65)	(1.34)
Log of Proceeds	-0.089***	-0.088***	-0.087***	-0.084***	-0.083***	-0.096***	-0.097***
	(12.94)	(24.63)	(23.23)	(22.96)	(21.65)	(23.20)	(22.55)
Pure Primary	-0.016	-0.014	-0.010	-0.012	-0.009	-0.004	-0.004
	(0.79)	(1.23)	(0.89)	(1.11)	(0.77)	(0.26)	(0.27)
Market Return	0.945***	0.938***	0.944***	1.061***	1.075***	0.961***	0.966***
	(6.85)	(9.13)	(9.21)	(8.37)	(8.52)	(8.69)	(8.75)
IPO Volatility	0.816***	0.817***	0.797***	0.686***	0.666***	0.851***	0.831***
	(13.28)	(27.25)	(26.84)	(20.77)	(20.36)	(27.48)	(26.99)
Log of GDP	-0.096*	-0.103**	-0.115***	-0.117**	-0.127**	-0.111**	-0.121***
	(1.92)	(2.42)	(2.73)	(2.15)	(2.35)	(2.42)	(2.68)
Log of Market Cap	0.152***	0.145***	0.150***	0.033	0.039	0.154***	0.161***
	(3.66)	(7.14)	(7.41)	(1.39)	(1.62)	(7.06)	(7.42)
Industry Volatility			-0.011		-0.007		0.002
			(1.08)		(0.93)		(0.16)
Industry Return			-0.009*		-0.002		0.006
			(1.67)		(0.39)		(0.27)
Industry Momentum			0.014		0.027		-0.053
			(0.32)		(0.61)		(0.43)
Industry Turnover			0.005***		0.004***		0.005***
			(6.13)		(5.58)		(5.57)
Intercept	-1.059	-0.888	-0.907	1.187	1.104	-0.888	-0.927
	-1.582	(3.46)	(3.51)	(2.31)	(2.13)	(2.99)	(3.11)

Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	No	No	Yes	No	Yes	No	Yes
Observations	17,002	17,002	16,992	15,086	15,078	13,491	13,481
Adjusted R^2	0.1623	0.161	0.163	0.151	0.153	0.166	0.167

Table 11. Long-term Performance Following IPOs

This table reports the average long-term performance, over 6-, 12-, 18-, 24-, 30-, 36-month post-IPO during 1990-2013. We report the results separately for Low, Medium, and High portfolios based on expected skewness as well the difference between the High and Low portfolio. Skewness is as defined in Tables 3 and 4. Panels A, B, C, and D report those based on raw returns, market-adjusted returns, industry and size benchmark-adjusted returns, and size and book to market benchmark-adjusted returns, respectively. Panel E reports the alphas from a global Fama-French 3 factor model. *t*-stats are estimated using White's (1980) heteroskedasticity-consistent standard errors. ***, **, * represent 1%, 5%, 10% significance levels, respectively.

Panel A. Raw returns

	6M	12M	18M	24M	30M	36M
Low	0.032	0.047	0.068	0.068	0.121	0.169
Medium	0.044	0.047	0.037	0.033	0.059	0.088
High	0.026	0.013	-0.037	-0.044	-0.043	-0.025
DIFF(H-L)	-0.006	-0.034***	-0.105***	-0.112***	-0.164***	-0.194***
t-stat	-0.62	-2.65	-6.97	-6.58	-8.35	-8.81

Panel B. Market-adjusted excess returns

	6M	12M	18M	24M	30M	36M
Low	0.003	0.018	-0.030	-0.071	-0.074	-0.082
Medium	0.003	0.007	-0.061	-0.099	-0.128	-0.168
High	-0.025	-0.037	-0.153	-0.200	-0.244	-0.263
DIFF(H-L)	-0.028***	-0.055***	-0.123***	-0.129***	-0.170***	-0.181***
t-stat	-3.19	-4.46	-8.73	-7.93	-8.98	-8.57

Panel C. Industry and Size adjusted excess returns

	6M	12M	18M	24M	30M	36M
Low	-0.012	-0.034	-0.079	-0.136	-0.168	-0.214
Medium	-0.023	-0.059	-0.100	-0.140	-0.189	-0.226
High	-0.046	-0.104	-0.161	-0.214	-0.228	-0.269
DIFF(H-L)	-0.034***	-0.070***	-0.082***	-0.078***	-0.060***	-0.055**
t-stat	-3.03	-4.82	-5.39	-3.78	-3.01	-2.41

Table 11. – *continued*

Panel D. Size and book-to-market-adjusted excess returns

	6M	12M	18M	24M	30M	36M
Low	0.032	0.066	0.070	0.060	0.043	-0.004
Medium	0.048	0.000	-0.010	-0.022	-0.031	-0.034
High	0.035	0.025	-0.045	-0.085	-0.081	-0.078
DIFF(H-L)	0.002	-0.041*	-0.116***	-0.145***	-0.124***	-0.074*
t-stat	0.13	-1.82	-3.75	-4.11	-3.22	-1.73

Panel E. Global Fama-French 3 factor alphas

	6M	12M	18M	24M	30M	36M
DIFF(H-L)	-0.021	-0.049*	-0.081***	-0.086***	-0.157***	-0.186***
t-stat	-1.14	-1.81	-3.18	-2.70	-4.45	-4.28

Table 12. Regression of Post-IPO Returns on Expected Skewness

This table reports the results of regressing post-IPO performance on expected skewness. The dependent variable is the 1-, 2-, and 3-year returns post- IPO. Skewness is as defined in Tables 3 and 4. Firmage represents the age of the firm in years at the time of the IPO. Log of Proceeds is the natural logarithm of IPO proceeds in US dollars. Log GDP is the natural logarithm of GDP per capita in US dollars. Log of market cap is the natural logarithm of market capitalization in US dollars for each country. Pre-IPO Market Returns is the market return over the previous 12 months prior to the IPO. Market $\text{Return}_{t-1,t-n}$ is the previous n-month market returns for each stock market, where n is 12, 24, or 36(for one-year, two- year, three-year returns, respectively). For example, if the dependent variable is one-year return, n is 12. *t*-stats, reported in parentheses, are calculated using White's (1980) heteroskedasticity-consistent standard errors. ***, **, * represent 1%, 5%, 10% significance levels, respectively.

	1-Year	2-Year	3-Year
Skewness	-0.427***	-0.568***	-0.757***
	(-7.25)	(-7.03)	(-7.21)
Firmage	-0.015***	-0.014**	-0.010
	(-3.27)	(-2.32)	(-1.23)
Log of Proceeds	-0.002	0.003	0.001
	(-0.66)	(0.80)	(0.12)
Log of GDP	-0.006	0.007	0.075***
	(-0.73)	(0.60)	(4.81)
Log of Market Cap	-0.022***	-0.029***	-0.033***
	(-8.12)	(-7.90)	(-6.97)
Pre-IPO Market Returns	-0.176***	-0.231***	-0.076*
	(-6.66)	(-6.49)	(-1.68)
$\text{Market Return}_{t-1,t-n}$	0.780***	0.629***	0.604***
	(31.79)	(23.75)	(20.66)
Year dummies	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes
Observations	16,228	15,167	13,695
Adjusted R^2	0.146	0.132	0.114

Table 13. Regression of Post-IPO Returns on (Expected Skewness x Culture)

This table reports the results of regressing post-IPO performance on expected skewness. The dependent variable is the 3-year returns post- IPO. Skewness is as defined in Tables 3 and 4. We consider 4 country-level cultural dimensions; gambling tendency, religion, individualism, and newspaper circulation. Specifically, Gamble is the number of gambling properties in a country divided by the geographic size in square kilometers. Non-religious is the percentage of people who identify themselves as atheist, agnostic, or non-believer in God for each country (Zuckerman, 2007). Individualism represents Hofstede's individualism score for each country (Hofstede, 2001). Newspaper is the logarithm of newspaper circulation per thousand inhabitants. Culture is a dummy variable that takes a value of one if a country is above the median in these culture dimensions. Firmage represents the age of the firm in years at the time of the IPO. Log of Proceeds is the natural logarithm of IPO proceeds in US dollars. Log GDP is the natural logarithm of GDP per capita in US dollars. Log of market cap is the natural logarithm of market capitalization in US dollars for each country. Pre-IPO Market Returns is the market return over the previous 12 months prior to the IPO. Market $\text{Return}_{t-1,t-36}$ is the previous 36-month market returns for each stock market. *t*-stats, reported in parentheses, are calculated using White's (1980) heteroskedasticity-consistent standard errors. ***, **, * represent 1%, 5%, 10% significance levels, respectively.

	Gamble	Non-religious	Individualism	Newspaper circulation
Skewness	-0.454***	-0.855***	-0.527***	-0.506***
	(-3.00)	(-5.47)	(-3.68)	(-2.98)
Skewness x Culture	-0.575***	0.296	-0.426**	-0.432**
	(-2.83)	(1.45)	(-2.11)	(-2.05)
Culture	0.142***	-0.189***	0.166***	0.097*
	(4.06)	(-6.61)	(4.67)	(1.88)
Firmage	-0.010	-0.003	-0.009	-0.010
	(-1.24)	(-0.41)	(-1.16)	(-1.30)
Log of Proceeds	-0.002	-0.008	-0.003	0.000
	(-0.42)	(-1.39)	(-0.48)	(0.09)
Log of GDP	0.049***	0.076***	0.014	0.058***
	(2.89)	(4.81)	(0.66)	(2.98)
Log of Market Cap	-0.040***	-0.014**	-0.032***	-0.034***
	(-7.63)	(-2.63)	(-6.83)	(-6.95)
Pre-IPO Market Returns	-0.082*	-0.114**	-0.069	-0.072
	(-1.79)	(-2.50)	(-1.51)	(-1.58)
Market $\text{Return}_{t-1,t-36}$	0.591***	0.580***	0.611***	0.595***
	(20.02)	(19.92)	(20.71)	(19.76)
Year dummies	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes
Observations	13,695	13,695	13,695	13,695
Adjusted R2	0.115	0.117	0.115	0.114