Access to Equity Markets, Corporate Investments and Stock Returns: International Evidence*

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Abstract

Recent studies have documented that, in the United States, firms that increase asset investments subsequently earn substantially lower risk-adjusted returns, which is referred to as the investment or asset growth effect. In this study, we document that there also exhibits the asset growth effect outside the United States and there is a substantial cross-country difference in the asset growth effect. More specifically, we find a strong asset growth effect among developed countries, but no such an effect among developing countries. Further analysis indicates that, among developed countries, the cross-country difference in the asset growth effect can be explained by the ease of access to equity markets in addition to country characteristics such as culture and corporate asset growth. However, the inclusion of these country characteristics does not damper the effect of the ease of access to equity markets. Our results appear to be generally consistent with an overinvestment explanation for the investment effect initiated by Titman, Wei, and Xie (2004) and inconsistent with the prediction by the q-theory with investment frictions suggested by Li and Zhang (2010).

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1. Introduction

Several recent studies have examined the relation between corporate investments and subsequent stock returns in the United States. For instance, Baker, Stein, and Wurgler (2003) find that current capital expenditures are negatively associated with future stock returns. Titman, Wei, and Xie (2004) and Anderson and Garcia-Feijóo (2006) find that firms that substantially increase capital expenditures subsequently achieve negative risk-adjusted or characteristic-adjusted returns. Cooper, Gulen, and Schill (2008) use total asset growth to capture a firm's overall investments and show that firms with low asset growth earn substantially higher risk-adjusted returns than do firms with high asset growth.[1] In general, these studies find that there exists a negative relation between any measure of corporate investment and subsequent stock returns -- a phenomenon that is often referred to as the investment or asset growth effect -- and this effect cannot be explained by standard asset-pricing models, such as the CAPM or the Fama and French (1993) three-factor model.[2]

This paper examines the asset growth effect in a sample of stocks from 40 countries during the period 1981-2005. We find that most countries exhibit a negative relation between asset growth and subsequent stock returns. While this effect is generally insignificant in our subsample of developing countries, the effect is quite strong in the subsample of 26 developed countries. Moreover, there is a significant cross-country variation in the asset growth effect that provides some motivations on analyzing the determinants of this phenomenon.

[1] See, also, Fama and French (2008).
[2] One of the exceptions is the study of the Japanese market by Titman, Wei, and Xie (2009). They find that there is no significant investment effect in the Japanese market. More specifically, the relation between capital investment and subsequent stock returns is flat.

The primary motivation for our analysis is the various behavioral explanations for the investment effect. For example, Titman, Wei, and Xie (2004) argue that firms that increase their level of investment tend to over-invest, and the market initially underreacts to the negative implications of the high level of investment.[3] They find that the negative relation is stronger for firms with higher free cash flows and lower debt, i.e., those firms with the greatest discretion, which are the most likely to overinvest (as suggested by Jensen (1986)). A related explanation, which can have somewhat different cross-country implications, is that the overinvestment is due to managerial overconfidence, as described in Heaton (2002).

Baker, Stein, and Wurgler (2003) suggest an alternative behavioral explanation that has been referred to as a catering theory of investment. The idea is that corporations tend to invest more when their stock is overpriced, which induces a negative relation between corporate investments and subsequent stock returns. Polk and Sapienza (2009) use discretionary accruals as a proxy for stock market mispricing and find that more overvalued firms tend to invest more, and tend to have lower subsequent stock returns than do undervalued firms, which is consistent with the catering theory of investment.[4]

The investment effect is also consistent with risk-based or rational explanations. For example, Berk, Green, and Naik (1999) argue that when firms exercise their growth options (i.e., increases in capital investments), their risk is reduced, and, hence, their expected future returns are lower. Another rational explanation is based on the neoclassical q-theory of investment as proposed by Cochrane (1991, 1996), Zhang (2005), Li, Livdan, and Zhang (2009), and Liu, Whited, and Zhang (2009), among others. Assuming that firms invest optimally, the theory

[3] Titman, Wei, and Xie (2004) further find that, during the period (1984-1989) of an increase in managerial control (i.e., an increase in the threat of hostile takeovers), the investment effect is much weaker. Cooper, Gulen, and Schill (2008) also find a same result. These results seem to be consistent with the view that the investment effect is in part attributable to managerial overinvestment and investors' under appreciation of managerial empire building tendency.
[4] Henderson, Jagadeesh, and Weisbach (2006) provide evidence in an international setting showing that firms are more likely to issue equity when the equity market appears to be overvalued.

suggests that, due to diminishing marginal rates of returns on investment, firms that invest more will earn lower expected returns. State differently, the theory argues that when the costs of capital are lower, new investment will generate higher net present values and therefore firms will invest more, again establishing a negative relation between firm investments and expected returns. The risk-based explanations assume that there is a common investment factor that has predictive power on the subsequent stock returns. A recent paper by Li and Zhang (2010) extends the q-theory of investment to the case with investment frictions. The extended q-theory predicts that the investment effect should be more pronounced in firms with high investment frictions than in firms with low investment frictions. Since investment frictions are highly negatively correlated with equity market development, the cross-country variation in equity market development may provide implications for the risk-based explanation.

Our analysis indicates that to a large extent, among developed countries, the difference in the asset growth effect can be explained by the cross-country difference in the ease of access to equity markets or equity market development. More specifically, the average spread in characteristic-adjusted returns between firms with the lowest asset growth quintile and firms with the highest asset growth quintile is 0.58%-0.59% per month (about 7%-7.1% per year) higher in countries with the access-to-equity market index or the market cap to GDP ratio ranked in the top 30 percentile than in countries ranked in the bottom 30 percentile of all developed economies. The difference in the stock return spreads is statistically highly significant.

In addition to a country's access to equity markets, we also consider a number of other country-specific variables that have been shown to have explanatory power on international

momentum, accruals, and share issuance effects.[5] These country-specific variables include proxies for corporate governance (such as the anti-self-dealing index and the revised anti-director rights index) and overconfidence (proxied by the individualism index). We find that the asset growth effect is significantly related to a country's cultural environment (i.e., individualism), but the inclusion of it does not materially affect the significant influence of the access to equity markets on the asset growth effect. Furthermore, the asset growth effect is stronger in countries with high corporate asset growth than in countries with low corporate asset growth. We interpret our results as to be more consistent with the overinvestment explanation originally proposed by Titman, Wei, and Xie (2004), and inconsistent with the prediction by the q-theory of investment with frictions put forth by Li and Zhang (2010).

In addition, our findings are less able to distinguish between the catering theory of investment and the general overinvestment explanations. It is possible that overvalued firms may issue more external equity and hence invest more or that countries with easier access to equity markets may have higher equity issuance activities.[6] However, no theoretical or empirical evidence available indicates that stocks in more developed equity markets are more likely to be overvalued. If equity issuance can be used as a proxy for investment due to market timing considerations, then our results are not consistent with the catering explanation of the asset growth effect. However, our results do suggest that equity issuance can predict future stock returns.[7]

[5] See, for example, Chui, Titman, and Wei (2010) for the momentum effect, McLean, Pontiff, and Watanabe (2009) for the net share issuance effect, and Pincus, Rajgopal, and Venkatachalam (2007) for the accrual effect in an international setting.

[6] See, for example, Henderson, Jagadeesh, and Weisbach (2006) and McLean, Pontiff, and Watanabe (2009), respectively, in an international setting.

[7] Our unreported results show that the cross-country variation in equity issuance cannot explain the cross-country variation in the asset growth effect. The results are available upon request.

The remainder of the paper is organized as follows. Section 2 develops our hypotheses and provides a brief sample description. Section 3 illustrates research methodology based on both portfolio sorts and regression analyses. The analyses are performed at both the firm and country levels. Section 4 documents the asset growth effect country-by-country and examines the persistence of the asset growth effect. Section 5 explores how differences in equity market development and other country-specific characteristics explain the cross-country difference in the asset growth effect. Finally, Section 6 concludes the paper.

2. Hypotheses Development and Data Description

2.1 Hypotheses development

In this study, we argue that if the negative relation between corporate investments and subsequent stock returns is due to corporate overinvestment tendencies, then factors that affect corporate overinvestment behavior should also have influences on the asset growth effect. At the country level, we argue that firms in countries with more developed capital markets may be more likely to invest more due to the ease of their access to external markets than firms in countries with less developed external capital markets. Therefore, our first hypothesis (H1) is that *countries with easy access to equity markets should show a stronger asset growth effect than countries with restricted access to equity markets, other things being equal*. The empirical evidence documented by Titman, Wei, and Xie (2004, 2009) showing that there is a significant difference in the investment effect between the United States and Japan appears to be consistent with this argument. More specifically, Titman, Wei, and Xie (2009) find that the investment

effect does not exist in Japan in the 1980s and 90s, where firms' access to capital markets was very limited compared to that in the United States during their study period.[8]

Our second hypothesis (H2) is based on the q-theory with investment frictions put forth by Li and Zhang (2010), where investment frictions are empirically proxied by financing constrains. The model predicts that the asset growth effect should be more pronounced in countries with high investment frictions than in countries with low investment frictions. Since investment frictions are highly negatively correlated with capital market development, the q-theory with investment frictions therefore predicts that *countries with difficult access to equity markets should show a stronger investment effect than countries with easy access to equity markets, other things being equal*. This is opposite to our first hypothesis.

In examining the effect of managerial overconfidence on the relation between corporate investments and stock returns, we adopt an individualism index developed by Hofstede (1980, 2001) as our proxy for overconfidence at the country level. Chui, Titman, and Wei (2010) indicate that individualism is associated with overconfidence and self-attribution bias. They show that the individualism measure is positively associated with trading volume and return volatility, which is consistent with the predictions of numerous theoretical models that suggest that overconfidence is positively associated with trading volume and return volatility.[9] Chui, Titman, and Wei (2010) further show that there is a strong and positive cross-country relation between individualism and momentum, which is consistent with the prediction of existing

[8] Titman, Wei, and Xie (2009) further find that the relation between capital expenditures and future stock returns is positive before 1990 and negative during 1990s although both are insignificant. They argue that the results may be due to regulations in Japan that limit firms' access to external capital markets. In particular, Japanese firms, especially independent firms, have very limited access to capital markets before capital market deregulations that start in late 1980s.

[9] For example, Odean (1998), Gervais and Odean (2001), and Scheinkman and Xiong (2003), among others, propose theoretical models that predict that more overconfident investors trade more and generate excessive volatility.

behavioral momentum models that link overconfidence and self-attribution bias to momentum.[10] As argued by Chui et al., their results appear to suggest that individualism is a good proxy for overconfidence and self-attribution bias. Since managerial overconfidence can lead corporation to overinvest as argued by Heaton (2002), our third hypothesis (H3) is that *countries with strong individualistic cultures should exhibit a stronger asset growth effect than countries with weak individualistic cultures*.

A stream of recent research focuses on how the cross-country difference in legal protection of minority investors from possible expropriation by insiders affects the cross-country difference in corporate governance, the cost of capital, and the accrual effect, among others.[11] The evidence shows that countries with stronger legal protection of shareholders have better corporate governance. Firms with better corporate governance are generally perceived to be able to provide more effective mechanisms to alleviate the agency problems and, hence, to reduce the tendency of overinvestment. If this is the case, one would expect that the asset growth effect is weaker in countries with better corporate governance or stronger legal protection for investors than in countries with poor corporate governance or weaker investor protection.

However, more recent studies on the relation between country-level investor rights and corporate investment policies suggest that it may not be the only case. For instance, John, Litov, and Yeung (2008) propose several potential arguments in predicting the relation between corporate governance and corporate risk-taking investment behavior. Their conclusion is that the relation can be positive or negative depending on which argument one believes. However, their empirical results support a positive relation between corporate governance and corporate risk-taking investment activities. Their findings imply that firms located in weak investor protection

[10] See, for example, a theoretical model derived by Daniel, Hirshleifer, and Subrahmanyam (1998).
[11] See, for example, La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997, 1998, 2002), Hail and Leuz (2006), Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008), and Chen, Chen, and Wei (2009), among others.

or poor corporate governance environments may be less likely to increase their investment excessively, and hence may exhibit a weaker investment effect. If this is the case, one would expect that weak investor protection mitigates the negative relation between corporate investment and subsequent stock returns. In addition, the evidence in the existing literature also shows that countries with weaker legal protection have a higher cost of capital (e.g., Hail and Leuz, 2006; Chen, Chen, and Wei, 2009), which may discourage corporate investment. In other words, one would expect a weaker investment effect in countries with poor corporate governance than in countries with good corporate governance. We therefore include two measures of investor protection in our analysis to control for the possible influence of corporate governance on the investment effect.

There have been extensive studies on the relation between corporate investments and stock returns among the U.S. firms. However, the issues on whether the asset growth effect is pervasive across countries and whether there is any cross-country difference in this effect and to the extent what determines the cross-country difference in the investment effect have not been extensively explored before. This study seeks to fill this gap and to shed some light on all these issues.

2.2 Sample selection and data description

The measurements of our variables are drawn from two major data sources. The first data source involves the measures of the ease of raising external funds, legal protection of investors, and overconfidence at the country level. The first two categories of variables are mainly drawn from La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997, 1998, and 2002) and Djankov, La Porta, Lopez-de-Silanes, and Shleifer. (2008). The key measure of the ease of access to external

markets is the index of access-to-equity market, constructed based on the annual surveys of business executives' qualitative assessment of the ability of firms to raise equity in local stock markets. These surveys are sponsored by World Economic Forum and the survey data are available from the publications of *Global Competitiveness Report* from 1999 to 2006. The survey question in 1999 is the statement "Stock markets are open to new firms and medium-sized firms," and in other years is "Raising money by issuing shares on the local stock market is." The response to the statement is scaled from 1 (strongly disagree or nearly impossible) to 7 (strongly agree or quite possible). The access-to-equity market index used in this study is the average of the annual scores for the period 1999-2006, calculated in a similar approach that La Porta, Lopez-de-Silanes, and Shleifer (2006) construct their equity market development measure.

We supplement this key measure with a measure of equity market development as a proxy for the ease of raising external funds: the ratio of stock market capitalization to gross domestic product (GDP) scaled by the fraction of stock market held by outside investors (dubbed as the market cap to GDP ratio for short in this study). This measure of ease of access to equity markets is the average ratio of market cap to GDP for the period 1996-2003. Both of our measures for the ease of access to equity market are used by La Porta, Lopez-de-Silanes, and Shleifer (2006) to proxy for the development of securities markets. As in La Porta et al. (2006), we apply both numerical measures of the ease of access to equity markets to the whole sample period.[12] We argue that it is easier for firms in countries with easy access to equity markets to raise funds than for firms in countries with less developed equity markets.

The two measures of legal protection of investors used in this study are the anti-self-

[12] La Porta, Lopez-de-Silanes, and Shleifer (2006) use the 1999 report on access to equity in their study, and their measure of the market cap to GDP ratio is averaged over 1996-2003. To the extent that institutional environments tend not to change rapidly, we believe that our measures of access to equity market are likely to represent fairly well the environments for our sample period.

dealing index and the revised anti-director rights index.[13] The anti-self-dealing index, constructed by Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008), is the average of ex-ante and ex-post private control of self-dealing indices. Djankov et al. (2008) argue that anti-self-dealing is a more appropriate measure of protection of minority shareholders from extrapolation of controlling shareholders than other commonly used measures of investor protection. The higher the index, the stronger the shareholder protection. The anti-director rights index, originally constructed by La Porta et al. (1998) and revised by Djankov et al. (2008), summarizes the protection of minority shareholders in the corporate decision-making process. It ranges from 0 (weak) to 5 (strong). Djankov et al. (2008) argue that the revised anti-director rights index is better associated with laws, rules, or provisions that are favorable to minority shareholders, compared with the original anti-director rights index.

The individualism index, constructed and extended by Greet Hofstede (1980, 2001), is based on a cross-country psychological survey of IBM employee's attitudes towards their work and private lives. The index ranges from 0 to 100. The higher the index of a country, the higher the individualism in the country. People who live in high individualistic cultures are likely to be more over-optimistic and more overconfident than people who live in low individualistic cultures.

The second major data source involves the firm-level financial and market data. With the exception of the U.S. sample that comes from CRSP and Compustat, these data are retrieved from Worldscope and Datastream International provided by Thomson Financial. Data are available for 55 countries starting from February 1980 (for some countries). The starting date for each country varies according to the availability of data. We include all domestic common stocks listed on the major stock exchange(s) in each country and exclude closed-end funds, trusts,

[13] We also use the investor protection index constructed by La Porta et al. (2006) as another measure of legal protection of investors and obtain similar results as those using the revised anti-director rights index.

ADRs, REITs, units of beneficial interest, and other financial institutions. We also exclude firm-year observations with negative book value of equity or with no valid data to calculate asset growth or market equity. As in Chui, Titman, and Wei (2010), monthly returns are winsorized to -100% or 100% to filter out suspicious stock returns.[14] Since we need a reasonable number of stocks to conduct our tests, we require each country to have at least 30 stocks that meet our stock selection criteria in any month during our sample period. After this screen process, our final sample consists of 40 countries, with 26 developed economies and 14 developing economies.[15]

Corporate investment can be defined in different ways. Cooper, Gulen, and Schill (2008) show that total asset growth exhibits the strongest effect on future returns among other investment growth measures such as growth in current assets, fixed assets, and capital expenditures. We hence measure corporate investment as the asset growth rate in this study.[16] The total asset growth rate (*TAG*) is defined as the percentage change in total assets (*TA*) from year *t*-1 to year *t*, denoted as $TAG_{it} = (TA_{it} - TA_{it\text{-}1})/TA_{it\text{-}1}$. We include the following firm-level variables in this study since existing literature shows that these variables have a significant influence on future stock returns across countries: firm size, book-to-market equity, momentum, and equity issuance.[17]

Firm size (SZ_t) is measured by the market equity in U.S. dollars at the end of June of year *t*. The book-to-market ratio (BM_t) is the ratio of a firm's book value of equity to its market value of equity at fiscal year-end of year *t*. The momentum (MOM_m) at month *m* is measured by the

[14] See, for instance, the discussions in Ince and Porter (2006) about the problems regarding the quality of emerging stock market data obtained from Datastream International.
[15] The developed economies are identified by the International Monetary Fund (IMF). Most of our developed economies are also OECD countries except the economies of Hong Kong, Israel, Singapore, and Taiwan.
[16] We also measure corporate investment with capital expenditures scaled by net fixed assets and its variants, as used by Titman, Wei, and Xie (2004) and Li and hang (2010). The results are qualitatively similar but weaker.
[17] See, for example, Fama and French (1998) for the size and book-to-market effects, Griffin, Ji, and Martin (2003) and Chui, Titman, and Wei (2010) for the momentum effect, and McLean, Pontiff, and Watanabe (2009) for the share issuance effect, in an international setting.

U.S.-dollar buy and hold return over the last six months that skips the most recent month (i.e., the buy and hold return from *m*-7 to *m*-1*)*. Equity issuance ($Issue_m$) at month *m* measures the change in the number of shares outstanding adjusted for distribution events over the past year (i.e., from *m*-12 to *m*). We apply the method in Pontiff and Woodgate (2008) to calculate equity issuance for firms in the U.S. and we follow McLean, Pontiff, and Watanabe (2009) to measure equity issuance for firms in other countries. Since the calculation of asset growth requires two years of accounting data and the asset growth of year *t*-1 is matched with returns from July of year *t* to June of year *t*+1, the return series in this study starts in July of 1982 and ends in June of 2005. Our final sample of 40 countries has a total of 1,653,547 firm-month observations.

3. Methodology

3.1 The asset growth effect: Portfolio analysis at the country level

We closely follow Titman, Wei, and Xie (2004) and Polk and Sapienza (2009) to examine whether there is an asset growth effect in each country. Our analysis starts with forming quintile portfolios for each local economy or country based on our investment measure. Specifically, for each country, at the end of June in year *t*, all firms are ranked in ascending order based on their total asset growth (*TAG*) in year *t*-1 and are assigned to a corresponding quintile. For instance, firms with asset growth in the bottom 20% are assigned to the *TAG*1 portfolio and those in the top 20% are assigned to the *TAG*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 quintiles are calculated for the same period. The returns are all measured in U.S. dollars.[18] All portfolios are rebalanced at the end of June each year.

[18] We obtain virtually the same results when returns are measured in local currencies.

We further form a zero-cost *TAG*-hedge portfolio for each country by simultaneously taking a long position in the *TAG*1 portfolio and a short position in the *TAG*5 portfolio. Monthly returns on the *TAG*-hedge portfolio are calculated by subtracting monthly returns on the *TAG*5 portfolio from the monthly returns on the *TAG*1 portfolio. These *TAG* portfolios and the *TAG*-hedge portfolio are referred to as the country-specific *TAG* portfolios and the country-specific *TAG*-hedge portfolio, respectively. Our purpose here is to examine whether the return spread between low and high asset growth firms (i.e., the asset growth effect) is significantly positive for each country. This summary result establishes a foundation for us to pursue further analysis on the determinants of the cross-country difference in the asset growth effect.

In addition to reporting unadjusted raw returns in portfolio analysis for individual countries, we follow Fama and French (2008) and adjust the returns for the book-to-market (*BM*) and firm size (*SZ*) effects. Fama and French (2008) argue, "Skipping the details, we can report that these [*BM* and *SZ*] portfolio-adjusted average returns are similar to the intercepts from the three-factor regression model of Fama and French (1993) estimated on the portfolio returns from the anomaly sorts." We use the *BM*- and *SZ*-adjusted return (which is referred to as the characteristic-adjusted return) in our analysis to control for possible size and book-to-market effects on the within-country cross-sectional differences in stock returns.

3.2 The asset growth effect: Portfolio analysis at the world level

Following Chui, Titman, and Wei (2010), we next form country-average portfolios and examine portfolio strategies that exploit the asset growth effects around the world. The country-average *TAG* portfolio equally weights each country-specific *TAG* portfolio. For instance, we first calculate the equally weighted monthly return on the country-specific *TAG*1 portfolio for

country j in month t, denoted as Rtn_{tj1}. We then average Rtn_{tj1} across all countries (j=1 to n) to obtain the equal-weighed return on the country-average $TAG1$ portfolio in month t, denoted as Rtn_{t1}. Finally, we average Rtn_{t1} over the whole sample period (t=1 to T) to obtain the time-series average return for the country-average $TAG1$ portfolio. Similarly, monthly returns and time-series average returns for other country-average *TAG* portfolios are calculated. A country-average *TAG*-hedge portfolio is formed similarly as we form a country-specific *TAG*-hedge portfolio. We form these country-average *TAG* portfolios and the country-average *TAG*-hedge portfolio to examine whether there is a global asset growth effect.

3.3 The asset growth effect: Regression analysis at the firm level across countries

In addition to portfolio analysis, we conduct regression analysis using pooled data across time and firms in all countries to explain returns on individual stocks as follows:

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

where $R_{i,t}$ is the monthly 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. $TAG_{i,t\text{-}1}$ and $BM_{i,t\text{-}1}$ are the total asset growth and the book-to-market equity ratio in year t-1, respectively. $SZ_{i,t}$ is firm size in June of year t and *Ln* represents natural 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. We include firm size, book-to-market equity, momentum, and share issuance in our analysis to control for their influences on stock returns.[19]

[19] We also include the logarithm of gross domestic product (GDP) per capita in both regression models (1) and (2) to control for a possible effect of economic development on the cross-country variation in stock returns. Our results show that the coefficient on this variable is consistently insignificant across different model specifications and does

We provide estimation results from four different regression approaches. As suggested by Petersen (2008), the regression equation is estimated with the ordinary least square (OLS) estimation procedure clustered by country and time using pooled data. To ensure that our results are not driven by a few countries with the highest number of observations, we also report regression results based on the weighted least squares (WLS) estimation method. Following Khurana, Martin, and Pereira (2006), we use the inverse of the number of observations in each month in each country as the weight so that each country is weighted equally. The third and fourth regression approaches use the Fama and MacBeth (1973) procedure with country dummies to capture the possible country effect. We report the Fama and MacBeth estimation results both with and without the Newey-West adjustment for standard errors. We expect b_1 in equation (1) to be negative, which suggests that there is a negative relation between asset growth and subsequent stock returns across firms and countries. We expect that both *BM* and *MOM* have a positive coefficient, while both *SZ* and *Issue* have a negative coefficient, as indicated by existing evidence in the literature.

3.4 Cross-country differences in the asset growth effect: Regression analysis

To explore the influence of country-level factors on the cross-country difference in the investment and return relation, we follow Chui, Titman, and Wei (2010) and employ the following baseline regression model in our study:

$$HedgeR_{j,t} = a_0 + F_j\gamma_1 + \gamma_2 Ln(MdBM_{j,t-1}) + \gamma_3 Ln(MdSZ_{j,t}) + \gamma_4 MdTAG_{j,t-1} + e_{j,t}, \qquad (2)$$

where the dependent variable, $HedgeR_{j,t}$, is the equal-weighted characteristic-adjusted monthly returns in U.S. dollars on the country-specific *TAG*-hedge portfolio in country *j* from July of year

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not affect the influence of other variables on stock returns. We hence report regression results without including this variable in the regression models.

t to June of year t+1. F_j is a vector of country-specific explanatory variables that are constant across time for country j. These variables include the measures of ease of raising external funds (i.e., the access-to-equity market index and the market cap to GDP ratio), the measures of legal protection of investors (i.e., the anti-self-dealing index and the revised anti-director rights index), and a measure of overconfidence (i.e., the individualism index).

The two country characteristics $MdBM_{jt\text{-}1}$ and $MdTAG_{jt\text{-}1}$ are the median book-to-market equity and the median asset growth in country j in year t-1, respectively.[20] The country characteristic $MdSZ_{jt}$ is the median of firm size measured at the end of June in year t. $MdBM_{jt\text{-}1}$ and $MdSZ_{jt\text{-}1}$ are included to serve two purposes. One is to control for valuation uncertainty or information uncertainty in a specific country, where small firms and firms with low *BM* are generally associated with high information uncertainty.[21] Zhang (2006) and Verardo (2009) argue that if momentum is driven by investor underreaction to information, the momentum effect should be stronger among firms with more valuation uncertainty or information uncertainty. They find that the momentum effect is indeed stronger among small firms and among growth firms. Since the asset growth effect can be driven by investor underreaction to firm overinvestment (Titman, Wei, and Xie (2004)), following the same argument by Zhang (2006) and Verardo (2009), we expect that the asset growth effect should be stronger in markets with greater valuation uncertainty or information uncertainty. The second purpose is, as in Chui, Titman, and Wei (2010), to simply examine to what extent that the cross-country difference in the average values of firm characteristics (which we refer to as the country characteristics), including asset growth, explain the cross-country variation in the asset growth effect.

[20] In an earlier version, we include the median equity issuance in the regression model (2). We find that the coefficient of this variable is statistically insignificant and the inclusion of this variable does not change the influence of other variables in the regression.

[21] Daniel and Titman (1999) use book-to-market ratios and Daniel and Titman (1999), Hong, Lim, and Stein (2000) and Zhang (2006) use firm size to proxy for information uncertainty.

The regression model (2) is estimated with the OLS approach using the pooled sample and clustered by country to obtain robust *t*-statistics.[22] The coefficient of interest in this regression model is γ_1. If the variable of interest is the access to equity markets or individualism, γ_1 is expected to be positive based on our hypotheses that the asset growth effect should be stronger among countries with easier access to equity markets or with more overconfident cultures. If the variable of interest is investor protection, γ_1 can be either positive or negative. If the asset growth effect is attributable to investor underreaction and investor underreaction is positively associated with information uncertainty, we expect both γ_2 and γ_3 to be negative.

3.5 Cross-country difference in the asset growth effect: Portfolio analysis

We complement regression analysis with portfolio analysis to explore whether cross-country differences in the ease of raising external equity, legal, and cultural environments can explain the cross-country difference in the asset growth effect. We form portfolios based on a two-way classification of the asset growth measure and a measure of a country-level variable of interest. For instance, to examine the effect of the cross-country difference in access to local equity markets on the cross-country difference in the asset growth effect, we first sort all countries into three groups each year based on their rankings on the access-to-equity market index (the bottom 30% or low, the middle 40% or medium, and the top 30% or high).[23] Within each (low, medium, and high) group, we calculate the time-series averages of returns on country-average *TAG*1, *TAG*5, and *TAG*-hedge portfolios, and examine the average asset growth effect for a given degree of access to equity markets. We further evaluate the difference in the asset growth effect between the high and the low groups. By doing so, we examine whether the cross-

[22] We obtain similar results when controlling for the time-fixed effect.
[23] Note that we may not have the same countries each year. A country in the low group in one year may be placed in another group next year.

country difference in the asset growth effect can be explained by the cross-country variation in access to equity markets or other country-specific variables such as individualism and legal protection of investors, and/or country characteristics such as corporate median asset growth.

4. Preliminary Results

4.1 The country-by-country asset growth effects

We first investigate whether the asset growth effect exists in each local economy. Table 1 presents the time-series averages of equal-weighted monthly raw returns on *TAG* portfolios for the whole sample period in each country. It also lists the number of firms, the sample period in each country, and two measures of our key variable, access to equity markets. It is not surprising that the largest three economies, the U.S., the U.K., and Japan, are the ones with the largest numbers of stocks.[24] Panel A of Table 1 provides the average returns on *TAG*1, *TAG*5, and the *TAG*-hedge portfolio for developed economies identified by the International Monetary Fund (IMF). It shows that only two countries exhibit a reversed investment effect (Israel and New Zealand) and both are insignificant. In addition, 14 out of the 26 developed economies have a significant asset growth effect, ranging from 0.38% a month in Germany to 1.28% a month in Hong Kong. The results indicate that there is a considerable variation in the asset growth effect across countries.[25]

[Insert Table 1 here]

Furthermore, the developed economies as a whole show a strong and significant global asset growth effect. Specifically, the last row of Panel A shows that the average return on the

[24] When we exclude the largest three economies (the U.S., the U.K., and Japan) from our sample, we obtain virtually the same results.

[25] Japan shows a significant investment effect in Panel A of Table 1. However, our results not reported here show that there is no significant investment effect in Japan when raw returns are adjusted for the size and book-to-market characteristic returns, consistent with the results reported by Titman, Wei, and Xie (2009).

country-average *TAG*1 portfolio is 1.78% a month and the average return is 1.28% a month for the country-average *TAG*5 portfolio. The average return on low asset growth firms significantly outperforms the average return on high asset growth firms by 0.50% per month or 6.07% per year, as indicated by the average return on the country-average *TAG*-hedge portfolio.

On the other hand, we do not observe an asset growth effect among developing economies, as indicated in Panel B of Table 1. Only three out of 14 developing economies show a significant asset growth effect (Argentina, South Africa, and Thailand). The average return on the country-average *TAG*1 portfolio is 1.68% a month and the average return on the country-average *TAG*5 portfolio is 1.54% a month. The average return spread between the country-average *TAG*1 and *TAG*5 portfolios is 0.14% a month and is statistically indifferent from zero. We also find that developed countries have on average a higher value of access to capital markets than developing countries. The average access-to-market index is 5.76 in developed countries versus 4.87 in developing countries, while the average market cap to GDP ratio is 0.59 in the developed countries versus 0.30 in developing countries. It seems that the market cap to GDP ratio is more closely related to the dichotomy classification of developed versus developing countries than is the access-to-market index.

The regression results of how asset growth affects subsequent stock returns based on pooled samples are presented in Table 2. Panel A of the table reports the OLS regression results clustered by country and time to obtain robust standard errors. Panel B reports the weighted least squares (WLS) regression results clustered by country and time, where the weight is the inverse of the number of observations in each month in each country. Panels C and D report the estimation results from the Fama-MacBeth (1973) regression procedure with country dummies. The reported estimates are the time-series averages of the monthly estimated coefficients. Panel

C reports the associated simple *t*-statistics and Panel D reports the *t*-statistics adjusted for the Newey-West robust standard errors.

[Insert Table 2 here]

Results from all four regression approaches indicate that total asset growth has a strong and negative effect on subsequent stock returns when firms from all sample economies are pooled together as well as when firms from the developed economies are pooled together. The estimated coefficient on *TAG* is significantly negative for these two samples even after controlling for the size, book-to-market, momentum, and issuance effects. However, the estimated coefficient on *TAG* for the subsample of developing economies is statistically indifferent from zero across all four regression approaches, suggesting that there is no investment effect among these developing economies. For instance, the estimated coefficient on *TAG* in Panel A is -0.463 (*t*-statistic = -2.76) for the whole sample and -0.539 (*t*-statistic = -3.06) for the developed economies, but it is insignificant with a value of 0.026 (*t*-statistic = 0.08) for the developing economies. The estimated coefficient on *TAG* based on the WLS method in Panel B is -0.492 (*t*-statistic = -2.46) for the developed economies, while it is -0.004 (*t*-statistic = 0.63) for the developing economies. We obtain similar results with the Fama and MacBeth (1973) regression approach both without and with the Newey-West adjustment for standard errors.

We further test whether the asset growth effect is stronger in the developed economies than in the developing economies, as our first hypothesis (H1) or the second hypothesis (H2) indicates. That is, we test the null hypothesis that the slope coefficient of asset growth is more negative from the subsample of developed economies than from the subsample of developing economies. The test results shown at the bottom of each panel in Table 2 support the null hypothesis (H1) and reject the alternative hypothesis (H2). For instance, the chi-square statistics

on the difference in the slopes of *TAG* between the two subsamples are 2.38 and 1.77 in Panels A and B, respectively, and are significant at the 10% level, suggesting that the asset growth effect is stronger among the developed economies than among the developing economies. The *t*-test results in Panels C and D based on the Fama-MacBeth regression approach also show that the asset growth effect is significantly more negative in developed markets than in developing markets.[26]

In addition, Table 2 also documents that, consistent with previous studies, the estimates of control variables have expected signs and are significant in most cases. Overall, our results suggest that the asset growth effect prevails in the developed economies but not in the developing economies, and the results are robust to different estimation approaches. If we use the dichotomy classification of developed markets versus developing markets as a simple measure of access to capital markets, the results in Table 2 appear to support the hypothesis that the asset growth effect is more profound in countries with easy access to capital markets than in countries with limited access to capital markets.

4.2 The persistence of the asset growth effect

Titman, Wei, and Xie (2004) and Cooper, Gulen, and Schill (2008) indicate that the asset growth effect is persistent up to four to five years after portfolio formation among firms in the United States. We investigate whether it is the case for the global asset growth effect. Since results presented in Table 2 suggest that both size and book-to-market equity have influences on subsequent stock returns, we report size and book-to-market characteristic-adjusted returns on the country-average *TAG* quintiles and on the country-average *TAG*-hedge portfolios. The size

[26] The *t*-test is calculated based on the Newey-West robust standard errors. Therefore, the t-statistics are the same in both cases.

and book-to-market characteristic portfolios are formed for each country as follows. First, at the end of June in year *t*, firms are sorted independently into three *SZ* groups based on their rankings on market value at the portfolio formation date and three *BM* groups based on their rankings in book-to-market equity in year *t*-1. The intersection of the three *SZ* groups and the three *BM* groups results in nine characteristic portfolios. Equal-weighted monthly raw returns are calculated from July of year *t* to June of year *t*+1 for the characteristic portfolios. All portfolios are rebalanced each year. The *SZ* and *BM* characteristic-adjusted monthly returns on an individual stock are the differences between the raw monthly returns on the stock and the monthly returns on the characteristic portfolio that the stock falls into. Next, we calculate the equal-weighted monthly returns on country-specific *TAG* portfolios based on the characteristic-adjusted individual stock returns, and then calculate the average returns on the country-average *TAG* portfolios.

Table 3 presents the time-series averages of the characteristic-adjusted monthly returns on the country-average *TAG* portfolios for one to five years (year = +1 to +5) after portfolio formation. Panel A reports the results for the whole sample economies, and Panels B and C report the results for the developed and the developing economies, respectively. The results show a persistent asset growth effect for the all economies as a whole and for developed economies. Characteristic-adjusted returns on the *TAG*1 portfolio consistently outperform characteristic-adjusted returns on the *TAG*5 portfolio in each of the five years after formation. For instance, for the subsample of developed economies, the average of the characteristic-adjusted returns on the *TAG*1 portfolio is 0.14% per month five years after formation and the average return on the *TAG*5 portfolio is -0.09% per month. The difference in characteristic-adjusted returns between these two extreme portfolios is 0.23% per month (or 2.80% per year)

on average and is significantly different from zero (*t*-statistic = 3.04). However, we do not observe an asset growth effect in any of the five years after portfolio formation among the developing economies, as shown in Panel C. Therefore, the rest of our study focuses on explaining the cross-country difference in asset growth effect for the developed economies. We also report test results for the whole sample economies and for the subsample of developing economies for completeness.

[Insert Table 3 here]

5. Explanations for the Asset Growth Effect across Countries

5.1 Summary statistics for country-level variables

We start this section by examining the basic statistic information on our country-level variables of interest. The time-invariant country-specific variables are the access-to-equity market index, the market cap to GDP ratio, the individualism index, the anti-self-dealing index, and the revised anti-director rights index. The country-level time-variant variables are the medians of firm size, book-to-market, asset growth, and the country-average *TAG*-hedge returns. The median variables are updated once a year and the hedge return variable is updated once a month for each country. Panel A of Table 4 reports the summary statistics on these variables and Panels B to D reports the correlations among them for the whole sample and the two subsamples. Panel A shows that the average characteristic-adjusted hedge returns over the whole sample period for the whole sample economies, the developed economies, and the developing economies are 0.23%, 0.27%, and 0.11% a month, respectively. The result suggests that the asset growth effect is more pronounced in developed countries (0.27% per month) than in developing

countries (0.11% per month) after adjusting the size and book-to-market effects. The statistics on country-specific variables are all in line with the existing studies.

[Insert Table 4 here]

Panels C and D of Table 4 show that there are much more significant correlations among these selected variables of interest in the developed economies than in the developing economies. For instance, the correlations between the hedge returns and most other variables are significant in the developed economies, but there is no significant relation between the hedge returns and other variables of interest in the developing economies.

5.2 Ease of access to equity markets and cross-country difference in the asset growth effect: Portfolio analysis

This section examines whether the cross-country difference in the ease of access to equity markets help explain the cross-country variation in the asset growth effect. Table 5 presents the results based on country-average *TAG* portfolios sorted on a measure of access to equity markets. Specifically, we classify countries into three groups each year, from low (bottom 30%) to high (top 30%) based on their rankings on a particular variable of interest. Country-average portfolios are then formed in each group as described in Section 3.2.[27] Panel A of Table 5 presents the time-series averages of characteristic-adjusted returns on country-average *TAG* portfolios for each group based on the access-to-equity market index, and Panel B is for the groups classified by the market cap to GDP ratio.

[Insert Table 5 here]

The results from both panels show that the asset growth effect increases monotonically with the degree of ease to raise funds in equity markets. For instance, Panel A shows that, for

[27] In Tables 5 and 6, the portfolio analysis for the developing economies starts at 1994 in order to have enough number of countries in a portfolio.

the subsample of developed economies, the average characteristic-adjusted returns on the country-average *TAG*-hedge portfolios in the low, medium, and high access-to-equity market index groups are -0.024% (*t*-statistic=0.21), 0.158% (*t*-statistic=1.70), and 0.55% (*t*-statistic=5.97) per month, respectively. The difference in the asset growth effect between the high and the low access-to-equity market index groups is 0.58% per month or 6.96% per year, and is highly significant at the 1% level (*t*-statistic = 4.03). Although there is no evidence of an asset growth effect (as measured by the slope effect) in the subsample of developing economies as shown in Table 2, there is a significant asset growth effect in the sub-group of developing countries with high access to equity markets. In addition, the asset growth effect is significantly more pronounced in developing countries with high access to capital market than in developing countries with low access to capital markets. However, we need to interpret the result with cautious, since the sample size is small and the return volatility is high in this subsample.

Similar characteristic-adjusted return patterns are observed in Panel B of Table 5. For instance, for the subsample of developed economies, the difference in the average characteristic-adjusted returns on the *TAG*-hedge portfolio between the high and the low market cap to GDP ratio groups is of a similar magnitude of 0.59% per month with a *t*-statistic of 3.67. These results indicate that, in general, countries with easy access to equity markets show a stronger asset growth effect than those with difficult access to equity markets. The results from the whole sample and the subsample of developing economies also show a same pattern.

5.3 Overconfidence, legal protection of investors, and cross-country differences in the asset growth effect: Portfolio analysis

Table 6 presents the results of portfolio analysis based on the sorts of country-level factors of interest. Panels A and B examine the influence of cross-country differences in

individualism and in investor protection proxied by anti-self dealing on the cross-country variation in the asset growth effect, respectively. The country-average portfolios for each individualism group or investor protection group are formed in a similar manner as those of country-average portfolios for each access-to-equity market group as illustrated in section 5.2.

[Insert Table 6 here]

The results in Panel A of Table 6 indicate that countries with more overconfidence cultures have a stronger asset growth effect than countries with less overconfidence cultures.[28] Specifically, the asset growth effect in developed countries with the high individualism group is 0.46% per month on average and is statistically significant at the 1% level. However, the asset growth effect is an insignificant 0.06% per month in developed countries with the low individualism group. The difference of 0.40% per month in the asset growth effect between the high and the low overconfidence groups is statistically significant (*t*-statistic = 3.12). These results are consistent with our third hypothesis (H3) that the asset growth effect is stronger in economies with more overconfidence cultures where overconfidence may induce overinvestment that leads to the observed asset growth effect.[29]

The results in Panel B of Table 6 show that the country-average investment effect is weak in countries with weak investor protection, and it is strong in countries with strong investor protection. For instance, with anti-self-dealing as a measure for shareholder protection, the asset growth effect in developed countries with strong investor protection is 0.38% per month on average and is statistically significant, while it is an insignificant -0.09% per month in developed countries with weak investor protection. The difference of 0.48% per month in the asset growth

[28] We also use the index of uncertainty avoidance constructed by Hofstede (2001) as a proxy for risk aversion and perform similar analysis by replacing the individualism index with the uncertainty avoidance index. We find that countries with a high uncertainty avoidance index, i.e., countries with a high propensity to avoid uncertainty, have a weak investment effect. This again appears to support the overinvestment argument for the investment effect.

[29] Our unreported results also indicate that firms in more overconfident cultures invest significantly more than firms in less overconfident cultures.

effect between the high and the low investor protection groups is statistically different from zero at the 10% level (*t*-statistic = 1.85).[30] However, the results in Table 6 indicate that individualism and investor protection seem not to have a significant influence on the across-country variation in the asset growth effect in developing economies.

5.4 Determinants of the cross-country difference in the asset growth effect: Regression analysis

Table 7 presents the regression results of equation (2) for the three samples, where the dependent variable is the size and book-to-market characteristic-adjusted monthly returns on the country-specific *TAG*-hedge portfolios. The regressions are performed with the Petersen (2008) approach clustered by country. Results from Models (1) and (2) in Panel B of Table 7 indicate that the ease of access to equity markets has a strong influence on the cross-country difference in the asset growth effect among the developed economies and that it has no such an effect among the developing economies. For instance, for the subsample of developed economies, the estimated coefficient on the access-to-equity market index is 0.599 with a *t*-statistic of 3.61, and the estimated coefficient on the market cap to GDP ratio is 0.420 with a *t*-statistic of 2.08. Both estimates are highly significant at the 1% level, after controlling for the country-specific size and book-to-market effects or information uncertainty. These findings are consistent with findings from the portfolio analysis in Table 5 and support our first hypothesis (H1) that countries with easy access to equity markets tend to have a stronger asset growth effect than do countries with difficult access to security markets. For the whole sample economies, while the coefficient of the market cap to GDP is significantly positive, the coefficient of the access-to-market index is positive but insignificant.

[30] We obtain similar results when the revised anti-director rights index is used as a measure of investor protections.

[Insert Table 7 here]

Results in Model (3) in Panels A and B of Table 7 reveal that the coefficient on individualism is significantly positive, suggesting that the individualistic cultures influence the cross-country variation in the asset growth effect in the whole sample economies as well as in the subsample of developed economies. This finding is consistent with the results from portfolio analysis reported in Table 6 and our third hypothesis (H3) that countries with more overconfident cultures have a stronger asset growth effect than do countries with less overconfident cultures.

However, we do not find evidence that supports the argument either for or against the influence of shareholder protection on the asset growth effect. The coefficients on the anti-self dealing index and the revised anti-director rights index are indifferent from zero, as shown in Models (4) and (5) across the two panels in Table 7. The discrepancy of our results on investor protection based on portfolio analysis and based on regression analysis may be attributed to the different analytical methods. While regression analysis controls for the country characteristics such as the medians of book-to-market, size, and asset growth, portfolio analysis does not. It appears that a country's median levels of book-to-market equity, size, and/or asset growth subsume investor protection in explaining the cross-country difference in the asset growth effect. For the developing economies, we find that the coefficients of all our interest variables are positive, but none of them are significant.

To test the catering explanation for the asset growth effect, we include the country-level median share insurance (*MdIssue*) as a proxy for country-level overvaluation (e.g., Henderson, Jagadeesh, and Weisbach, 2006) in our cross-country multivariate regression equation (2). Our untabulated results show that the regression coefficient of *MdIssue* is always insignificant, while

the significance levels of other coefficients remain unchanged.[31] The results suggest that the country-level median share insurance does not have any impact on the cross-country difference in the asset growth effect. That is, countries with a higher tendency of market overvaluation as proxied by equity issuance do not show a stronger asset growth effect.

In addition, in all model specifications in Table 7, our results show that a country's characteristic of median asset growth has a strong effect on the cross-country difference in the asset growth effect. The coefficient on *MdTAG* is consistently and significantly positive, suggesting that the asset growth effect is stronger in countries with higher asset growth. We also find that a country's median book-to-market equity has a significantly negative effect on the asset growth effect in most cases, consistent with the underreaction argument that the asset growth effect is more profound in countries with greater valuation or information uncertainty.

5.5 Cross-country difference in the asset growth effect: A multivariate regression analysis

So far both of our regression and portfolio analysis results suggest that the cross-country difference in the ease of access to equity markets and in individualism have significant influences on the cross-country variation in the asset growth effect when each is considered separately, for the whole sample economies as well as for the subsample of developed economies. This section examines whether the effect of one variable subsumes the effects of other country-specific variables. The results from the multivariate regressions of equation (2) are presented in Table 8, where Panel A is for all economies, and Panels B and C are for the developed and developing economies, respectively.

[Insert Table 8 here]

[31] The results are available upon request.

The results in Panel B show that both measures of the ease of access to equity markets are statistically significant across all three model specifications for the developed economies and so are for the individualism index and the country median asset growth. More importantly, the influence of the access-to-equity market index or the market cap to GDP ratio on the asset growth effect is not subsumed by the effect of individualism. For example, in Model (3), the estimated coefficient on the access-to-equity market index is 0.411 with a *t*-statistic of 2.78, and the estimated coefficient on individualism is 0.007 with a *t*-statistic of 4.34. Model (6) shows that the estimated coefficient on the market cap to GDP ratio is 0.383 with a *t*-statistic of 2.78, and the estimated coefficient on individualism is 0.01 with a *t*-statistic of 6.10. The results in Panel C for the developing economies show that most of the explanatory variables of our interest tend not to have any effect on the cross-country variation in the asset growth effect. This result is not surprising given that there is no asset growth effect among the developing economies.

Our results in Table 8 suggest that the ease of access to equity markets and managerial overconfidence contribute to the cross-country difference in the observed asset growth effect. In addition, the significant coefficient on the country-level asset growth indicates that the asset growth effect is stronger in countries with greater asset growth. Finally, investor protection in general tends to have insignificant influence on cross-country variation in the asset growth effect. Overall, our results tend to be consistent with the hypothesis that the asset growth effect might be attributable to overinvestment, and tend to be inconsistent with the prediction of the q-theory with investment frictions as initiated by Li and Zhang (2010).[32]

[32] We have also performed a test on the Fama and MacBeth (1973) regression slope of asset growth as suggested in Li and Zhang (2010), where the dependent variable is the monthly excess stock returns on a stock and the independent variable is the firm's asset growth with any other control variables. The q-theory of investment with frictions predicts that the magnitude of the expected return-asset growth relation should be stronger among countries with difficult access to equity markets. However, our test results show that the slope is more negative in countries with easy access to equity markets than countries with difficult access to equity markets although the difference is not statistically significant. The results are available upon request.

6. Conclusion

In this study, we document that there exists the asset growth effect outside the United States. Specifically, we find a strong asset growth effect among the developed economies but we do not observe any asset growth effect among the developing economies. We further show that access to equity markets and culture environments influence the cross-country variation in the asset growth effect, possibly through a propensity-to-overinvest channel. We find that developed countries with easy access to equity markets and more overconfidence cultures show a stronger asset growth effect than their counterpart countries with less developed equity markets and less overconfidence cultures. A country's asset growth level is also found to be a strong indicator of the asset growth effect. Our results complement the findings by McLean, Pontiff, and Watanabe (2009), who find that the share issuance effect is more profound in countries with higher share issuance activities, more developed stock markets, and stronger investor protection.[33] They argue that their results tend to be consistent with the view that the share issuance effect is associated with the easiness of share issuance and repurchases (i.e., how easy a firm accesses to equity markets). Overall, our results appear to be in support of the overinvestment explanation initiated by Titman, Wei, and Xie (2004) and in contradiction to the explanation of the q-theory with investment frictions suggested by Li and Zhang (2010).

This study broadens our understanding of the cross-country variation in corporate investment behavior and stock performance. While there are other plausible explanations for the negative relation between corporate investment and subsequent stock returns, the results in this study seem to suggest that the cross-country variation in the asset growth effect might be

[33] A share issuance trading strategy is a trading strategy that buys stocks with small net share issuance and at the same time shorts stocks with large net share issuance. Net share issuance is share issuance minus share repurchases. This trading strategy is highly profitable even after controlling for risk and is called the share issuance effect.

inherited from the cross-country difference in access to equity markets and cultural environments. As argued by Chui, Titman, and Wei (2010), it is always interesting to compare the profitability of an investment strategy across countries. Besides providing a robustness check on the results obtained from the overwhelmingly mined U.S. data, a cross-country study also provides a platform for examining how cross-country differences in country-specific factors influence the efficiency of financial markets. The asset growth effect in the U.S. documented by Titman, Wei, and Xie (2004) and Cooper, Gulen, and Schill (2008), among others, seems to be too large and too persistent (over five years) to be explained by risk, and hence posits a challenge on the efficient market hypothesis. The results in this study posit an even bigger challenge on the efficient market hypothesis, since we find that the asset growth effect is highly significant and large in the developed markets, but it is not the case in the developing markets. The efficient market hypothesis needs to explain why emerging markets are more efficient, while developed markets are more inefficient, if the observed asset growth effect is related to market efficiency.[34]

Our cross-country evidence on the asset growth effect also poses a challenge on the risk-based as well as the behavioral explanations. The risk-based arguments must explain why the investment-hedge portfolios are risky in the developed markets but not risky in the emerging markets. The behavioral explanation must explain why managers have a tendency to overinvest and at the same time investors tend to underreact to the negative information contained in overinvestment in the developed markets, but it is not the case in the developing markets. Our evidence in this study appears to suggest that the cross-country differences in financial and cultural factors play an important role in explaining the cross-country variation in the asset growth effect.

[34] Please see a recent paper by Griffin, Kelly, and Nardari (2010) that examines the issues related to the measures of market efficiency across markets.

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Table 1. Asset growth effects by country

This table presents the time-series averages of monthly raw returns (%) on country-specific *TAG* 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 total asset growth (*TAG*) in year t-1. Firms in the bottom 20% are assigned to the *TAG*1 quintile and those in the top 20% are assigned to the *TAG*5 quintile. Equally weighted portfolio monthly returns in U.S. dollars are calculated from July of year t to June of year t+1. These portfolios are rebalanced each year. The *TAG*-hedge portfolio is a zero-cost hedge portfolio that takes a $1 long position in *TAG*1 quintile and a $1 short position in *TAG*5 quintile simultaneously. The monthly returns on the hedge portfolio are calculated by subtracting monthly returns on the *TAG*5 quintile from the monthly returns on the *TAG*1 quintile. A country-average portfolio is a portfolio that puts an equal weight on each country-specific *TAG* portfolio. *N* is the average number of firms in a country. *Equity index* is the index of access-to-equity market. *Mkt cap to GDP* is the ratio of stock market capitalization to gross domestic product scaled by the fraction of stock market held by outside investors. Panel A reports raw returns for developed economies and Panel B is for developing economies. The *t*-statistics are reported in parentheses.

Panel A: Average monthly raw returns (%) for developed economies

Country	N	Equity index	Mkt cap to GDP	Time period	*TAG*1	*TAG*5	*TAG*-hedge
Australia	360	6.27	0.63	1981-2005	**1.963 (4.16)**	**0.978 (2.28)**	**0.986 (4.00)**
Austria	66	5.30	0.07	1987-2005	1.284 (2.83)	1.313 (3.51)	0.028 (0.08)
Belgium	374	5.13	0.33	1981-2005	1.448 (4.05)	0.972 (2.74)	0.476 (1.38)
Canada	433	6.06	0.61	1981-2005	**2.155 (5.99)**	**1.259 (3.61)**	**0.896 (3.88)**
Denmark	148	5.76	0.31	1985-2005	**1.660 (4.45)**	**1.177 (3.85)**	**0.484 (1.91)**
Finland	94	6.12	0.93	1989-2005	2.012 (3.65)	1.358 (2.61)	0.654 (1.54)
France	423	5.95	0.49	1981-2005	**2.296 (6.24)**	**1.486 (4.22)**	**0.810 (4.22)**
Germany	374	5.84	0.26	1981-2005	**1.345 (4.06)**	**0.961 (2.89)**	**0.384 (2.24)**
Greece	164	5.23	0.25	1989-2005	**1.665 (1.79)**	**0.874 (1.09)**	**0.790 (1.79)**
Hong Kong	348	6.20	1.39	1984-2005	**2.704 (4.05)**	**1.419 (2.34)**	**1.285 (3.79)**
Ireland	48	5.53	0.42	1988-2005	**2.201 (3.65)**	**0.974 (2.06)**	**1.227 (2.04)**
Israel	71	5.65	0.24	1997-2005	1.435 (1.60)	1.605 (1.95)	-0.169 (-0.31)
Italy	188	5.20	0.20	1982-2005	1.438 (3.32)	1.434 (3.45)	0.005 (0.02)
Japan	1,757	5.77	0.59	1981-2005	**1.397 (2.85)**	**1.062 (2.51)**	**0.335 (1.91)**
Korea	429	5.34	0.32	1989-2005	**1.676 (1.69)**	**0.895 (1.02)**	**0.780 (1.97)**
Netherlands	126	5.94	0.88	1981-2005	1.729 (4.19)	1.555 (4.56)	0.175 (0.65)
New Zealand	69	6.07	0.25	1995-2005	1.240 (2.34)	1.451 (2.48)	-0.211 (-0.46)
Norway	132	5.89	0.25	1988-2005	1.330 (2.23)	1.163 (2.38)	0.166 (0.43)
Portugal	65	5.00	0.22	1990-2005	1.970 (3.02)	1.762 (2.90)	0.207 (0.29)
Singapore	223	5.80	0.81	1986-2005	1.631 (2.29)	1.378 (2.25)	0.253 (0.94)
Spain	118	5.13	0.32	1988-2005	1.598 (3.22)	1.431 (2.85)	0.167 (0.43)
Sweden	169	5.82	0.90	1984-2005	**1.927 (3.74)**	**1.147 (2.51)**	**0.780 (2.41)**
Switzerland	142	6.06	1.44	1981-2005	**1.611 (5.00)**	**1.185 (3.63)**	**0.426 (1.81)**
Taiwan	583	5.91	0.83	1994-2005	1.144 (1.09)	0.888 (1.05)	0.256 (0.41)
United Kingdom	1,091	6.35	1.20	1981-2005	**1.860 (5.09)**	**0.802 (2.33)**	**1.057 (7.61)**
United States	2,568	6.45	1.18	1981-2005	**1.622 (4.46)**	**0.790 (2.12)**	**0.872 (5.38)**
Country-average		5.76	0.59		**1.782 (5.56)**	**1.277 (4.65)**	**0.506 (5.74)**

Table 1 - Continued

Panel B: Average monthly raw returns (%) for developing economies

Country	# of firms	Equity index	Mkt Cap to GDP	Time period	*TAG*1	*TAG*5	*TAG*-hedge
Argentina	64	3.21	0.13	1997-2005	2.107 (1.81)	0.479 (0.51)	**1.629 (2.00)**
Brazil	52	4.58	0.13	1991-2005	4.145 (3.42)	4.668 (3.60)	-0.522 (-0.36)
Chile	133	5.20	0.50	1993-2005	1.849 (3.11)	1.278 (2.43)	0.570 (1.55)
China	701	3.51	.	1994-2005	1.819 (2.10)	1.743 (2.30)	0.076 (0.15)
India	253	5.70	0.19	1990-2005	2.550 (3.07)	1.859 (2.53)	0.691 (1.66)
Indonesia	169	4.78	0.12	1990-2005	2.593 (1.84)	2.656 (1.78)	-0.063 (-0.10)
Malaysia	392	5.70	0.78	1987-2005	1.463 (1.60)	1.355 (1.63)	0.108 (0.39)
Mexico	97	4.10	0.11	1987-2005	1.938 (2.62)	1.488 (1.95)	0.450 (0.79)
Pakistan	72	.	.	1994-2005	1.948 (2.13)	1.951 (2.37)	-0.003 (-0.00)
Philippines	138	4.94	0.28	1993-2005	1.617 (1.66)	1.089 (1.12)	0.528 (0.76)
Poland	83	4.80	.	1997-2005	3.465 (3.33)	2.838 (2.95)	0.627 (0.88)
South Africa	167	6.01	0.78	1981-2005	2.585 (4.82)	1.315 (2.84)	**1.271 (3.40)**
Thailand	293	5.38	0.18	1992-2005	2.357 (2.40)	0.792 (0.80)	**1.565 (2.97)**
Turkey	136	5.44	0.13	1994-2005	2.690 (1.85)	3.290 (2.38)	0.600 (1.22)
Country-average		4.87	0.30		**1.679 (6.65)**	**1.536 (3.44)**	**0.143 (0.63)**

Table 2
Regression results of asset growth on stock returns: Firm-level analysis across countries

This table reports the estimation results from the following regression model:

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

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. $TAG_{ij,t-1}$ and $BM_{ij,t-1}$ are the total asset growth and the book-to-market equity ratio in year *t*-1, respectively. $SZ_{ij,t}$ is firm size at the end of June in year t. $MOM_{ij,t}$ 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*. The null hypothesis is that there is no difference in the coefficient of *TAG* between the developed economy subsample and the developing economy subsample.

Panel A reports results from the ordinary least squares (OLS) estimation method clustered by country and month. Panel B reports the weighted least squares (WLS) regression results clustered by country and month. The weight is the inverse of the number of observations in each month in each country. Panels C and D report regression results from the Fama-MacBeth (1973) procedure with country dummies. The regular *t*-statistics associated with the averages of the estimated coefficients are reported in Panel C and the *t*-statistics with the Newey-West adjustment for standard errors are reported in Panel D. Obs. in Panels A and B is the total number of observations in each sample. Obs. in Panels C and D is the total number of months in each sample. The *t*-statistics are in parentheses.

	Panel A: Petersen (2008) approach			Panel B: Weighted Least Squares (WLS)		
Independent variable	Whole sample	Developed economy	Developing economy	Whole sample	Developed economy	Developing economy
Intercept	2.080	1.851	3.173	2.164	1.595	3.210
(t-value)	(3.47)	(3.01)	(4.17)	(4.05)	(3.03)	(3.82)
TAG	**-0.463**	**-0.539**	0.026	**-0.369**	**-0.492**	-0.004
	(-2.76)	**(-3.06)**	(0.08)	**(-1.99)**	**(-2.47)**	(-0.01)
Ln(BM)	0.381	0.316	0.871	0.330	0.200	0.929
	(4.19)	(3.37)	(3.80)	(3.76)	(2.43)	(3.98)
Ln(SZ)	-0.116	-0.098	-0.241	-0.135	-0.095	-0.233
	(-2.30)	(-1.81)	(-2.74)	(-3.11)	(-2.07)	(-2.67)
MOM	0.022	0.025	0.004	0.034	0.046	0.003
	(4.79)	(5.57)	(0.42)	(6.52)	(9.69)	(0.31)
Issue	-0.260	-0.229	-0.910	-0.161	-0.138	0.922
	(-3.71)	(-3.37)	(-3.12)	(-2.63)	(-2.31)	(-3.20)
Adj. R^2	0.007	0.008	0.005	0.012	0.020	0.006
Obs.	1,640,277	1,435,877	191,122	1,640,277	1,435,877	191,122

Null hypothesis test:		
Difference in b_1 coefficient	-0.513	-0.488
Chi-square (χ^2)	(2.38)	(1.77)
p-value (one-tailed)	0.061	0.091

Table 2 – continued

Independent variable	Panel C: Fama-MacBeth (1973) approach			Panel D: Fama-MacBeth (1973) approach with the Newey-West adjustment		
	Whole sample	Developed economy	Developing economy	Whole sample	Developed economy	Developing economy
TAG	**-0.331**	**-0.338**	0.397	**-0.331**	**-0.338**	0.397
	(-4.07)	**(-4.07)**	(0.94)	**(-3.74)**	**(-3.63)**	(0.87)
Ln(BM)	0.165	0.152	0.314	0.165	0.152	0.314
	(4.67)	(4.10)	(2.55)	(3.72)	(1.94)	(2.50)
Ln(SZ)	-0.054	-0.045	-0.104	-0.054	-0.045	-0.104
	(-1.76)	(-1.44)	(-1.43)	(-1.76)	(-0.78)	(-1.37)
MOM	0.045	0.047	-0.005	0.045	0.047	-0.005
	(14.10)	(14.86)	(-0.88)	(9.04)	(9.81)	(-0.83)
Issue	-0.269	-0.233	0.414	-0.269	-0.233	0.414
	(-5.06)	(-4.32)	(0.60)	(-4.70)	(-4.14)	(0.53)
Obs.	288	288	246	288	288	246
Null hypothesis test:						
Difference		-0.735			-0.735	
(t-statistic)		(-1.84)			(-1.84)	
p-value (one-tailed)		0.039			0.039	

Table 3. Returns on the country-average *TAG* portfolios in years after portfolio formation

Country-average *TAG* portfolios are formed as described in Table 2. Year 1 is one year after portfolio formation and corresponds to the case where *TAG* is ranked based on total asset growth of year *t*-1 and is matched with the monthly return series from July of year *t* to June of year *t*+1. Year +2 is two year after portfolio formation and corresponds to the monthly return series from July of year t+1 to June of year t+2. Similar methods apply to Year+3, Year+4, and Year+5. Returns on each quintile portfolio are equal-weighted by each country in each month. That is, the country-average *TAG* portfolios put an equal weight on each country-specific *TAG* portfolio. The table presents the time-series averages of the size and book-to-market characteristic-adjusted monthly returns on country-average *TAG* portfolios. Panel A is for the whole sample economies, Panel B is for developed economies, and Panel C is for developing economies. The *t*-statistics are in parentheses.

	TAG quintile portfolio rank					
Year	1	2	3	4	5	TAG-hedge (1-5)
Panel A: Country-average *TAG* quintile portfolio for the whole sample						
+1	0.122	0.083	0.009	-0.031	-0.077	**0.199 (3.33)**
+2	0.121	0.129	0.011	0.004	-0.159	**0.280 (4.23)**
+3	0.105	0.005	0.009	0.050	-0.199	**0.304 (4.16)**
+4	0.121	0.109	0.082	-0.019	-0.108	**0.229 (3.14)**
+5	0.144	0.130	0.020	0.064	-0.058	**0.202 (2.22)**
Panel B: Country-average *TAG* quintile portfolio for developed economies						
+1	0.106	0.114	0.009	-0.033	-0.123	**0.228 (3.62)**
+2	0.090	0.128	0.030	0.004	-0.211	**0.301 (4.21)**
+3	0.115	0.063	0.074	0.036	-0.203	**0.318 (4.67)**
+4	0.167	0.118	0.057	0.021	-0.114	**0.280 (4.07)**
+5	0.142	0.168	0.053	0.090	-0.091	**0.233 (3.04)**
Panel C: Country-average *TAG* quintile portfolio for developing economies						
+1	0.045	-0.061	-0.054	0.056	0.155	-0.109 (-0.57)
+2	0.136	-0.020	-0.058	-0.094	0.226	-0.090 (-0.46)
+3	-0.088	-0.049	0.072	0.071	-0.044	-0.043 (-0.19)
+4	-0.153	-0.043	0.284	0.028	-0.128	-0.024 (-0.09)
+5	-0.025	-0.192	-0.074	-0.044	0.083	-0.108 (-0.30)

Table 4. Summary statistics on country-level variables

This table presents summary statistics on and correlations among selected variables. *Access to equity* is the index of access-to-equity market. *Mkt. cap to GDP* is the ratio of stock market capitalization to gross domestic product scaled by the fraction of stock market held by outside investors. *Indv. index* is the Hofstede's individualism index. *Rev. anti-dir. rights* is the revised anti-director rights index and *anti-self dealing* is the index of anti-self dealing. All these five variables are time invariant country-specific. *MdBM, MdSZ*, and *MdTAG* are the medians of book-to-market ratio, firm size, and firm asset growth, respectively, measured once a year for a given country. Hedge return is the time-series average of characteristic-adjusted monthly returns on country-average *TAG*-hedge portfolio described in Table 1. Panel A presents summary statistics and Panels B to D presents the Pearson correlations among these variables for the whole sample economies, the sample of developed economies, and the sample of developing economies. ***. **, and * indicate significant at the 1%, 5%, and 10% levels, respectively.

Panel A: Summary statistics on selected country-level variables and adjusted monthly returns on the TAG-hedge portfolio

	All economies						Developed economies		Developing economies	
Variable	Obs.	Mean	Std. dev.	Min	Median	Max	Obs.	Mean	Obs.	Mean
access-to-equity	37	5.53	0.65	3.21	5.70	6.45	26	5.76	11	5.00
Mkt. cap to GDP	37	0.50	0.38	0.07	0.32	1.44	26	0.59	11	0.30
Indv. Index	37	52.43	20.01	14.00	54.00	91.00	26	60.04	11	34.45
Rev. anti-dir. Rights	37	3.75	0.96	2.00	4.00	5.00	26	3.65	11	4.00
Anti-self dealing	37	0.54	0.25	0.17	0.47	1.00	26	0.54	11	0.53
MdBM	610	-0.50	1.05	-5.30	-0.32	1.05	471	-0.57	139	-0.26
MdSZ	610	6.44	2.13	2.23	5.92	12.90	471	6.14	139	7.44
MdTAG	610	0.18	1.26	-0.09	0.07	25.93	471	0.08	139	0.56
Hedge return (%)	7,085	0.23	4.93	-116.00	0.13	66.36	5,508	0.27	1,577	0.11

Panel B: Pearson correlations for the all economies

	Access- to-equity	Mkt. cap to GDP	Indv. Index	Rev. anti-dir. rights	Anti-self Dealing	MdBM	MdSZ	MdTAG
Mkt. cap to GDP	0.65***							
Indv. Index	0.46**	0.26						
Rev. anti-dir. Rights	0.30**	0.20	0.56***					
Anti-self dealing	0.42**	0.34**	0.61**	0.60***				
MdBM	-0.28***	-0.26***	-0.32***	-0.22***	-0.29***			
MdSZ	-0.15***	-0.05	-0.43**	0.40***	0.15***	-0.14***		
MdTAG	-0.16***	-0.10**	-0.08**	0.09**	-0.08**	-0.11***	-0.07	
Hedge returns	0.03***	0.03***	0.04***	0.01	0.02*	-0.03***	0.01	0.02

Table 4 – continued

Panel C: Pearson correlations for the developed economies

	Access- to-equity	Mkt. cap to GDP	Indv. Index	Rev. anti-dir. rights	Anti-self dealing	MdBM	MdSZ	MdTAG
Mkt. cap to GDP	0.71***							
Indv. index	0.41**	0.08						
Rev. anti-dir. rights	0.28	0.22	-0.12					
Anti-self dealing	0.38*	0.27	-0.05	0.68***				
MdBM	-0.29***	-0.25***	-0.32***	-0.26***	-0.34***			
MdSZ	-0.01	0.06	-0.35**	0.45***	0.17***	-0.25***		
MdTAG	-0.19***	-0.11**	-0.19***	0.06	0.09**	-0.13***	0.17***	
Hedge returns	0.05***	0.04***	0.04***	0.02*	0.03**	-0.04***	0.01	0.04***

Panel D: Pearson correlations for the developing economies

	Access- to-equity	Mkt. cap to GDP	Indv. Index	Rev. anti-dir. rights	Anti-self dealing	MdBM	MdSZ	MdTAG
Mkt. cap to GDP	0.59*							
Indv. index	0.12	0.27						
Rev. anti-dir. rights	0.74***	0.53*	0.12					
Anti-self dealing	0.68**	0.67**	-0.08	0.50				
MdBM	-0.23***	-0.11	-0.14	-0.29***	-0.13			
MdSZ	-0.09	-0.15*	-0.46***	0.09	0.04	0.09		
MdTAG	-0.12	-0.14*	0.02	0.11	-0.19**	-0.40***	-0.11	
Hedge returns	0.01	0.01	0.04	-0.00	0.02	-0.03	-0.03	0.03

Table 5. Portfolio analysis on the relation between the easiness of access to equity markets and the asset growth effect

This table reports the averages of size and book-to-market characteristic-adjusted monthly returns (%) in U.S. dollars for country-average *TAG* portfolios classified by an access to equity market measure. Specifically, at the end of June each year, all countries are sorted into 3 groups, from low (bottom 30%) to medium (middle 40%) to high (top 30%) based on, for instance, the access-to-equity market index. Country-average portfolios are formed in each access to equity market-sorted group. Returns on the (High – Low) *TAG*-hedge portfolios are the difference in returns on the country-average *TAG*-hedge portfolio between the high and the low access to equity market groups. Panel A reports the country-level asset growth effect classified by the access-to-equity market index. Panel B reports the investment effect classified by the ratio of market cap to GDP. The *t*-statistics are in parentheses.

Panel A: The investment effect classified by the access-to-equity market index

	Whole sample			Developed economies			Developing economies		
	TAG1	TAG5	TAG-hedge	TAG1	TAG5	TAG-hedge	TAG1	TAG5	TAG-hedge
Low	0.099	0.116	-0.001	0.007	0.031	-0.024	0.103	0.340	-0.240
	(1.17)	(1.53)	(-0.00)	(0.09)	(0.46)	(0.21)	(0.44)	(1.20)	(-0.65)
Medium	0.010	-0.103	0.113	0.040	-0.118	0.158	0.117	0.001	0.116
	(0.14)	(-2.08)	(1.23)	(0.56)	(-2.42)	(1.70)	(0.59)	(0.01)	(0.37)
High	0.293	-0.239	0.532	0.280	-0.275	0.555	0.398	-0.128	0.525
	(4.57)	(-4.61)	(6.10)	(4.16)	(-4.87)	(5.97)	(3.36)	(-1.05)	(2.75)
(High – Low) TAG-hedge			**0.532**			**0.579**			**0.766**
			(3.66)			**(4.03)**			**(1.87)**

Panel B: The investment effect classified by the market cap to GDP ratio

	Whole sample			Developed economies			Developing economies		
	TAG1	TAG5	TAG-hedge	TAG1	TAG5	TAG-hedge	TAG1	TAG5	TAG-hedge
Low	0.038	0.124	-0.069	-0.098	-0.016	-0.083	-0.500	0.323	-0.823
	(0.49)	(1.65)	(-0.60)	(-1.20)	(-0.21)	(-0.68)	(-2.04)	(1.55)	(-2.37)
Medium	0.039	-0.141	0.180	0.123	-0.129	0.252	0.534	0.101	0.462
	(0.56)	(-2.76)	(1.89)	(2.16)	(-2.72)	(3.10)	(2.51)	(0.36)	(1.24)
High	0.314	-0.217	0.532	0.288	-0.221	0.510	0.293	-0.227	0.520
	(4.67)	(-4.49)	(6.07)	(3.53)	(-3.74)	(4.76)	(1.82)	(-2.04)	(2.30)
(High – Low) TAG-hedge			**0.601**			**0.592**			**1.343**
			(4.35)			**(3.67)**			**(3.28)**

Table 6. Portfolio analysis on the relation between individualism, investor legal protection, and the investment effect

This table reports average characteristic-adjusted monthly returns (%) in U.S. dollars for country-average *TAG* portfolios classified by the individualism index, the anti-self dealing index, and the median asset growth. Specifically, at the end of June each year, all countries are sorted into 3 groups, from low (bottom 30%) to high (top 30%) based on a variable of interest. Country-average portfolios are formed in each sorting group. Returns on the (High – Low) *TAG*-hedge portfolios are the difference in returns on the *TAG*-hedge portfolio between the high and the low sorting variable groups. Panels A and B report the investment effect classified by the individualism index and the anti-self-dealing index, respectively. The *t*-statistics are in parentheses.

Panel A: The investment effects classified by the individualism index

	Whole sample			Developed economies			Developing economies		
	TAG1	TAG5	TAG-hedge	TAG1	TAG5	TAG-hedge	TAG1	TAG5	TAG-hedge
Low	0.056	0.048	0.009	0.056	-0.003	0.059	-0.062	0.063	-0.126
	(0.79)	(0.86)	(0.09)	(0.79)	(-0.06)	(0.60)	(-0.35)	(0.42)	(-0.52)
Medium	0.123	-0.067	0.206	0.065	-0.077	0.142	-0.155	0.144	-0.299
	(1.53)	(-0.88)	(1.70)	(0.80)	(-1.16)	(1.20)	(1.00)	(1.03)	(-1.30)
High	0.168	-0.216	0.384	0.192	-0.265	0.457	0.615	-0.009	0.646
	(2.99)	(-4.52)	(4.76)	(3.22)	(-5.32)	(5.50)	(2.70)	(-0.03)	(1.64)
(High – Low) TAG-hedge			**0.375**			**0.397**			0.771
			(3.03)			**(3.12)**			(1.52)

Panel B: The investment effects classified by the anti-self-dealing index

	Whole sample			Developed economies			Developing economies		
	TAG1	TAG5	TAG-hedge	TAG1	TAG5	TAG-hedge	TAG1	TAG5	TAG-hedge
Low	0.070	-0.038	0.128	-0.029	-0.124	-0.095	-0.043	0.193	-0.219
	(0.83)	(-0.54)	(1.08)	(-0.33)	(-1.96)	(-0.80)	(-0.17)	(0.65)	(-0.54)
Medium	0.110	-0.049	0.159	0.154	-0.051	0.205	0.043	0.123	-0.080
	(1.92)	(-0.95)	(1.86)	(2.73)	(-0.97)	(2.44)	(0.29)	(0.82)	(-0.33)
High	0.192	-0.144	0.336	0.136	-0.249	0.385	0.386	-0.163	0.549
	(2.59)	(-2.63)	(3.36)	(1.63)	(-4.20)	(3.52)	(2.80)	(-1.58)	(2.90)
(High – Low) TAG-hedge			0.209			**0.480**			0.768
			(1.31)			**(1.85)**			(1.67)

Table 7. **Regression results of country-specific *TAG*-hedge returns on the easiness of access to equity market measures**

The dependent variable in the regressions is the equal-weighted size and book-to-market characteristic-adjusted monthly return in US dollars on the country-specific *TAG*-hedge portfolio. Explanatory variables are time invariant country(j)-level variables, including the access-to-equity market index and the ratio of market cap to GDP, and time (*t*) variant country(*j*)-level variables ($MdBM_{jt}$, $MdSZ_{jt}$, $MdTAG_{jt}$). $MdBM_{jt}$, $MdSZ_{jt}$, $MdTAG_{jt}$ are the median book-to-market ratio, the median firm size or market capitalization, and the median firm asset growth in year *t* in country *j*, respectively. *Ln* is the natural logarithm. Regressions are performed using the Petersen (2008) approach clustering by country. Panel A presents results for the whole sample of economies and Panel B for developed economies and developing economies. The *t*-statistics are in parentheses.

Panel A: Whole sample

Model	1	2	3	4	5
Intercept	-0.969	0.182	-0.200	0.436	0.191
	(-0.17)	(0.787)	(-0.59)	(0.57)	(0.70)
Access-to- equity market	0.229				
	(1.57)				
Market cap to GDP		**0.345**			
		(2.28)			
Individualism			**0.007**		
			(2.14)		
Anti-self dealing				0.312	
				(1.16)	
Rev. anti-dir. rights					0.077
					(1.33)
Ln(MdBM)	-0.137	-0.138	-0.115	-0.154	-0.166
	(-2.65)	(-2.44)	(-2.11)	(-2.70)	(-3.03)
Ln(MdSZ)	-0.028	-0.036	-0.004	-0.046	-0.054
	(-0.81)	(-1.10)	(-0.12)	(-1.23)	(-1.43)
MdTAG	**0.093**	**0.089**	**0.090**	**0.081**	**0.070**
	(5.89)	**(9.24)**	**(8.56)**	**(7.09)**	**(6.23)**
Adjusted R^2	0.003	0.003	0.003	0.002	0.002

Table 7 – continued

Panel B: Developed vs. developing economies

	Developed economies					Developing economies				
Model	1	2	3	4	5	1	2	3	4	5
Intercept	-3.145 (-3.53)	-0.106 (0.49)	-0.698 (-1.95)	0.057 (0.23)	-0.073 (-0.21)	-0.266 (-0.17)	0.640 (0.79)	-0.364 (-0.33)	0.436 (0.57)	0.446 (0.54)
Access-to-equity market	**0.599** **(3.61)**					0.214 (0.75)				
Market cap to GDP		**0.420** **(2.08)**					0.768 (0.73)			
Individualism			**0.009** **(2.98)**					0.020 (1.35)		
Anti-self dealing				0.242 (0.98)					0.859 (0.89)	
Rev. anti-dir. rights					0.095 (1.48)					0.117 (0.76)
Ln(MdBM)	-0.068 (-1.42)	-0.097 (-1.90)	-0.054 (-1.13)	-0.119 (-2.51)	-0.123 (-2.38)	-0.274 (-2.04)	-0.283 (-1.76)	-0.297 (-2.28)	-0.195 (-1.05)	-0.316 (-2.16)
Ln(MdSZ)	-0.015 (-0.58)	-0.023 (-0.82)	0.024 (0.82)	-0.024 (-0.73)	-0.040 (-1.24)	-0.099 (-1.04)	-0.104 (-1.23)	-0.038 (-0.44)	-0.113 (-1.19)	-0.112 (-1.20)
MdTAG	**2.927** **(3.20)**	**2.509** **(2.68)**	**2.698** **(2.85)**	**2.088** **(2.22)**	**2.168** **(2.33)**	**0.058** **(2.29)**	**0.060** **(1.88)**	**0.055** **(2.56)**	**0.075** **(2.59)**	0.043 (1.29)
Adjusted R^2	0.005	0.004	0.004	0.003	0.003	0.003	0.004	0.004	0.003	0.003

Table 8. Multivariate regression results of country-specific *TAG*-hedge returns

The dependent variable in all regressions is the equal-weighted characteristic-adjusted return in U.S. dollars on the country-specific *TAG*-hedge portfolio. The explanatory variables are time invariant country-(*j*) specific variables, such as the measures of the easiness of access to equity markets (the access-to-equity market index and the ratio of market cap to GDP), the measures of legal protection of investors (the anti-self-dealing index and the revised anti-director rights index), the individualism index, and time (year *t*) variant country- (*j*) level variables ($MdBM_{jt}$, $MdSZ_{jt}$, $MdTAG_{jt}$). $MdBM_{jt}$, $MdSZ_{jt}$, $MdTAG_{jt}$ are the median book-to-market ratio, the median firm size or market capitalization, and the median firm asset growth in year *t* in country *j*, respectively. Regressions are performed using the Petersen (2008) approach clustering by country. Panels A, B, and C present results for all economies, developed economies, and developing economies, respectively. The table presents regression estimates with the *t*-statistics in parentheses.

Panel A: All economies

Model	1	2	3	4	5	6
Intercept	-0.972 (-1.13)	-0.878 (-1.06)	-0.892 (-1.00)	0.289 (-0.82)	-0.436 (-1.30)	-0.438 (-1.15)
Access-to-equity market	0.162 (1.01)	0.102 (0.63)	0.120 (0.66)			
Market cap to GDP				**0.302** **(2.10)**	**0.247** **(1.75)**	**0.275** **(2.02)**
Individualism	0.004 (1.28)	**0.006** **(1.75)**	0.005 (1.41)	**0.006** **(1.86)**	**0.006** **(2.30)**	**0.006** **(2.00)**
Anti-self dealing		0.319 (1.36)			0.282 (1.16)	
Revised anti-director rights			0.043 (0.77)			0.052 (0.89)
Ln(MdBM)	-0.107 (-1.97)	-0.082 (-1.35)	-0.103 (-1.85)	-0.090 (-1.44)	-0.070 (-1.11)	-0.083 (-1.34)
Ln(MdSZ)	-0.006 (-0.18)	-0.006 (-0.17)	-0.012 (-0.34)	-0.005 (-0.16)	-0.006 (-0.18)	-0.013 (-0.36)
MdTAG	**0.098** **(6.91)**	**0.103** **(8.07)**	**0.094** **(5.74)**	**0.101** **(7.76)**	**0.106** **(8.86)**	**0.089** **(7.72)**
Adjusted R^2	0.003	0.003	0.003	0.005	0.003	0.003

Table 8 – continued

Panel B: Developed economies

Model	1	2	3	4	5	6
Intercept	-3.123 (-4.39)	-3.083 (-4.40)	-3.038 (-4.38)	-0.954 (-3.58)	-1.045 (-3.89)	-1.195 (-4.72)
Access-to-equity market	**0.460** **(3.59)**	**0.447** **(3.54)**	**0.411** **(2.78)**			
Market cap to GDP				**0.417** **(2.94)**	**0.389** **(2.87)**	**0.383** **(2.78)**
Individualism	**0.006** **(3.66)**	**0.006** **(4.02)**	**0.007** **(4.34)**	**0.009** **(4.62)**	**0.010** **(5.14)**	**0.010** **(6.10)**
Anti-self dealing		0.042 (0.25)			0.186 (1.05)	
Revised anti-director rights			0.058 (1.23)			0.089 (2.28)
Ln(MdBM)	-0.026 (-0.52)	-0.024 (-0.46)	-0.019 (-0.38)	-0.016 (-0.27)	-0.002 (-0.04)	-0.002 (-0.05)
Ln(MdSZ)	0.013 (0.53)	0.014 (0.53)	0.005 (0.19)	0.022 (0.87)	0.021 (0.83)	0.007 (0.27)
MdTAG	**3.161** **(3.59)**	**3.147** **(3.52)**	**3.159** **(3.60)**	**3.077** **(3.47)**	**3.044** **(3.39)**	**3.118** **(3.54)**
Adjusted R^2	0.006	0.004	0.006	0.006	0.006	0.006

Table 8 – continued

Panel C: Developing economies

Model	1	2	3	4	5	6
Intercept	-0.824 (-0.66)	-0.649 (-0.62)	-0.882 (-0.52)	0.475 (-0.37)	-1.017 (-1.03)	0.090 (0.07)
Access-to-equity market	0.113 (0.40)	-0.102 (-0.38)	0.135 (0.26)			
Market cap to GDP				0.437 (0.60)	-0.424 (-0.31)	0.866 (1.25)
Individualism	0.018 (1.04)	0.025 (1.66)	0.018 (1.05)	0.022 (1.38)	**0.028** **(2.25)**	0.025 (1.47)
Anti-self dealing		1.187 (1.43)			1.190 (0.83)	
Revised anti-director rights			-0.018 (-0.06)			-0.249 (-1.06)
Ln(MdBM)	-0.278 (-2.14)	-0.150 (-0.85)	-0.274 (-1.83)	-0.247 (-1.60)	-0.171 (-0.98)	-0.296 (-1.81)
Ln(MdSZ)	-0.041 (-0.46)	-0.038 (-0.44)	-0.040 (-0.43)	-0.044 (-0.49)	-0.047 (-0.50)	-0.016 (-0.17)
MdTAG	**0.058** **(2.59)**	**0.085** **(3.32)**	0.060 (1.31)	**0.061** **(1.92)**	**0.075** **(2.60)**	**0.072** **(1.94)**
Adjusted R^2	0.004	0.005	0.004	0.005	0.006	0.006