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 investment 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 exist substantial cross-country differences 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, 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 on the asset growth effect. Our results appear to be generally consistent with an overinvestment explanation for the investment effect initiated by Titman, Wei, and Xie (2004) and to be inconsistent with the prediction by the q-theory with investment frictions suggested by Li and Zhang (2010).

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Abstract

Recent studies have documented that, in the United States, firms that increase asset investment 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 exist substantial cross-country differences 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, 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 on the asset growth effect. Our results appear to be generally consistent with an overinvestment explanation for the investment effect initiated by Titman, Wei, and Xie (2004) and to be inconsistent with the prediction by the q-theory with investment frictions suggested by Li and Zhang (2010).

Keywords: Cross-sectional stock returns; Asset growth/investment effect; International; Access to equity markets

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1. Introduction

Several recent studies have examined the relation between corporate asset investment 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, while 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 investment 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 a measure of firm investment and subsequent stock returns in the U.S. market -- a phenomenon that is often referred to as the investment or asset growth effect -- and this investment 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 explores the determinants of the investment/asset growth effect by examining stock returns from 40 countries from 1981-2005. Because of better data availability, our focus is on the Cooper, Gulen and Schill (2008) asset growth measure. We find that most countries exhibit a negative relation between asset growth and subsequent stock returns that is roughly similar to what is found in the United States. However, there is a significant cross-country dispersion in the asset growth effect, which is the focus of this paper. For example, the effect is

[1] See also Fama and French (2008).
[2] One of the exceptions is the study by Titman, Wei, and Xie (2009) of the Japanese market where no significant investment effect is observed.

quite strong in the subsample of 26 developed countries, but it is generally insignificant in our subsample of developing countries.

Most of the explanations of the asset growth effect are behavioral. For example, Titman, Wei, and Xie (2004) argue that firms that increase their level of investment tend to overinvest, and the market initially underreacts to the negative implications of the higher 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)).

If the negative investment-return relation is due to corporate overinvestment tendencies, then factors that affect corporate overinvestment should also influence the asset growth effect. For example, if firms find it somewhat easier to overinvest in countries with easier access to equity markets, there may be a stronger asset growth effect in countries with better developed capital markets. The empirical evidence documented by Titman, Wei, and Xie (2009) showing that the investment effect is weaker in Japan, especially among firms that have less access to capital, is consistent with this argument.[4] Cultural factors may also influence overinvestment. For example, Heaton (2002) suggests that overinvestment can be due to managerial overconfidence, which suggests that cultures that promote overconfidence are likely to exhibit a stronger asset growth effect. Finally, legal institutions, which affect the quality of corporate governance, can also influence the asset growth effect. For example, the agency theory suggests that better corporate

[3] Titman, Wei, and Xie (2004) further find that, during the period (1984-1989) of an increase in managerial control (i.e., the threat of hostile takeovers), the investment effect is much weaker. Cooper, Gulen, and Schill (2008) also find a similar 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] 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 related 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.

governance help alleviate the agency problems hence the tendency to overinvest, which suggests that countries with weaker legal protection for investors are more likely to show a stronger asset growth effect.

To test these hypotheses we examine whether cross-country differences in the asset growth effect is related to cross-country differences in access to capital, overconfidence, and corporate governance. To measure cross-country differences in access to capital we use stock market capitalization to gross domestic product (GDP) scaled by the fraction of the stock market held by outside investors, as well as an index based on a cross-country survey of executives that we describe below. To measure cross-country differences in overconfidence we use the Hofstede (1980, 2001) individualism index, which Chui, Titman, and Wei (2010), in their cross-country analysis of the momentum effect, argue that it is a good proxy for overconfidence. To capture the cross-country difference in corporate governance, we use a measure of legal protection of shareholders from Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008). Our evidence indicates that the asset growth effect is indeed significantly stronger in countries with greater access to capital and with more individualistic cultures.

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 (less) when their stock is overpriced (undervalued), inducing a negative relation between firm investment 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. The catering theory is quite similar to what we will call the market timing theory, which suggests that firms issue equity when managers think that their

stocks are favorably priced, and then use the money they raise to invest. This effect may be more important in countries in which firms have more access to equity markets.[5] However, our results show a strong asset growth effect even after controlling for the equity issuance effect, suggesting that the catering theory of investment may not fully explain the asset growth effect.

The investment effect is also consistent with risk-based or rational explanations. Most of these explanations are based in part on the Cochrane (1991, 1996) insight that firms will tend to invest more when their cost of capital is lower, i.e., when the expected returns on their stocks are lower.[6] An extension of this idea, modeled and tested by Li and Zhang (2010), is that the investment effect is stronger when frictions associated with increasing investment are stronger. This follows from the fact that a given change in required rates of return produces a smaller change in investment when investment frictions are higher. Given this, the asset growth effect is expected to be higher in countries with higher investment frictions. It should be noted that this prediction is inconsistent with our observation that the asset growth effect is stronger in developed economies and in economies with better access to capital.

The remainder of the paper is organized as follows. Section 2 provides a brief discussion of our sample selection and data description. Section 3 documents the asset growth effect country-by-country and by developed countries versus developing countries. Section 4 explores how differences in access to equity markets and other country-specific characteristics explain the cross-country difference in the asset growth effect. Finally, Section 5 concludes the paper.

2. Sample Selection and Data Description

[5] For instance, Henderson, Jegadeesh, and Weisbach (2006) provide evidence in an international setting that firms are more likely to issue equity when the equity market appears to be overvalued. McLean, Pontiff, and Watanabe (2009) show that countries with easy access to equity markets tend to have high equity issuance activities.

[6] See also Berk, Green, and Naik (1999), Zhang (2005), Li, Livdan, and Zhang (2009), and Liu, Whited, and Zhang (2009).

Our cross-country variables are drawn from a variety of data sources. To measure the ease of raising external funds, we use two variables taken from La Porta, Lopez-de-Silanes, Shleifer (2006). One is the index of access to equity markets, 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, for example, in 1999 is the statement "Stock markets are open to new firms and medium-sized firms (1= strongly disagree, 7= strongly agree)" and in some other years "Raising money by issuing shares on the local stock market is (1= nearly impossible, 7= quite possible for a good company)." 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. The other measure of access to equity markets is the ratio of stock market capitalization to gross domestic product (GDP) scaled by the fraction of the stock market held by outside investors (dubbed as the market cap to GDP ratio). This measure, as in La Porta, Lopez-de-Silanes, and Shleifer (2006), is averaged over the period 1996-2003.[7]

To measure overconfidence-related cultural differences, we use the individualism index, constructed and extended by Hofstede (1980, 2001), based on a cross-country psychological survey of IBM employee's attitudes towards their work and private lives. A higher index value indicates stronger individualism. As argued by Chui, Titman and Wei (2010), people in highly individualistic cultures tend to be more optimistic and more overconfident. To measure the

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

cross-country difference in corporate governance, we adopt the anti-self-dealing index constructed by Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008) as our measure of legal protection of investors.[8]

With the exception of the U.S. sample, which comes from CRSP and Compustat, our financial data are retrieved from Worldscope and Datastream International provided by Thomson Financial. Data are available for 55 countries from February 1980 (for some countries) to June 2005. 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, ADRs, REITs, units of beneficial interest, and other financial institutions. We exclude firm-year observations with negative book value of equity or with no valid data to calculate asset growth or market equity. Monthly returns are winsorized to -100% or 100% to filter out suspicious stock returns.[9] 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 screening process, our final sample consists of 40 countries, with 26 developed economies and 14 developing economies.[10]

As we mentioned in the introduction, we measure firm investment as the total asset growth rate (*TAG*), defined as the percentage change in total assets (*TA*) from fiscal year *t*-1 to fiscal year *t*, denoted as $TAG_t = (TA_t - TA_{t-1})/TA_{t-1}$.[11] Other firm-level variables include firm size,

[8] We obtain similar results when the revised anti-director rights index from Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008) is used as a measure of investor protections.

[9] 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.

[10] 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.

[11] 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 obtain qualitatively similar results. Since substantially more firms report total assets than capital expenditures in our data, we present test results based on asset growth.

book-to-market equity, momentum, and equity issuance.[12] 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 the end of fiscal year *t*. The momentum (MOM_m) at month *m* is measured by the U.S. dollar buy-and-hold return from month *m*-6 to month *m*-1. Equity issuance ($Issue_m$) at month *m* measures the change in the number of shares outstanding adjusted for distribution events over the past year (i.e., from month *m*-12 to month *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 fiscal year ending in year *t*-1 is matched with returns from July of year *t* to June of year *t*+1, the return series 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. Empirical Results

3.1 The country-by-country asset growth effects: Portfolio analysis

We first investigate whether the asset growth effect exists in each individual economy. 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

[12] 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.

these quintile portfolios, measured in U.S. dollars, are calculated for the same period.[13] These portfolios are referred to as the country-specific *TAG* portfolios and are rebalanced at the end of June each year.

We form a country-specific 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 country-specific *TAG*-hedge portfolio are calculated by subtracting monthly returns on the *TAG*5 portfolio from the monthly returns on the *TAG*1 portfolio. Our purpose here is to examine whether the return spread between the low and high asset growth firms (i.e., the asset growth effect measured by the return spread) is significantly positive for each country.

To examine the asset growth effect around the world we form country-average portfolios, which equally weight each country-specific *TAG* portfolio, as follows. We first calculate the equal-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-weighted return on the country-average *TAG*1 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 *TAG*1 portfolio. Monthly returns and time-series average returns for country-average *TAG*2 to *TAG*5 are calculated in the same way. A country-average *TAG*-hedge portfolio is formed similarly as we form a country-specific *TAG*-hedge portfolio and the associated return spread is calculated accordingly.

Since the dichotomous classification of developed versus developing economies is a simple and easy way to measure the ease of access to external capital markets, we report in Table 1 the time-series averages of equal-weighted monthly raw returns on *TAG*1, *TAG*5, and *TAG*-hedge

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

portfolios for developed economies (Panel A) and developing economies (Panel B) separately. Table 1 also lists the number of firms, the sample period, and the two measures of our key variable of access to equity markets in each country. In general, we find that there is a strong asset growth effect among developed countries, but no such an effect among developing countries.[14] In addition, there exists a significant cross-country dispersion in the asset growth effect.

[Insert Table 1 here]

More specifically, Panel A of Table 1 shows that among developed countries, all but two exhibit the asset growth effect as found in the U.S. (the exceptions are Israel and New Zealand). 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, indicating considerable variation in the asset growth effect across countries.[15] The last row of Panel A shows that there is a global asset growth effect among the developed economies. More specifically, the average monthly return is 1.78% for the country-average *TAG*1 portfolio and it is 1.28% 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.

In contrast, the evidence in Panel B of Table 1 shows that there is no significant asset growth effect among most of the developing economies. Only three out of 14 developing economies reveal a significant asset growth effect (Argentina, South Africa, and Thailand). The average

[14] The results from the book-to-market and size adjusted returns (to be discussed in section 4.3) are similar to but weaker than those reported in Table 1.

[15] Japan shows a significant investment effect in Panel A of Table 1. However, we find an insignificant investment effect in Japan when returns are adjusted for the size and book-to-market effects, consistent with the result reported by Titman, Wei, and Xie (2009).

monthly return spread between country-average *TAG*1 and *TAG*5 portfolios is 0.14% and is statistically indifferent from zero.

3.2 The persistence of the asset growth effect

Cooper, Gulen, and Schill (2008) find that the asset growth effect generates abnormal returns up to five years after portfolio formation among firms in the United States.[16] Therefore, it is interesting to investigate whether this is also true outside of the U.S. Table 2 presents the time-series averages of the monthly raw returns on the country-average *TAG* portfolios during the first year (year = +1) to the fifth year (year = +5) after portfolio formation.[17] Panel A reports the results for the whole sample economies, and Panels B and C for the developed and developing economies, respectively. Similar to the results in Table 1, the results in Table 2 show that there exists a persistent asset growth effect for all economies as a whole, but the persistence mainly comes from the developed economies. In particular, Panel B shows that among the developed countries, the returns on the *TAG*1 portfolio consistently outperform the returns on the *TAG*5 portfolio in each of the five years after formation by 0.35% to 0.51% per month, which is consistent with the findings in the U.S. market.[18] In contrast, 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.

[Insert Table 2 here]

3.3 The asset growth effect: Regression analysis

[16] Titman, Wei, and Xie (2004) find the investment effect based on capital expenditures is also persistent up to five years.
[17] We obtain similar results when raw returns are adjusted for size and book-to-market characteristics.
[18] These results include the U.S. firms in the sample, but similar results are obtained when U.S. stocks are excluded from the sample.

The results in Tables 1 and 2 indicate that the asset growth effect, as measured by the return spread, is quite strong and persistent in developed countries but not in developing countries. To check whether this result holds after controlling for other characteristics that are known to influence returns, we examine the asset growth effect from the following regression model using pooled data across firms and time:

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

where $R_{i,t}$ is the monthly raw return in U.S. dollars for stock *i* from July of year *t* to June of year *t*+1, R_{ft} is the risk-free rate of the corresponding month and is proxied by the one-month U.S. Treasury-bill rate. $TAG_{i,t-1}$ and $BM_{i,t-1}$ 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 the analysis to control for their influences on stock returns as documented in the previous literature.[19] The inclusion of share issuance ($Issue_{i,t}$) also serves to test whether the investment effect is simply a reflection of the market timing effect (i.e., the catering theory of investment); that is, firms use the money raised from overpriced stocks (i.e., share issuance) to increase investment.[20]

Panel A of Table 3 reports the estimates of regression (1) using the Fama and MacBeth (1973) regression procedure with country dummies. The reported estimates are the time-series averages of the monthly estimated coefficients and the corresponding *t*-statistics are calculated with

[19] We also include the logarithm of gross domestic product (GDP) per capita in both regression (1) and regression (2) (to be discussed below) 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 not affect the influence of other variables on stock returns. We hence report regression results without the inclusion of this variable in the regressions.

[20] For example, Hirshleifer and Jiang (2010) use repurchases and external financing (including equity and debt issues) to capture common misevaluation across firms.

Newey-West robust standard errors. To ensure that the results are not driven by a few countries with the large number of observations, Panel B reports regression results from the weighted least square (WLS) Fama and MacBeth (1973) regression procedure with country dummies, where all variables are weighted by the inverse of the number of firm observations in each month in each country as suggested by Khurana, Martin, and Pereira (2006). [21] The results using both estimation methods indicate that total asset growth has a significantly negative effect on subsequent stock returns when firms from all sample economies or when firms from just the developed economies are pooled together. On the contrary, the estimated coefficient on *TAG* for the subsample of developing economies is positive although statistically indifferent from zero across both estimation methods, suggesting that there is no asset growth effect among the developing countries.

[Insert Table 3 here]

Specifically, the estimated coefficient of *TAG* in Panel A is -0.48 with a *t*-statistic of -5.12 for the developed economies, while it is 0.49 with a *t*-statistic of 1.01 for the developing economies. Similarly, the coefficient of *TAG* estimated with WLS in Panel B is -0.34 with a *t*-statistic of -3.66 for the developed economies, and it is 0.49 with a *t*-statistic of 1.12 for the developing economies. The test results, shown at the bottom of each panel in Table 3, indicate that the estimated coefficient of *TAG* is significantly smaller (at the 1% level) for the subsample of developed economies than for the subsample of developing economies.

It is also worth noting that the coefficient of *Issue* is highly significant for both the sample of all countries and the subsample of developed countries but not for the subsample of developing

[21] To further gauge the robustness of our results, we estimate the regression equation (1) by (a) the ordinary least square (OLS) method clustered by both country and time to obtain robust *t*-statistics as suggested by Petersen (2008), and (b) the weighted least square (WLS) method controlling for both country and time effects. We obtain similar results to those from the Fama and MacBeth (1973) regression procedure.

countries in Table 3, which is consistent with the findings in the United States by Pontiff and Woodgate (2008) and with the international evidence reported by McLean, Pontiff, and Watanabe (2009). However, the asset growth effect in developed countries remains very strong even with the inclusion of share issuance in the regression, suggesting that the catering theory of investment (or the market timing hypothesis) does not fully account for the asset growth effect. In addition, when we include lagged *TAG* in equation (1), we find that the lagged *TAG* has also a strong negative influence on stock returns in the developed economies, consistent with the finding of the persistence of the asset growth effect shown in Table 2.

4. Cross-country Determinants of the Asset Growth Effect

In this section we examine the extent to which cross-country differences in institutional and cultural variables influence the asset growth effect.

4.1 Summary statistics for country-level variables

Panel A of Table 4 reports the summary statistics of our selected variables of interest and Panel B reports the correlations among them for the subsamples of developed and developing countries, respectively. Panel A shows that developed countries tend to have higher access to capital market measures than do 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. The developed countries also have a higher average individualism index than the developing countries with a value of 60 versus 35, respectively. In addition, the average monthly book-to-market and size characteristic-adjusted *TAG*-hedge returns over the whole sample period are 0.27% and 0.08%

per month for the developed and the developing economies, respectively.[22] The result suggests that the asset growth effect is more pronounced in developed countries than in developing countries even after adjusting for the size and book-to-market effects. The statistics on other country-specific variables are all in line with the existing studies.

[Insert Table 4 here]

Panel B of Table 4 shows that there are more significant correlations among these selected variables in the developed economies than in the developing economies. For instance, the correlations between the *TAG*-hedge returns and most other variables are significant in the developed economies, but are insignificant in the developing economies.

4.2 The asset growth effect and country-specific factors: Regression analysis

To test whether firms in countries with better access to equity markets, more overconfident cultures, and weaker investor protection exhibit stronger asset growth effects, we divide all countries into three groups based on the measures of the relevant country-level variable. For example, we sort all countries in ascending order based on their access-to-equity market indexes and put them in the low, medium, or high group accordingly. The cutoff point for each group takes into consideration the actual cutoff value of the index and the number of countries in each group. We apply the same grouping method for the other three variables of interest.[23]

Table 5 presents regression estimates of equation (1) using the Fama and MacBeth (1973) procedure with the Newey-West adjustment for standard errors.[24] Panel A is for the access-to-market index grouping and Panel B is for the market cap to GDP ratio grouping. The results

[22] The detailed calculation of the characteristic-adjusted returns will be discussed in section 4.3.
[23] It is noted that one developing country has missing value on the access-to-equity market index and three developing countries have missing value on the market cap to GDP ratio.
[24] To check the robustness of our results, we also estimate equation (1) using (a) the WLS Fama-MacBeth regression procedure with country dummies, and (b) the clustering method with country dummies and with or without weights. We obtain similar results as those reported in Table 5.

from both panels show that countries in the high group (i.e., greater access to equity markets) have a significant asset growth effect, while countries in the low group (i.e., limited access to equity markets) do not show a significant asset growth effect. For example, based on the access-to-equity market index classification, the coefficient of *TAG* is -0.41 with a *t*-statistic of -5.21 for the high group, while it is -0.04 with a *t*-statistic of -0.21 for the low group. In addition, we perform a formal test on the difference in the *TAG* coefficient estimated from the high and low groups. The results shown at the bottom of the two panels suggest that the slope of *TAG* is significantly more negative for the high group than for the low group at the 5% level in both cases.

These results tend to be consistent with the overinvestment explanation for the asset growth effect and to be inconsistent with the q-theory of investment with frictions explanation. The q-theory with investment frictions predicts that the magnitude of the expected return-asset growth relation should be stronger among countries with greater difficult access to equity markets. However, our test results show that the slope of asset growth is more negative in countries with better access to equity markets than in countries with difficult access to equity markets.

[Insert Table 5 here]

Panels C and D in Table 5 provide the estimates of these same regressions, but with sorts based on the individualism index and the anti-self-dealing index. Panel C shows that the asset growth effect exists in both high and low individualism countries and that the difference in the *TAG* coefficient between these two groups is not statistically significant. It should be noted that the momentum effects is significantly stronger in the high than in the low individualism countries. The coefficient of *MOM* is 1.02 with a *t*-statistic of 4.42 for the high group, while it is -0.87 with a *t*-statistic of -1.60 for the low group. This finding is consistent with the finding by

Chui, Titman, and Wei (2010). Panel D shows that the asset growth effect is strong in economies with stronger investor protection and is insignificant in economies with weaker investor protection. Specifically, the coefficient of *TAG* is -0.50 with a *t*-statistic of -5.26 for the high anti-self dealing group while it is -0.20 with a *t*-statistic of -1.64 for the low group. Furthermore, our results suggest that the asset growth effect is significantly stronger in the high investor protection group than in the low investor protection group at the 1% level, which tends to be inconsistent with the agency theory prediction of the investment effect related to legal institutions.[25]

4.3 Access to equity markets and cross-country differences in the asset growth effect: Portfolio analysis

This section examines the relation between the ease of access to equity markets and cross-country differences in the asset growth effect based on portfolio analysis. Specifically, we first classify countries into three groups each year, from low (bottom 30%) to high (top 30%) based on their rankings of a particular variable of interest. We then form country-average *TAG* portfolios and country-average *TAG*-hedge portfolio within each group and calculate monthly returns on these portfolios. Since the results in Tables 3 and 5 indicate that both firm size (*SZ*) and book-to-market equity (*BM*) appear to have influences on stock returns, we adjust raw returns on individual stocks for the *BM* and *SZ* based benchmark returns before calculating returns on *TAG* portfolios.[26]

[25] The results in this subsection are based on all economies in the sample. We obtain similar results for the subsample of developed economies, which further support our finding that the asset growth effect mainly exists among developed economies.

[26] Our method of adjusting returns is very much like the method suggested by Daniel, Grinblatt, Titman and Wermers (1997), except that we do not adjust for momentum. We choose not to adjust for momentum, because most small countries in our sample have too few observations to create sufficiently diversified benchmark portfolios with three way sorts, especially among those developing countries. In addition, Fama and French (2008) who study the asset growth effect in the United States based on the book-to-market and size adjusted returns, argue that,

We follow Fama and French (1993) to form *BM* and *SZ* benchmark portfolios 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 intersections of the three *SZ* groups and the three *BM* groups result in nine benchmark portfolios. Equal-weighted monthly raw returns are calculated from July of year *t* to June of year *t*+1 for each benchmark portfolio. 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 benchmark portfolio that the stock falls into.

Panel A of Table 6 presents the time-series averages of characteristic-adjusted returns on country-average *TAG* portfolios for each group classified by the access-to-equity market index, and Panel B is for the groups classified by the market cap to GDP ratio.[27] The results from both panels show that the asset growth effect increases monotonically with the degree of ease to raise funds in equity markets in both developed and developing markets. For instance, Panel A shows that, for the subsample of developed economies, the average monthly characteristic-adjusted returns on the country-average *TAG*-hedge portfolio in the low, medium, and high access-to-equity market index groups are -0.02% (*t*-statistic = 0.21), 0.16% (*t*-statistic = 1.70), and 0.56% (*t*-statistic = 5.97), respectively. The difference in the asset growth effect between the high and 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). Similar characteristic-adjusted return patterns are observed in Panel B of Table 6. For instance, in the subsample of developed economies, the

skipping the detail, the *BM* and *SZ* portfolio-adjusted returns are similar to the intercepts from the Fama and French (1993) three-factor regression model. We therefore report results that are based on the size and book-to-market characteristic-adjusted returns in our portfolio analysis.

[27] The return series in Table 6 for the developing economies starts at 1994 to ensure that there is enough number of countries in each country-average *TAG* portfolio.

difference in the average characteristic-adjusted returns on the *TAG*-hedge portfolio between the high and low market cap to GDP ratio groups is of a similar magnitude of 0.59% per month with a *t*-statistic of 3.67. Interestingly, although there is no evidence of an asset growth effect in the subsample of developing economies as a whole as reported in Tables 1 and 3, there is a significant asset growth effect in the "high" sub-group of developing countries in both Panels A and B. In addition, the asset growth effect is significantly more pronounced in the high sub-group than in the low sub-group among the developing countries. Overall, the results from Panels A and B indicate that, in general, countries with better access to equity markets show a stronger asset growth effect than those with poorer access to equity markets.

[Insert Table 6 here]

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

Panels C and D of Table 6 presents the return results based on the sort of overconfidence proxied by the individualism index and the sort of legal protection, proxied by the anti-self dealing index. The results in Panel C indicate that countries with more individualistic cultures tend to exhibit a stronger asset growth effect.[28] Specifically, among developed countries, the asset growth effect in the high individualism group is 0.46% per month on average and is statistically significant at the 1% level, while it is an insignificant 0.06% per month in the low individualism group. The difference of 0.40% per month in the asset growth effect between the high and low overconfidence groups is statistically significant (*t*-statistic = 3.12). The results from the developing economies show that there is no significant asset growth effect for any of

[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 higher uncertainty avoidance index (i.e., countries with a high propensity to avoid uncertainty) have a weaker investment effect. This result appears to support the overinvestment argument for the investment effect.

the individualism groups and that the difference in the asset growth effect between the high and low individualism groups is statistically insignificant.

The results in Panel D of Table 6 show that the country-average asset growth effect seems not to exist in countries with weak investor protection as measured by the low anti-self-dealing index, and is strong in countries with strong investor protection. For instance, 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 effect between the high and low investor protection groups is significantly different from zero at the 10% level (*t*-statistic = 1.85). The results from the developing economies show a similar pattern. However, the difference of 0.77% per month in asset growth effect between the high and low anti-self-dealing groups is, though large, insignificant possibly due to imprecise estimation based on fewer observations in the portfolio.

4.5 Determinants of cross-country differences in the asset growth effect: Regression analysis

Although the results from portfolio analysis in Table 6 are in general consistent with the overinvestment hypothesis, the univariate nature of the analysis raises the concern that some omitted country-level variables correlated with the sorting variable might drive our results. To rule out this possibility, we estimate the following regression to explore the influence of the above country-level factors along with other country characteristics on the cross-country difference in the investment and return relation:

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

where the dependent variable, $HedgeR_{j,t}$, is the equal-weighted *SZ* and *BM* characteristic-adjusted monthly returns in U.S. dollars on the country-specific *TAG*-hedge portfolio in country *j* from July of year *t* to June of year *t*+1. F_j is a vector of key country-specific explanatory variables that are constant across time for country *j*. These key variables, also referred to as country characteristic variables, include the two measures of access to equity markets, the overconfidence proxied by the individualism index, and the legal protection of investors proxied by the anti-self-dealing index.

Other country characteristics are the median book-to-market equity ($MdBM_{j,t-1}$) and the median asset growth ($MdTAG_{j,t-1}$) measured in year *t*-1, and the median firm size ($MdSZ_{j,t}$) measured at the end of June in year *t*. These country characteristics are included to control for their possible influences on the *TAG*-hedge portfolio returns. 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 arguments explained at the outset. If the variable of interest is investor protection, γ_1 is expected to be negative based on the agency theory prediction. The regression equation (2) is estimated with the Petersen (2008) approach clustered by country.[29]

Panel A of Table 7 presents the regression results of equation (2) when each of the key country-specific explanatory variables is included one at the time. The results from Models (1) and (2) in Panel A 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 there is no such an influence among the developing economies. For instance, for the subsample of developed economies, the estimated coefficient on the access-to-equity market index is 0.60 with

[29] We obtain similar results when the model is estimated with the OLS procedure clustered by time to control for the time-fixed effect.

a *t*-statistic of 3.61, and the estimated coefficient on the market cap to GDP ratio is 0.42 with a *t*-statistic of 2.08. Both estimates are significant at the 1% level, after controlling for the country-specific size and book-to-market effects. In contrast, the estimated coefficients on both measures of access to equity markets are statistically insignificant for the developing economies. Consistent with findings from the portfolio analysis shown in Table 6, our results here appear to support the overinvestment explanation on the asset growth effect.

[Insert Table 7 here]

The Model (3) of Panel A reveals a significantly positive coefficient on individualism for the subsample of developed economies. Specifically, the coefficient of the individualism index is 0.01 with a *t*-statistic of 2.98, suggesting that the individualistic cultures influence the cross-country variation in the asset growth effect among these economies. In contrast, the coefficient of the individualism index is statistically insignificant for the developing countries. This finding is also consistent with the results from portfolio analysis reported in Table 6, and provides additional support for the overinvestment explanation.

However, we do not find evidence that investor protection has an influence on the cross-country difference in the asset growth effect. The coefficient on the anti-self dealing index is not statistically differently from zero for both developed and developing countries, as shown in Model (4) of Panel A in Table 7. This finding, along with the finding in Panel D in Table 5, appears not to support the agency theory prediction that the asset growth effect should be stronger in countries with weaker corporate governance. It should be noted, however, that in countries with the poor corporate governance, ownership is highly concentrated.[30] Therefore,

[30] For instance, the empirical evidence in La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998) indicates that there is significant difference across countries in the degree of investor protection, and that countries with low investor protection are generally characterized by a high concentration of equity ownership within firms. Burkart, Panunzi, and Shleifer (2003) also argue that poor investor protection creates the need for dominant owners.

majority-owner managers may have less incentive to simply overinvest; they may expropriate the company resources from minority shareholders through other means such as connected transactions.[31]

So far both of our portfolio and regression analyses suggest that for developed countries, the cross-country differences in access to equity markets and individualism have significant influences on the cross-country variation in the asset growth effect when each is considered separately. We next examine whether the effect of one country-specific variable subsumes the effects of other country-specific variables. The results from the multivariate regressions of equation (2) are presented in Panel B of Table 7 for both developed and developing countries.

Panel B of Table 7 shows that, for the developed economies, the estimated coefficients of both measures of the ease of access to equity markets are statistically significant across the two model specifications and so is the individualism index. More importantly, the influence of the ease of access to equity markets on the asset growth effect is not subsumed by the effect of individualism. For instance, in Model (2) for the developed economies, the estimated coefficient of the access-to-equity market index is 0.45 with a *t*-statistic of 3.54, while the estimated coefficient of individualism is about 0.01 with a *t*-statistic of 4.02. Model (4) shows that the estimated coefficient of the market cap to GDP ratio is 0.39 with a *t*-statistic of 2.78, while the estimated coefficient of individualism is 0.01 with a *t*-statistic of 5.14. All these estimates are statistically significant at the 1% level. The results for the developing economies show that most

[31] For instance, Morck, Wolfenzon, and Yeung (2005) show that in poor investor protection countries, corporations may have dominant shareholders with nontrivial cash flow rights and large private benefits in the firms that they control, and their high exposure may lead them to be conservative in directing corporate investment. La Porta, Lopez-de-Silanes, and Shleifer (1999) describe a variety ways of tunneling through which controlling shareholders extract value from the firms. Dyck and Zingales (2004), among others, also provide empirical evidence that in countries where investors are less well protected by law, controlling shareholders can and do extract large private benefits of control.

of the explanatory variables of interest tend to have no explanatory power on the cross-country variation in the asset growth effect.

Our results in Table 7 suggest that the ease of access to equity markets and managerial overconfidence contribute to the cross-country difference in the observed asset growth effect for the developed countries but not for the developing countries. In addition, our results show that a country's median asset growth (*MdTAG*) tends to be related to the asset growth effect as well. The coefficient on *MdTAG* in all model specifications is consistently and significantly positive for the developed economies, suggesting that the asset growth effect is stronger in countries with higher asset growth. However, the *MdTAG* coefficient is significantly negative in general for the developing economies, suggesting that the asset growth effect tends to be stronger in countries with lower asset growth.[32] Finally, investor protection tends to have little influence on cross-country variation in the asset growth effect after controlling for other country-level characteristics. Overall, our results seem to be consistent with the explanation that the asset growth effect might be attributable to overinvestment.

5. Conclusion

This study documents 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 influence the cross-country variation in the asset growth effect in developed countries, possibly through a tendency-to-overinvest channel. We find that countries

[32] These results are consistent with portfolio analysis based on the country-average portfolios similarly formed as in Table 6. The results not reported in the table suggest that for the subsample of developed economies, both low and high asset growth economies show strong asset growth effect and that the high asset growth economies show a significantly stronger asset growth effect than the low asset growth economies. For the subsample of developing economies, our results indicate that the asset growth effect is strong among the low asset growth economies but not among the high asset growth economies.

with easier 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 a share issuance trading strategy that buys stocks with small net share issuance and at the same time shorts stocks with large net share issuance is more profound in countries with higher share issuance activities, more developed stock markets, and stronger investor protection. They argue that their results tend to be consistent with the view that the share issuance effect is associated with the ease of share issuance and repurchases (i.e., how easy a firm accesses to equity markets).[33] 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 by 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 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

[33] Our unreported results indicate that countries with high share issuance activities have a stronger asset growth effect than countries with low issuance activities.

influence the efficiency of financial markets. The asset growth effect seems to be too large and too persistent (over five years) in the developed markets but no such effect in the developing markets to be explained by risk, and hence posits a challenge on the efficient market hypothesis. 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] See a recent study 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. The asset growth effect 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. Equal-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 portfolio and a $1 short position in *TAG*5 portfolio simultaneously. The monthly returns on the hedge portfolio are calculated by subtracting monthly returns on the *TAG*5 portfolio from the monthly returns on the *TAG*1 portfolio. 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 (%) on country-specific TAG portfolios for developed economies

Country	N	Equity index	Mkt cap to GDP	Time period	TAG1	TAG5	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 (%)on country-specific TAG portfolios for developing economies

Country	N	Equity index	Mkt Cap to GDP	Time period	TAG1	TAG5	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. Returns on the country-average *TAG* portfolios five years after portfolio formation

Country-average *TAG* portfolios are formed as described in Table 1. Year +*k* (*k*=1 to 5) is the *k*-th year after portfolio formation and corresponds to the case where *TAG* is ranked based on total asset growth of year *t*+*k*-2 and is matched with the monthly return series from July of year *t*+*k*-1 to June of year *t*+*k*. 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 raw 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					TAG-hedge
Year	1	2	3	4	5	(1-5)
Panel A: Average monthly raw returns (%) on country-average *TAG* quintile portfolios for the whole sample						
+1	1.861	1.731	1.605	1.485	1.374	**0.487 (6.19)**
+2	1.772	1.672	1.543	1.446	1.243	**0.529 (6.70)**
+3	1.770	1.607	1.648	1.527	1.270	**0.500 (5.88)**
+4	1.744	1.682	1.592	1.520	1.351	**0.393 (4.74)**
+5	1.608	1.568	1.416	1.444	1.296	**0.312 (3.10)**
Panel B: Average monthly raw returns (%) on country-average *TAG* quintile portfolios for developed economies						
+1	1.782	1.716	1.565	1.456	1.277	**0.506 (5.74)**
+2	1.669	1.621	1.538	1.422	1.154	**0.515 (5.81)**
+3	1.689	1.574	1.567	1.476	1.223	**0.466 (5.77)**
+4	1.688	1.606	1.482	1.460	1.289	**0.399 (4.96)**
+5	1.476	1.493	1.350	1.360	1.128	**0.349 (3.93)**
Panel C: Average monthly raw returns (%) on country-average *TAG* quintile portfolios for developing economies						
+1	1.679	1.441	1.440	1.408	1.536	0.143 (0.63)
+2	1.859	1.651	1.391	1.364	1.700	0.160 (0.69)
+3	1.861	1.594	1.847	1.626	1.574	0.288 (1.07)
+4	1.694	1.767	1.980	1.625	1.467	0.227 (0.71)
+5	1.640	1.452	1.409	1.473	1.663	0.025 (0.10)

Table 3. Regression results of stock returns on asset growth: Firm-level analysis classified by developed versus developing markets

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

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

where $R_{ij,t}$ is the monthly return in U.S. dollars from July of year t to June of year t+1 for stock *i* in country *j*. R_{ft} is the risk-free rate proxied by the one-month U.S. Treasury-bill rate. $TAG_{ij,t-1}$ and $BM_{ij,t-1}$ are 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, and 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*.

Panel A reports regression results from the Fama and MacBeth (1973) procedure with country dummies, where the *t*-statistics are calculated with the Newey-West adjustment for standard errors. Panel B reports regression results from the Fama and MacBeth (1973) procedure with country dummies and with all variables weighted by the inverse of the number of observations in each month in each country. The *t*-statistics are in parentheses. Obs. is the total number of months in each sample. The null hypothesis is that the coefficient of *TAG* is more negative in the developed economy subsample than in the developing economy subsample.

	Panel A: Fama-MacBeth (1973) procedure with the Newey-West adjustment			Panel B: Fama-MacBeth (1973) procedure with weights		
Independent variable	Whole sample	Developed economy	Developing economy	Whole Sample	Developed economy	Developing economy
TAG	**-0.476**	**-0.484**	0.489	**-0.345**	**-0.338**	0.488
	(-5.10)	**(-5.12)**	(1.01)	**(-3.78)**	**(-3.66)**	(1.12)
Ln(BM)	0.185	0.176	0.252	0.133	0.165	0.109
	(3.89)	(3.53)	(1.99)	(3.71)	(4.17)	(0.88)
Ln(SZ)	-0.092	-0.077	-0.207	-0.085	-0.064	-0.155
	(-2.62)	(-2.16)	(-2.64)	(-3.08)	(-2.25)	(-2.10)
MOM	0.478	0.591	0.164	0.757	1.004	0.237
	(2.30)	(2.86)	(0.28)	(3.65)	(4.64)	(0.43)
Issue	-0.262	-0.244	0.505	-0.422	-0.394	0.489
	(-4.01)	(-3.77)	(0.69)	(-5.48)	(-5.29)	(0.72)
Obs.	288	288	246	288	288	246
Null hypothesis test:						
Difference in b_1 coefficient		-0.973			-0.827	
(t-statistic)		(-2.36)			(-1.98)	
p-value (one-tailed test)		0.009			0.024	

Table 4. Summary statistics on country-level variables

This table presents summary statistics 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. *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 log(book-to-market equity), log(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 Panel B presents the Pearson correlations among these variables for the sample of developed economies and the sample of developing economies. **and * indicate significant at the 1% and 5% levels, respectively.

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

	Developed economies						Developing economies					
Variable	Obs.	Mean	Std. dev.	Min	Median	Max	Obs.	Mean	Std. dev.	Min	Median	Max
Access-to-equity	26	5.76	0.41	5.00	5.83	6.45	13	4.87	0.85	3.21	4.94	6.01
Mkt. cap to GDP	26	0.59	0.40	0.07	0.45	1.44	11	0.30	0.26	0.11	0.18	0.78
Indv. Index	26	60.04	23.30	17.00	68.50	91.00	13	35.31	15.75	14.00	32.00	65.00
Anti-self dealing	26	0.54	0.25	0.20	0.46	1.00	13	0.53	0.26	0.17	0.58	0.95
MdBM	471	-0.57	1.12	-5.30	-0.34	1.05	155	-0.30	0.70	-4.60	-0.22	0.88
MdSZ	471	6.14	1.99	2.94	5.63	12.32	155	7.40	2.322	2.23	7.20	12.90
MdTAG	471	0.07	0.06	-0.09	0.06	0.45	155	0.52	2.48	-0.05	0.12	25.93
Hedge return (%)	5,508	0.27	4.09	-80.63	30.24	0.17	1,757	0.08	6.91	-116.00	-0.12	66.36

Panel B: Pearson correlations among country-level variables

	Developed economies							Developing economies						
	Access-to-equity	Mkt. cap to GDP	Indv. index	Anti-self dealing	MdBM	MdSZ	MdTAG	Access-to-equity	Mkt. cap to GDP	Indv. index	Anti-self dealing	MdBM	MdSZ	MdTAG
Mkt. cap to GDP	0.71**							0.59						
Indv. Index	0.41*	0.08						0.20	0.27					
Anti-self dealing	0.38	0.27	-0.05					0.44	0.67*	-0.25				
MdBM	-0.29**	-0.25**	-0.32**	-0.34**				-0.08	-0.11	-0.05	-0.17*			
MdSZ	-0.01	0.06	-0.35*	0.17***	-0.25**			-0.09	-0.15	-0.47**	0.08	0.06		
MdTAG	-0.19**	-0.11*	-0.19**	0.09*	-0.13**	0.17**		-0.08	-0.14	0.02	-0.19*	-0.38**	-0.10	
Hedge return	0.05**	0.04**	0.04**	0.03*	-0.04**	0.01	0.04**	0.01	0.01	0.03	0.02	-0.03	-0.03	0.03

Table 5. Regression results of stock returns on asset growth: Firm-level analysis classified by country characteristics

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

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

where $R_{ij,t}$ is the monthly return in U.S. dollars from July of year t to June of year t+1 for stock *i* in country *j*. R_{ft} is the risk-free rate proxied by the one-month U.S. Treasury-bill rate. $TAG_{ij,t-1}$ and $BM_{ij,t-1}$ are 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, $Issue_{m,\ m\text{-}12} = Ln(Adjshares_m) - Ln(Adjshares_{m\text{-}12})$, where $Adjshares_m = (Shares\ Outstanding_m)/CAI_m$, and CAI_m is the capital adjustment index from Datastream recorded as the end of month *m*.

All countries are ranked on the access-to-equity market index, the market cap to GDP ratio, the individualism index, and the anti-self-dealing index, respectively, in ascending order. The cutoff points for each ranking take into consideration of the number of countries in each group (N) and the actual cutoff value of the ranking variable. The Fama and MacBeth (1973) regression procedure with country dummies is used to estimate the coefficients and the Newey-West adjustment for standard errors are used to calculate the *t*-statistics. Panels A to D present results based on the access-to-market index, the market cap to GDP ratio, the individualism index, and the anti-self-dealing index, respectively. The associated *t*-statistics are in parentheses. Obs. is the total number of months in each sample. The null hypothesis is that the coefficient of *TAG* is more negative in the high group than in the low group.

	Panel A: Access-to-equity market index			Panel B: Market cap to GDP ratio		
	Low (N=15)	Medium (N=10)	High (N=14)	Low (N=14)	Medium (N=9)	High (N=14)
TAG	**-0.040**	**-0.285**	**-0.409**	**-0.076**	**-0.282**	**-0.461**
	(-0.21)	**(-1.06)**	**(-5.21)**	**(-0.40)**	**(-1.84)**	**(-5.29)**
Ln(BM)	0.183	0.469	0.193	0.121	0.370	0.199
	(2.96)	(5.40)	(3.31)	(1.79)	(5.67)	(3.42)
Ln(SZ)	-0.040	-0.126	-0.071	-0.113	-0.074	-0.100
	(-0.68)	(-1.84)	(-1.76)	(-1.83)	(-1.33)	(-2.27)
MOM	0.531	0.473	0.924	0.598	-0.309	0.669
	(1.08)	(1.15)	(4.02)	(1.20)	(-0.81)	(2.79)
Issue	-0.831	-1.319	-0.172	-0.680	-0.858	-0.155
	(-2.96)	(-4.19)	(-2.58)	(-2.38)	(-3.60)	(-2.17)
Obs.	252	264	264	252	264	264
Null hypothesis test:						
Difference in b_1 coefficient			-0.367			-0.384
(t-statistic)			(-1.85)			(-1.89)
p-value (one-tailed test)			0.032			0.030

Table 5 – continued

	Panel C: Individualism index			Panel D: Anti-self-dealing index		
	Low (N=12)	Medium (N=14)	High (N=11)	Low (N=12)	Medium (N=11)	High (N=14)
TAG	**-0.453**	**-0.281**	**-0.479**	**-0.204**	**-0.276**	**-0.497**
	(-2.61)	**(-1.34)**	**(-6.29)**	**(-1.64)**	**(-1.21)**	**(-5.26)**
Ln(BM)	0.505	0.335	0.152	0.185	0.329	0.211
	(4.79)	(4.89)	(2.59)	(3.07)	(4.98)	(3.89)
Ln(SZ)	-0.189	-0.100	-0.053	-0.059	-0.001	-0.124
	(-2.06)	(-1.69)	(-1.39)	(-1.49)	(-0.02)	(-2.63)
MOM	-0.873	-0.147	1.022	1.406	-0.013	0.548
	(-1.60)	(-0.42)	(4.42)	(4.05)	(-3.14)	(2.16)
Issue	-0.525	-1.070	-0.137	-0.391	-1.316	-0.150
	(-5.65)	(-4.52)	(-2.23)	(-1.49)	(-5.11)	(-2.14)
Obs.	240	264	264	264	264	264
Null hypothesis test:						
Difference in b_1 coefficient			-0.025			-0.293
(t-statistic)			(-0.13)			(-2.00)
p-value (one-tailed)			0.447			0.023

Table 6. Portfolio analysis on the relation between the asset growth effect and the country characteristics

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 a country-level variable of interest. 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 the ranking on a specific variable. Country-average portfolios are formed within each 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 groups. Panels A to D reports the country-level asset growth effect classified by the access-to-equity market index, the market cap to GDP ratio, the individualism index, and the anti-self-dealing index, respectively. The *t*-statistics are in parentheses.

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

	Developed economies			Developing economies		
	TAG1	TAG5	TAG-hedge	TAG1	TAG5	TAG-hedge
Low	0.007	0.031	-0.024	0.103	0.340	-0.240
	(0.09)	(0.46)	(0.21)	(0.44)	(1.20)	(-0.65)
Medium	0.040	-0.118	0.158	0.117	0.001	0.116
	(0.56)	(-2.42)	(1.70)	(0.59)	(0.01)	(0.37)
High	0.280	-0.275	0.555	0.398	-0.128	0.525
	(4.16)	(-4.87)	(5.97)	(3.36)	(-1.05)	(2.75)
(High – Low) TAG-hedge			**0.579**			**0.766**
			(4.03)			**(1.87)**

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

	Developed economies			Developing economies		
	TAG1	TAG5	TAG-hedge	TAG1	TAG5	TAG-hedge
Low	-0.098	-0.016	-0.083	-0.500	0.323	-0.823
	(-1.20)	(-0.21)	(-0.68)	(-2.04)	(1.55)	(-2.37)
Medium	0.123	-0.129	0.252	0.534	0.101	0.462
	(2.16)	(-2.72)	(3.10)	(2.51)	(0.36)	(1.24)
High	0.288	-0.221	0.510	0.293	-0.227	0.520
	(3.53)	(-3.74)	(4.76)	(1.82)	(-2.04)	(2.30)
(High – Low) TAG-hedge			**0.592**			**1.343**
			(3.67)			**(3.28)**

Table 6 – continued

Panel C: The investment effects classified by the individualism index

	Developed economies			Developing economies		
	TAG1	TAG5	TAG-hedge	TAG1	TAG5	TAG-hedge
Low	0.056	-0.003	0.059	-0.062	0.063	-0.126
	(0.79)	(-0.06)	(0.60)	(-0.35)	(0.42)	(-0.52)
Medium	0.065	-0.077	0.142	-0.155	0.144	-0.299
	(0.80)	(-1.16)	(1.20)	(1.00)	(1.03)	(-1.30)
High	0.192	-0.265	0.457	0.615	-0.009	0.646
	(3.22)	(-5.32)	(5.50)	(2.70)	(-0.03)	(1.64)
(High – Low) TAG-hedge			**0.397**			0.771
			(3.12)			(1.52)

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

	Developed economies			Developing economies		
	TAG1	TAG5	TAG-hedge	TAG1	TAG5	TAG-hedge
Low	-0.029	-0.124	-0.095	-0.043	0.193	-0.219
	(-0.33)	(-1.96)	(-0.80)	(-0.17)	(0.65)	(-0.54)
Medium	0.154	-0.051	0.205	0.043	0.123	-0.080
	(2.73)	(-0.97)	(2.44)	(0.29)	(0.82)	(-0.33)
High	0.136	-0.249	0.385	0.386	-0.163	0.549
	(1.63)	(-4.20)	(3.52)	(2.80)	(-1.58)	(2.90)
(High – Low) TAG-hedge			**0.480**			0.768
			(1.85)			(1.67)

Table 7. **Regression results of country-specific *TAG*-hedge returns on the country characteristics**

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 the time invariant country(*j*)-level variables (namely, the access-to-equity market index, the ratio of market cap to GDP, the individualism index, and the anti-self-dealing index) and the time (*t*) variant country(*j*)-level variables ($MdBM_{j,t}$, $MdSZ_{j,t}$, $MdTAG_{j,t}$). $MdBM_{j,t}$, $MdSZ_{j,t}$, and $MdTAG_{j,t}$ are the median book-to-market ratio, the median firm size, 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. The univariate regression results are presented in Panel A and the multivariate regression results are presented in Panel B. The *t*-statistics are in parentheses.

Panel A: Univariate regressions

	Developed economies				Developing economies			
Model	1	2	3	4	1	2	3	4
Intercept	-3.145 (-3.53)	-0.106 (0.49)	-0.698 (-1.95)	0.057 (0.23)	0.183 (0.11)	1.428 (1.48)	0.169 (0.14)	0.992 (1.15)
Access-to-equity market	**0.599** **(3.61)**				0.215 (0.77)			
Market cap to GDP		**0.420** **(2.08)**				0.182 (0.16)		
Individualism			**0.009** **(2.98)**				0.018 (1.21)	
Anti-self dealing				0.242 (0.98)				0.501 (0.49)
Ln(MdBM)	-0.068 (-1.42)	-0.097 (-1.90)	-0.054 (-1.13)	-0.119 (-2.51)	-0.478 (-2.75)	-0.651 (-3.44)	-0.493 (-2.79)	-0.421 (-1.72)
Ln(MdSZ)	-0.015 (-0.58)	-0.023 (-0.82)	0.024 (0.82)	-0.024 (-0.73)	-0.132 (-1.50)	-0.151 (-1.74)	-0.074 (-0.84)	-0.137 (-1.53)
MdTAG	**2.927** **(3.20)**	**2.509** **(2.68)**	**2.698** **(2.85)**	**2.088** **(2.22)**	**-1.533** **(-2.72)**	**-1.732** **(-2.49)**	**-1.320** **(-2.49)**	**-1.324** **(-2.43)**

Table 7 - continued

Panel B: Multivariate regressions

	Developed economies				Developing economies			
Model	1	2	3	4	1	2	3	4
Intercept	-3.123 (-4.39)	-3.083 (-4.40)	-0.954 (-3.58)	-1.045 (-3.89)	-0.344 (-0.25)	-0.396 (-0.31)	0.337 (0.22)	-0.190 (-0.15)
Access-to-equity market	**0.460** **(3.59)**	**0.447** **(3.54)**			0.131 (0.45)	-0.006 (-0.02)		
Market cap to GDP			**0.417** **(2.94)**	**0.389** **(2.87)**			-0.059 (-0.07)	-0.700 (-0.50)
Individualism	**0.006** **(3.66)**	**0.006** **(4.02)**	**0.009** **(4.62)**	**0.010** **(5.14)**	0.015 (0.87)	0.020 (1.25)	0.020 (1.22)	0.025 (1.77)
Anti-self dealing		0.042 (0.25)		0.186 (1.05)		0.741 (0.82)		0.966 (0.72)
Ln(MdBM)	-0.026 (-0.52)	-0.024 (-0.46)	-0.016 (-0.27)	-0.002 (-0.04)	-0.468 (-2.91)	-0.332 (-0.85)	-0.585 (-2.45)	-0.474 (-1.95)
Ln(MdSZ)	0.013 (0.53)	0.014 (0.53)	0.022 (0.87)	0.021 (0.83)	-0.079 (-0.84)	-0.065 (-0.44)	-0.091 (-0.89)	-0.088 (-0.86)
MdTAG	**3.161** **(3.59)**	**3.147** **(3.52)**	**3.077** **(3.47)**	**3.044** **(3.39)**	**-1.348** **(-2.43)**	**-0.975** **(-1.60)**	**-1.561** **(-1.83)**	**-1.405** **(-1.94)**