Explaining the Value Premium around the World: Risk or Mispricing?[*]

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Abstract

We empirically examine the predictions of the risk-based explanation versus the mispricing hypothesis with limits-to-arbitrage on the positive relation between book-to-market ratios and subsequent stock returns (i.e., the value premium) around the world. We use the uncertainty avoidance index and the individualism index developed by Hofstede (2001) to measure investors' attitudes-toward-risk and use the transaction cost index and market development measures to proxy for limits-to-arbitrage. Using data from forty countries, we conduct cross-sectional regressions of returns on book-to-market ratios on subsamples split by a given measure of attitudes-toward-risk or limits-to-arbitrage. Our cross-country results in general appear to be consistent with the risk-based explanation but fail to support the mispricing hypothesis.

JEL Classification: G14, G31, M41, M42

Keywords: Book-to-market effect; Risk aversion; Mispricing; Limits-to-arbitrage; International

1. Introduction

A considerable body of literature has investigated the value premium puzzle--the phenomenon that stocks with high book to market equity earn higher expected returns than do stocks with low book to market equity and that this book-to-market effect cannot explained by the CAPM. For example, Fama and French (1992) find that the value premium is significantly positive in the U.S. stock market (see also Rosenberg, Reid, and Lanstein (1985) and others). Furthermore, Fama and French (1998, 2012), and Hou, Karolyi, and Kho (2011) find that this value premium exists not only in developed markets but also in emerging markets.[1] However, the cause of this phenomenon is still inconclusive. There are two prominent alternative explanations for the value premium: the risk-based explanation versus the mispricing explanation.

Fama and French (1992, 1993, 1996) argue that book-to-market equity is a proxy for distress risk. That is, the higher is the book-to-market equity of a firm, the larger is this firm's exposure to the distress risk. Since the distress risk is not captured by the market risk, firms with high book-to-market ratios are commensurate with higher expected returns than are firms with low book-to-market ratios. In other words, the value premium represents compensation for risk.

If the risk-based explanation is correct, then the value premium or the book-to-market effect should vary with some risk factors. However, the identification of this set of factors is still under investigation. Fama and French (1993) find that the book-to-market effect in the U.S., except for small growth firms, can be explained by their empirically constructed three-factor model consisted of the market, size, and book-to-market factors. Hahn and Lee (2006) find that the book-to-market effect is subsumed by a credit market risk factor proxied by the term spread in

[1] Chui and Wei (1998) study the value premiums in five Asian countries and find that the value premium is significant in Hong Kong, South Korea, and Malaysia but not in Taiwan and Thailand. Chan, Hamao, and Lakonishok (1991) and Daniel, Titman, and Wei (2001) also find that the value premium exists in Japan. See also Griffin (2002) for the evidence of four developed markets, Canada, Japan, The U.K., and the U.S.

explaining the cross-section of expected stock returns. Kapadia (2011) finds that a two-factor model with the market factor and the tracking portfolio for aggregate distress as another factor can explain the 25 size and book-to-market sorted portfolios as well as does the Fama and French (1993) three-factor model. Xing (2008) finds that the value premium disappears when an investment factor is taken into account, which is consistent with the *q*-theory explanation associated with the business cycle for the value premium suggested by Zhang (2005). The above empirical findings indicate that the book-to-market effect is related to the macroeconomic risk that is associated with the distress risk, the credit market condition, and the business cycle.

An alternative explanation for the value premium is mispricing--the stock price of a firm is deviated from its true or intrinsic value. For example, stocks tend to be overpriced or underpriced from time to time. Investors may overreact to past performance of firms and extrapolate past earnings growth too far to the future (e.g., DeBont and Thaler (1987); Lakonishok, Shleifer, and Vishny (1994); Daniel, Hirshleifer, and Subrahmanyam (1998, 2001)). Since overpriced stocks tend to have lower book-to-market ratios, while underpriced stocks tend to have higher book-to-market ratios, the eventual market correction on equity mispricing can lead to the value premium.

The mispricing explanation further suggests that the significance of the value premium depends on how fast arbitrageurs correct the mispricing. If arbitrage activities are costless and entail no risk, one would expect that the mispricing should be short-lived and the value premium should be small. However, as argued by De Long, Shleifer, Summers, and Waldmann (1990) and Shleifer and Vishny (1997), arbitrage activities are costly, risky, and limited. If mispricing is the cause, then arbitrage risk or the degree of limits-to-arbitrage should be a major determinant of the value premium. Using a sample of stocks from the U.S., Ali, Hwang, and Trombley (2003) find that the value premium is larger for stocks with higher idiosyncratic risk, higher transaction

costs, and lower analyst following. They interpret their findings to be consistent with the mispricing with limits-to-arbitrage argument.

The above empirical studies from the U.S. market are inconclusive about which hypothesis is better in explaining the book-to-market effect.[2] In this paper, we take the advantage of the cross-country differences in the degree of attitudes-toward-risk and the degree of limits-to-arbitrage to examine the debate between the risk-based versus the mispricing-based explanations for the book-to-market effect. A cross-country study based on these country-level institutional variables should shed additional light on our understanding of the value premium puzzle.

To test the risk-based explanation, instead of searching for a new risk factor that is associated with book-to-market equity or testing an existing asset-pricing model as in previous studies, we conduct the tests from the viewpoint of investor behavior. Investors who have grown up in different cultures are likely to have different attitudes-toward-risk. If firms with high book-to-market equity are riskier than firms with low book-to-market equity, the value premium should be higher in countries where investors are more risk averse. We use the uncertainty avoidance index and the individualism index constructed by Hofstede (2001) to measure investors' attitudes-toward-risk in a country. Uncertainty avoidance refers to the degree in which people avoid ambiguous situations and therefore it should be a direct measure of risk aversion.[3] Chui, Titman, and Wei (2010) suggest that people in individualistic countries are more overoptimistic and overconfident than are people in collectivistic countries. Since overoptimistic and/or overconfident investors tend to overestimate the probability of the success and underestimate the

[2] Daniel and Titman (1997) propose a characteristic model as an alternative hypothesis for the Fama and French three-factor model. Please see Daniel and Titman (1997) and Davis, Fama, and French (2000) for the U.S. evidence, Daniel, Titman, and Wei (2001) for the Japanese evidence, and Hou, Karolyi, and Kho (2011) foe the international evidence. However, this debate is not the focus of our paper.

[3] Bontempo, Bottom, and Weber (1997) document that risk judgments of respondents from high uncertainty avoidance (*UAI*) countries are more sensitive to potential losses than to potential gains. It is this fear of failure that makes people in high-*UAI* countries to take less risk than those in low-*UAI* countries.

risk of their investment, individualism is an inverse measure of risk aversion. We therefore expect that the value premium is positively associated with uncertainty avoidance and negatively related to individualism.[4]

To test the mispricing with limits-to-arbitrage hypothesis, instead of using firm characteristics to measure limits-to-arbitrage within a country as in previous studies, we use county-level institutional characteristics to measure the degree of limits-to-arbitrage. Arbitrage activities should be easier and less costly in a country with more advanced market development. We consider two measures of market development to proxy for limits-to-arbitrage: the access-to-equity market index and the market capitalization-to-GDP ratio. We also use the transaction cost index to measure limits-to-arbitrage directly. We expect that the value premium should be stronger in countries with less market development or higher transaction costs.

Our study is closely related to those of Griffin (2002), Fama and French (1998, 2012), and Hou, Karolyi, and Kho (2011). However, Griffin (2002) and Fama and French (1998, 2012) focus on testing whether the value premium can be explained by the Fama and French three-factor model (and its variants) and whether the global or local version of these models is better to explain global stock returns. Hou, Karolyi, and Kho (2011) focus on whether it is the factors or characteristics that better explain the cross-section of global stock returns. Our study differs from these studies. Instead of testing whether the value premium can be explained by a local or global factor model or whether book-to-market equity is a factor or characteristic, we focus on whether the value premium is caused by risk or pricing. As in Hou, Karolyi, and Kho (2011), our sample also includes emerging markets but for a different reason. The purpose of including emerging markets by Hou, Karolyi, and Kho (2011) is to provide a more comprehensive analysis, while

[4] Using data from thirty-five countries, Griffin, Li, Yue, and Zhao (2011) document that managers in individualistic countries are willing to take more risk than are managers in collectivistic countries.

our purpose is to increase the power of statistical tests. Since arbitrage activities are expected to be more difficult and more costly in emerging markets, including developing markets can improve the power of the tests related to the mispricing explanation. Second, different from these studies, we examine the determinants of the cross-country differences in the value premium, the issue which has not been examined previously. The answer to this question can help us distinguish between the risk-based and the mispricing explanations without specifically testing an asset-pricing model.

Consistent with Fama and French (1998, 2012) and Hou, Karolyi, and Kho (2011), we find that the value premium is pervasive based on the return data from 40 countries during the period of 1981 to 2009. In particular, the size-adjusted value premium is positive in 36 out of these 40 countries in our sample. In addition, the value premium is statistically significant in 22 countries and there are significant variations in the value premium across countries. We then conduct the Fama and MacBeth (1973) cross-sectional regressions of returns on book-to-market ratios on subsamples split by a given measure of attitudes-toward-risk or limits-to-arbitrage to test our hypotheses. We find that, in general, the value premium decreases with individualism and increases with uncertainty avoidance. On the contrary, the value premium is generally not related to our measures of limits-to-arbitrage. Overall, our international evidence provides significant support for the risk-based explanation for the value premium but fails to support the mispricing explanation.

The remainder of this paper proceeds as follows. The next section reviews the related literature and develops our hypotheses. Section 3 describes our sample and empirical methodology. Section 4 discusses the test results from the risk-based hypothesis and the mispricing with limits-to-arbitrage hypothesis. Finally Section 5 concludes the paper.

2. Literature Review and Hypothesis Development

2.1. The rational risk-based explanation

Fama and French (1992, 1993, 1996) argue that book-to-market equity reflects the relative distress risk of a firm. The market disciplines firms with poor earnings prospects by depressing their stock prices, which, in turn, makes these firms to have a higher book-to-market ratio. This distress risk factor is not captured by the CAPM and hence investment in stocks of firms with a higher book-to-market ratio is commensurate with a higher expected return. Using a three-factor model consisted of the market, size, and book-to-market factors, Fama and French (1993, 1996) find that their three-factor model can explain the value premium and several other well-documented anomalies.[5]

Using the change in the term spread as a risk measure for the credit market condition, Hahn and Lee (2006) find that firms with high book-to-market ratios have higher factor loadings on the change in the term spread than firms with low book-to-market ratios. They further document that the book-to-market effect vanishes when the effect of the change in the term spread on stock returns have been taken into account.[6] Their results appear to support the argument that the book-to-market effect is associated with a distress risk factor.[7] In addition, Liew and Vassalou (2000) find that the book-to-market factor (*HML*) constructed by Fama and French (1993) is

[5] Although Fama and French (1992) find that past market betas cannot explain the value premium, Campbell and Vuolteenaho (2004) find that the value premium documented by Fama and French (1992) can be explained by the fact that value stocks tend to have higher cash-flow (i.e., bad) betas than do growth stocks.

[6] However, Griffin and Lemmon (2002) find that the book-to-market effect is more than twice larger among firms with the highest distress risk than among other firms and that the effect differential cannot be explained by the Fama and French (1993) three-factor model. In addition, firms with high distress risk experience the largest return reversal around earnings announcements. They argue that their results appear to be more consistent with the mispricing argument suggested by Lakonishok, Shleifer, and Vishny (1994) but fail to support the distress risk argument suggested by Fama and French (1992, 1993, 1995).

[7] Using aggregate business failure of both public and private firms, Kapadia (2011) constructs a portfolio that tracks aggregate business failure as a measure of aggregate distress risk. He finds that the value premium and the size premium can be explained by their exposures to this distress risk.

positively associated with future gross domestic product (GDP) growth, which also supports a risk-based explanation for the value premium.

Zhang (2005) proposes an alternative risk-based explanation. He shows that the value premium can be explained by the *q*-theory of investment with asymmetric adjustment costs and a time-varying price of risk in that value firms suffer increased risk during downturns. In addition, *q*-theory argues that firms with a lower (higher) future discount rate tend to make more (less) investment and to have a lower (higher) book-to-market ratio. Therefore, controlling for future productivity, the *q*-theory predicts a positive relation between book-to-market ratios and expected returns.[8] Using data from the U.S., Xing (2008) finds evidence that is consistent with this prediction, which suggests that book-to-market equity is a risk factor related to the discount rate for future cash flows.[9]

If book-to-market equity is associated with risk, we should expect that there is a positive relation between the value premium and the degree of risk aversion. Investors who have grown up in different cultures are likely to have different attitudes-toward-risk, leading to variations in the value premium across cultures. Hofstede (2001) classifies culture into five dimensions and, among them, uncertainty avoidance and individualism are related to risk attitudes.[10] Hofstede (2001) argues that uncertainty avoidance refers to the degree in which people in a country would like to avoid ambiguous situations. If the future prospects of firms with high book-to-market equity are indeed more ambiguous than those of firms with low book-to-market, investors in

[8] Based on the dividend discount valuation model with clean surplus accounting, Fama and French (1998) also show a similar result. More specifically, they show that, controlling for expected equity cash flows, there is a positive relation between book-to-market ratios and expected stock returns. However, this argument is silent on whether the book-to-market effect is caused by rational or irrational pricing.

[9] Lettau and Wachter (2007) propose a duration-based explanation for the value premium. They show that since growth stocks are long-horizon equity, they vary less with fluctuations in cash flows so they are less risky. They argument appears to be consistent with Campbell and Vuolteenaho's (2004) empirical finding that growth stocks have lower cash flow betas (bad betas) than do value stocks.

[10] These five dimensions are individualism, uncertainty avoidance, power distance, masculinity, and long-term orientation. Among them, individualism is studied very intensively in the business literature.

cultures with high uncertainty avoidance will tend to avoid these firms, which, in turn, will lead to a higher value premium.

Individualism is referred to as the extent to which people in a country tend to have an *independent* rather than an *interdependent* self-construal, and the reverse is the case for collectivism (Hofstede (2001)). The independent construal of self is defined as "a conception of the self as an autonomous, independent person" and the interdependent construct of self is defined as "seeing oneself as part of an encompassing social relationship and recognizing that one's behavior is determined, contingent on, and to a large extent organized by what the actor perceives to be the thoughts, feelings, and actions of others in the relationship" (Markus and Kitayama (1991, pp. 226-227)). It is expected that people who have an independent self-construal emphasize more on one's positive attributes, such as their own abilities, than people who have an interdependent self-construal. Chui, Titman, and Wei (2010) argue that, compared with investors in collectivistic cultures, investors in individualistic cultures are prone to be more overoptimistic and overconfident about their abilities. As a result, they tend to overestimate their probability of success and underestimate the risk of their investment, making them more willing to take more risk.[11] Therefore, we expect a negative relation between individualism and the value premium. The above discussions lead to our first hypothesis:

H_1: The positive relation between book-to-market ratios and expected returns is stronger in countries with high uncertainty avoidance attitudes or low individualistic cultures than in countries with low uncertainty avoidance attitudes or high individualistic cultures.

2.2. The mispricing with limits-to-arbitrage explanation

[11] Camerer and Lovallo (1999) find that entrant failure is related to overoptimistic behavior because decision makers over-estimate their success rates. In addition, overconfident people tend to overestimate the precision of their estimates and therefore underestimate the risk.

The value premium can also be a result of mispricing.[12] Lakonishok, Shleifer, and Vishny (1994) argue that the value premium exists, because investors overreact to past outperformance of low book-to-market firms (i.e., growth firms) and extrapolate their past earnings growth too far to the future.[13] DeBont and Thaler (1987) and Daniel, Hirshleifer, and Subrahmanyam (1998, 2001) show that if investors overreact to publicly announced good (bad) news of a firm, the price of this firm may be substantially above (below) its true value and this firm will have a lower (higher) book-to-market ratio. The positive value premium is just a result of a market correction. Consistent with this prediction, Daniel and Titman (2006) find that the value premium is mainly attributable to investors' overreaction to intangible information and Jiang (2010) further finds that the primary cause of the value premium in the U.S. stock market is the overreaction by institutional investors to intangible information.[14] Indeed, Jiang (2010) documents that the book-to-market effect exists only among stocks with intensive institutional trading.

If a stock is mispriced, the opportunity for a profitable trading will attract smart rational investors to arbitrage and their arbitrage activities should correct the mispricing. In an ideal case where the arbitrage opportunity is obvious, costless, and riskless to exploit, the mispricing should be corrected immediately. However, in a realistic market, De Long, Shleifer, Summers, and Waldmann (1990) and Shleifer and Vishny (1997) argue that arbitrage is limited, costly, and risky. Therefore, arbitrage risk or limits-to-arbitrage can be a major force to deter arbitrage activities, which suggests that mispricing can persist for a long period of time if arbitrage is too

[12] There is a third explanation, proposed by Fama and French (2007). Fama and French suggest that investor tastes for certain firm characteristics unrelated to properties of returns may also play a role to generate the value premium. This line of argument is related to the characteristic-based model proposed by Daniel and Titman (1997) and style investing suggested by Barberis and Shleifer (2003).

[13] Lakonishok, Shleifer, and Vishny (1994) further find that market betas are higher for value stocks than for growth stocks in good times but are lower in bad times, which is inconsistent with the risk explanation. In contrast, Petkova and Zhang (2005) find that time-varying betas tend to covary positively with the expected market risk premium for value stocks but negatively for growth stocks, a result that is consistent with the risk explanation. However, they also find that the beta-premium covariation is too small to explain the observed magnitude of the value premium.

[14] See Daniel and Titman (2006) for the detailed description on the construction of intangible information.

risky or too costly to implement. In fact, Doukas, Kim, and Pantzalis (2010) find evidence that indicates that stock mispricing is positively related to arbitrage risk proxied by the volatility of arbitrage returns.[15]

If the value premium is caused by mispricing, it should be negatively associated with arbitrage activities or positively related to the degree of limits-to-arbitrage. Consistent with this argument, Ali, Hwang, and Trombley (2003) document that while the value premium increases in idiosyncratic risk and transaction costs, it decreases in investor sophistication as measured by analyst following in the U.S. market. Nagel (2005) finds that the value premium is stronger among firms with low institutional holdings. He interprets his finding as consistent with the mispricing with limits-to-arbitrage hypothesis. The reason is that stocks with low institutional holdings are more difficult to sell short, which causes growth stocks to be overvalued.[16]

The above studies suggest that if the value premium is caused by mispricing, it should be positively associated with the severity of limits-to-arbitrage in a country. Stocks in countries with more advanced market development should have a low degree of limits-to-arbitrage. Similarly, stocks in countries with lower transaction costs or no short sales constraints should also have a lower degree of limits-to-arbitrage. The above discussions lead to our second hypothesis as follows:

H_2: The positive relation between book-to-market ratios and subsequent stock returns is stronger in countries with high limits-to-arbitrage (i.e., less market development or higher transaction

[15] Several studies have also examined the limits-to-arbitrage explanations for other anomalies. For example, Mashruwala, Shivaram, and Shevlin (2006) find that the accrual anomaly documented by Sloan (1996) can be explained by the severity of limits-to-arbitrage. Li and Zhang (2010) find only weak evidence that the q-theory with investment frictions explains the investment effect and that mispricing with limits-to-arbitrage seems to dominate the q-theory with investment frictions in explaining the investment effect. In contrast, Lam and Wei (2011) find that each explanation for the asset growth effect is supported by a fair and similar amount of evidence based on a more comprehensive analysis and using more exhaustive and comprehensive measures of limits-to-arbitrage and investment frictions.

[16] However, Chen (2011) argues that the stronger book-to-market effect in stocks with small market capitalization (Fama and French (2012)), high idiosyncratic risk (Ali, Hwang, and Trombley (2003)), high default risk (Griffin and Lemmon (2002)), and low institutional ownership (Nagel (2005)) is also consistent with the rational asset pricing explanation based on firm life expectancy or equity duration.

costs,) than in countries with low limits-to-arbitrage (i.e., more advanced market development or lower transaction costs).

3. Sample Selection and Methodology

3.1. Sample selection, variable definition, and data description

Our sample consists of firm-level and country-level data that are obtained from various sources. All firm-level data except the U.S firms are retrieved from Worldscope and Datastream International, provided by Thomson Financial. Data for the U.S. firms come from the Center for Research in Security Prices (CRSP) and Compustat. The starting date for each country varies according to the availability of the data in the country. We include all domestic common stocks listed on the major stock exchanges in each country, excluding ADRs, REITs, closed-end funds, trusts, and other financial institutions. We exclude firm-year observations with no valid data to calculate firm-level variables discussed below. We also exclude firm-year observations with negative book value of equity. As in Chui, Titman, and Wei (2010) we winsorize monthly returns obtained from Datastream to -95% or 100%. Since we need a reasonable number of stocks to perform portfolio analysis, we require each country to have at least 30 stocks that meet our sample selection criteria in any month in our sample period. After the screening process, our final sample consists of forty countries and twenty-six of them are classified as advanced economies by the International Monetary Fund (IMF). There are about 3.44 million firm-month observations in our sample.

Our firm-level variables are measured as follows. The book-to-market ratio (BM_t) is the ratio of book equity to market equity at the end of fiscal year t. Firm size (SZ_t) is the market capitalization in U.S. dollars at the end of June of year t. Total asset growth (TAG_t) is measured as the annual percentage change in total assets from fiscal year t-1 to fiscal year t. Momentum

(MOM_m) at month m measures the U.S. dollar buy-and-hold return from month m-7 to month m-1. Equity issuance ($Issue_m$) at month m measures the change in the number of shares outstanding adjusted for distribution events over the last 12 months from month m-12 to month m, as in Pontiff and Woodgate (2008) for the U.S. firms and as in McLean, Pontiff, and Watanabe (2009) for firms in other countries. The accounting variables of fiscal year ending in calendar year t-1 are matched with monthly returns from July of year t to June of year t+1. Our return series starts in July of 1982 as the earliest for some countries and ends in December of 2009 for all countries.

Our country-level variables are adopted from existing literature. We use three proxies to measure the cross-country difference in the culture-related general attitudes-toward-risk. Two of them, the individualism index (*Indv*) and the uncertainty avoidance index (*UAI*), are taken from Hofstede (1980, 2001). A higher value of *Indv* indicates a stronger individualistic environment and a higher value of *UAI* indicates a lower level of tolerance toward risk. As argued by Chui, Titman and Wei (2010), people in highly individualistic cultures tend to be more optimistic and more overconfident, and hence less risk averse. As a robustness check, we also consider an alternative measure of individualism (*AltIndv*), which is the reverse of the institutional collectivism index, as our third measure of attitudes-toward-risk. The institutional collectivism index is constructed by the Global Leadership and Organizational Behavior Effectiveness (GLOBE) project.[17] This index is considered as an updated version of Hofstede's individualism index. A higher value of *AltIndv* indicates a stronger individualistic culture.

We use two proxies related to the extent of equity market development to measure the degree of limits-to-arbitrage. The first measure is the ratio of stock market capitalization to gross domestic product (GDP) (*MktCap*, the market cap to GDP ratio), averaged over the period 1996-

[17] We obtain the GLOBE's institutional collectivism index from House, Hanges, Javidan, Dorfman, and Gupta (2004).

2010. The second measure is the index of access to equity markets (*Equity*), which is the average of the annual survey scores over the period 1999-2006. The annual survey, sponsored by World Economic Forum and published in Global Competitiveness Report, provides qualitative assessment of business executives on the ability of a firm to raise equity in their local stock markets. A country with a high value of the *MktCap* ratio or the *Equity* index indicates that it has more advanced capital markets and easier access to external equity markets, hence a lower level of limits-to-arbitrage. Both measures are originally constructed and used by La Porta, Lopez-de-Silanes, and Shleifer (2006) to proxy for equity market development.[18] We take the index of trading costs (*TCost*) used by Chan, Covrig, and Ng (2005) and Chui, Titman, and Wei (2010) as our third measure of limits-to-arbitrage. A higher value of this index indicates a higher transaction cost, and hence a higher level of limits-to-arbitrage. The values for all country-level variables except for the short sales status are reported in the Appendix.

3.2. Empirical methodology: Regression analysis

To examine the value premium or the book-to-market effect across countries, we follow Hou, Karolyi, and Kho (2011) and use the Fama-MacBeth (1973) procedure to estimate the following regression equation based on individual stocks from all countries:

$$R_{i,t} - R_{ft} = a_0 + b_1 Ln(BM)_{i,t-1} + b_2 Ln(SZ_{i,t}) + b_3 TAG_{i,t-1} + b_4 MOM_{i,t} + b_5 Issue_{i,t} + e_{i,t}, \quad (1)$$

where $R_{i,t}$ is the monthly raw return in U.S. dollars for stock *i* from July of year *t* to June of year *t*+1. R_{ft} is the risk-free rate of the corresponding month and is proxied by the one-month U.S. Treasury-bill rate. $BM_{i,t-1}$ and $TAG_{i,t-1}$ are the book-to-market ratio and asset growth in year *t*-1, respectively. $SZ_{i,t}$ is the market capitalization in June of year *t*. *Ln* represents the natural

[18] In their study, La Porta, Lopez-de-Silanes, and Shleifer (2006) use the 1999 annual survey score to proxy for access to equity markets. Their market cap to GDP ratio is average over the period 1996-2003.

logarithm. All these three variables are updated yearly. $MOM_{i,t}$ and $Issue_{i,t}$ are momentum and share issuance for stock i with the same time subscript as the dependent variable. Regression model (1) is estimated with country dummies using the Fama and MacBeth (1973) procedures. The reported estimates are the time-series averages of the monthly estimated coefficients with the *t*-statistics adjusted for the Newey-West (1987) robust standard errors.

Firm size, asset growth, momentum, and share issuance are included in the regression since previous studies have shown that these firm characteristics have significant influence on future stock returns. For example, Banz (1981) and Fama and French (1992) find that stocks of small firms (i.e., low market capitalization) tend to have higher future returns than stocks of big firms. Titman, Wei, and Xie (2004, 2012) and Cooper, Gulen, and Schill (2008) find that firms that grow their capital assets or total assets more tend to earn lower future returns. Jegadeesh and Titman (1993), Griffin, Ji, and Martin (2003), and Chui, Titman, and Wei (2010) have documented that stocks that have performed well in the past 3-12 months tend to continue to do well in the next 3-12 months. Daniel and Titman (2006), Fama and French (2008), Pontiff and Woodgate (2008), and McLean, Pontiff, and Watanabe (2009) find that stocks of firms with higher net share issuance tend to have lower future returns than stocks of firms with lower net share issuance.

To explore whether the risk-based hypothesis or the mispricing with limits-to-arbitrage hypothesis better explains the value premium, we use a split-sample approach suggested by Li and Zhang (2010) and Lam and Wei (2011). More specifically, we partition all sample countries into low, medium, and high subgroups based on their rankings on a country-level variable of interest and examine the book-to-market effect in each subgroup. If the risk-based hypothesis prevails, we expect that the value premium measured by the slope of $Ln(BM)$, b_1, in regression

equation (1) is significantly smaller in the high subgroup than in the low subgroup when the individualism index or the alternative individualism index is the partitioning variable. We expect the opposite when the uncertainty avoidance index is the partitioning variable. If the mispricing with limits-to-arbitrage hypothesis dominates, we should observe a significantly stronger book-to-market effect in the low subgroup than in the high subgroup when the market cap to GDP ratio or the access to equity market index is the partitioning variable. We expect the opposite when the transaction costs index is the partitioning variable.

4. Empirical Results

4.1. The country-by-country value premiums

We use portfolio analysis to examine whether the value premium exists in each individual economy. For each country, at the end of June in year *t*, we form *BM* quintile portfolios based on the book-to-market ratio (*BM*) in year *t*-1 in ascending order. For instance, firms with *BM* in the bottom 20% are assigned to the *BM*1 portfolio and those in the top 20% are assigned to the *BM*5 portfolio. Firms remain in these portfolios from July of year *t* to June of year *t*+1. The equal-weighted monthly returns on these quintile portfolios, measured in U.S. dollars, are calculated for the same period. These country-specific *BM* portfolios are rebalanced each year in June.

A country-specific zero-cost *BM*-hedge portfolio is then formed by simultaneously taking a long position in the *BM*5 quintile and a short position in the *BM*1 quintile. Monthly returns on the *BM*-hedge portfolio are calculated by subtracting the returns on the *BM*1 quintile from the returns on the *BM*5 quintile. Forming country-specific *BM*-hedge portfolios enables us to

examine whether the value premium or the book-to-market effect (i.e., the return spread between *BM*5 and *BM*1) exists in a country.

We also adjust raw returns on individual stocks for the size-based benchmark returns to control for the size effect when calculating returns on the *BM* portfolios. We form the size-based benchmark portfolios for each country as follows. In each year, firms are sorted into quintiles based on their rankings on market equity at the end of June of year *t* in ascending order. Equal-weighted monthly raw returns are calculated from July of year *t* to June of year *t*+1 for each size-based benchmark portfolio. All portfolios are rebalanced each year in June. The size-adjusted monthly returns on an individual stock are the difference between the raw monthly returns on the stock and the monthly returns on the size benchmark that the stock falls into. The size-adjusted returns on the *BM* portfolios are then calculated based on the size-adjusted returns on the individual stocks.

In addition to reporting the total number of firm-month and the sample period in each country, Table 1 also reports the time-series averages of size-adjusted monthly returns on *BM*1, *BM*5, and *BM*-hedge portfolios. As the table reveals, 36 out of our 40 sample countries has a positive value premium on average, and 20 of them show a value premium that is statistically significant at the 5% level and additional two markets show a significant value premium at the 10% level. The average value premium ranges from -0.555% a month in Argentina to 1.444% a month in Brazil, indicating a considerable cross-country dispersion in the value premium. The overall average value premium across all countries is about 0.595% a month or 7.14% a year.

[Insert Table 1 here]

4.2. Summary statistics and correlation coefficients

Panel A of Table 2 reports the summary statistics of our firm-level variables. These variables are the natural logarithm of the book-to-market ratio (*Ln*(*BM*)), the natural logarithm of firm size (*Ln*(*SZ*)), the total asset growth (*TAG*), the momentum in stock returns (*MOM*), and the equity issuance (*Issue*). Panel B of Table 2 shows the correlation coefficients among these firm-level variables and raw stock returns (*Ret*). Consistent with previous findings, *Ret* is significantly and positively related to *Ln*(*BM*) and *MOM*, and negatively related to *Ln*(*SZ*), *TAG*, and *Issue*. Panel C of Table 2 shows the correlation coefficients among the country-level variables: the Hofstede's individualism index (*Indv*) and uncertainty avoidance index (*UAI*), the alternative measure of individualism index from GLOBE (*AltIndv*), the market capitalization-to-GDP ratio (*MktCap*), the access-to-equity index (*Equity*), and the transaction cost index (*TCost*). The correlation coefficients between *Indv* and *UAI* (negative) and between *Indv* and *AltIndv* (positive) are insignificant, suggesting that individualism index may capture different aspects of attitudes-towards-risk than either the uncertainty avoidance index or the alternative individualism index does. *MktCap* is significantly and positively correlated with *Indv* or *Equity*. Although there is a negative relation between *TCost* and *Equity* or *MktCap*, it is not significant.

[Insert Table 2 here]

4.3. Firm-level regression analysis on split subsamples

4.3.1. The risk-based explanation

We use the Fama and MacBeth (1973) regression procedure to estimate equation (1), which is our baseline model, for each of the three subgroups partitioned by a given measure of attitudes-toward-risk to test the risk-based explanation. The regression results are presented in Table 3. We find that the estimated slope coefficients on the book-to-market ratio (*Ln*(*BM*)) are

positive and statistically significant at the 1% level in all three subgroups classified by the individualism index (*Indv*), the uncertainty avoidance index (*UAI*), or the alternative individualism index (*AltIndv*). These findings are consistent with those documented by Fama and French (1998, 2012) and suggest that the value premium (i.e., the estimated slope coefficient on *Ln*(*BM*)) is prevalent around the world.

[Insert Table 3 here]

In particular, we find that the value premium measured by the *BM* slope in general decreases in *Indv* and increases in *UAI*. For example, the *BM* slope is 0.332, 0.452, and 0.133 for the low-, medium-, and high-*Indv* subgroups, respectively. The *BM* slope is 0.163, 0.169 and 0.427 for the low-, medium-, and high-*UAI* subgroups, respectively. The difference in the *BM* slope between the high and low subgroups is reported at the bottom of the table. We find that the difference in the value premium between the low- and high-*Indv* subgroups is 0.199 and it is 0.264 between the high- and low-*UAI* subgroups. Both differences in the *BM* slope are statistically significant at the 1% level. We have an even stronger relation between individualism and the value premium when the alternative individualism index (*AltIndv*) is used as the partitioning variable. The *BM* slope decreases in *AltIndv* from 0.485 in the low-*AltIndv* subgroups to 0.160 in the medium-*AltIndv* subgroup and then to 0.175 in the high-*AltIndv* subgroups. The difference in the *BM* slope between the low- and high-*AltIndv* subgroups is 0.310 with a robust *t-statistic* of 3.61.

The above findings are consistent with the risk-based explanation which suggests that the value premium is compensation for risk entailed in the book-to-market ratio. Since investors in individualistic (or lower uncertainty avoidance) countries have a higher tolerance level towards risk or a lower level of risk aversion, the value premium is smaller in these countries than in collectivistic (or higher uncertainty avoidance) countries. We also find from Table 3 that the

results on the effects of momentum, asset growth, and net share issue on future returns are all consistent with findings in the existing literature. For example, the momentum effect is stronger in the high individualistic environments as in Chui, Titman, and Wei (2010). The asset growth effect and the net share issue effect are strong and prevalent around the world as in Titman, Wei, and Xie (2012) and McLean, Pontiff, and Watanabe (2009), respectively.

4.3.2. The mispricing with limits-to-arbitrage argument

Table 4 shows the regression results for the tests on the mispricing with limits-to-arbitrage hypothesis. Similar to the results in Table 3, the estimated slope coefficients on the book-to-market ratio are positive and statistically significant in all subgroups partitioned by any measure of limits-to-arbitrage. However, we do not observe a clear relation between the value premium and any of our measures of limits-to-arbitrage. For example, the *BM* slope is 0.183, 0.442, and 0.175 for the low-, medium-, and high-*Equity* subgroups, respectively. The *BM* slope is 0.203, 0.394 and 0.184 for the low-, medium-, and high-*MktCap* subgroups, respectively. It appears that the *BM* slope is the highest in the medium subgroup when limits-to-arbitrage is proxied by either *Equity* or *MketCap*. The *BM* slope is higher in the high-*TCost* subgroup than in other two subgroups, which is consistent with the direction predicted by the mispricing explanation. However, as shown at the bottom of the table, the difference in the *BM* slope between the high- and low-limits-to-arbitrage subgroups is small and statistically insignificant for the *Equity* or the *MktCap* measure and is only marginally significant for the *TCost* measure of limits-to-arbitrage.[19] These findings are in general inconsistent with the mispricing with limits-to-arbitrage explanation for the value premium.

[19] For robustness checks, we also use two other measures for limits-to-arbitrage: one is the information on short sales restrictions which are retrieved from Bris, Goetzmann, and Zhu (2007) and the other is the dichotomy of

[Insert Table 4 here]

In addition, we find that momentum has the strongest effect in the high-*Equity*, high-*MktCap*, or medium-*TCost* subgroup of countries. The asset growth effect is more pronounced in countries with more advanced market development (*i.e.*, the high-*Equity* or high-*MktCap* subgroup) and in countries with lower transaction costs, which is consistent with the finding in Titman, Wei, and Xie (2012). Finally, the net share issue effect is very prevalent across countries.

4.4. Robustness checks

4.4.1. Excluding small stocks

It is well known that the data error problem from Datastream International is concentrated on small stocks. In addition, as shown by Fama and French (2012), the value premium is more pronounced for small firms in their study of twenty-three developed markets. To explore if our results are driven by small firms or the data errors, we exclude those firms with monthly market capitalization less than $100 million U.S. dollars from our sample.[20] It should be noted, however, that this procedure will weaken the relation between any measure of the cultural values and the value premium. The reason is that culture tends to have a stronger effect on individual investors who mainly trade small stocks than on institutional investors. Using this sample of large firms, we re-estimate our baseline model with the Fama-MacBeth regression procedure. The results are reported in Panel A of Table 5.

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developed versus developing markets classified by International Monetary Fund (IMF). Our results show that there is no significant difference in the value premium between countries where short sales are allowed and practiced and countries where short sales are not allowed or practiced. Neither do our results show that there is a significant difference in the *BM* slope between developed and developing countries. The evidence tends not to support the mispricing with limits-to-arbitrage explanation on the value premium. To save space, these findings are not reported but are available upon request.

[20] This cutoff point of $100 million U.S. dollars is suggested by Chui, Titman, and Wei (2010). With this restriction, we still have 40 countries in the sample. However, the sample periods for many countries do not start as early as those without excluding small stocks. That is, our sample has more small stocks in the earlier years.

[Insert Table 5 here]

Consistent with our findings in Table 3, whereas the value premium is negatively related to individualism measured by either *Indv* or *AltIndv*, it is positively related to uncertainty avoidance (*UAI*). Specifically, the *BM* slope differential between the high and low subgroups is -0.237, 0.181, and -0.289 when the partitioning variable is *Indv*, *UAI*, and *AltIndv*, respectively, and it is statistically significant for all three measures of attitudes-toward-risk. Similar to the findings reported in Table 4, the relation between the value premium and our measures of limits-to-arbitrage is statistically insignificant. The results in Panel A of Table 5 strongly support the risk-based explanation but fail to support the mispricing with limits-to-arbitrage argument.

4.4.2. Excluding firms in the U.S. and Japan

Since quite a number of our observations are from Japan and the U.S., our findings may be attributable to firms from these two big countries. To investigate this possibility, we exclude firms from Japan and the U.S. from our sample and re-estimate the baseline model. The regression results are reported in Panel B of Table 5. We still find that the relation between individualism as measured by either *Indv* or *AltIndv* and the value premium is negative and that the difference in value premium between the high and low subgroups measured by either *Indv* or *AltIndv* is statistically significant. However, the relation between uncertainty avoidance (*UAI*) and the value premium becomes flat and statistically insignificant when firms in Japan and the U.S. are removed. In addition, the relations between the measures of limits-to-arbitrage and the value premium are still weak and statistically insignificant.[21] Overall, the results appear to suggest that our main findings are not driven by large economies such as the U.S. and Japan.

[21] An alternative estimation method to adjust for a disproportionate number of firms from large economies is to use the weighted least squares (WLS) in the Fama and MacBeth (1973) regression procedure, where the weight is the

4.4.3. An alternative model specification

Since previous studies on the value premium normally do not control for other anomalous effects such as net share issuance (*Issue*), total asset growth (*TAG*), or momentum (*MOM*), we exclude these three explanatory variables from the Fama-MacBeth (1973) regressions to examine if our main results still hold. The results reported in Panel C of Table 5 are consistent with the risk-based argument and fail to support the mispricing with limits-to-arbitrage explanation. Specifically, the *BM* slope is negatively related to *Indv* and *AltIndv*, and positively related to uncertainty avoidance. The differences in the *BM* slope between the high and low subgroups partitioned by *Indv*, *UAI*, and *AltIndv*, are -0.169, 0.231, and -0.272, respectively, and all are statistically significant. In contrast, the relation between the value premium and any of the measures of limits-to-arbitrage is flat and statistically insignificant. The results suggest that our main findings that are consistent with the risk-based explanation but fail to support the mispricing with limits-to-arbitrage explanation are not driven by model specifications that include other anomalous variables in the regressions.

5. Conclusion

Fama and French (1992) and others find that stocks of U.S. firms with high book-to-market (*BM*) ratios earn substantially higher returns than do stocks of U.S. firms with low book-to-market ratios. Furthermore, this return differential between high and low *BM* firms cannot be explained by the traditional capital asset-pricing model (CAPM). This phenomenon is often

inverse of the number of firms in each country in each month. Using this alternative estimation method, our results are in general consistent with the risk-based explanation although the significance levels are weaker. In addition, the WLS results continue to fail to support the limits-to-arbitrage argument except when the trading cost (*TCost*) is the partitioning variable.

referred to as the book-to-market effect or the value premium. Fama and French (1998, 2012) and Hou, Karolyi, and Kho (2011) further document that the book-to-market effect is very pervasive across countries and there are substantial variations in the book-to-market effect across countries and regions.

The existing literature provides two potential explanations for this book-to-market effect. The risk-based explanation (e.g., Fama and French (1992, 1993)) argues that the book-to-market ratio is a proxy for the distress risk. The reason is that firms with high BM ratios have a higher probability of distress than do firms with low BM ratios. The mispricing explanation argues that the book-to-market effect exists because investors overreact to the past outstanding (poor) accounting performance of low BM or growth firms (high BM or value firms) and extrapolate their past earnings too far into future, leading to overvaluation for growth firms and undervaluation for value firms (e.g., Lakonishok, Shleifer, and Vishny (1994)). This overreaction is eventually corrected by the market, which, in turn, generates the value premium.

In this paper, we test these two competing explanations for the value premium in an international prospective. If the risk-based argument can explain the value premium, one would expect that the value premium should be stronger in countries where investors are more risk averse. If the mispricing is the cause for the value premium, one would expect that the value premium should be weaker or even disappear in countries where arbitrage is easier and less costly (i.e., countries with low limits-to-arbitrage). We use the uncertainty avoidance index and the individualism index developed by Hofstede (2001) and the alternative individualism index from the GLOBE to proxy for investors' risk aversion in a country. We use the transaction cost index and two market development measures to proxy for the degree of limits-to-arbitrage. The

results from our cross-country study provide strong support for the risk-based explanation and fail to support the mispricing with limits-to-arbitrage argument.

Our study contributes to the growing literature on the debate on the causes of the value premium by extending the existing single country study to a cross-country study to examine these two competing explanations in an integrated framework. A cross-country study can provide evidence on whether the cross-country differences in institutional characteristics and/or cultures are important factors in explaining the value premium across countries. Our findings that the value premium appears to be more consistent with the risk-based explanation than the mispricing argument in an international setting should shed some light on the causes of the value premium.

Our study also contributes to the growing literature that compares the profitability of a trading strategy across countries and at the same time provides an explanation for the cross-country variation in the trading profits. Our findings complement the evidence of McLean, Pontiff, and Watanabe (2009), who show that the net issuance effect is stronger in countries with more issuance activities, more market development, and stronger investor protection. Our results also complement the findings of Chui, Titman, and Wei (2010), who find that momentum is stronger in countries with more individualistic cultures. Finally, our evidence complements the results of Titman, Wei, and Xie (2012), who document that the asset growth effect as measured by the return spread between low and high asset growth firms is stronger in countries with more developed equity markets. All these studies show that cross-country differences in trading profits of a particular strategy are associated with cross-country differences in cultures or institutional characteristics.

Appendix A: The values of country-level variables

This appendix lists the values of country-level variables. Cuntry is the abbreviation of a country. *Indv* and *UAI* are the Hofstede's individualism index and uncertainty avoidance index. *Coltvsm* is the collectivism index, which is an inverse measure of individualism and is the institutional collectivism obtained from the GLOBE and House et al. (2004). *Equity* is the index of access-to-equity markets. *MktCap* is the ratio of stock market capitalization to gross domestic product (GDP). *TCost* is the index of transaction costs.

Country	Cuntry	Indv	UAI	Coltvsm	Equity	MktCap	TCost
Argentina	AR	46	86	3.66	3.21	0.13	58.0
Australia	AU	90	51	4.29	6.27	0.63	54.7
Austria	OE	55	70	4.30	5.30	0.07	53.2
Belgium	BG	75	95	.	5.13	0.33	27.1
Brazil	BR	38	76	3.81	4.58	0.13	50.6
Canada	CN	80	48	4.38	6.06	0.61	46.8
Chile	CL	23	86	.	5.20	0.50	107.4
China	CH	20	30	4.77	3.51	0.43	.
Denmark	DK	74	23	4.80	5.76	0.31	40.8
Egypt	EY	25	80	4.5	.	0.33	.
Finland	FN	63	59	4.63	6.12	0.93	45.2
France	FR	71	86	3.93	5.95	0.49	35.7
Germany	BD	67	65	3.79	5.84	0.26	30.6
Greece	GR	35	112	3.25	5.23	0.25	105.1
Hong Kong	HK	25	29	4.13	6.20	1.39	47.3
India	IN	48	40	4.38	5.70	0.19	113.3
Indonesia	ID	14	48	4.54	4.78	0.12	107.3
Ireland	IR	70	35	4.63	5.53	0.42	93.7
Israel	IS	54	81	4.46	5.65	0.24	.
Italy	IT	76	75	3.68	5.20	0.19	41.0
Japan	JP	46	92	5.19	5.77	0.58	19.4
Korea Rep.	KO	18	85	5.20	5.34	0.32	73.2
Malaysia	MY	26	36	4.61	5.70	0.78	91.7
Mexico	ME	30	82	4.06	4.10	0.11	51.5
Netherlands	NL	80	53	4.46	5.94	0.88	24.5
New Zealand	NZ	79	49	4.81	6.07	0.25	36.9
Norway	NW	69	50	.	5.89	0.25	41.5
Pakistan	PA	14	70	.	.	0.19	.
Philippines	PH	32	44	4.65	4.94	0.28	126.2
Portugal	PT	27	104	3.92	5.00	0.22	35.7
Singapore	SG	20	8	4.90	5.80	0.81	51.5
South Africa	SA	65	49	4.50	6.01	0.78	55.8
Spain	ES	51	86	3.85	5.13	0.32	39.2
Sweden	SD	71	29	5.22	5.82	0.90	33.0
Switzerland	SW	68	58	4.14	6.06	1.44	38.6
Taiwan	TA	17	69	4.59	5.91	0.83	55.1
Thailand	TH	64	64	4.03	5.38	0.18	65.0
Turkey	TK	37	85	4.03	5.44	0.13	47.0
United Kingdom	UK	89	35	4.27	6.35	1.20	34.1
United States	US	91	46	4.20	6.45	1.18	29.2

References

Ali, Ashiq, Lee-Seok Hwang, and Mark A. Trombley, 2003, Arbitrage risk and the book-to-market anomaly, *Journal of Financial Economics* 69, 355-373.

Banz, Rolf W., 1981, The relationship between return and market value of common stocks, *Journal of Financial Economics* 9, 3-18.

Barberis, Nicholas, and Andrei Shleifer, 2003, Style investing, *Journal of Financial Economics* 68, 161-199.

Bontempo, Robert N., William P. Bottom, and Elke U. Weber, 1997, Cross-cultural differences in risk perception: a model-based approach, *Risk Analysis* 17, 479-488.

Bris, Arturo, William N. Goetzmann, and Ning Zhu, 2007, Efficiency and the bear: Short sales and markets around the world, *Journal of Finance* 62, 1029-1079.

Camerer, Colin, and Dan Lovallo, 1999, Overconfidence and excess entry: An experimental approach, *American Economic Review* 89, 306-318.

Campbell, John Y., and Tuomo Vuolteenaho, 2004, Bad beta, good beta, *American Economic Review* 94, 1249-1275.

Chan, Kalok, Vicentiu Covrig, and Lilian Ng, 2005, What determines the domestic bias and foreign bias? Evidence from mutual fund equity allocations worldwide, *Journal of Finance* 60, 1495-1534.

Chan, Louis K.C., Yasushi Hamao, and Josef Lakonishok, 1991, Fundamentals and stock returns in Japan, *Journal of Finance* 46, 1739-1764.

Chen, Huafeng (Jason), 2011, Firm life expectancy and the heterogeneity of the book-to-market effect, *Journal of Financial Economics* 100, 402-423.

Chui, Andy C.W., Sheridan Titman, and K.C. John Wei, 2010, Individualism and momentum around the world, *Journal of Finance* 65, 361-392.

Chui, Andy C.W., and K.C. John Wei, 1998, Book-to-market, firm size, and the turn-of-the-year effect: Evidence from Pacific-Basin emerging markets, *Pacific-Basin Finance Journal* 6, 275-293.

Cooper, Michael J., Huseyin Gulen, and Michael J. Schill, 2008, Asset growth and the cross-section of stock returns, *Journal of Finance* 63, 1609-1651.

Daniel, Kent D., and Sheridan Titman, 1997, Evidence on the Characteristics of Cross Sectional Variation in Stock Returns, *Journal of Finance* 52, 1–33.

Daniel, Kent, David Hirshleifer, and Avanidhar Subrahmanyam, 1998, Investor psychology and security market under- and overreactions, *Journal of Finance* 53, 1839-1886.

Daniel, Kent D., David Hirshleifer, and Avanidhar Subrahmanyam, 2001, Overconfidence, arbitrage, and equilibrium asset pricing, *Journal of Finance* 56, 921-965.

Daniel, Kent D., and Sheridan Titman, 2006, Market reactions to tangible and intangible information, *Journal of Finance* 61, 1605–1643.

Daniel, Kent D., Sheridan Titman, and K.C. John Wei, 2001, Explaining the cross-section of stock returns in Japan: factors or characteristics? *Journal of Finance* 56, 743-766.

Davis, James, Eugene F. Fama, and Kenneth R. French, 2000, Characteristics, covariances, and average returns: 1929 to 1997, *Journal of Finance* 55, 389–406.

DeBont, Werner, F.M., and Richard H. Thaler, 1987, Further evidence on investor overreaction and stock market seasonality, *Journal of Finance* 42, 557-581.

De Long, Bradford J., Andrei Shleifer, Lawrence H. Summers, and Robert J. Waldmann, 1990, Noise trader risk in financial markets, *Journal of Political Economy* 98, 703-738.

Doukas, John A., Chansog (Francis) Kim, and Christos Pantzalis, 2010, Arbitrage risk and stock mispricing, *Journal of Financial and Quantitative Analysis* 45, 907-934.

Fama, Eugene F., and Kenneth R. French, 1992, The cross-section of expected stock returns, *Journal of Finance*, 47, 427-465.

Fama, Eugene F., and Kenneth R. French, 1993, Common risk factors in the returns on stocks and bonds, *Journal of Financial Economics* 33, 3-56.

Fama, Eugene F., and Kenneth R. French, 1995, Size and book-to-market factors in earnings and returns, *Journal of Finance* 50, 131–155.

Fama, Eugene F., and Kenneth R. French, 1996, Multifactor explanation of asset pricing anomalies, *Journal of Finance* 51, 55-84.

Fama, Eugene F., and Kenneth R. French, 1998, Value versus growth: The international evidence, *Journal of Finance* 53, 1975–1999.

Fama, Eugene F., and Kenneth R. French, 2007, Disagreement, tastes, and asset prices, *Journal of Financial Economics* 83, 667-689.

Fama, Eugene F., and Kenneth R. French, 2008, Average returns, BM, and share issues, *Journal of Finance* 63, 2971–2995.

Fama, Eugene F., and Kenneth R. French, 2012, Size, value, and momentum in international stock returns, *Journal of Financial Economics* 105, 457-472.

Fama, Eugene F., and James MacBeth, 1973, Risk, return and equilibrium: Empirical tests, *Journal of Political Economy* 81, 607-636.

Griffin, Dale, Kai Li, Heng Yue, and Longkai Zhao, 2011, Cultural values and corporate risk-taking, working paper, University of British Columbia

Griffin, John M., 2002, Are the Fama and French factors global or country specific? *Review of Financial Studies* 15, 783-803.

Griffin, John M., Xiuqing Ji, and J. Spencer Martin, 2003, Momentum investing and business cycle risk: Evidence from pole to pole, *Journal of Finance* 58, 2515-2547.

Griffin, John M., and Michael L. Lemmon, 2002, Book-to-market equity, distress risk, and stock returns, *Journal of Finance* 57, 2317-2336.

Hahn, Jaehoon, and Hangyong Lee, 2006, Yield spreads as alternative risk factors for size and book-to-market, *Journal of Financial and Quantitative Analysis* 41, 245-269.

Hofstede, Geert, 1980, *Culture's Consequences: International Differences in Work-related Values*, Sage Publication: Beverly Hills, CA.

Hofstede, Geert, 2001, *Culture's Consequences: Comparing Values, Behaviors, Institutions, and Organizations across Nations*, 2nd edition, Sage Publication: Beverly Hills, CA.

Hou, Kewei, G. Andrew Karolyi, and Bong Chan Kho, 2011, What factors drive global stock returns? *Review of Financial Studies* 24, 2527-2574.

House, Robert, Paul Hanges, Mansour Javidan, Peter Dorfman, and Vipin Gupta, 2004, eds. *Culture, Leadership, and Organizations: The GLOBE Study of 62 Societies* (Sage Publication, Thousand Oaks, CA).

Jegadeesh, Narasimhan, and Sheridan Titman, 1993, Returns to buying winners and selling losers: Implications for stock market efficiency, *Journal of Finance* 48, 65-91.

Jiang, Hao, 2010, Institutional investors, intangible information, and the book-to-market effect, *Journal of Financial Economics* 96, 98-126.

Kapadia, Nishad, 2011, Tracking down distress risk, *Journal of Financial Economics* 102, 167-182.

La Porta, Rafael, Florencio Lopez-de-Silanes, and Andrei Shleifer, 2006, What works in securities laws, *Journal of Finance* 61, 1-32.

Lakonishok Josef, Andrei Shleifer, and Robert W. Vishny, 1994, Contrarian investment, extrapolation, and risk, *Journal of Finance* 49, 1541-1578.

Lam, F.Y. Eric C., and K.C. John Wei, 2011, Limits-to-arbitrage, investment frictions, and the asset growth anomaly, *Journal of Financial Economics* 102, 127-149..

Lettau, Martin, and Jessica, A. Wachter, 2007, Why is long-horizonequity less risky? A duration-based explanation of the value premium, *Journal of Finance* 62, 55-92.

Li, Dongmei, and Lu Zhang, 2010, Does *q*-theory with investment frictions explain anomalies in the cross-section of returns? *Journal of Financial Economics* 98, 297-314.

Liew, Jimmy, and Maria Vassalou, 2000, Can book-to-market, size and momentum be risk factors that predict economic growth? *Journal of Financial Economics* 57, 221-245.

Markus, Hazel Rose, and Shinobu Kitayama, 1991, Culture and the self: Implications for cognition, emotion, and motivation, *Psychological Review* 98, 224-253.

Mashruwala, Christina, Shivaram Rajgopal, and Terry Shevlin, 2006, Why is the accrual anomaly not arbitraged away? The role of idiosyncratic risk and transaction costs, *Journal of Accounting and Economics* 42, 3-33.

McLean, David, Jeffrey Pontiff, and Akiko Watanabe, 2009, Share issuance and cross-sectional returns: International evidence, *Journal of Financial Economics* 94, 1-17.

Nagel Stefan, 2005, Short sales, institutional investors and the cross-section of stock returns, *Journal of Financial Economics* 78, 277-309.

Newey, Whitney K., and Kenneth D. West, 1987, A simple, positive semi-definite, heteroskedasticity and autocorrelation consistent covariance matrix, *Econometrica* 55, 703-708.

Petkova, Ralisa, and Lu Zhang, 2005, Is value riskier than growth? *Journal of Financial Economics* 978, 187-202.

Pontiff, Jeffrey, and Artemiza Woodgate, 2008, Share issuance and cross-sectional returns, *Journal of Finance* 63, 921-945.

Rosenberger, Barr, Kenneth Reid, and Ronald Lanstein, 1985, Persuasive evidence of market inefficiency, *Journal of Portfolio Management* 11, 9-17.

Shleifer, Andrei, and Robert W. Vishny, 1997, The limits of arbitrage, *Journal of Finance* 52, 35-55.

Sloan, Richard G., 1996, Do stock prices fully reflect information in accruals and cash flows about future earnings, *Accounting Review* 71, 289-315.

Titman, Sheridan, K.C. John Wei, and Feixue Xie, 2004, Capital investments and stock returns, *Journal of Financial and Quantitative Analysis* 39, 677-700.

Titman, Sheridan, K.C. John Wei, and Feixue Xie, 2012, Market development and the asset growth effect: International evidence, *Journal of Financial and Quantitative Analysis*, forthcoming.

Xing, Yuhang, 2008, Interpreting the value effect through the q-theory: An empirical investigation, *Review of Financial Studies* 21, 1767-1795.

Zhang, Lu, 2005, The value premium, *Journal of Finance* 60, 67-103.

Table 1
Size-adjusted value premium by country

This table presents the time-series averages of size-adjusted monthly returns (%) on country-specific *BM* portfolios formed as follows. For each country at the end of June of year *t*, all firms are ranked in ascending order based on their rankings on the book to market ratio (*BM*) in year *t*-1. Firms in the bottom 20% are assigned to the *BM*1 quintile and those in the top 20% are assigned to the *BM*5 quintile. Monthly returns on individual stocks are adjusted for size-based benchmark returns (see description below) first and then equal-weighted size-adjusted monthly returns in U.S. dollars for each *BM* portfolio are calculated from July of year *t* to June of year *t*+1. These portfolios are rebalanced each year in June. The *BM*-hedge portfolio is a zero-cost hedge portfolio that takes a $1 long position in *BM*5 portfolio and a $1 short position in *BM*1 portfolio simultaneously. Monthly returns on the hedge portfolio are calculated by subtracting monthly returns on the *BM*1 portfolio from the monthly returns on the *BM*5 portfolio.

The size-based benchmark portfolios for each country are formed as follows. First, at the end of June in year *t*, firms are sorted into quintiles based on their rankings on market capitalization at the end of June in year *t*. Equal-weighted monthly raw returns are calculated from July of year *t* to June of year *t*+1 for each size-based benchmark portfolio. All portfolios are rebalanced each year in June. The size-adjusted monthly returns on an individual stock are the differences between the raw monthly returns on the stock and the monthly returns on the benchmark portfolio that the stock falls into. N is the number of firm-month observations in a country. The *t*-statistics are reported in parentheses. Time period for the return series starts from July of the starting year and ends in December of 2009.

Country	N	Time period	BM1	BM5	BM-hedge
Argentina	7,389	1997-200912	-0.102 (-0.37)	-0.657 (-2.00)	-0.555 (-1.08)
Australia	151,846	1981-200912	-0.322 (-3.05)	0.328 (3.07)	0.649 (3.81)
Austria	12,334	1988-200912	-0.389 (-2.10)	0.260 (1.63)	0.648 (2.29)
Belgium	17,576	1988-200912	-0.128 (-0.75)	0.639 (4.51)	0.767 (2.96)
Brazil	6,272	2000-200912	-1.016 (-2.39)	0.428 (0.89)	1.444 (1.85)
Canada	132,515	1981-200912	-0.144 (-1.09)	0.163 (1.57)	0.307 (1.50)
Chile	18,733	1992-200912	-0.136 (-0.92)	0.232 (1.75)	0.369 (1.60)
China	136,749	2000-200912	-0.203 (-1.49)	0.084 (0.63)	0.287 (1.13)
Denmark	24,577	1988-200912	-0.368 (-2.57)	0.194 (1.37)	0.562 (2.41)
Egypt	4,812	2004-200912	0.365 (0.73)	0.073 (0.18)	-0.291 (-0.38)
Finland	18,836	1992-200912	-0.535 (-2.43)	0.230 (1.42)	0.766 (2.26)
France	114,704	1981-200912	-0.381 (-3.31)	0.463 (4.44)	0.845 (4.39)
Germany	102,567	1981-200912	-0.358 (-3.51)	0.210 (2.58)	0.567 (3.76)
Greece	38,657	1992-200912	-0.161 (-.94)	-0.035 (-0.18)	0.126 (0.44)
Hong Kong	94,007	1986-200912	-0.484 (-3.26)	0.350 (2.34)	0.835 (3.47)
India	82,545	1993-200912	-0.083 (-0.45)	0.108 (0.57)	0.191 (0.58)
Indonesia	29,062	1992-200912	-0.311 (-1.28)	0.145 (0.64)	0.456 (1.22)
Ireland	8,239	1990-200912	0.315 (1.37)	-0.104 (-0.43)	-0.419 (-1.12)
Israel	21,185	1998-200912	-0.265 (-1.16)	0.277 (1.15)	0.542 (1.41)
Italy	40,033	1986-200912	-0.558 (-4.55)	0.163 (1.55)	0.721 (3.77)
Japan	615,623	1981-200912	-0.423 (-4.63)	0.274 (3.91)	0.697 (4.64)
Korea Rep.	139,791	1989-200912	-0.677 (-3.84)	0.565 (3.52)	1.242 (4.11)
Malaysia	109,407	1986-200912	-0.295 (-2.36)	0.331 (2.32)	0.627 (2.74)
Mexico	14,416	1993-200912	-0.242 (-1.38)	0.325 (1.52)	0.567 (1.84)

Country	N	Time period	BM1	BM5	BM-hedge
Netherlands	31,294	1984-200912	-0.280 (-2.03)	0.198 (1.66)	0.478 (2.29)
New Zealand	12,656	1995-200912	-0.436 (-2.09)	-0.056 (-0.26)	0.379 (1.07)
Norway	26,097	1988-200912	-0.393 (-1.84)	0.148 (0.68)	0.542 (1.52)
Philippines	15,829	1994-200912	-0.513 (-1.82)	0.784 (2.63)	1.297 (2.71)
Pakistan	12,516	1994-200912	-0.164 (-0.57)	-0.302 (-0.88)	-0.138 (-0.25)
Portugal	10,279	1990-200912	-0.169 (-0.71)	0.450 (1.91)	0.619 (1.52)
Singapore	55,830	1989-200912	-0.266 (-1.73)	0.198 (1.48)	0.465 (2.05)
South Africa	43,902	1987-200912	-0.649 (-3.64)	0.461 (2.46)	1.110 (3.51)
Spain	19,886	1987-200912	-0.161 (-1.21)	0.136 (1.07)	0.297 (1.42)
Sweden	50,391	1988-200912	-0.361 (-1.82)	0.093 (0.62)	0.454 (1.49)
Switzerland	36,286	1986-200912	-0.224 (-2.25)	0.328 (3.50)	0.552 (3.38)
Taiwan	82,630	1994-200912	-0.148 (-0.70)	0.220 (1.00)	0.368 (0.96)
Thailand	53,748	1992-200912	-0.647 (-4.16)	0.523 (2.63)	1.170 (4.13)
Turkey	25,437	1994-200912	-0.110 (-0.48)	0.081 (0.36)	0.191 (0.54)
United Kingdom	287,459	1981-200912	-0.418 (-4.10)	0.386 (5.05)	0.804 (4.93)
United States	769,089	1981-200912	-0.057 (-0.42)	0.860 (6.07)	0.917 (4.74)
Country Average			-0.308 (-7.26)	0.287 (7.83)	0.595 (8.74)

Table 2
Summary statistics of firm-level variables and correlations among country-level variables

Panel A presents summary statistics of firm-level variables. Ln(*BM*) is the natural logarithm of the book-to-market equity ratio at the end of year *t*-1. Ln(*SZ*) is the natural logarithm of market value of equity at the end of June in year *t*. *TAG* is the total asset growth. Momentum (*MOM*) is measured as the past six-month holding period stock return that skips the most recent month. Equity issuance (*Issue*) is measured over the past 12-month period as in Pontiff and Woodgate (2008) or McLean et al. (2009). Specifically, $Issue_{m,m-12} = Ln(Adjshares_m) - Ln(Adjshares_{m-12})$, where $Adjshares_m = (Shares\ Outstanding_m)/CAI_m$ and CAI_m is the capital adjustment index from Datastream recorded as the end of month *m*. *Ret* is monthly raw return in percent. Panel B reports the correlations among these firm-level variables. Panel C reports correlations among country-level variables. *Indv* and *UAI* are the Hofstede's individualism index and uncertainty avoidance index. *AltIndv* is an alternate measure of individualism and is measured as the inverse of the institutional collectivism obtained from the GLOBE and House et al. (2004). *Equity* is the index of access-to-equity markets. *MktCap* is the ratio of stock market capitalization to gross domestic product (GDP). *TCost* is the index of transaction costs. All these six variables are time invariant and country-specific. ***, **, and * indicate significant at the 1%, 5%, and 10% levels, respectively.

Panel A: Summary statistics at the firm level (N = 3.44 million total firm-month observations)

Variable	Mean	Std Dev	25th	Median	75th
Ln(BM)	-0.453	0.885	-1.000	-0.428	0.121
Ln(SZ)	5.052	1.880	3.709	4.969	6.279
TAG	0.158	0.436	-0.018	0.064	0.193
MOM	1.028	0.432	0.830	1.007	1.195
ISSUE	0.133	0.695	0.000	0.000	0.021
Ret (%)	1.156	14.867	-6.452	0.080	7.250

Panel B: Pearson correlations based on the firm-level observations by pooling all firms together

Variable	Ln(BM)	LN(SZ)	TAG	MOM	Issue
Ln(SZ)	-0.376***				
TAG	-0.182***	0.042***			
MOM	0.142***	-0.072***	-0.043***		
Issue	-0.102***	0.082***	0.064***	0.005***	
Ret	0.043***	-0.029***	-0.020***	0.027***	-0.002***

Panel C: Correlations among country-level variables

Variable	Indv	UAI	AltIndv	Equity	MktCap
UAI	-0.185				
AltIndv	0.096	0.512***			
Equity	0.506***	-0.320**	-0.239		
MktCap	0.252	-0.455***	-0.230	0.591**	
TCost	-0.299*	-0.068	-0.003	-0.299	-0.290

Table 3
Test results for the risk-based hypothesis: Firm-level regressions

This table reports the estimation results from the following baseline or full regression model:

$$R_{ij,t} - R_{ft} = a_0 + b_1 Ln(BM)_{ij,t-1} + b_2 Ln(SZ_{ij,t}) + b_3 Ln(TAG_{ij,t-1}) + b_4 MOM_{ij,t} + b_5 Issue_{ij,t} + e_{ij,t},$$

where $R_{ij,t}$ is the monthly return in U.S. dollars from July of year t to June of year t+1 for stock i in country j. R_{ft} is the risk-free rate proxied by the one-month U.S. Treasury-bill rate. $BM_{ij,t-1}$ and $TAG_{ij,t-1}$ are the book-to-market equity ratio and total asset growth in year t-1, respectively. $SZ_{ij,t}$ is market capitalization at the end of June in year t. Ln represents the natural logarithm. $MOM_{ij,t}$ and $Issue_{ij,t}$ are momentum and equity issuance, respectively. Both has the same time subscript as the dependent variable, $R_{ij,t}$. *MOM* is measured as the past six-month holding period stock return that skips the most recent month. *Issue* is measured over the past 12-month period as in Pontiff and Woodgate (2008) and McLean et al. (2009). Specifically, $Issue_{m,m-12} = Ln(Adjshares_m) - Ln(Adjshares_{m-12})$, where $Adjshares_m = (Shares\ Outstanding_m)/CAI_m$ and CAI_m is the capital adjustment index from Datastream recorded as the end of month m. All countries are ranked based on the value of on the individualism index (Panel A), the uncertainty avoidance index (Panel B), and the alternate individualism index (Panel C), respectively, in ascending order. The cutoff points for each ranking take into consideration of the number of countries in each group (N) and the actual cutoff value of the ranking variable. The Fama and MacBeth (1973) regression procedure with country dummies is used to estimate the coefficients and the Newey-West (1987) robust standard errors are used to calculate the *t*-statistics which are presented in parentheses. Obs. is the total number of months in each sample. The null hypothesis is that the coefficient of *BM* is greater in the High group than in the Low group with one-tailed *p*-valued reported. Difference in b_1 is the difference in the *BM* coefficient between the High and the Low groups.

	Panel A: Individualism index			Panel B: Uncertainty avoidance index			Panel C: Alternate Individualism index		
	Low (N=13)	Medium (N=12)	High (N=15)	Low (N=12)	Medium (N=16)	High (N=12)	Low (N=12)	Medium (N=12)	High (N=12)
Ln(BM)	**0.332**	**0.452**	**0.133**	**0.163**	**0.169**	**0.427**	**0.485**	**0.160**	**0.175**
	(4.49)	**(6.45)**	**(2.70)**	**(3.32)**	**(3.30)**	**(7.09)**	**(6.87)**	**(3.14)**	**(3.51)**
Ln(SZ)	-0.221	-0.101	-0.062	-0.089	-0.108	-0.060	-0.081	-0.111	-0.068
	(-2.88)	(-1.67)	(-1.91)	(-2.17)	(-3.68)	(-1.11)	(-1.41)	(-2.88)	(-1.89)
TAG	-0.299	-0.391	-0.436	-0.509	-0.272	-0.288	-0.386	-0.487	-0.281
	(-2.30)	(-1.86)	(-6.20)	(-5.39)	(-3.28)	(-1.84)	(-2.19)	(-5.67)	(-2.25)
MOM	-0.509	-0.428	0.950	0.461	0.915	-0.494	-0.509	0.711	0.802
	(-1.31)	(-1.18)	(3.83)	(1.94)	(3.53)	(-1.53)	(-1.37)	(2.83)	(2.83)
Issue	-1.278	-1.140	-0.152	-0.157	-0.406	-1.205	-1.678	-0.092	-0.730
	(-4.38)	(-3.56)	(-2.92)	(-2.40)	(-2.70)	(-4.67)	(-6.39)	(-1.70)	(-2.63)
Obs.	270	318	330	330	330	330	318	330	330
Null hypothesis test:									
Difference in b_1			-0.199			0.264			-0.310
(t-value)			(-2.64)			(3.65)			(-3.88)
p-value (one-tailed)			0.004			0.000			0.000

Table 4
Test results for the mispricing with limits-to-arbitrage hypothesis: Firm-level regressions

This table reports the estimation results from the following baseline or full regression model:

$$R_{ij,t} - R_{ft} = a_0 + b_1 Ln(BM)_{ij,t-1} + b_2 Ln(SZ_{ij,t}) + b_3 Ln(TAG_{ij,t-1}) + b_4 MOM_{ij,t} + b_5 Issue_{ij,t} + e_{ij,t},$$

where $R_{ij,t}$ is the monthly return in U.S. dollars from July of year t to June of year t+1 for stock i in country j. R_{ft} is the risk-free rate proxied by the one-month U.S. Treasury-bill rate. $BM_{ij,t-1}$ and $TAG_{ij,t-1}$ are the book-to-market equity ratio and total asset growth in year t-1, respectively. $SZ_{ij,t}$ is market capitalization at the end of June in year t. Ln represents the natural logarithm. $MOM_{ij,t}$ and $Issue_{ij,t}$ are momentum and equity issuance, respectively. Both has the same time subscript as the dependent variable, $R_{ij,t}$. *MOM* is measured as the past six-month holding period stock return that skips the most recent month. *Issue* is measured over the past 12-month period as in Pontiff and Woodgate (2008) and McLean et al. (2009). Specifically, $Issue_{m,m-12} = Ln(Adjshares_m) - Ln(Adjshares_{m-12})$, where $Adjshares_m = (Shares\ Outstanding_m)/CAI_m$ and CAI_m is the capital adjustment index from Datastream recorded as the end of month m. All countries are ranked based on the value of the access-to-equity market index (Panel A), the market cap to GDP ratio (Panel B), and the transaction cost index (Panel C), respectively, in ascending order. The cutoff points for each ranking in panels A to C take into consideration of the number of countries in each group (N) and the actual cutoff value of the ranking variable. The Fama and MacBeth (1973) regression procedure with country dummies is used to estimate the coefficients and the Newey-West (1987) robust standard errors are used to calculate the *t*-statistics which are presented in parentheses. Obs. is the total number of months in each sample. The null hypothesis is that the coefficient of *BM* is greater in the High group than in the Low group with one-tailed *p*-valued reported. Difference in b_1 is the difference in the *BM* coefficient between the High and the Low groups.

	Panel A: Access-to-equity market index			Panel B: Market cap to GDP ratio			Panel C: Transaction costs index		
	Low (N=13)	Medium (N=12)	High (N=13)	Low (N=12)	Medium (N=14)	High (N=14)	Low (N=11)	Medium (N=14)	High (N=11)
Ln(BM)	**0.183**	**0.442**	**0.175**	**0.203**	**0.394**	**0.184**	**0.189**	**0.142**	**0.308**
	(3.16)	**(6.62)**	**(3.55)**	**(3.07)**	**(6.83)**	**(3.73)**	**(3.88)**	**(2.64)**	**(3.86)**
Ln(SZ)	-0.084	-0.064	-0.105	-0.092	-0.051	-0.111	-0.050	-0.136	-0.168
	(-1.42)	(-1.23)	(-2.90)	(-1.65)	(-1.07)	(-2.91)	(-1.39)	(-4.04)	(-2.41)
TAG	-0.187	-0.249	-0.437	-0.193	-0.291	-0.453	-0.496	-0.296	-0.315
	(-2.32)	(-1.15)	(-5.98)	(-1.80)	(-1.99)	(-5.76)	(-5.88)	(-3.66)	(-3.48)
MOM	0.451	-0.407	0.767	0.352	-0.231	0.651	0.438	0.763	-0.124
	(1.39)	(-1.23)	(3.21)	(0.88)	(-0.75)	(2.66)	(1.74)	(2.89)	(-0.26)
Issue	-0.782	-1.470	-0.148	-0.670	-1.334	-0.150	-0.169	-0.565	-1.540
	(-4.00)	(-5.91)	(-2.50)	(-2.67)	(-5.74)	(-2.51)	(-3.05)	(-3.46)	(-5.95)
Obs.	258	330	330	258	330	330	330	330	246
Null hypothesis test:									
Difference in b_1			-0.008			-0.019			0.119
(t-value)			(-0.12)			(-0.26)			(1.51)
p-value (one-tailed)			0.453			0.396			0.067

Table 5
Robustness checks

This table presents robustness checks on results obtained from the Fama and MacBeth (1973) regression on variants of the following baseline or full model:

$$R_{ij,t} - R_{ft} = a_0 + b_1 Ln(BM)_{ij,t-1} + b_2 Ln(SZ_{ij,t-1}) + b_3 TAG_{ij,t-1} + b_4 MOM_{ij,t} + b_5 Issue_{ij,t} + e_{ij,t},$$

where $R_{ij,t}$ is the monthly return in U.S. dollars from July of year t to June of year t+1 for stock i in country j. R_{ft} is the risk-free rate proxied by the one-month U.S. Treasury-bill rate. Refer to Table 3 for the description of other variables. The Fama and MacBeth (1973) regression procedure is used to estimate the model with country dummies and the Newey-West (1987) robust t-statistics are presented in parentheses. The Low, Medium, and High groups for each country-level variable classification are defined in Tables 3 and 4. *Indv* and *UAI* are the Hofstede's individualism index and uncertainty avoidance index. *AltIndv* is an alternate measure of individualism and is measured as the inverse of institutional collectivism obtained from the GLOBE and House et al. (2004). *Equity* is the index of access-to-equity market. *MktCap* is the ratio of stock market capitalization to gross domestic product. *TCost* is the index of transaction costs. The High group in this category consists of developed economies, and the Low group in this category consists of developing economies. Panels A to C reports the *BM* estimates for each subgroup. Diff: High – Low is the difference in the *BM* estimates between the High and the Low groups. The null hypothesis is that the coefficient of *BM* is greater in the High group than in the Low group with one-tailed *p*-valued reported. Panel A reports the results from the subsample excluding firms with market capitalization less than US$100 million. Panel B reports the results from the subsample excluding firms in Japan and The U.S., while Panel C reports results based on a simpler mode specification with Ln(BM) and Ln(SZ) as the only explanatory variables.

	Low	Medium	High	Diff: High – Low	one-tailed p-value	Low	Medium	High	Diff: High – Low	one-tailed p-value
	Panel A Excluding firms with SZ < $100 million					**Panel B Excluding firms in Japan and the U.S.**				
Indv	0.395	0.453	0.158	-0.237	0.003	0.363	0.236	0.189	-0.174	0.022
	(4.55)	(6.20)	(2.76)	(-2.78)		(4.74)	(3.97)	(3.13)	(-2.03)	
UAI	0.235	0.215	0.416	0.181	0.011	0.280	0.300	0.248	-0.031	0.344
	(4.22)	(3.62)	(6.58)	(2.32)		(4.44)	(4.77)	(4.16)	(-0.40)	
AltIndv	0.490	0.211	0.201	-0.289	0.001	0.410	0.283	0.175	-0.235	0.004
	(6.59)	(3.51)	(3.58)	(-3.38)		(4.93)	(4.27)	(3.51)	(-2.67)	
Equity	0.179	0.450	0.220	0.041	0.300	0.183	0.313	0.277	0.094	0.107
	(2.56)	(6.54)	(3.83)	(0.53)		(3.16)	(4.36)	(4.71)	(1.25)	
MktCap	0.189	0.399	0.242	0.053	0.260	0.203	0.293	0.295	0.092	0.125
	(2.55)	(6.51)	(4.16)	(0.64)		(3.07)	(5.10)	(4.90)	(1.15)	
TCost	0.250	0.219	0.343	0.093	0.300	0.219	0.142	0.308	0.090	0.156
	(4.51)	(3.77)	(3.77)	(1.04)		(3.47)	(2.64)	(3.86)	(1.01)	

Table 5 - Continued

	Low	Medium	High	Diff: High – Low	one-tailed p-value
	Panel C With BM and Size as the only explanatory variables				
Indv	0.350	0.468	0.181	-0.169	0.018
	(4.61)	(5.91)	(3.30)	(-2.11)	
UAI	0.211	0.204	0.442	0.231	0.004
	(4.03)	(3.70)	(6.54)	(2.91)	
AltIndv	0.501	0.206	0.230	-0.272	0.001
	(6.41)	(3.74)	(4.28)	(-3.07)	
Equity	0.185	0.464	0.225	0.04	0.289
	(3.18)	(6.17)	(4.16)	(0.56)	
MktCap	0.216	0.423	0.232	0.016	0.416
	(3.22)	(6.65)	(4.33)	(0.21)	
TCost	0.234	0.176	0.335	0.101	0.108
	(4.40)	(3.10)	(4.16)	(1.24)	