The asset growth effect:
Insights from international equity markets *

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Abstract

Firms with higher asset growth rates subsequently experience lower stock returns in international equity markets, consistent with the U.S. evidence. This negative effect of asset growth on returns is stronger in more developed capital markets and markets where stocks are more efficiently priced, but is unrelated to country characteristics representing limits to arbitrage, investor protection, and accounting quality. The evidence suggests that the cross-sectional relation between asset growth and stock return is more likely due to an optimal investment effect than due to over-investment, market timing, or other forms of mispricing.

JEL Classification: G12, G14, G15
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1. Introduction

It has been documented that firms experiencing rapid growth by raising external financing and making capital investments subsequently have low stock returns, whereas firms experiencing contraction via divestiture, share repurchase, and debt retirement enjoy high future returns.[1] Cooper, Gulen, and Schill (2008) summarize the synergistic effect of firms' investment and financing activities by creating a simple measure of total asset growth. They show that in the United States during the period from 1968 to 2003, a value-weighted portfolio of stocks in the top asset-growth decile underperforms the portfolio of stocks in the bottom decile by 13% per year, and such cross-sectional return difference cannot be explained by standard asset pricing models.

One of the most actively debated issues in the current finance literature is whether the negative effect of investment and financing on stock returns, as highlighted by the asset growth effect, is evidence of market inefficiency or can be viewed as a rational asset pricing result. From the behavioral camp, several mispricing-based explanations have been proposed. These explanations include 1) over-investment and empire-building tendency of corporate managers (e.g., Titman, Wei, and Xie, 2004), 2) capital structure market timing when raising and retiring external financing (e.g., Baker and Wurgler, 2002), 3) earnings management prior to financing activities or acquisitions (e.g., Teoh, Welch, and Wong, 1998a; 1998b), and 4) excessive extrapolation on past growth by investors when they value firms (e.g., Lakonishok, Shleifer, and Vishny, 1994).

From the rational asset pricing camp, the explanations center around the association between investment and expected return, albeit with some variations. For example, Cochrane (1991, 1996) and Liu, Whited, and Zhang (2009) study the discount rate effect of investments, i.e., firms making large investments are likely to be those with low discount rates. In Lyandres, Sun, and Zhang (2008) and Li, Livdan, and Zhang (2009), higher investments are associated with lower expected returns via both decreasing return to scale and the discount rate effect. Berk, Green, and Naik (1999) and Carlson, Fisher, and Giammarino (2004) further argue that firms have reduced risk and expected return after growth options are exercised through capital investments.[2]

It is difficult to empirically distinguish the mispricing hypothesis from the optimal investment

[1]See Cooper, Gulen, and Schill (2008) for a survey of the large body of empirical literature on the relation of firms' financing and investments with operating performance and stock returns.

[2]In addition, several empirical studies, such as Agrawal, Jaffee, and Mandelker (1992), Ikenberry, Lakonishok, and Vermaelen (1995), Loughran and Ritter (1995), Rau and Vermaelen (1998), and Richardson and Sloan (2003), have subscribed to one or multiple mispricing-based explanations. A few other studies have provided empirical evidence consistent with the optimal investment effect; see, for example, Anderson and Garcia-Feijoo (2006), Fama and French (2006), and Xing (2008).

hypothesis, because they offer similar predictions on the relation of corporate investments with both future stock returns and firms' future operating performance. To address this issue, recent studies have focused on *conditional* evidence in the U.S. by examining the effect of investment or financing on stock returns during subperiods or in subsamples of stocks. Titman, Wei, and Xie (2004) find that the negative investment-return relation is stronger among firms with greater managerial investment discretion, and is significant only during the periods when external corporate governance is weak. Cooper, Gulen, and Schill (2008) similarly show that the asset growth effect on stock returns weakens during the periods of heightened external corporate oversight, but becomes stronger following higher market returns when investor sentiment is stronger. In addition, Lipson, Mortal, and Schill (2011) show that the asset growth effect is greater among stocks with higher arbitrage costs measured by idiosyncratic return volatility.

While these studies favor mispricing-based interpretations, Li and Zhang (2010) point out that in the q-theory model of corporate investment, the investment-return linkage should be stronger among firms facing higher investment and financing frictions. Empirically, they find relatively weak evidence for this prediction using various proxies for investments, investment frictions, and arbitrage costs. However, using a more comprehensive set of arbitrage costs measures, Lam and Wei (2011) report that the investment friction effect and the limits to arbitrage effect are supported by a similar amount of evidence.

This study investigates the asset growth effect in international stock markets.[3] We have two goals. The first is to examine whether the negative relation between asset growth and future stock returns exists in financial markets outside the U.S. An affirmative answer would alleviate the concern that the empirical pattern documented in the U.S. is due to chance or data-snooping. Second, we use the international data to evaluate the plausible economic causes of the asset growth effect. Our approach builds upon Li and Zhang (2010) and Lam and Wei (2011), but the large variation in the asset growth effect across countries and the large dispersion of country characteristics enable us to perform a new set of tests for evaluating competing theories.

Using the Datastream-Worldscope data spanning the period from 1982 to 2010, we find evidence of a significant asset growth effect in the international equity markets. When we pool stocks across 42 countries outside the U.S. and sort them into equal-weighted decile portfolios based on annual

[3] Throughout the paper, we use the term "country" and "market" interchangeably with the understanding that some markets, such as Hong Kong, are not sovereign countries.

asset growth rates (AG), the bottom AG decile outperforms the top decile by a significant 6.43% in the following year. When we form equal-weighted AG-sorted portfolios within each of the 42 countries, the return spread between the bottom and top AG portfolios, averaged across countries, is also significantly positive at 3.50% per year. The return-predictive power of asset growth remains significant after controlling for size, book-to-market, momentum, and operating profitability. We also find that the magnitude of the asset growth effect varies substantially across countries. For example, the equal-weighted annual return spreads between the bottom and top AG portfolios formed within each country range from -11% to 11%. The return spreads are positive in 30 countries (including the U.S.) but negative in 13 countries. Such cross-country divergence provides a rich ground for testing various hypotheses on the cause of the asset growth effect.

Our cross-country analysis centers around two contrasting ideas that link the asset growth effect to various country characteristics in opposite ways. First, if the asset growth effect is due to mispricing, one would expect it to be stronger in countries where stocks are less efficiently priced and in countries where mispricing is difficult to arbitrage away. Further, if managerial empire-building, capital structure market timing, or accounting manipulation is behind the asset growth anomaly, one would expect this effect to be weaker in countries with stronger corporate governance, better investor protection, and less room for accounting manipulation. Second, if the asset growth effect is driven by optimal corporate investment decisions, one would expect this effect to be stronger in markets where stocks are more efficiently priced (i.e., prices staying closer to the fundamental values and the expected returns exhibiting closer relation with risks). Based on these ideas, we formulate three hypotheses and investigate them empirically.

The first hypothesis we examine is on the relation between market efficiency and the asset growth effect. The optimal investment explanation suggests that the AG effect should be stronger among countries where stocks are more efficiently priced, whereas the mispricing explanation suggests the opposite. We consider four country-level proxies for the efficiency of a financial market. The first is Morck, Yeung, and Yu's (2000) stock return synchronicity (R2), which is negatively related to the amount of firm-specific information incorporated into individual stock prices. To compute R2, we regress weekly individual stock returns on the contemporaneous weekly market returns as well as two leads and two lags of the weekly market returns, and then take the average R-squared from the firm-level regressions within each country. The second is the future earnings response coefficient (FERC) developed in the accounting literature (e.g., Collins et al. 1994), which captures the extent to which stock price reflects information about future corporate earnings. The stock-level FERC is calculated as the sum of three coefficients on future earnings changes, which we obtain by regressing the firm's annual stock returns on its current year's earnings change, three leads of its annual earnings changes, and three leads of its annual stock returns. The country-level FERC is then given by the mean of the FERC estimates across all firms in the country.

We use the developed-market status (DEV) provided by the International Finance Corporation as our third market efficiency proxy, in order to capture the idea that developed stock markets tend to be more informationally efficient than emerging ones. Following La Porta et al. (1997), our fourth variable, MKT, measures the importance of stock market to the economy. MKT is computed as the sum of cross-country rankings on the following three variables - the ratio of total stock market capitalization to the Gross Domestic Product (GDP), the number of publicly listed companies scaled by the population, and the number of inital public offerings (IPOs) scaled by the population.

To quantify the magnitude of the asset growth effect in each country, we consider both the return spread (SPREAD) between the extreme AG portfolios and the slope coefficient (SLOPE) from the cross-sectional regression of stock returns on asset growth rates. Both equal-weighted and value-weighted versions of SPREAD and SLOPE are examined. Based on these measures, we find that the AG effect is stronger in countries with lower stock return synchronicity and higher future earnings response coefficients, in developed markets, and in economies where stock markets play a more important role. These results suggest that the return-predictive power of AG is stronger in countries with more efficient stock markets. Such evidence is supportive of the optimal investment explanation but is difficult to reconcile with the mispricing explanation.

We further examine the role of market efficiency in explaining the AG effect under a specific q-theory prediction. Several recent studies (e.g., Chen, Novy-Marx, and Zhang, 2011) emphasize that the investment-return relation is conditional on firm profitability. We therefore construct alternative measures of country-level asset growth effect using portfolio sorts and regressions that control for firm-level return on equity. We find that even if we use these alternative measures, the four proxies for market efficiency continue to exhibit strong power to explain the cross-country difference in the AG effect.

The second hypothesis we investigate is on the effect of limits to arbitrage. If the asset growth effect is due to mispricing, it should be stronger when mispricing is difficult to arbitrage away. Consistent with this hypothesis, Li and Zhang (2010), Lam and Wei (2011), and Lipson, Mortal, and

Schill (2011) find that the asset growth effect in the U.S. is stronger among stocks with higher trading frictions. We evaluate this effect at the country level based on three measures of trading frictions, namely, the average idiosyncratic return volatility (IRISK, residual standard deviations when regressing daily individual stock returns onto market returns), the average stock liquidity (DVOL, dollar trading volume), and an indicator for short-sale permission (SHORT). In sharp contrast with the U.S. evidence from the existing studies, we find that the cross-country relation between the limits to arbitrage proxies and the AG effect is relatively weak. Only idiosyncratic return volatility IRISK exhibits some marginal explanatory power, while DVOL and SHORT always have an insignificant effect. Our results therefore suggest that the stock-level U.S. evidence in favor of the costly arbitrage explanation cannot be generalized to account for the cross-country difference in the asset growth effect.

The third hypothesis we investigate is directly related to the potential causes of the asset growth effect under the mispricing explanation. Existing studies have identified several sources of mispricing associated with asset growth, such as firms' over-investment tendency, opportunistic financing behavior, and earnings management practices. Under these explanations, the asset growth effect on stock return should be stronger among countries with less investor protection and lower accounting quality. Motivated by the law and finance literature, we consider four country-level proxies for investor protection. First, following the idea of La Porta et al. (2000) that legal origin matters for investor protection and corporate governance, we classify countries into English, French, German, and Scandinavian legal origins. Second, we adopt the La Porta et al. (1998) measure of creditor rights index (CR), which is based on various aspects of legal protection on the rights of secured lenders in a country. Third, we use the revised anti-director rights index (AD) constructed by Djankov, McLiesh, and Shleifer (2007), which measures the protection of minority shareholders against expropriation by controlling shareholders. Fourth, the anti-self-dealing index (AS) is from Djankov et al. (2008) and captures the protection of outside investors against self-dealing by the controlling shareholders.

We further follow the existing literature to construct two country-level proxies for the quality of accounting information. The first is the accounting quality index (ACCT) of La Porta et al. (1998) based on the reporting or omission of 90 items in corporate financial reporting. The second, earnings management score (EMS), is developed by Leuz, Nanda, and Wysocki (2003) to quantify the discretion by corporate insiders in managing reported earnings. However, from the cross-country regression analysis incorporating this extensive list of proxies, we find quite weak and sometimes conflicting evidence for the hypothesis that investor protection and accounting quality reduce the magnitude of the AG effect.

In sum, our paper documents the existence of the asset growth effect in international stock markets and provide informative evidence to assess different hypotheses regarding this effect. As such, our study joins the expanding literature (e.g., McLean, Pontiff, and Watanabe, 2009; Hou, Karolyi, and Kho, 2011) that looks at international evidence for various forms of stock return predictability originally documented in the U.S. Our study also adds to the literature that attemps to disentangle competing explanations for the asset growth effect based on the U.S. data, e.g., Li and Zhang (2010), Lam and Wei (2011), and Lipson, Mortal, and Schill (2011). Relative to these studies, our incremental contribution is to take advantage of the wide dispersion in the asset growth effect across countries and offer a fresh set of perspectives. In particular, the international data enable us to examine the two hypotheses that have not been considered by the existing studies, namely, the effect of information efficiency and the effect of investor protection and accouting quality.

In a contemporaneous study, Titman, Wei, and Xie (2011) show that the access to external financing is an important determinant of the magnitude of the asset growth effect within the developed markets. Relative to their study, our analysis includes a more comprehensive set of country characteristics and covers both the developed and emerging markets. Overall, our study provides more supportive evidence for the optimal investment explanation than for the mispricing-based explanation.

The remainder of the paper is organized as follows. Section 2 discusses the competing explanations of the asset growth effect and outlines testable hypotheses. Section 3 describes the data and provides evidence on the existence of the asset growth effect in international markets. Section 4 evaluates the hypotheses by analyzing the relation between country characteristics and the asset growth effect. Section 5 concludes.

2. Hypothesis development

In this section, we first describe various explanations proposed in the literature on the relation between investment and stock returns. Based on these explanations, we then outline hypotheses that can be tested using the international data.

2.1 Optimal investment effects

The optimal investment explanations of the investment-return relation are based on either the q theory or the effect of real options.

For illustration purpose, we adopt the model of Li and Zhang (2010) to highlight the two investment effects motivated by the q theory. There are two periods, 0 and 1. Firm i makes investment I_{i0} during period 0 and incurs a convex investment adjustment cost. The firm's capital K_{it} evolves as $K_{i1} = I_{i0} + (1-\delta)K_{i0}$, where δ is the capital depreciation rate. The investment adjustment cost is quadratic in I_{i0}: $C(I_{i0}, K_{i0}) = \frac{\lambda_i}{2}\left(\frac{I_{i0}}{K_{i0}}\right)^2 K_{i0}$, where a higher value of λ_i indicates a higher degree of investment friction. The firm's operating profit is ΠK_{it} (t=0 and 1), where Π is the marginal productivity of capital. Given the above information, the firm's free cash flow is $K_{i0} - I_{i0} - \frac{\lambda_i}{2}\left(\frac{I_{i0}}{K_{i0}}\right)^2 K_{i0}$ for period 0 and $\Pi K_{i1} + (1-\delta)K_{i1}$ for period 1 (assuming no capital investment beyond period 0).

The firm's objective is to maximize the present value of the free cash flows (see Equation (2) of Li and Zhang (2010)):

$$\max_{I_{i0}} \Pi K_{i0} - I_{i0} - \frac{\lambda_i}{2}\left(\frac{I_{i0}}{K_{i0}}\right)^2 K_{i0} + \frac{1}{R_i}\left[\Pi K_{i1} + (1-\delta)K_{i1}\right] \tag{1}$$

where R_i is the discount rate or the expected return. The first-order condition for the firm's optimal investment is (see Equation (3) of Li and Zhang (2010)):

$$R_i = \frac{\Pi + 1 - \delta}{1 + \lambda_i(I_{i0}^*/K_{i0})}. \tag{2}$$

Note that the left-hand-side of the above expression is the cost of capital, while the right-hand-side can be interpreted as the marginal investment return, i.e., the marginal benefit of investment divided by the marginal cost of investment. Therefore, the first-order condition suggests that the optimal level of investment is reached when the cost of capital equals the marginal return on investment.

The first investment effect on expected return, often termed the "discount rate channel," is due to Cochrane (1991, 1996). Holding profitability (Π) and depreciation rate (δ) constant, for the optimality condition described by Equation (2) to hold, firms with larger observed investments (i.e., higher I_{i0}/K_{i0}) must be those with lower discount rates R_i. Hence, a negative cross-sectional relation between investment and return arises.[4]

[4] A further implication of the "discount rate channel" is examined by Li and Zhang (2010). They show that, based on the above optimality condition (2), the sensitivity of investment (I_{i0}/K_{i0}) to expected return (R_i) is increasing in the adjustment

The second investment effect on expected return is the "cash flow channel" proposed by Lyandres, Sun, and Zhang (2008) and Li, Livdan, and Zhang (2009). The key to this effect is decreasing return to scale, i.e., the marginal productivity of capital Π is a decreasing function of investment. Note that the right-hand-side of the above expression (2) is the investment return. If Π decreases with investment, then the right-hand-side of the expression decreases in investment. Thus, the left-hand-side of the expression, the expected return, must also be decreasing in investment. Wu, Zhang, and Zhang (2010) discuss both the discount rate channel and the cash flow channel in the context of the accruals anomaly.

The real option literature also offers an explanation of the asset growth effect. It is based on the assumption that real options are riskier than assets in place. When firms make investments, real options are exercised and converted into less risky assets in place. Thus, firms making large investments tend to have lower risk and lower expected returns in the future. Studies on this real option effect of investment include, for example, Berk, Green, and Naik (1999) and Carlson, Fisher, and Giammarino (2004).

2.2 Mispricing-based explanations

The literature has proposed four types of mispricing-based explanations on the negative investment-return relation.

The first explanation is based on over-investment. Corporate managers are subject to agency problems when they make investment decisions on behalf of the firms. Due to their empire-building tendency, managers may invest in projects with negative net present values, thus reducing firm value. Titman, Wei, and Xie (2004) link this observation to the negative investment-return relation under the additional assumption of investor misreaction. That is, if investors do not fully understand the agency problem of over-investment, they may over-value a firm with large investments by over-valuing its potential future cash flows. The low return subsequent to large investment hence reflects a market correction of the initial over-valuation.

The second explanation is based on firms' market timing behavior in financing decisions (e.g., Baker and Wurgler, 2002). Since firms (or corporate insiders) have better information about their own values, they may opportunistically raise equity financing when their stocks are over-priced and

cost parameter λ_i, a proxy for investment friction. In other words, the negative relation between investment and expected return should be stronger among firms facing higher investment frictions.

buy back shares when their stocks are under-valued. If investors do not fully take such opportunistic corporate behavior into account when they value stocks, this leads to a negative relation between corporate financing and subsequent stock returns. If asset growth is driven by external financing, a negative relation between asset growth and stock returns ensues.

The third explanation is corporate earnings management (e.g., Teoh, Welch, and Wong, 1998a; 1998b). Prior to raising external financing or engaging in acquisitions, firms may have incentives to manipulate reported corporate earnings upward in order to obtain favorable market valuation or financing terms. Hence, even though asset growth (via financing or investment) has no causal effect on future returns, earnings management may create a contemporaneous association between asset growth and over-valuation, resulting in an observable negative relation between asset growth and subsequent stock returns.

There is a fourth potential explanation based on investors' extrapolation bias. As pointed out by Lakonishok, Shleifer, and Vishny (1994), investors may excessively extrapolate from firms' past growth when they value stocks. Such excessive extrapolation results in overvaluation of firms with high past growth and their low future returns. The extrapolation bias is originally proposed to explain the sales growth anomaly and related value anomalies. However, as pointed out by Cooper, Gulen, and Schill (2008), it could also be applied to the asset growth effect.

Note that all the four mispricing-based explanations depend on the assumption that investors misreact to publicly available information when they value stocks, and the lower returns to stocks with higher asset growth rates are a form of market correction of initial misreaction. The first three explanations further depend on the existence of agency problems or asymmetric information on the part of firms or corporate managers. The fourth extrapolation-based explanation does not necessarily depend on the behavior of firms or corporate managers.

2.3 Testable hypotheses

As discussed above, existing studies have proposed a quite diverse set of explanations on the asset growth effect. The objective of this study is not to empirically validate every aspect of these explanations. Rather, we attempt to distill a few predictions that can be tested at the country level using the international data.

Our first hypothesis focuses on the role of market efficiency. The optimal investment effect, based on either the q theory or the real options model, requires certain degree of market efficiency. That is, stocks must be priced to correctly reflect the effect of optimal corporate investments on expected cash flows and the amount of risk involved. When the stock prices are noisy and do not accurately reflect the corporate fundamental information, the effect of optimal corporate investment on stock valuation may be thrown off. At the opposite side of the coin, when stock prices efficiently reflect firms' fundamental information, mispricing should be less rampant. Therefore, if the asset growth effect is due to various forms of mispricing, its magnitude should be weaker in more efficient financial markets. Based on this discussion, we have the following hypothesis:

Hypothesis H1: Under the optimal investment explanation, the asset growth effect is stronger in stock markets that are more informationally efficient. Under the mispricing-based explanation, the asset growth effect is weaker in markets that are more informationally efficient.

The second hypothesis is developed from the mispricing perspective. If the asset growth effect is due to mispricing, it should be weaker when it is easier for sophisticated investors to trade on systematic patterns of mispricing. Essentially, we investigate an international version of the limits-to-arbitrage hypothesis examined by Li and Zhang (2010), Lam and Wei (2011), and Lipson, Mortal, and Schill (2011). An advantage of testing it in the international data is the large variation in trading frictions across markets. For example, eight markets in our sample have explicit restrictions on equity short-selling.

Hypothesis H2: Under the mispricing-based explanation, the asset growth effect is stronger in markets with severer limits to arbitrage.

The third hypothesis is further developed from the mispricing perspective. However, different from the second hypothesis, the focus now is directly on the causes of the mispricing of asset growth. As discussed earlier, with the exception of the extrapolation bias effect, the other three mispricing-based explanations rely on managers' agency problem (the over-investment hypothesis) and/or asymmetric information (the market timing hypothesis and the earnings management hypothesis). Thus, we expect the magnitude of the asset growth effect to be linked to corporate governance, protection of outside investors, the quality of disclosed accounting information, and the rampancy of the earnings manipulation practice.

Hypothesis H3: Under the mispricing-based explanation, the asset growth effect is stronger in markets with less investor protection, weaker corporate governance mechanism, poorer accounting quality, and more prevalence of earnings management.

Hypothesis H2 has been the focus of existing studies based on the U.S. data (Li and Zhang, 2010; Lam and Wei, 2011; and Lipson, Mortal, and Schill, 2011). However, the other two hypotheses have not been examined in the literature.

3. International evidence on the asset growth effect

3.1 Data

The data on stock market variables and company accounting items are obtained from Thomson-Reuter Datastream and Worldscope. We start with 54 countries for which full research level data are available, and select common stocks traded on each country's major stock exchange(s) from both active and defunct research files of Datastream to avoid survivorship bias. A single exchange with the largest number of listed stocks is chosen for most countries, whereas multiple exchanges are used for China (Shanghai and Shenzhen), Japan (Tokyo and Osaka), and the U.S. (NYSE, AMEX, and NASDAQ). We further remove financial firms that have Datastream industry codes (INDM) corresponding to the four-digit SIC codes between 6000 and 6999.

To ensure the quality of the data from Datastream, we apply the following screening procedures proposed by Ince and Porter (2006). First, we require that firms selected for each country are domestically incorporated based on their home country information (GEOGC). To be included in our sample, a stock must have a type of instrument indicator (TYPE) equal to equity (EQ) and contain no words or phrases in its name (NAME) suggesting that the stock is not a common equity.[5] Further, in order to screen for coding errors in monthly stock returns (i.e., the percentage change in Datastream's month-end total return index RI), any return above 300% that is reversed within one month is treated as missing. To be more exact, if r_t and r_{t-1} are the gross returns in month t and $t-1$, we set r_t and r_{t-1} to missing if r_t or r_{t-1} is greater than 300% and $(1+r_t)(1+r_{t-1})-1 < 50\%$. We also eliminate all monthly observations for delisted stocks from the end of the sample period

[5] Specifically, we eliminate preferred stocks, closed-end funds, exchange-traded funds, real estate investment trusts, and warrants by identifying firms whose names contain words such as "pf", "pref", "fund", "reit", "trust", "warrant", etc.

to the first non-zero return date since Datastream keeps padding the last available data after the delisting date.

In addition, we follow McLean, Pontiff, and Watanabe (2009) to trim monthly returns at the top and bottom one percentiles within each country, as such extreme returns are likely due to data errors. To ensure the quality of the accounting data from Worldscope, we also follow McLean, Pontiff, and Watanabe (2009) to winsorize all relevant Worldscope variables at the top and bottom one percentiles of their distributions within each country.

A main variable of interest is the asset growth rate (AG). Following Cooper, Gulen, and Schill (2008), AG observed at the end of June of year t is the percentage change in total assets from the end of fiscal year $t-2$ to the end of fiscal year $t-1$, where fiscal year t is defined as the fiscal year ending in calendar year t. Total assets in local currency is the Worldscope item 02999. To compute AG, we require that a firm has a positive value for total assets at the end of both fiscal years $t-2$ and $t-1$. In addition to the winsorization procedure described in the above paragraph, we treat firm-year observations with absolute values of AG exceeding 1,000% as coding errors and exclude them from analysis.

Table 1 provides the summary statistics for the sample consisting of the 54 markets including the U.S. The starting date of inclusion in the sample varies across countries, depending on each country's data availability. The sample consists of 291,725 firm-year observations when the U.S. is included and 222,418 observations when the U.S. is excluded. The U.S. represents the largest part of the overall sample, accounting for 24% of the total firm-year observations and 41% of the total market capitalization on average. Japan and the United Kingdom are the second and third largest, accounting for 15% and 8% of the total observations and 14% and 7% of the total market value, respectively. While the remaining countries typically each account for less than 5% of the total observations and market value, the sample covers a variety of countries from different regions.

The last two columns of Table 1 provide the median and standard deviation of the asset growth rates (AG) for each country averaged across sample years. There is noticeable cross-country dispersion in these statistics, with the median AG ranging between -52.32% (Zimbabwe) and 29.45% (Turkey) and the standard deviation between 7.51% (Bangladesh) and 233.04% (Zimbabwe). We also find that the cross-firm variation in the asset growth rate is slightly smaller outside the U.S. (46.30%) than in the U.S. (51.73%). The greater homogeneity of asset growth rates relative to the U.S. has been previously documented by Yao et al. (2011) for the nine Asian markets.

Our cross-country analysis requires a reliable estimate of the country-level asset growth effect, which in turn requires a meaningful cross-section of stocks within a market. Thus, we construct a sample for the cross-country analysis by imposing the following criterion – in each year, we require a market to have at least 30 stocks with valid observations of asset growth, market capitalization, and annual stock returns. For the period between July of 1982 and June of 2010, 11 out of 54 markets never meet this criteria, resulting in a 43-market sample including the U.S.[6] Also as a result, a few countries have shorter sample years relative to what are implied by the beginning and ending dates in Table 1.

3.2 Asset growth and stock returns

Two measures are used to quantify the magnitude of the asset growth (AG) effect within each country. The first is the return spread of sorted portfolios. Specifically, we sort stocks in each country at the end of June of year t into portfolios based on AG observed at that time point. We use the following procedure to ensure that we have a sufficient number of stocks in each portfolio. If the number of stocks for a market is between 30 and 50 in a given year, we form tercile portfolios. If the number of stocks is between 50 and 100, we form quintiles. Finally, we form deciles if a specific market has more than 100 stocks in a given year. We refer to these portfolios as the AG-bucket portfolios. We obtain monthly stock returns from Datastream and compute one-year holding-period return for each stock from July of year t to June of year $t+1$. Based on the annual stock returns, we calculate the annual return spread by subtracting the top-bucket AG portfolio returns from the bottom-bucket AG portfolio returns, which is denoted as SPREAD.

The second measure of the asset growth effect is derived from univariate predictive regressions. Within each country, we regress annual stock returns from July of year t to June of year $t+1$ cross-sectionally on asset growth observed in June of year t. The measure of the per-unit asset growth effect, SLOPE, is *negative one* times the regression coefficient, so that a positive value of SLOPE indicates a negative relation between asset growth and stock returns.

To ensure the robustness of inference, we measure SPREAD and SLOPE based on both equal-

[6] The 11 markets excluded are Bangladesh, Colombia, Cyprus, Hungary, Kenya, Luxembourg, Morocco, Russia, Sri Lanka, Venezuela, and Zimbabwe. Several recent studies on international stock markets have used a similar selection criterion and a similar set of markets. For example, McLean, Pontiff, and Watanabe (2009) include 41 countries in their study for the period between 1981 and 2006. Karolyi, Lee, and van Dijk (2012) include 40 countries for the period between 1995 and 2009. The sample used in Hou, Karolyi, and Kho (2011) broadly includes 49 countries from 1981 to 2003, although they do not impose a restriction on the minimum number of stocks in the cross-section within a country.

weighting and value-weighting, denominated in both local currency and U.S. dollar (USD). The weights for the value-weighted SPREAD are based on the market capitalizations of individual stocks. The value-weighted SLOPE is obtained from weighted-least-squares (WLS) regressions, where the weights are again based on the market capitalizations of individual stocks.

Table 2 depicts the magnitude of the asset growth effect in each of the 43 countries that meet the 30-stock requirement described earlier. The first variable reported in Panel A of this table, asset growth spread AGSPREAD, is the difference in the average asset growth rates between the top and bottom AG buckets. For the U.S. market, AGSPREAD is 136.20%. Only a handful of other markets, such as Hong Kong, Australia, Norway, U.K., and Canada, have AGSPREAD higher than the U.S. Panel A further reports equal-weighted SPREAD and SLOPE across countries, both in local currency and in USD. Out of the 43 countries, 30 and 28 have positive values of SPREAD and SLOPE measured in local currency, and 30 and 30 have positive values of SPREAD and SLOPE measured in USD, respectively. Thus, the asset growth effect – the negative relation between asset growth and stock return – is quite pervasive internationally.

We also find that there exists a large dispersion in the magnitude of the AG effect across countries, which is the focus of our subsequent analysis. Calculated in local currency, the equal-weighted SPREAD ranges from -10.92% (Argentina) to 10.63% (Denmark), and the equal-weighted SLOPE ranges from -25.98% (Taiwan) to 14.93% (Denmark). Alternatively when calculated in USD, the equal-weighted SPREAD ranges from -4.99% (New Zealand) to 12.27% (Denmark), and theh equal-weighted SLOPE ranges from -10.78% (Czech Republic) to 14.67% (Denmark).

Panel B of Table 2 reports the value-weighted SPREAD and SLOPE across countries, in local currency and in USD. Out of the 43 countries, 25 and 30 have positive values of SPREAD and SLOPE measured in local currency, and 27 and 33 have positive values of SPREAD and SLOPE measured in USD, respectively. There is also a large dispersion in the magnitude of the value-weighted AG effect across countries. Calculated in local currency, the value-weighted SPREAD ranges from -14.12% (Czech Republic) to 15.38% (France), and the value-weighted SLOPE ranges from -7.67% (Taiwan) to 18.84% (Ireland). Alternatively when calculated in USD, the value-weighted SPREAD ranges from -14.16% (Thailand) to 16.93% (France), and the value-weighted SLOPE ranges from -11.45% (Taiwan) to 21.31% (South Korea).

Panel C of Table 2 further reports statistics to assess the asset growth effect at the global level using a global-pooling approach and a country-neutral approach. In the global-pooling approach, SPREAD is the annual USD-denominated return spread between stocks in the bottom and top AG deciles when stocks are pooled across countries to form decile portfolios. Under the same approach, SLOPE is negative one times the coefficient of regressing USD-denominated annual stock returns onto asset growth rates across all stocks regardless of their country belongings. In the country-neutral approach, we estimate SPREAD and SLOPE within each country in each year as before based on USD-denominated annual stock returns, and then take the cross-country averages each year. The weights used in the value-weighted versions of SPREAD and SLOPE are given by USD-denominated market capitalizations of individual stocks.

These global-pooling and country-neutral measures highlight the economic significance of the asset growth effect internationally. Within the sample of 43 countries with large cross-sections of stocks (including the U.S.), the equal-weighted SPREAD under the global-pooling approach is 6.10% (t=3.82, equivalent to an annualized Sharpe ratio of 0.722), and the value-weighted SPREAD is 4.17% (t=1.90). For the same country sample and under the country-neutral approach, the equal-weighted SPREAD is 3.55% while the value-weighted SPREAD is 3.77%, both statistically significant at the 1% level. When we exclude the U.S. stocks, the resulting global-pooling SPREADs become 6.43% and 4.04% (significant at the 1% and 10% level) under equal- and value-weighting, respectively. Similarly excluding the U.S., the country-neutral SPREADs are 3.50% when equal-weighted and 3.81% when value-weighted (both significant at the 1% level).

The results based on the regression coefficient SLOPE are similar. Under either global-pooling or country-neutral approach, SLOPE is always significantly positive with or without considering the U.S. stocks. Overall, these results suggest that the asset growth effect exists in the global markets outside the U.S.

Finally, for the purpose of completeness, Panel C of the table also reports the global asset growth effect in the unrestricted sample of 54 countries, including the 11 countries that never meet the 30-stock requirement (hence not meaningful to report their country-level AG effect or to include them in the country-neutral approach). As it turns out, the inclusion of these countries does not substantially affect either SPREAD or SLOPE under the global-pooling approach. For example, after including these countries and under equal-weighting, the globally-pooled SPREAD is 6.18% (t=4.12) including the U.S. and 6.07% (t=3.79) excluding the U.S. Similarly, the globally-pooled SLOPE is 3.94% (t=2.46) including the U.S. and 4.38% (t=3.13) excluding the U.S. These numbers are quite close to those obtained for the 43-country sample.

3.3 Variations and robustness

Cooper, Gulen, and Schill (2008) report that the U.S. asset growth effect is robust to the control of return-predictive power of many firm characteristic variables; chiefly among them are the size, value, and momentum effects. Here we check whether the asset growth effect is robust to the control of these effects in the international markets. Prior studies have shown the existence of the size, value, and momentum effects in many countries outside the U.S.; see, for example, Heston, Rouwenhorst, and Wessels (1995) for the size effect, Fama and French (1998) for the value effect, Rouwenhorst (1998) and Griffin, Ji, and Martin (2003) for the momentum effect, and Hou, Karolyi, and Lee (2011) for a comprehensive study on all three effects. In addition, we examine various horizons over which the asset growth rate predicts returns.

Following McLean, Pontiff, and Watanabe (2009), we use the country-pooled Fama and MacBeth (1973) regression approach to perform robustness analyses. Specifically, we estimate cross-sectional regressions in each year t in a way similar to how we obtain SLOPE. The dependent variable is the USD-denominated holding-period return of individual stocks from all the countries in each of the three following years, i.e., the first year return from July of year t to June of year $t+1$, the second year return from July of year $t+1$ to June of year $t+2$, and the third year return from July of year $t+2$ to June of year $t+3$. The predictors include asset growth rate (AG), size (ME), book-to-market ratio (BM), momentum (MOM), and country dummies. ME is the natural logarithm of the USD-denominated market capitalization (Datastream variable MV) as of June of year t. BM is the natural logarithm of the book value of common equity (Worldscope item 03501) at the end of fiscal year $t-1$ divided by the market value of common equity at the end of December in year $t-1$. MOM is the five-month cumulative return from January to May in year t (computed using the monthly percentage change in Datastream return index RI).

Table 3 reports the time-series averages of the estimated coefficients and adjusted R^2s. We do not impose the minimum of 30 stocks requirement here, and produce regression results for the pooled sample of 53 countries outside the U.S. and for the U.S. separately for comparison. We estimate the regressions for the U.S. by both equal-weighting and value-weighting each observation. Alternatively for the country-pooled sample, we follow McLean, Pontiff, and Watanabe (2009) and run regressions by both equal-weighting and scaled-weighting each observation. The scale-weighting regressions assign each firm-return observation the weight that equals the firm's market value divided by the average market value of the firm's country (both measured at the beginning of the holding period).

Since the scaled-weighting is equivalent to a within-country value-weight, the results from the two regressions show how the AG effect varies between small and large firms within each country. We include country dummies in the pooled regressions to control for any country attributes that may affect the relation between asset growth and returns, although their coefficients are not reported for the sake of brevity.

Panel A of Table 3 shows that the asset growth effect outside the U.S. is robust to the control of the three firm-level characteristics. The equal-weighted coefficients on AG are significantly negative for all the holding periods, though turn less statistically significant with the time horizon. The scaled-weighted coefficient, on the other hand, is significant for the first-year return regression. The regression results for the U.S., reported in Panel B of Table 3, show that the AG coefficients are significant for the first and second years, but turn insignificant in the third year under equal-weighting. A comparison of the regression coefficients in the two panels further reveals that, after controlling for the size, value, and momentum effects, the U.S. does not dominate the international markets in terms of the magnitude of the AG effect. For example, for the first-year return, the equal-weighted AG coefficient is -0.027 for the international markets outside the U.S., versus -0.025 for the U.S. market. Note that the relatively high R^2s for the non-U.S. sample compared to those for the U.S. are due to the inclusion of country dummies in the regressions. Overall, these results indicate a robust negative effect of asset growth on future stock returns in international markets under different weighting schemes and holding horizons.

Table 4 reports yet another variation in measuring the international asset growth effect, which is designed specifically with the q-theory explanation in mind. A few recent studies, such as Chen, Novy-Marx, and Zhang (2011), point out that a firm's investment and profitability jointly determine its expected stock return under the q theory, and hence it is necessary to control for firm profitability when investigating the investment-return relation. To this end, we conduct a double-sorting portfolio procedure while measuring firm profitability by return on equity (ROE, Worldscope item 08301). Specifically, we independently sort stocks from all the 54 markets into ROE quintiles and AG quintiles at the end of June of each year and produce 25 portfolios. We then compute the equal-weighted and value-weighted USD returns on the 25 portfolios and the return spreads between the bottom and top AG quintiles within each ROE quintile.

Table 4 shows that the asset growth effect continues to exist after controlling for firm profitability. For the equally weighted portfolios, the time-series averages of the return spreads subtracting the top from the bottom AG quintiles are 5.41%, 6.03%, 6.31%, 4.04%, and 4.64% across the five ROE quintiles. All the return spreads are statistically significant except for the fourth ROE quintile (t=1.57) and are relatively close in magnitude. The results are similar for the value-weighted portfolios. Across the five ROE quintiles, the return spreads between the bottom and top AG quintiles are 5.48%, 7.18%, 5.68%, 4.72% and 6.23%, all significantly positive. These results are in line with the q-theory prediction on the investment-return relation.

4. Cross-country analysis

4.1 Country characteristics

In this section, we use cross-country analysis to evaluate various explanations for the asset growth effect. To test the hypotheses outlined in Section 2, we identify three sets of relevant country characteristics. The details of the variable constructions are provided in Appendix A. Below, we describe the rationale for the selection of each variable.

The first group of characteristics serves as proxies for market efficiency. Recall from Section 2 that according to Hypothesis H1, the optimal investment explanation suggests a positive relation between market efficiency and the AG effect, while the mispricing explanation suggests the opposite. The market efficiency proxies consist of four measures, R2, FERC, DEV, and MKT. R2 is the within-country average of the R-squared from firm-level regressions, in which individual stock returns are regressed on market returns using weekly observations. According to Roll (1988), Morck, Yeung, and Yu (2000), and Durnev et al. (2003), lower stock return synchronicity means more firm specific information being impounded into stock prices, and thus R2 is inversely related to the pricing efficiency of a stock market. Supportive evidence for the inverse relation between R2 and information efficiency is also provided by, for example, Durnev, Morck, and Yeung (2004), Chen, Goldstein, and Jiang (2006), and Jin and Myers (2006).[7]

The future earnings response coefficient FERC as a measure of stock price efficiency is developed in the accounting literature, e.g., Collins et al. (1994). It is the sum of the coefficients on future earnings when annual stock returns are regressed on the changes in current and future earnings,

[7] In addition, a number of papers show that R2 is lower in countries where capital markets are more open (Li et al., 2004), short sales are permitted (Bris, Goetzmann, and Zhu, 2007), capital is better allocated and there is less government ownership in the economy (Wurgler, 2000). However, a few studies have questioned the validity of this relation at the individual stock level; see, e.g., Kelly (2005), Hou, Peng, and Xiong (2007), and Teoh, Yang, and Zhang (2009). Therefore, it is important to note that our inference is not based on a single measure of efficiency, but rather is reinforced by evidence based on multiple measures.

thus intuitively capturing the extent to which information about future earnings is reflected in stock price movements. A series of accounting studies, such as Gelb and Zarowin (2002), Lundholm and Myers (2002), Tucker and Zarowin (2006), and Orpurt and Zang (2009), have shown that FERC is positively correlated with firm attributes that are indicative of informative stock prices, in particular the quality of corporate information disclosure. In addition, Durnev et al. (2003) show that FERC is significantly higher for stocks with lower R2, another indication of stock price informativeness. The country-level FERC we use is the average of FERCs estimated for individual stocks in the country. Countries with greater FERCs are hence expected to be more informationlly efficient.[8]

The third and fourth proxies of market efficiency, DEV and MKT, are based on the degree of financial market development, following the idea that stock prices are more efficient in more developed financial markets. DEV is an indicator for developed markets based on International Finance Corporation 2009 classifications.[9] MKT is another measure of the development status of financial market. La Porta et al. (1997, hereafter LLSV) point out that when a market is more developed and more efficient, public equity financing is more active and plays a more important role in the economy. Following LLSV (1997), MKT for a country is given by the sum of its cross-country rankings of the following three variables: i) market capitalization of publicly listed companies as a percentage of GDP,[10] ii) the number of publicly listed companies scaled by population, and iii) the number of IPOs scaled by population.

The second set of country characteristics gauges the severity of trading frictions, or the limits to arbitrage, under Hypothesis H2. The variables include idiosyncratic risk of stock returns averaged across firms (IRISK), stock dollar trading volume averaged across firms (DVOL), and an indicator of no short sale restriction (SHORT) which equals to one when short-selling is allowed and zero otherwise, obtained from Bris, Goetzmann, and Zhu (2007). Trading frictions limit the ability of sophisticated investors to arbitrage away stock mispricing. Li and Zhang (2010), in their analysis of the U.S. data, consider two stock-level proxies for the limits to arbitrage: idiosyncratic volatility and dollar trading volume. Our first two measures are the country-level versions of theirs, and we use

[8] We require a firm to have at least 12 year of data for its stock-level FERC estimate to be valid. In three countries, Czech Republic, Egypt, and Israel, we do not have sufficient data to estimate any firm-level FERC and therefore we do not have their country-level FERCs.

[9] Note that the emerging/developed-market status of a country can change over time. However, we do not have the complete historical data to trace the evolution of a country's status. This is a reason why we construct the fourth market efficiency proxy, MKT, which is time varying.

[10] LLSV's original measure uses market capitalization of publicly listed firms owned by minority shareholders. We do not have data for the fraction of minority ownership, thus our measure slightly differs from LLSV's. Our measure however is appropriate for the purpose of this paper as a proxy for information efficiency.

the third variable to additionally captures the cross-country variations in the short-selling practice.

The third set of characteristics are related to investor protection and accounting quality under Hypothesis H3. The country characteristics related to investor protection include creditor rights index (CR), the revised anti-director rights index (AD), the anti-self-dealing index (AS), and four legal origin dummies. Following Djankov, McLiesh, and Shleifer (2007), the creditor rights index (CR) is the sum of four indicators for creditors' legal rights, including no automatic stay on assets, secured creditors being first paid, restrictions for going into reorganization, and removal of management in reorganization. The revised anti-director rights index (AD) is adopted from Djankov et al. (2008) and measures the degree of minority shareholder protection against expropriation by controlling shareholders. Based on a similar idea but using a different data construction method, the anti-self-dealing index (AS) of Djankov et al. (2008) measures the strength of minority shareholder protection against self-dealing by the controlling shareholders. The legal origin dummies are indicators of a country's investor protection and corporate governance effectiveness. We adopt the definition of LLSV (2000) on the four major legal traditions, which are denoted as UK (United Kingdom), FR (France), GE (Germany), and SC (Scandinavia), respectively. Countries with the English legal origin typically are more effective in corporate governance, followed by the Scandinavian origin, and then the German origin, with the French origin being the least protective (see e.g., LLSV, 2000).

Further, the country characteristics related to accounting quality include the accounting standard index (ACCT) and the earnings management score (EMS). The accounting standard index (ACCT) is constructed by LLSV (1998) to measure the quality of accounting and financial reporting. It is based on the reporting or omission of 90 items from corporate annual reports. The earnings management score (EMS) is developed by Leuz, Nanda, and Wysocki (2003) to capture the degree to which corporate insiders can exercise their discretion to manage reported earnings. It is the average rank of four earnings management proxies, two of which measure the ability to smooth earnings using accounting accruals while the other two measure the management discretions in earnings reporting. A higher value of the earnings management score signals poorer accounting quality and a higher likelihood of earnings manipulation.

Table 5 reports the country characteristics for the 43 countries including the U.S. Except for R2, MKT, IRISK, and DVOL, the rest of the country characteristics are time invariant. For the four time-varying characteristics, we take the time series averages to obtain country specific values. We also report their regional averages. Based on the DEV dummy, there are 24 developed markets and 19 emerging markets in the sample. FERC tends to be higher in developed markets than in emerging markets. Consistent with Morck, Yeung, and Yu (2000), R2 tends to be higher in emerging markets than in developed markets. However, R2 exhibits large variations in emerging markets. For example, the countries with the lowest (0.09 for Czech Republic) and the highest (0.30 for Turkey) R2 are both emerging markets. In addition, the value of MKT ranges from 25.00 (Czech Republic) to 115.60 (Hong Kong) and has an average of 63.27.

As for the trading friction characteristics, the average idiosyncratic risk of stock returns (IRISK) is 3.04%, with the lowest for Chile (1.77%) and the highest for Canada (5.28%). The average annual dollar trading volume per stock (DVOL) is the lowest in Poland (USD 72 million) and the highest in the U.S. (USD 1.85 trillion), with a cross-country average of USD 439 million. Finally, stock short selling is explicitly prohibited in eight markets, including Singapore, South Korea, China, Indonesia, Pakistan, Czech Republic, Greece, and Peru.

The table also provides various measures of investor protection and accounting quality for each country. According to the creditor rights index CR, Hong Kong and New Zealand provide the strongest creditor protection while France, Mexico, and Peru offer the weakest protection. Based on the revised anti-director rights index AD and the anti-self-dealing index AS, Hong Kong, Singapore, Malaysia, and U.K. rank among the highest in terms of corporate governance quality, whereas Greece and Poland rank among the lowest. In addition, the quality of accounting information is the best in Sweden (with the accounting standard index ACCT=83.00) and the U.S. (with the earnings management score EMS=2.00), while it is the worst in Egypt (ACCT=24.00), Austria (EMS=28.30), and Greece (EMS=28.30). Finally, among the 43 markets, 14 share the English legal origin, 16 have the French legal origin, 9 have the German legal origin, and 4 have the Scandinavian legal origin.

In Table 6, we report the cross-sectional correlations among the country characteristics. Within each of the three characteristic groups, variables are of similar economic nature and naturally have relatively high correlations. For example, among the market efficiency proxies, the correlation between DEV and MKT is 0.50. FERC is negatively correlated with R2 (-0.06) but positively correlated with DEV and MKT (0.35 and 0.29, respectively). Durnev et al. (2003) report a significantly negative relation between FERC and R2 across individual stocks in the U.S. By contrast, the country-level correlation between FERC and R2 we obtain is relatively low. The correlations among the three investor protection proxies CR, AD, and AS are all above 0.27 and can be as high as 0.54 (between AS and AD). The two accounting quality measures ACCT and EMS have a correlation of -0.67, and their correlations with the investor protection proxies CR, AD, and AS are above 0.30 in absolute value except between EMS and CR. Finally, similar to the findings of previous studies such as LLSV (1997; 1998), Leuz, Nanda, and Wysocki (2003), Djankov, McLiesh, and Shleifer (2007), and Djankov et al. (2008), legal origins matter for investor protection as well as for accounting quality. Markets with English and Scandinavian legal origins tend to have higher CR, AD, AS, and ACCT, as well as lower EMS.

We also find substantial correlations among variables in different country-characteristic groups. With only a small number of exceptions, markets with higher degree of efficiency (lower R2, higher FERC, DEV, and MKT) tend to have less trading frictions (lower IRISK, higher DVOL and SHORT), better investor protection (higher CR, AD, and AS), higher accounting quality (higher ACCT, lower EMS), and are more likely to have English or Scandinavian legal origins. Similar patterns have been reported by existing studies. For example, consistent with the idea that investor protection facilitates the development of financial markets, LLSV (1997) find positive correlations between MKT and various investor protection measures. Morck, Yueng, and Yu (2000) and Li and Myers (2006) also show that R2 is negatively correlated with the anti-director rights index AD and the accounting quality measure ACCT.

In contrast, the correlations of trading friction measures with the proxies for investor protection and accounting quality have mixed signs. Markets that permit short selling tend to have better investor protection, higher accounting quality, and are more likely to have English or Scandinavian legal origins. On the other hand, stock trading liquidity (measured by DVOL) exhibits insignificant relations with investor protection (CR, AD, and AS) and legal origins, while having moderate associations with accounting quality (ACCT and EMS). Finally, markets with higher idiosyncratic stock return volatility (IRISK) actually have better investor protection (higher AD and AS), higher accounting quality (higher ACCT and lower EMS), and are more likely to have English legal origin.

The fact that our market efficiency proxies are negatively correlated with the limits-to-arbitrage measures but positively correlated with the investor-protection and accounting-quality variables is crucial to our analysis. Recall that, based on the optimal investment explanation, an improvement in market efficiency leads to a stronger negative effect of asset growth rates on subsequent stock returns. Alternatively, according to the mispricing-based explanations, factors such as severer limits to arbitrage, weaker corporate governance, and poorer accounting quality contribute to strengthen the asset growth effect. It is important to notice that these contributing factors under the mispricing arguments are all inversely related to the degree of market efficiency. Therefore, should we find that that there were a positive association between the extent of market efficiency and the magnitude of the asset growth effect, we can reliably conclude that the effect is more likely due to firms' optimal investment behavior rather than due to various forms of mispricing.

4.2 Regression specification

The main variables of interest in our cross-country analysis are the country-level AG effect measures, SPREAD and SLOPE, which have a panel data structure with both a country dimension and a time dimension. Among the country characteristic variables, a few have both the country and time dimensions (i.e., R2, MKT, IRISK, and DVOL) while others are time invariant (i.e., FERC, DEV, SHORT, CR, AD, AS, ACCT, EMS, and the four legal origin dummies). Under such data structure, the relation between a country characteristic variable and the AG effect measure (SPREAD or SLOPE) also has two dimensions, which are often termed the *within-effect* and the *between-effect* (e.g., Greene 2011). The former refers to the within-country relation between the time variation of the AG effect and the time variation of the country characteristics. The latter refers to the cross-country relation between the time-averaged AG effect and the time-averaged values of the country characteristics.

In empirical analysis, we find that it is generally the time-invariant part of the country characteristics that bears explanatory power on the AG effect, whereas the time-varying part of the characteristics typically do not have power. In other words, in the international stock markets, the relation between country characteristics and the AG effect is mainly in the form of the between-effect instead of the within-effect. Therefore, the main empirical results reported in the paper are based on the cross-sectional regressions designed to capture the between-effect. Specifically, we regress a country-level measure of the asset growth effect cross-sectionally onto country characteristics. The dependent variable is the time-series average of either SPREAD or SLOPE witin each country using local currency. The independent variables are the time-series averages of the country characteristic variables (if the country characteristics are time varying).

For statistical inference, the t-statistics for the cross-sectional regressions are computed using the White (1980) heteroscedasticity-robust standard errors. We note that this is a common approach adopted by the existing studies performing country-level analysis; see, e.g., LLSV (1997; 1998), Demirgüç-Kunt and Maskimovic (1999), Morck, Yeung, and Yu (2000), Beck, Demirgüç-Kunt, and

Levine (2003), Djankov, McLiesh, and Shleifer (2007), and Karolyi, Lee, and van Dijk (2012). For the purpose of completeness, we describe the results of panel regressions designed to capture the within-effect in Appendix B.

4.3 Empirical results

4.3.1 Analysis based on information efficiency

Table 7 reports the empirical results for Hypothesis H1 regarding the cross-country relation between market efficiency and the AG effect. As discussed above, the cross-sectional regressions are designed to measure the between-country effect. In Panel A, the dependent variable that captures country-level magnitude of the AG effect is the within-country mean value of SPREAD. The results show that both the equal-weighted and value-weighted versions of SPREAD are significantly higher in markets with lower R2 and higher FERC, in developed markets indicated by DEV, and in countries with greater importance of stock market as measured by MKT. In the multiple regression where R2, FERC, DEV, and MKT are jointly used as explanatory variables, the coefficient for MKT under the equal-weighted SPREAD and the coefficients for FERC and MKT under the value-weighted SPREAD become insignificant, possibly due to the high correlations among the market efficiency proxies.

The pattern is virtually the same in Panel B, where we use equal-weighted and value-weighted SLOPE as the dependent variables. Overall, our analysis shows that the AG effect is stronger in markets with greater information efficiency. This result is consistent with the prediction of the optimal investment hypothesis but inconsistent with the mispricing-based hypothesis.

Recall that a few recent studies, such as Chen, Novy-Marx, and Zhang (2011) built on the q theory framework, point out that it is important to control for firms' operating profitability when examining the investment-return relation. We therefore repeat the same analysis using alternative measures of the AG effect to control for firm profitability. The first, SPREAD2, is computed using the double-sorting procedure with firm-level profit measured by the return on equity (ROE). In July of each year t, we sort stocks within each country into terciles based on ROE and further divide each ROE group into quintiles based on AG. We subsequently form five AG portfolios by combining all the stocks that are ranked into the same AG quintile but belong to the different ROE tertiles. This procedure ensures that the average ROEs are compatible across the resulting five AG portfolios.

SPREAD2 is then given by the difference in annual return from July of year t to June of year $t+1$ between the bottom and top AG portfolios formed in this way.

The second alternative measure, SLOPE2, is calculated based on multiple regressions. In each year, we regress annual stock returns from July of year t to June of year $t+1$ on both AG and ROE for year $t-1$ within each country. SLOPE2 is then given by the negative one times the AG coefficient estimated from this regression. To ensure the accuracy of the new AG effect measures, we require that a country has at least 50 stocks in a given year for its SPREAD2 and SLOPE2 estimates to be valid for that year. Similar to the construction of SPREAD and SLOPE, we develop both equal-weighted and value-weighted measures of SPREAD2 and SLOPE2.

We continue with our cross-country regression analysis to study the relation between market efficiency and the AG effect. The dependent variable is now the equal-weighted or value-weighted average of SPREAD2 or SLOPE2 measured in local currency for each country. As before, the explanatory variables are the within-country time-series averages of the four market efficiency proxies (R2, FERC, DEV, and MKT). The univariate regression results reported in Table 8 show that SPREAD2 and SLOPE2, both equal-weighted and value-weighted, are significantly higher in countries with lower R2, higher FERC, higher MKT, and in developed markets indicated by DEV. In the multiple regressions with all four regressors jointly included, R2, FERC, and DEV continue to exhibit significant impact on the magnitude of the country-level AG effect, whereas MKT loses its explanatory power. The result remains the same even if we use different dependent variables. Our findings therefore lend further support to our earlier conclusion that greater market efficiency leads to a stronger investment-return relation, consistent with the prediction of the optimal investment hypothesis.

4.3.2 Analysis based on limits to arbitrage

Using the same regression framework, we now test Hypothesis H2 on the relation between limits to arbitrage and the AG effect. The dependent variable is, once again, either the equal-weighted or value-weighted mean of SPREAD or SLOPE for each country. The explanatory variables are the within-country time-series averages of the three limits-to-arbitrage proxies (IRISK, DVOL, and SHORT). According to Hypothesis H2, the AG effect will be stronger in countries with greater idiosyncratic volatility averaged across stocks (higher IRISK), with smaller average stock-level dollar trading volume (lower DVOL), and where the short-selling restriction is in effect (lower SHORT).

The cross-country regressions should therefore yield a positive slope on IRISK and negative slopes on DVOL and SHORT to be consistent with Hypothesis H2.

The results are reported in Table 9. In Panel A, SPREAD is used as the dependent variable. In univariate regressions, the coefficient on IRISK is 0.018 when the dependent variable is the equal-weighted SPREAD and 0.027 when the dependent variable is the value-weighted SPREAD. Both are significant at the 10% level. These results suggest that the AG effect is stronger in countries with greater idiosyncratic volatilities, in line with the prediction of the limits to arbitrage argument. However, the other two limits to arbitrage proxies DVOL and SHORT do not have significant explanatory power on the country-level AG effect. In the multiple regressions, the coefficients for IRISK remain significant and the coefficients on the other two proxies DVOL and SHORT are still insignificant. In Panel B of Table 9, the dependent variable is SLOPE. None of the three coefficients on the limits to arbitrage variables is significant.

In their recent studies based on the U.S. individual stock data, Li and Zhang (2010), Lam and Wei (2011), and Lipson, Mortal, and Schill (2011) find that the negative effect of asset growth rates on subsequent stock returns is stronger for firms with severer limits to arbitrage. In contrast, our analysis using international data identifies a relatively weak role of arbitrage costs in explaining the country-level asset growth effect.

4.3.3 Analysis based on investor protection and accounting quality

As discussed in Section 2.2, factors such as corporate mangagers' empire-building tendency, firms' capital-structure market timing, and corporate earnings manipulations may potentially cause mispricing of asset growth. Hypothesis H3 links the AG effect to the country characteristics that proxy for the rampancy of such corporate or managerial behavior. For the cross-sectional regressions to test this hypothesis, the dependent variable is the equal-weighted or value-weighted mean of SPREAD or SLOPE within each country. The explanatory variables are the measures of investor protection and accounting quality including the creditor rights index CR, the revised anti-director index AD, the anti-self-dealing index AS, the accounting standard index ACCT, the earnings management score EMS, and the four legal origin dummies UK, FR, GE, and SC. When the four legal origin dummies are used jointly as regressors, the regressions do not include an intercept.

Under Hypothesis H3, the coefficients for CR, AD, AS, ACCT are expected to be negative and the coefficient for EMS is expected to be positive (as a higher EMS indicates more earnings manipulation).

Given the relation between legal systems and the effectiveness of corporate governance described in Section 4.1, we additionally expect the coefficient on UK to be less positive relative to those of SC and GE, with the largest coefficient expected for FR.

Table 10 shows that the estimated coefficients on most of the investor-protection and accounting-quality proxies are insignificant regardless of the choice of the dependent variable, with a few exceptions. The first exception is that AS bears a significantly negative slope in the multiple regressions when the dependent variable is the equal-weighted SPREAD (see Panel A), equal-weighted SLOPE, or value-weighted SLOPE (see Panel B). The results imply that the negative investment-return relation is stronger in countries with weaker investor protection measured by the anti-self-dealing index. However, this is the only significant piece of evidence that is consistent with the mispricing-based hypothesis. All the other significant results contradict the prediction of Hypothesis H3. For example, the regression slopes on UK and SC are significantly positive when the equal-weighted SPREAD is the dependent variable (see Model 6 of Panel A), whereas the slopes on FR and GE are significantly negative when the value-weighted SPREAD is instead used as the dependent variable (Model 7 of Panel A). These findings, together with the significantly positive effects of UK on both the equal- and value-weighted SLOPE (Model 6 of Panel B), lead us to conclude that the AG effect is stronger in countries with the U.K. and Scandinavian legal origins where the investor protection is expected to be superior.

Additional evidence against Hypothesis H3 is provided by the strong positive effects of ACCT on the value-weighted SPREAD and SLOPE (see Models 4 and 7 of Panel A and Model 7 of Panel B, respectively) and by the significant negative effect of EMS on the value-weighted SPREAD (Model 5 of Panel A). Contrary to the mispricing-based arguments, these results suggest that worsening of the accounting quality reduces the magnitude of the asset growth effect.

We note that the positive relation of investor protection and accounting quality with the AG effect, as indicated by some of the significant results reported above, may be explained by the optimal investment effect. With better investor protection and lesser room for earnings manipulations, managers' incentives align more with shareholders' and insiders' incentives also align more with outsiders'. Thus, firms are more likely to undertake value-enhancing investments, leading to more visible investment effect based on the q theory. Of course, this is only a second-order effect as it is conditional on the financial markets being informationally efficient in the first place. Taken together, our analysis finds relatively weak and somewhat conflicting evidence for Hypothesis H3 regarding the effect of investor protection and accounting quality on the investment-return relation.

4.3.4 Horse-races among competing explanations

We have thus far evaluated how each group of country characteristics affects the magnitude of the asset growth effect separately. A natural concern is that the correlations among the country characteristics may confound our inference. According to the correlation patterns reported in Section 4.1, markets that are more efficient tend to have fewer limits to arbitrage, better investor protection, and higher accounting quality. The limits-to-arbitrage proxies also seem to correlate with the measures of investor protection and accounting quality, although the directions of their correlations are mixed.

As we have argued in Section 4.1, the particular patterns of correlations observed between the market efficiency proxies and the remaining country characteristics enhance our ability to differentiate between the optimal investment hypothesis and the mispricing-based hypothesis. Since the two hypotheses produce the opposite predictions as to how each of the country characteristics should affect the asset growth effect, the confounding issue may be of minor concern for our study. Nevertheless, it is desirable to examine the joint effects of the country characteristic variables given their substantial correlations. The joint tests also allow us to spot the possibility that one effect (e.g., the mispricing-based effect) emerges more strongly once we control for the other (e.g., the optimal investment effect).

To assess the relative importance of the optimal investment effect and the mispricing-based effect, we continue to rely on the cross-country multiple regression analysis. The dependent variable in our regressions is the within-country mean of SPREAD or SLOPE. As for the explanatory variables in each regression, we draw one proxy for information efficiency and pair it either with one variable motivated by the mispricing-based arguments or with the set of four legal origin dummies. Given the high correlations among some of the variables (especially those within the same group), we do not include all the country characteristics into a single regression.

Table 11 summarizes the results of the multiple regressions in which the dependent variable is either the equal-weighted SPREAD (Panels A to D) or the equal-weighted SLOPE (Panels E to H). We estimate 72 regressions, each of which contains a different set of a market efficiency measure and a mispricing-based variable as regressors. The results of the regressions, which use the value-weighted SPREAD or SLOPE as the dependent variable, produce similar results and hence are omitted to conserve space.

The most notable finding in Table 11 is the robustness of the market efficiency effect on the investment-return relation. In all of the 72 regressions, the signs of the coefficients on the information efficiency proxies conform to the predictions of the optimal investment explanation (i.e., negative slope on R2 and positive slopes on FERC, DEV, and MKT). In 64 out of the 72 regressions, these coefficients are also significant at least at the 10% level. Furthermore, in the remaining eight cases where the efficiency measures show insignificant effects, the jointly included mispricing-based variables also exhibit insignificant or counter-intuitive effects. Taken together, we find no evidence that the mispricing-based factors dominate firms' optimal investment behavior in driving the country-level asset growth effect.

Turning to the role of limits to arbitrage, we identify that the coefficients on IRISK, DVOL, and SHORT are mostly insignificant. The only three exceptions are the significantly positive effects of IRISK on SPREAD when included together with R2 or FERC (Panels A and B, respectively), and the significantly negative effect of SHORT on SPREAD when added alongside FERC (Panel B). The results imply a stronger AG effect in countries with greater average idiosyncratic volatility and the short-selling restriction, in line with the mispricing-based perspective. However, we note that in these three cases where the limits-to-arbitrage proxies have significant slopes, the market efficiency measures (R2 and FERC) also bear significant coefficients. We therefore conclude that the role of limits to arbitrage in affecting the magnitude of the AG effect is relatively weak, and it does not eliminate the significance of the optimal investment effect.

Lastly, we also find that the slopes on the investor-protection and accounting-quality proxies are also mostly insignificant, with five exceptions. Four of the exceptions involve the legal origin dummies US and SC (Panels A, B, and E), while the remaining one involves the accounting quality measure ACCT (Panel B). The regression coefficients on US, SC, and ACCT are positive in all of the five cases, suggesting that the AG effect strengthens as the investor protection and accounting quality improve. This result is inconsistent with the mispricing-based explanation, but may be linked to the second-order optimal investment effect mentioned earlier. Specifically, as the investor protection and accounting quality get better, firms become more likely to undertake value-enhancing investments, making the q-theory based investment effect more visible.

Overall, the results of our cross-country multiple regressions suggest that the evidence for the mispricing-based effects is weak, while that for the optimal investment effect tends to be much more prevailing.

5. Conclusion

The existing literature documents a negative relation of firms' investment and financing activities with future stock returns. For example, Cooper, Gulen, and Schill (2008) show that the U.S. firms with lower asset growth rates tend to have higher subsequent stock returns. However, there is a debate on whether such an empirical pattern is the result of market mispricing or can be viewed as an optimal corporate investment effect.

Our study finds that the asset growth effect originally documented in the U.S. also exists in international equity markets. In addition, we provide informative evidence that allows us to evaluate the optimal investment explanation of the asset growth effect vis-à-vis the mispricing-based explanation. Across the 43 equity markets we examine, there are large differences in the asset growth effect and in various measures of market efficiency, trading frictions, investor protection, and accounting quality. The competing hypotheses predict that these country characteristics are related to the magnitude of the asset growth effect in different ways. Empirically, we find that the country characteristics possessing the strongest power to explain the magnitude of the asset growth effects are those related to market efficiency – the asset growth effect is stronger in markets that are more informationally efficient. On the other hand, the country characteristics representing limits to arbitrage, investor protection, and accounting quality have limited power to explain the variation of the asset growth effect across international markets.

Appendix

A. Country characteristic variables

- Stock return synchronicity (R2): the R-squared of a regression in which weekly individual stock returns are regressed on contemporaneous weekly market returns as well as two leads and two lags of the weekly market returns. The inclusion of the leads and lags of market returns is to control for non-synchronous trading. We run the regression for each stock every year and then take the average R-squared from the firm-level regressions within each country to compute the country-level R2. Both the individual stock returns and market returns are from Datastream.
- Future earnings response coefficient (FERC): the sum of the coefficients on future earnings when current annual stock returns are regressed on the changes in current and future earnings. Following Collins et al. (1994) and Durnev et al. (2003), the regression takes the form:

$$r_{i,t} = a + b_0 \Delta E_{i,t} + \sum\nolimits_{\tau=1}^{3} b_\tau \Delta E_{i,t+\tau} + \sum\nolimits_{\tau=1}^{3} c_\tau r_{i,t+\tau} + u_{i,t}$$

  where $\Delta E_{i,t+\tau}$ is the change in earnings per share from year $t+\tau-1$ to year $t+\tau$, scaled by the price at the beginning of year $t+\tau$. The change in earnings per share is the difference in the net income before extraordinary items/preferred dividend (Worldscope item 01551) and preferred dividend (Worldscope item 05401), scaled by shares outstanding. $r_{i,t+\tau}$ is the annual stock return of a firm from July of year t to June of year $t+\tau$. FERC is defined as $\sum_{\tau=1}^{3} b_\tau$. We estimate FERC for each stock over the entire sample period, and then take the average FERC across all stocks in a country to obtain the country-level FERC. We require a firm to have at least 12 years of observations for its FERC estimate to be valid.
- DEV: an indicator for developed markets based on the 2009 International Finance Corporation classification.
- MKT: the sum of the annual cross-country ranks of the following three variables: 1) a country's market capitalization to GDP ratio, 2) the number of publicly listed companies scaled by population, and 3) the number of IPOs scaled by population. We rank these variables across countries in each year. Data are from the World Bank development index database.
- Idiosyncratic risk (IRISK): the annual value-weighted average of idiosyncratic volatility of all stocks in a country. We follow Li and Zhang (2010) and estimate idiosyncratic volatility for an individual stock every year by regressing daily stock returns on the value-weighted market return from July 1st of year $t-1$ to June 30th of year t. A stock's idiosyncratic risk is the standard deviation of the regression residuals. The data are from Datastream.
- Dollar trading volume (DVOL): the annual value-weighted average of dollar trading volume for all stocks in a country. Dollar trading volume is the product of share volume and daily closing price, summed from July of year $t-1$ to June of year t. The data are from Datastream.
- Short-sale permission (SHORT): a dummy variable equal to 1 if short selling is allowed and

zero otherwise. We obtain this information from Bris, Goetzmann, and Zhu (2007). Following McLean, Pontiff, and Watanabe (2009), if short selling was legal prior to 1990, we assume that short selling was allowed in each of the years prior to 1990.

- Creditor rights index (CR): an index measuring creditors' rights obtained from LLSV (1998). A score of one is assigned when each of the following rights of secured lenders are defined in laws and regulations. First, there are restrictions, such as creditor consent or minimum dividends, for a debtor to file for reorganization. Second, secured creditors are able to seize their collateral after the reorganization petition is approved, i.e., there is no "automatic stay" or "asset freeze." Third, secured creditors are paid first out of the proceeds of liquidating a bankrupt firm, as opposed to other creditors such as government or workers. Finally, management does not retain administration of its property pending the resolution of the reorganization. CR is the sum of the four scores, ranging from 0 (weak creditor rights) to 4 (strong creditor rights).

- Revised anti-director rights index (AD): the sum of 6 components, three of which are on shareholder voting (voting by mail, voting without blocking of shares, and calling an extraordinary meeting), and the remaining three are on minority protection (proportional board representation, preemptive rights, and judicial remedies). AD is obtained from Djankov et al. (2008). The index ranges from 0 (weak shareholder protection) to 6 (strong shareholder protection).

- Anti-self-dealing index (AS): a survey-based measure of ex-ante and ex-post restrictions on controlling shareholders' self-dealing, obtained from Djankov et al. (2008). The index ranges from 0 (weak control of self-dealing transactions) to 1 (strong control).

- Accounting standards (ACCT): an index of accounting standards obtained from LLSV (1998). The index is based on the reporting or omission of 90 items from annual reports. A higher value of ACCT indicates higher accounting standards.

- Earning management score (EMS): a measure of earnings management tendency developed in Leuz, Nanda, and Wysocki (2003), given by the average rank across the following four variables. EM1 is the country's median ratio of the firm-level standard deviations of operating income and operating cash flow (both scaled by lagged total assets). EM2 is the country's Spearman correlation between the change in accruals and the change in cash flow from operations (both scaled by lagged total assets). EM3 is the country's median ratio of the absolute value of accruals and the absolute value of the cash flow from operations. EM4 is the number of "small profits" divided by the number of "small losses" for each country. The aggregate earnings management measure EMS is the average rank across all four measures, EM1-4. A higher value of the EMS signals poorer earnings quality.

- UK: an indicator equal to one if a country has English legal origin. We obtain the data from Andrei Shleifer's website.[11] English origin countries typically are more effective in corporate governance (LLSV, 2000).

[11] http://www.economics.harvard.edu/faculty/shleifer/dataset. Same for FR, GE, and SC.

- FR: an indicator equal to one if a country has French legal origin. Relative to English-origin countries, French-origin countries are less effective in corporate governance (LLSV, 2000).
- GE: an indicator equal to one if a country has German legal origin. Relative to English-origin countries, German-origin countries are less effective in corporate governance (LLSV, 2000).
- SC: an indicator equal to one if a country has Scandinavian legal origin. Scandinavian-origin countries are less effective in corporate governance relative to English-origin countries, but more effective than French-origin and German-origin countries (LLSV, 2000).

B. The within-effect regressions

Consider a full panel model of the asset growth effect in the following form:

$$Y_{i,t} = \beta_0 + \beta_1 X_{i,t} + u_i + e_{i,t} \tag{3}$$

where $\mathrm{Y}_{i,t}$ is a measure of the AG effect for country i in year t (SPREAD or SLOPE) and $X_{i,t}$ is a characteristic for country i in year t. β_0 and β_1 are coefficients. The first error term u_i is time-invariant and country-specific (modeled as either fixed effects or random effects), and the second error term $e_{i,t}$ has both country and time dimensions (it may have a time-varying but country-invariant component, not singled out here).

In this model the relation between $Y_{i,t}$ and $X_{i,t}$ has two dimensions – the relation between the time variation of the AG effect and the time variation of the country characteristic within a given country (i.e., the within-effect), and the cross-country relation between the average AG effect and the average country characteristic (i.e., the between-effect). These two types of relations are captured by the following two regressions, respectively:

$$Y_{i,t} - \bar{Y}_i = \beta_2(X_{i,t} - \bar{X}_i) + e_{i,t} \qquad \text{(within-effect)} \tag{4}$$

$$\bar{Y}_i = \beta_3 + \beta_4 \bar{X}_i + u_i \qquad \text{(between-effect)} \tag{5}$$

where $\bar{Y}_i$ and $\bar{X}_i$ are the means of $\mathrm{Y}_{i,t}$ and $\mathrm{X}_{i,t}$ for country i. The coefficients of the full panel model (3), when properly estimated, are the weighted averages of the corresponding coefficients from the within-effect regression (4) and the between-effect regression (5).

All the empirical results for the cross-country analysis reported in the main text of the paper are based on the between-effect regression (5). Below, for the purpose of completeness, we further report the results of the within-effect regression (4) for country characteristics that are time-varying, i.e., R2, MKT, IRISK, and DVOL. The regressions include year fixed dummies, and the t-statistics are computed using two-way clustered standard errors (by country and by year). As it turns out, the t-statistics for the coefficients in these within-effect regressions are all insignificant.

Table A.1: The within-effect Regressions

Panel A: SPREAD as dependent variable

	Equal-weighted SPREAD				Value-weighted SPREAD			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
R2	-0.157				-0.064			
	(-0.892)				(-0.361)			
MKT		0.046				0.087		
		(0.933)				(1.092)		
IRISK			0.042				0.065	
			(1.238)				(1.544)	
DVOL				-0.016				-0.019
				(-1.215)				(-1.332)
Intercept	-0.002	0.071*	-0.105***	0.035***	0.010	0.078	-0.180**	0.027**
	(-0.082)	(1.955)	(-2.590)	(3.944)	(0.294)	(1.430)	(-2.393)	(2.058)

Panel B: SLOPE as dependent variable

	Equal-weighted SLOPE				Value-weighted SLOPE			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
R2	-0.257				0.268			
	(-1.023)				(1.223)			
MKT		0.052				-0.073		
		(0.917)				(-1.209)		
IRISK			0.031				0.030	
			(1.218)				(1.103)	
DVOL				-0.006				-0.006
				(-0.357)				(-0.571)
Intercept	-0.015	0.082*	-0.067	0.032***	-0.018	0.083*	-0.066	0.029**
	(-0.344)	(1.782)	(-1.426)	(2.785)	(-0.442)	(1.896)	(-1.495)	(2.456)

This table reports the results of the within-effect regressions on the asset growth effect. The dependent variables are the country-level measures of the asset growth effect, SPREAD and SLOPE, in both the equal-weighted and value-weighted versions. The weights for the value-weighted measures of SPREAD and SLOPE are based on firms' market capitalizations. The independent variables are the time-varying country characteristics R2, MKT, IRISK, and DVOL. For the dependent variable as well as the explanatory variables in each regression, we subtract their respective country-specific means before including them in the regressions. Panel A reports the regression results when SPREAD is used as the dependent variable. Panel B presents the regression results when SLOPE is used as the dependent variable. Two-way clustered standard errors (by country and by year) are used to compute the t-statistics reported in parentheses. Statistical significance at the 1%, 5%, and 10% levels are indicated by ***, **, and *, respectively. The sample period is from July of 1982 to June of 2010.

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Table 1: Sample Descriptive Statistics

Country	Start Date	End Date	Firm-Year Obs	% of Total Obs	No. of Firms Per Year	% of Total Firm	Total Mkt Value (USD$M)	% of Total Mkt Value	Asset Growth Median (%)	Asset Growth Stdev (%)
Argentina	198207	201006	700	0.24	39	0.34	27,773	0.18	5.48	40.53
Australia	198207	201006	10,101	3.46	361	3.15	212,712	1.39	7.75	73.73
Austria	198207	201006	1,200	0.41	43	0.37	23,008	0.15	4.30	46.94
Bangladesh	199201	201006	7	0.00	2	0.02	648	0.00	16.15	7.51
Belgium	198207	201006	1,777	0.61	63	0.55	58,302	0.38	6.36	45.17
Brazil	198701	201006	4,658	1.60	291	2.54	304,985	2.00	8.76	123.58
Canada	198207	201006	11,666	4.00	417	3.63	362,691	2.38	8.46	62.38
Chile	198801	201006	1,899	0.65	95	0.83	61,549	0.40	8.88	29.17
China	199012	201006	10,818	3.71	601	5.24	408,681	2.68	9.36	39.22
Colombia	199112	201006	298	0.10	18	0.15	10,715	0.07	13.46	30.12
Cyprus	199212	201006	192	0.07	23	0.20	2,224	0.01	7.02	29.04
Czech Republic	199306	201006	351	0.12	31	0.27	22,859	0.15	3.10	25.10
Denmark	198207	201006	2,625	0.90	94	0.82	53,763	0.35	5.46	39.25
Egypt	199410	201006	309	0.11	31	0.27	28,198	0.18	8.14	36.84
Finland	198612	201006	2,019	0.69	92	0.80	120,903	0.79	4.45	41.75
France	198207	201006	10,775	3.69	385	3.36	680,754	4.46	7.27	47.27
Germany	198207	201006	9,216	3.16	329	2.87	499,159	3.27	4.47	62.73
Greece	198712	201006	3,280	1.12	156	1.36	44,800	0.29	10.10	42.11
Hong Kong	198207	201006	7,212	2.47	258	2.25	239,524	1.57	9.10	54.12
Hungary	199101	201006	316	0.11	20	0.17	12,884	0.08	7.92	41.47
India	198207	201006	5,370	1.84	283	2.46	245,068	1.61	14.85	38.00
Indonesia	199003	201006	1,857	0.64	98	0.85	39,735	0.26	11.92	35.43
Ireland	198207	201006	922	0.32	33	0.29	23,424	0.15	10.28	49.31
Israel	198601	201006	1,384	0.47	87	0.75	42,586	0.28	8.07	48.91
Italy	198207	201006	4,711	1.61	168	1.47	220,439	1.44	6.14	43.98
Japan	198207	201006	42,333	14.51	1,512	13.18	2,128,523	13.95	2.36	16.91
Kenya	199101	201006	70	0.02	18	0.15	2,415	0.02	15.40	28.77
Luxembourg	198812	201006	168	0.06	9	0.08	13,563	0.09	4.46	57.00
Malaysia	198207	201006	7,228	2.48	258	2.25	74,530	0.49	5.23	33.96
Mexico	198207	201006	1,872	0.64	85	0.74	128,621	0.84	14.33	30.11
Morocco	199307	201006	178	0.06	16	0.14	16,423	0.11	9.67	29.93
Netherlands	198207	201006	2,846	0.98	102	0.89	234,200	1.53	6.39	44.71
New Zealand	198512	201006	1,051	0.36	46	0.40	18,572	0.12	4.88	44.04
Norway	198207	201006	2,584	0.89	92	0.80	65,081	0.43	9.75	59.75
Pakistan	198811	201006	987	0.34	55	0.48	10,368	0.07	11.28	27.83
Peru	199012	201006	993	0.34	55	0.48	13,222	0.09	7.30	38.26
Philippines	198207	201006	1,582	0.54	79	0.69	21,103	0.14	4.57	36.72

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Table 1 – continued from previous page

Country	Start Date	End Date	Firm-Year Obs	% of Total Obs	No. of Firms Per Year	% of Total Firm	Total Mkt Value (USD$M)	% of Total Mkt Value	Asset Growth Median (%)	Asset Growth Stdev (%)
Poland	199104	201006	1,281	0.44	80	0.70	28,030	0.18	13.38	54.90
Portugal	198712	201006	1,009	0.35	48	0.42	35,573	0.23	6.61	31.48
Russia	199801	201006	289	0.14	24	0.21	265,063	1.74	21.64	37.49
Singapore	198207	201006	4,069	1.39	145	1.27	114,708	0.75	7.74	40.68
South Africa	198207	201006	3,613	1.24	129	1.13	97,887	0.64	11.68	54.65
South Korea	198207	201006	9,224	3.16	355	3.09	186,957	1.22	8.52	41.54
Spain	198207	201006	1,810	0.62	75	0.66	217,309	1.42	7.54	39.85
Sri Lanka	198701	201006	510	0.17	23	0.20	1,705	0.01	11.71	40.62
Sweden	198207	201006	4,698	1.61	168	1.46	141,427	0.93	7.82	57.29
Switzerland	198207	201006	3,849	1.32	137	1.20	82,869	0.54	4.18	32.22
Taiwan	198709	201006	5,901	2.02	295	2.57	209,374	1.37	6.08	27.11
Thailand	198701	201006	3,936	1.35	187	1.63	46,100	0.30	5.63	33.21
Turkey	198712	201006	1,827	0.63	91	0.80	32,422	0.21	29.45	50.13
U.K.	198207	201006	24,557	8.41	877	7.65	1,092,150	7.16	8.22	57.90
U.S.	198207	201006	69,307	23.75	2,475	21.58	6,234,398	40.85	7.80	51.73
Venezuela	198912	201006	285	0.10	15	0.13	2,444	0.02	20.46	47.61
Zimbabwe	198804	201006	5	0.00	1	0.01	316	0.00	-52.32	233.04
All			291,725	100.00	11,470	100.00	15,262,736	100.00	7.94	46.40
All excluding U.S.			222,418	76.24	8,994	78.42	9,028,338	59.15	7.95	46.30

This table provides summary statistics for the 54 markets from the Datastream-Worldscope sample. Columns 2 and 3 report the beginning and ending dates during which each country is included in our sample. Each country's total number of firm-year observations, the average number of firms per year, and the average annual total market capitalization in millions of U.S. dollars are provided in columns 4, 6, and 8, respectively. The values of these statistics represented as percentages of the corresponding total across countries are given in columns 5, 7, and 9, respectively. The last two columns report the medians and standard deviations of the asset growth rates for each market.

Table 2: Asset Growth and Stock Returns: Country Level and Global Level

Panel A: Asset growth effect within countries: equal-weighted measures

				in local currency				in U.S. dollars			
Region	Country	AGSPREAD	t-stat	SPREAD	t-stat	SLOPE	t-stat	SPREAD	t-stat	SLOPE	t-stat
Africa - Emerging											
	Egypt	51.23	(5.25)	1.90	(0.30)	1.73	(0.42)	2.29	(0.23)	6.28	(3.23)
	South Africa	130.17	(5.42)	3.34	(0.76)	-3.56	(-0.44)	1.88	(0.35)	1.08	(0.24)
Asia - Developed											
	Hong Kong	139.76	(8.60)	3.31	(0.88)	11.22	(1.86)	3.41	(1.04)	11.99	(1.80)
	Israel	75.37	(5.74)	-0.88	(-0.15)	-1.17	(-0.20)	-4.15	(-0.87)	-2.32	(-0.55)
	Japan	45.14	(21.62)	0.55	(0.22)	2.95	(0.41)	0.34	(0.12)	0.63	(0.09)
	Singapore	100.26	(7.68)	3.28	(0.62)	2.30	(0.43)	3.19	(0.63)	0.69	(0.19)
	South Korea	102.88	(11.15)	9.21	(2.19)	12.44	(2.84)	8.68	(2.11)	4.36	(1.22)
	Taiwan	84.24	(11.35)	-7.23	(-0.56)	-25.98	(-1.18)	-3.63	(-0.50)	-7.81	(-0.92)
Asia - Emerging											
	China	104.75	(8.07)	5.23	(1.61)	11.21	(1.80)	5.30	(1.37)	11.71	(1.81)
	India	110.57	(12.06)	7.67	(1.84)	9.36	(1.33)	7.84	(1.71)	6.73	(1.30)
	Indonesia	93.49	(12.13)	2.20	(0.26)	5.45	(0.47)	5.42	(1.39)	11.90	(2.86)
	Malaysia	93.17	(9.18)	-5.99	(-1.35)	-5.20	(-0.76)	-1.42	(-0.33)	2.56	(0.66)
	Pakistan	60.09	(11.07)	-0.80	(-0.24)	-1.11	(-0.16)	-0.85	(-0.20)	9.14	(1.29)
	Philippines	93.63	(8.45)	2.21	(0.28)	9.55	(0.99)	2.72	(0.52)	9.31	(1.46)
	Thailand	89.60	(9.81)	1.15	(0.23)	4.62	(0.83)	0.95	(0.26)	7.66	(1.82)
Australasia - Developed											
	Australia	151.83	(5.93)	6.97	(1.68)	5.53	(1.23)	6.04	(1.36)	1.85	(0.60)
	New Zealand	86.60	(8.31)	-2.84	(-0.78)	-1.43	(-0.18)	-4.99	(-1.72)	-0.59	(-0.16)
Europe - Developed											
	Austria	72.58	(7.68)	2.02	(0.39)	2.50	(0.30)	2.79	(0.46)	-2.10	(-0.35)
	Belgium	85.82	(9.47)	8.15	(1.31)	4.89	(0.64)	6.44	(1.40)	3.69	(0.66)
	Denmark	105.95	(7.98)	10.63	(2.78)	14.93	(3.04)	12.27	(2.91)	14.67	(2.59)
	Finland	83.91	(4.86)	3.36	(0.48)	5.59	(0.07)	4.84	(0.74)	-1.33	(-0.18)
	France	103.10	(7.14)	4.31	(1.03)	6.45	(1.07)	5.03	(1.30)	5.29	(1.75)
	Germany	118.78	(4.58)	5.59	(2.14)	8.02	(1.56)	5.65	(2.26)	4.68	(1.61)
	Ireland	73.73	(8.79)	1.75	(0.44)	-3.78	(-0.16)	4.80	(1.34)	9.06	(1.50)
	Italy	114.93	(10.26)	6.94	(2.47)	5.47	(1.41)	4.46	(1.53)	4.42	(1.33)
	Netherlands	99.05	(5.70)	2.33	(0.54)	3.74	(0.19)	4.31	(0.94)	1.03	(0.22)
	Norway	149.74	(6.20)	0.79	(0.20)	2.31	(0.43)	0.65	(0.15)	2.28	(0.55)
	Spain	74.66	(9.08)	-1.52	(-0.39)	-1.68	(-0.29)	0.27	(0.06)	0.95	(0.21)
	Sweden	130.28	(6.12)	7.19	(1.86)	2.77	(0.43)	6.47	(2.02)	6.20	(1.16)
	Switzerland	84.04	(8.86)	4.49	(1.10)	9.98	(1.96)	5.61	(1.64)	4.61	(0.82)
	U.K.	157.05	(8.09)	9.08	(3.49)	13.58	(3.98)	9.56	(3.32)	8.52	(3.82)
Europe - Emerging											
	Czech Republic	33.94	(17.93)	-5.30	(-0.71)	-9.93	(-1.19)	-3.01	(-0.39)	-10.78	(-0.57)
	Greece	112.40	(6.96)	4.05	(0.57)	-0.63	(-0.09)	1.35	(0.21)	-3.11	(-0.54)
	Poland	121.15	(4.39)	-1.59	(-1.14)	-20.07	(-0.31)	-0.08	(-0.01)	4.63	(0.56)
	Portugal	55.34	(9.15)	-5.13	(-0.86)	6.17	(0.59)	-3.35	(-0.73)	-1.22	(-0.16)
	Turkey	126.54	(10.78)	-7.22	(-1.60)	-8.02	(-1.41)	-4.31	(-0.97)	-3.48	(-0.92)
North America - Developed											
	Canada	161.38	(8.38)	4.48	(1.07)	3.36	(0.80)	4.36	(1.07)	1.54	(0.65)
	U.S.	136.20	(10.42)	8.14	(3.06)	8.08	(2.46)	8.14	(3.06)	8.08	(2.46)
Latin America - Emerging											
	Argentina	52.09	(6.72)	-10.92	(-1.95)	-8.93	(-0.87)	-3.85	(-1.68)	-4.58	(-0.88)
	Brazil	97.29	(13.19)	3.19	(0.75)	4.54	(0.77)	-0.68	(-0.11)	-4.05	(-0.93)
	Chile	66.04	(10.96)	-4.84	(-1.14)	-6.11	(-0.64)	-4.53	(-1.03)	-4.89	(-0.90)
	Mexico	68.52	(10.84)	-3.47	(-0.62)	-3.81	(-0.34)	-2.14	(-0.48)	-9.86	(-1.04)
	Peru	54.70	(3.88)	2.30	(0.35)	4.52	(0.35)	4.41	(0.55)	2.62	(0.23)

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Panel B: Asset growth effect within countries: value-weighted measures

Region	Country	in local currency SPREAD	t-stat	SLOPE	t-stat	in U.S. dollars SPREAD	t-stat	SLOPE	t-stat
Africa - Emerging									
	Egypt	-6.35	(-0.94)	2.91	(0.57)	1.86	(0.26)	7.27	(0.05)
	South Africa	12.08	(2.06)	-2.97	(-0.34)	6.66	(1.38)	-0.63	(-0.15)
Asia - Developed									
	Hong Kong	1.45	(0.28)	10.61	(2.43)	1.41	(0.44)	10.22	(2.32)
	Israel	-3.12	(-0.26)	3.78	(0.36)	-1.31	(-0.10)	2.85	(0.06)
	Japan	0.98	(0.42)	2.74	(0.38)	0.43	(0.11)	3.29	(0.03)
	Singapore	3.28	(0.87)	2.83	(0.57)	5.45	(1.45)	7.30	(1.01)
	South Korea	0.82	(0.12)	14.55	(2.79)	5.90	(0.51)	21.31	(1.77)
	Taiwan	-4.92	(-1.06)	-7.67	(-1.16)	-11.42	(-1.21)	-11.45	(-1.21)
Asia - Emerging									
	China	1.43	(0.36)	9.66	(1.77)	4.23	(0.83)	8.28	(1.23)
	India	6.20	(0.75)	7.60	(1.13)	4.27	(0.55)	-7.75	(-0.52)
	Indonesia	1.16	(0.16)	6.01	(0.53)	5.72	(0.86)	15.78	(3.33)
	Malaysia	-6.63	(-1.33)	-2.47	(-0.71)	-4.24	(-0.61)	-5.01	(-1.28)
	Pakistan	2.02	(0.68)	-2.04	(-0.41)	5.54	(0.63)	3.66	(1.20)
	Philippines	-9.56	(-0.99)	7.41	(0.96)	-3.59	(-0.36)	6.09	(0.53)
	Thailand	-6.34	(-0.81)	4.71	(0.80)	-14.16	(-1.69)	2.16	(0.36)
Australiasia - Developed									
	Australia	8.66	(2.46)	5.22	(1.68)	10.59	(3.05)	4.52	(1.19)
	New Zealand	-2.25	(-1.48)	-0.89	(-0.11)	-1.19	(-0.18)	-6.63	(-0.87)
Europe - Developed									
	Austria	8.31	(1.57)	4.10	(0.39)	15.66	(1.20)	9.66	(0.74)
	Belgium	7.44	(1.68)	4.27	(0.56)	16.88	(1.69)	0.73	(0.12)
	Denmark	11.76	(2.40)	10.35	(3.06)	11.96	(2.61)	15.61	(3.88)
	Finland	5.00	(0.64)	4.47	(1.19)	4.12	(0.61)	-2.57	(-0.74)
	France	15.38	(2.91)	7.29	(1.83)	16.93	(2.79)	14.36	(2.64)
	Germany	4.39	(1.27)	6.90	(1.66)	1.41	(0.21)	0.45	(0.06)
	Ireland	5.37	(0.69)	18.84	(1.86)	12.02	(0.53)	14.67	(1.08)
	Italy	-6.13	(-1.04)	6.42	(1.39)	-0.25	(-0.04)	5.35	(0.73)
	Netherlands	1.79	(0.37)	5.83	(0.86)	6.86	(0.80)	9.39	(0.99)
	Norway	-4.23	(-0.79)	2.39	(0.44)	-7.22	(-0.76)	0.46	(0.07)
	Spain	-3.99	(-0.82)	-1.16	(-0.22)	-3.47	(-0.59)	2.34	(0.36)
	Sweden	7.63	(1.22)	3.33	(0.50)	7.10	(1.17)	15.95	(1.22)
	Switzerland	-0.50	(-0.14)	12.36	(2.05)	7.26	(1.26)	12.45	(1.08)
	U.K.	9.30	(2.59)	9.71	(3.77)	9.75	(2.11)	4.30	(1.44)
Europe - Emerging									
	Czech Republic	-14.12	(-0.93)	-2.66	(-0.84)	-3.50	(-2.04)	-2.77	(-0.81)
	Greece	-5.05	(-0.70)	-3.93	(-0.72)	-5.80	(-0.67)	-6.01	(-0.62)
	Poland	12.28	(1.43)	5.55	(0.24)	4.38	(0.27)	-0.66	(-0.10)
	Portugal	-7.64	(-0.92)	-5.30	(-1.00)	-8.98	(-1.11)	3.94	(0.35)
	Turkey	-2.50	(-0.37)	-5.98	(-1.11)	14.63	(1.16)	4.77	(0.84)
North America - Developed									
	Canada	13.13	(2.99)	3.88	(1.15)	11.64	(2.36)	6.85	(2.42)
	U.S.	5.48	(2.43)	7.43	(2.28)	5.48	(2.43)	7.43	(2.28)
Latin America - Emerging									
	Argentina	4.90	(0.41)	-1.41	(-0.41)	-2.39	(-0.19)	6.59	(0.86)
	Brazil	-3.24	(-0.33)	4.71	(0.71)	-6.62	(-1.51)	4.34	(0.64)
	Chile	-1.40	(-0.23)	-4.33	(-0.46)	-0.87	(-0.10)	9.45	(0.26)
	Mexico	1.77	(0.25)	-2.32	(-0.18)	-1.74	(-0.22)	-9.04	(-0.80)
	Peru	-0.42	(-0.25)	9.95	(0.43)	2.80	(1.42)	4.95	(0.28)

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Panel C: Global asset growth effect

	equal-weighted				value-weighted			
	SPREAD	t-stat	SLOPE	t-stat	SPREAD	t-stat	SLOPE	t-stat
Restricted sample: 43 countries								
Global	6.10	(3.82)	3.95	(2.32)	4.17	(1.90)	4.11	(2.74)
Global excluding U.S.	6.43	(3.79)	4.44	(3.17)	4.04	(1.71)	4.39	(2.31)
Country neutral	3.55	(3.94)	3.38	(2.82)	3.77	(2.22)	5.34	(1.84)
Country neutral excluding U.S.	3.50	(3.50)	3.42	(2.85)	3.81	(2.24)	5.53	(1.78)
Whole sample: 54 countries								
Global	6.18	(4.12)	3.94	(2.46)	4.07	(1.86)	6.23	(2.83)
Global excluding U.S.	6.07	(3.79)	4.38	(3.13)	4.32	(1.74)	5.74	(2.21)

This table reports the equal-weighted and value-weighted measures of the asset growth effect by country and globally. Panel A reports the equal-weighted asset growth effect by country. A minimum of 30 stocks is required for a country to be included in the analysis. In each year t and within each country, we sort stocks into tercile/quintile/decile buckets based on the asset growth rates if the number of stocks in that country-year is greater than 30/50/100, respectively. AGSPREAD is the time-series average of the differences in the asset growth rates between the top and bottom asset growth buckets. The country-level asset growth effect is measured by SPREAD and SLOPE. SPREAD is the average annual return difference between the bottom and top asset-growth buckets. The portfolio returns are calculated based on the equal-weighted buy-and-hold returns of stocks in the portfolios from July of year t to June of year $t+1$, expressed in both local currency and U.S. dollars. SLOPE is given by negative one times the time-series average of the coefficients, which are obtained by regressing buy-and-hold stock return from July of year t to June of year $t+1$ on the asset growth rates measured over year $t-1$. The returns are measured in local currency or in U.S. dollars. Panel B reports the value-weighted asset growth effect by country. For SPREAD in both local currency and U.S. dollars, all the bucket portfolios are value-weighted using firms' market capitalizations in June of year t as weights. The measures of SLOPE in both local currency and in U.S. dollars are computed based on weighted-least-squares regressions, where the weights are proportional to firms' market capitalizations in June of year t. Panel C reports the global-level asset growth effect. SPREAD and SLOPE are measured in U.S. dollars. They are computed similar to their country-level counterparts, except that they are based on different samples. For the global portfolios, we pool together firms across countries to form asset growth deciles. For country-neutral portfolios, the asset growth buckets are ranked within each country, and then the stocks ranked in the top or bottom buckets in different countries are pooled together to form asset growth bucket portfolios. We report the results for the restricted sample of 43 countries (with a minimum of 30 stocks required for each country) and for the unrestricted sample of 54 countries. All the variables are reported in percentage points. The sample period is from July of 1982 to June of 2010. The t-statistics reported in the parentheses are calculated using the Newey-West (1987) standard errors with a one-year lag.

Table 3: Robustness of the Asset Growth Effect: Alternative Horizons and Weightings, and Controlling for Additional Firm Characteristics

Panel A: All countries excluding U.S.

Horizon	First Year		Second Year		Third Year	
Weighting	Equal	Scaled	Equal	Scaled	Equal	Scaled
AG	-0.027***	-0.028**	-0.025**	0.006	-0.026*	-0.014
	(-3.266)	(-2.131)	(-2.774)	(0.409)	(-1.949)	(-0.488)
ME	-0.005	0.001	-0.005*	-0.001	-0.003	-0.002
	(-1.663)	(0.245)	(-1.835)	(-0.127)	(-0.897)	(-0.329)
BM	0.041***	0.044***	0.040***	0.043***	0.029***	0.027***
	(4.152)	(4.688)	(3.805)	(4.047)	(3.514)	(3.618)
MOM	0.073***	0.081***	-0.029***	-0.036*	-0.022**	-0.033**
	(3.873)	(3.351)	(-3.215)	(-1.922)	(-2.410)	(-2.280)
Intercept	0.212***	0.292***	0.318***	0.250*	0.184**	0.178
	(3.687)	(3.871)	(3.353)	(1.957)	(2.218)	(1.386)
R^2	0.251	0.315	0.240	0.309	0.232	0.302

Panel B: U.S.

Horizon	First Year		Second Year		Third Year	
Weighting	Equal	Value	Equal	Value	Equal	Value
AG	-0.025**	-0.021	-0.015**	-0.014	0.008	0.013
	(-2.096)	(-0.859)	(-2.538)	(-0.910)	(1.080)	(0.459)
ME	-0.014*	-0.003	-0.006	0.001	-0.003	-0.003
	(-1.821)	(-0.520)	(-1.033)	(0.147)	(-0.596)	(-0.470)
BM	0.011	-0.001	0.019	0.003	0.021**	0.000
	(0.739)	(-0.055)	(1.662)	(0.220)	(2.574)	(0.040)
MOM	0.056***	0.091**	-0.020	-0.009	0.007	0.015
	(3.439)	(2.178)	(-1.342)	(-0.295)	(0.468)	(0.526)
Intercept	0.264***	0.176**	0.180***	0.119*	0.178***	0.173**
	(3.666)	(2.655)	(3.055)	(1.986)	(3.606)	(2.767)
R^2	0.041	0.087	0.032	0.075	0.023	0.072

This table reports the results of the Fama-MacBeth regressions which examine the robustness of the asset growth effect. Panel A reports the regression results for stocks pooled across all 53 countries excluding the U.S., and Panel B presents the results for the U.S. stocks only. The dependent variable is the individual stock return measured over the first-, second- or third-year holding period (relative to June of year t, the time of the asset growth rate measurement). The explanatory variables include the asset growth rate and control variables, including ME (the natural logarithm of the June-end market value in year t), BM (the natural logarithm of the fiscal year-end book-to-market ratio in year $t-1$) and MOM (the January-to-May cumulative return in year t). The regressions use both equal weights ("Equal") and value weights within country ("Scaled" in Panel A and "Value" in Panel B). The value weight is based on each firm's market capitalization divided by the average (total) market capitalization of the country in June of year t in Panel A (Panel B). In Panel A the regressions include country dummies, whose coefficients are not reported. The sample period is from July of 1982 to June of 2010. The t-statistics are adjusted for time-series autocorrelation and reported in the parentheses. Statistical significance at the 1%, 5%, and 10% levels are indicated by ***, **, and *, respectively.

Table 4: The Asset Growth Effect: Controlling for Firm Profitability

Panel A: Equal-weighted portfolios

	Low ROE	2	3	4	High ROE
Low AG	17.00	19.62	20.70	19.75	20.61
2	18.27	19.68	20.01	19.19	17.24
3	14.46	18.13	20.10	19.46	19.09
4	16.91	16.10	17.44	16.88	17.82
High AG	11.59	13.59	14.40	15.71	15.97
Low - High	5.41***	6.03***	6.31***	4.04	4.64**
t-stat	(2.65)	(4.98)	(3.71)	(1.57)	(2.10)

Panel B: Value-weighted portfolios

	Low ROE	2	3	4	High ROE
Low AG	14.95	18.37	19.35	17.37	19.97
2	15.40	17.96	17.50	16.48	15.35
3	12.25	16.69	17.58	17.47	17.09
4	17.22	14.89	16.66	15.97	15.29
High AG	9.47	11.20	13.68	12.65	13.75
Low - High	5.48**	7.18***	5.68**	4.72*	6.23**
t-stat	(2.88)	(4.49)	(2.88)	(1.70)	(2.19)

This table reports the percentage annual returns on two-way sorted portfolios, which measure the asset growth effects after controlling for firm profitability. At the end of June of each year, stocks pooled across all the 54 markets are independently sorted into asset growth (AG) quintiles and return-on-equity (ROE) quintiles. We then compute the equal-weighted (Panel A) and value-weighted (Panel B) returns on the resulting 25 portfolios and the return spreads between the bottom and top AG quintiles (Low - High) within each ROE group. Returns are computed from July of year t to June of year $t+1$. The sample period is from July of 1982 to June of 2010. The rows labeled "t-stat" show t-statistics for the Low - High return spreads computed using the Newey-West (1987) heteroscedastic-robust standard errors.

Table 5: Country Characteristics

Region	Country	R2	FERC	DEV	MKT	IRISK	DVOL	SHORT	CR	AD	AS	ACCT	EMS	UK	FR	GE	SC
Africa - Emerging																	
	Egypt	0.23		0	41.00	2.58	195.32		2.00	3.00	0.20	24.00		0	1	0	0
	South Africa	0.14	1.23	0	74.20	3.72	178.71	1	3.00	5.00	0.81	70.00	5.60	1	0	0	0
Regional Average		0.18	1.23	0	57.60	3.15	187.01	1	2.50	4.00	0.51	47.00	5.60	0.50	0.50	0	0
Asia - Developed																	
	Hong Kong	0.18	0.75	1	115.60	3.33	375.05	1	4.00	5.00	0.96	69.00	19.50	1	0	0	0
	Israel	0.12		1	85.86	3.08	125.23	1		4.00	0.73	64.00		1	0	0	0
	Japan	0.27	1.80	1	79.75	2.45	628.64	1	2.85	4.50	0.50	65.00	20.50	0	0	1	0
	Singapore	0.24	1.07	1	108.05	2.82	243.34	0	3.00	5.00	1.00	78.00	21.60	1	0	0	0
	South Korea	0.17	1.21	1	76.58	3.64	553.50	0	3.00	4.50	0.47	62.00	26.80	0	0	1	0
	Taiwan	0.26	0.47	1		2.48	1,391.19	1	2.00	3.00	0.56	65.00	22.50	0	0	1	0
Regional Average		0.20	1.06	1	93.17	2.97	552.83	0.67	2.97	4.33	0.70	67.17	22.18	0.50	0	0.50	0
Asia - Emerging																	
	China	0.13	0.51	0	43.67	2.27	386.68	0	2.00	1.00	0.76			0	0	1	0
	India	0.19	1.23	0	50.07	4.62	84.79	1	2.00	5.00	0.58	57.00	19.10	1	0	0	0
	Indonesia	0.16	0.44	0	32.73	4.71	74.32	0	2.00	4.00	0.65		18.30	0	1	0	0
	Malaysia	0.27	0.66	0	100.32	3.00	92.51	1	3.00	5.00	0.95	76.00	14.80	1	0	0	0
	Philippines	0.15	0.20	0	45.00	3.85	95.89	1	1.00	4.00	0.22	65.00	8.80	0	1	0	0
	Pakistan	0.16	0.91	0	30.71	3.17	211.83	0	1.00	4.00	0.41		17.80	1	0	0	0
	Thailand	0.17	0.11	0	55.63	3.27	107.32	1	2.56	4.00	0.81	64.00	18.30	1	0	0	0
Regional Average		0.18	0.58	0	51.16	3.56	150.48	0.57	1.94	3.86	0.64	65.50	16.18	0.57	0.29	0.14	0
Australasia - Developed																	
	Australia	0.11	0.83	1	97.55	4.58	187.12	1	3.00	4.00	0.76	75.00	4.80	1	0	0	0
	New Zealand	0.13	1.23	1	61.13	2.77	104.92	1	4.00	4.00	0.95	70.00		1	0	0	0
Regional Average		0.12	1.03	1	79.34	3.67	146.02	1	3.50	4.00	0.85	72.50	4.80	1	0	0	0
Europe - Developed																	
	Austria	0.16	0.80	1	42.95	2.46	215.46	1	3.00	2.50	0.21	54.00	28.30	0	0	1	0
	Belgium	0.15	0.45	1	62.65	3.04	255.26	1	2.00	3.00	0.54	61.00	19.50	0	1	0	0
	Denmark	0.13	1.68	1	72.33	2.25	228.23	1	3.00	4.00	0.46	62.00	16.00	0	0	0	1
	Finland	0.17	0.34	1	75.16	2.54	581.89	1	1.22	3.50	0.46	77.00	12.00	0	0	0	1
	France	0.14	0.84	1	60.70	2.92	695.83	1	0.00	3.50	0.38	69.00	13.50	0	1	0	0
	Germany	0.15	0.76	1	49.45	2.77	731.41	1	3.00	3.50	0.28	62.00	21.50	0	0	1	0
	Ireland	0.13	0.23	1	60.17	3.44	573.26	1	1.00	5.00	0.79		5.10	1	0	0	0
	Italy	0.24	1.15	1	43.55	2.19	894.83	1	2.00	2.00	0.42	62.00	24.80	0	1	0	0
	Netherlands	0.17	0.99	1	67.14	2.42	1,465.46	1	3.00	2.50	0.20	64.00	16.50	0	1	0	0
	Norway	0.18	0.37	1	74.73	3.22	445.42	1	2.00	3.50	0.42	74.00	5.80	0	0	0	1
	Spain	0.24	1.17	1	76.95	2.00	1,464.74	1	2.00	5.00	0.37	64.00	18.60	0	1	0	0
	Sweden	0.18	0.85	1	80.63	3.46	395.91	1	1.56	3.50	0.33	83.00	6.80	0	0	0	1
	Switzerland	0.14	1.83	1	90.48	2.34	307.78	1	1.00	3.00	0.27	68.00	22.00	0	0	1	0

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Table 5 – continued from previous page

Region	Country	R2	FERC	DEV	MKT	IRISK	DVOL	SHORT	CR	AD	AS	ACCT	EMS	UK	FR	GE	SC
	U.K.	0.13	1.11	1	89.50	2.42	1,377.72	1	3.90	5.00	0.95	78.00	7.00	1	0	0	0
Regional Average		0.16	0.90	1	67.60	2.68	688.09	1	2.05	3.54	0.43	67.54	15.53	0.14	0.36	0.21	0.29
Europe - Emerging																	
	Czech Republic	0.09		0	25.00	2.25	104.03	0	3.00	4.00	0.33			0	0	1	0
	Greece	0.27	0.47	0	68.28	2.84	144.45	0	1.00	2.00	0.22	55.00	28.30	0	1	0	0
	Poland	0.14	0.72	0	46.36	3.52	71.93	1	1.00	2.00	0.29			0	0	1	0
	Portugal	0.14	0.24	0	41.62	2.98	326.26	1	1.00	2.50	0.44	36.00	25.10	0	1	0	0
	Turkey	0.30	0.48	0	38.15	3.48	267.27	1	2.00	3.00	0.43	51.00		0	1	0	0
Regional Average		0.19	0.48	0	43.88	3.01	182.79	0.60	1.60	2.70	0.34	47.33	26.70	0	0.60	0.40	0
North America - Developed																	
	Canada	0.11	0.79	1	93.90	5.28	217.26	1	1.45	4.00	0.64	74.00	5.30	1	0	0	0
	U.S.	0.15	1.60	1	78.95	3.79	1,851.18	1	1.00	3.00	0.65	71.00	2.00	1	0	0	0
Regional Average		0.13	1.20	1	86.43	4.54	1,034.22	1	1.23	3.50	0.64	72.50	3.65	1	0	0	0
Latin America - Emerging																	
	Argentina	0.21	0.37	0	34.94	2.66	35.94	1	1.00	2.00	0.34	45.00		0	1	0	0
	Brazil	0.13	0.08	0	38.31	3.47	724.39	1	1.00	5.00	0.27	54.00		0	1	0	0
	Chile	0.15	0.81	0	73.13	1.77	82.68	1	2.00	4.00	0.63	52.00		0	1	0	0
	Mexico	0.20	0.88	0	29.68	2.18	359.07	1	0.00	3.00	0.17	60.00		0	1	0	0
	Peru	0.10	0.67	0	44.80	2.58	16.57	0	0.00	3.50	0.45	38.00		0	1	0	0
Regional Average		0.16	0.57	0	44.17	2.53	243.73	0.80	0.80	3.50	0.37	49.80		0	1	0	0
Mean		0.17	0.82	0.51	63.27	3.04	438.85	0.81	1.99	3.64	0.52	62.65	16.02	0.33	0.37	0.21	0.09
Std. dev.		0.05	3.17	0.51	23.25	0.77	451.62	0.40	1.06	1.03	0.24	12.49	7.75	0.47	0.49	0.41	0.29

This table reports the country characteristics used in the cross-country analysis of the asset growth effect. The country characteristics are proxies for market efficiency, limits to arbitrage, investor protection, and accounting quality. The market efficiency proxies include stock return synchronicity R2, future earnings response coefficient FERC, the developed-market indicator DEV, and the importance of stock market in the economy MKT. The limits to arbitrage proxies include the average idiosyncratic stock return volatility IRISK (in percentage points), the averaged annual dollar trading volume DVOL (in millions), and the indicator for equity short-sale permission SHORT. The proxies for investor protection and accounting quality include the creditor rights index CR, the revised anti-director rights index AD, the anti-self-dealing index AS, the accounting standards ranking ACCT, the earnings management score EMS, and four legal origin indicators UK, FR, GE, and SC, representing English, French, German, and Scandinavian legal origins respectively. The details of these variables are provided in Appendix A. We report the values of these variables for each country and their averages for different regions. The last two rows report the means and standard deviations of these characteristics across all the countries. The sample period is from July of 1982 to June of 2010.

Table 6: Correlations of Country Characteristics

	R2	FERC	DEV	MKT	IRISK	DVOL	SHORT	CR	AD	AS	ACCT	EMS	UK	FR	GE	SC
R2	1.000															
FERC	-0.058	1.000														
	(0.115)															
DEV	-0.096	0.353	1.000													
	(0.005)	(0.000)														
MKT	-0.029	0.291	0.503	1.000												
	(0.171)	(0.000)	(0.000)													
IRISK	-0.119	-0.024	-0.081	0.050	1.000											
	(0.001)	(0.533)	(0.023)	(0.195)												
DVOL	0.013	0.196	0.305	0.112	-0.073	1.000										
	(0.710)	(0.000)	(0.000)	(0.002)	(0.046)											
SHORT	-0.030	0.298	0.332	0.142	0.081	0.159	1.000									
	(0.403)	(0.000)	(0.000)	(0.000)	(0.026)	(0.000)										
CR	0.112	0.301	0.270	0.384	-0.068	-0.002	0.175	1.000								
	(0.004)	(0.000)	(0.000)	(0.000)	(0.099)	(0.951)	(0.000)									
AD	-0.102	0.189	0.226	0.421	0.153	0.050	0.294	0.273	1.000							
	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)	(0.123)	(0.000)	(0.000)								
AS	-0.090	0.069	0.233	0.495	0.123	0.006	0.089	0.361	0.536	1.000						
	(0.009)	(0.022)	(0.000)	(0.000)	(0.001)	(0.851)	(0.002)	(0.000)	(0.000)							
ACCT	-0.115	0.299	0.621	0.563	0.093	0.155	0.343	0.301	0.485	0.491	1.000					
	(0.002)	(0.000)	(0.000)	(0.000)	(0.017)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)						
EMS	0.324	-0.030	-0.110	-0.241	-0.327	-0.117	-0.388	0.098	-0.340	-0.330	-0.666	1.000				
	(0.000)	(0.396)	(0.002)	(0.000)	(0.000)	(0.003)	(0.000)	(0.016)	(0.000)	(0.000)	(0.000)					
UK	-0.115	0.198	0.142	0.426	0.314	0.009	0.170	0.406	0.559	0.766	0.463	-0.441	1.000			
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.795)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)				
FR	0.070	-0.419	-0.390	-0.397	-0.172	-0.020	-0.184	-0.508	-0.407	-0.492	-0.653	0.277	-0.562	1.000		
	(0.044)	(0.000)	(0.000)	(0.000)	(0.000)	(0.556)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)			
GE	0.088	0.273	0.118	-0.118	-0.128	0.039	-0.102	0.136	-0.169	-0.201	0.028	0.487	-0.320	-0.411	1.000	
	(0.012)	(0.000)	(0.000)	(0.001)	(0.000)	(0.245)	(0.000)	(0.000)	(0.000)	(0.000)	(0.371)	(0.000)	(0.000)	(0.000)		
SC	-0.053	0.037	0.287	0.126	-0.040	-0.031	0.182	0.033	0.036	-0.110	0.328	-0.293	-0.204	-0.262	-0.149	1.000
	(0.129)	(0.230)	(0.000)	(0.000)	(0.268)	(0.351)	(0.000)	(0.324)	(0.209)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	

This table reports the correlations among the country characteristic variables. The country characteristics are proxies for market efficiency, limits to arbitrage, investor protection, and accounting quality. The market efficiency proxies include stock return synchronicity R2, future earnings response coefficient FERC, the developed-market indicator DEV, and the importance of stock market in the economy MKT. The limits to arbitrage proxies include the average idiosyncratic stock return volatility IRISK (in percentage points), the averaged annual dollar trading volume DVOL (in millions), and the indicator for short-sale permission SHORT. The proxies for investor protection and accounting quality include the creditor rights index CR, the revised anti-director rights index AD, the anti-self-dealing index AS, the accounting standards ranking ACCT, the earnings management score EMS, and the four legal origin indicators UK, FR, GE, and SC, representing English, French, German, and Scandinavian legal origins, respectively. The details of these variables are provided in Appendix A. The *p*-values for the pairwise correlations are reported in the parentheses.

Table 7: Cross-country Analysis: Market Efficiency and the Asset Growth Effect

Panel A: SPREAD as dependent variable

	Equal-weighted SPREAD					Value-weighted SPREAD				
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 1	Model 2	Model 3	Model 4	Model 5
R2	-0.305**				-0.372**	-0.329**				-0.364***
	(-2.146)				(-2.465)	(-2.116)				(-2.992)
FERC		0.041**			0.031**		0.029			0.012
		(2.124)			(2.173)		(1.526)			(0.736)
DEV			0.043***		0.032*			0.056***		0.042*
			(2.352)		(1.863)			(3.142)		(1.703)
MKT				0.063**	0.038				0.097**	0.026
				(2.415)	(1.097)				(2.368)	(0.836)
Intercept	0.062**	0.003	0.010	-0.003	0.050	0.079**	-0.005	-0.011	-0.047*	0.048
	(2.416)	(0.233)	(0.733)	(-0.101)	(1.918)	(2.339)	(-0.282)	(-0.637)	(-1.686)	(0.855)
R^2	0.106	0.0981	0.174	0.127	0.283	0.098	0.042	0.182	0.113	0.273

Panel B: SLOPE as dependent variable

	Equal-weighted SLOPE					Value-weighted SLOPE				
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 1	Model 2	Model 3	Model 4	Model 5
R2	-0.472**				-0.320*	-0.405***				-0.430***
	(-2.083)				(-1.896)	(-3.107)				(-3.374)
FERC		0.052*			0.026*		0.026*			0.039
		(1.942)			(1.932)		(1.768)			(1.244)
DEV			0.043*		0.040*			0.035**		0.030**
			(1.972)		(1.813)			(2.234)		(2.047)
MKT				0.084*	0.027				0.016	0.022
				(1.826)	(1.048)				(1.063)	(0.595)
Intercept	0.054	-0.006	0.001	-0.028	-0.033	0.102	0.015	0.015	0.034	0.096**
	(0.548)	(-0.32)	(0.034)	(-1.150)	(-0.201)	(4.464)	(0.968)	(0.147)	(1.083)	(2.324)
R^2	0.102	0.108	0.094	0.077	0.196	0.147	0.072	0.072	0.028	0.198

This table reports the results of the cross-country regressions which examine the relation between market efficiency and the asset growth effect. The dependent variables are the within-country time-series averages of the asset growth effect measures, SPREAD and SLOPE, given in local currency. SPREAD is the equal-weighted or value-weighted average of the annual return difference between the bottom and top asset growth bucket portfolios, where their returns are cumulated from July of year t to June of year $t+1$. The value weighting of SPREAD is based on firms' market capitalizations in June of year t. SLOPE is given by negative one times the time-series average of the coefficients, which are obtained by regressing buy-and-hold stock returns from July of year t to June of year $t+1$ on the asset growth rates measured over year $t-1$. The regressions are either equal-weighted or value-weighted. The value-weighted version of SLOPE is based on the weighted-least-squares regressions, where the weights are proportional to market capitalizations in June of year t. Panel A reports the regression results where the equal- or value-weighted SPREAD is used as the dependent variable. Panel B presents the regression results where the equal- or value-weighted SLOPE is used as the dependent variable. The explanatory variables are market efficiency proxies, including stock return synchronicity R2, future earnings response coefficient FREC, the developed-market indicator DEV, and the importance of stock market MKT, which are explained in detail in Appendix A. The t-statistics reported in parentheses are computed using robust standard errors. Statistical significance at the 1%, 5%, and 10% levels are indicated by ***, **, and *, respectively.

Table 8: Cross-country Analysis: Market Efficiency and the Asset Growth Effect, Controlling for Firm Protiability

Panel A: SPREAD2 as dependent variable

	Equal-weighted SPREAD2					Value-weighted SPREAD2				
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 1	Model 2	Model 3	Model 4	Model 5
R2	-0.286***				-0.327**	-0.225**				-0.294**
	(-2.894)				(-2.170)	(-2.239)				(-2.056)
FERC		0.030**			0.035*		0.032**			0.026**
		(2.296)			(1.994)		(2.480)			(1.842)
DEV			0.027*		0.033*			0.022*		0.026*
			(1.885)		(1.732)			(1.739)		(1.860)
MKT				0.034*	0.023				0.037**	0.029
				(1.910)	(1.260)				(2.258)	(1.474)
Intercept	0.078***	0.029	0.011	-0.002	0.071*	0.052**	0.073	0.013	0.006	0.138*
	(4.367)	(0.394)	(0.964)	(-0.077)	(1.966)	(2.301)	(1.390)	(1.042)	(0.185)	(1.799)
R^2	0.123	0.106	0.088	0.069	0.219	0.107	0.092	0.086	0.104	0.203

Panel B: SLOPE2 as dependent variable

	Equal-weighted SLOPE2					Value-weighted SLOPE2				
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 1	Model 2	Model 3	Model 4	Model 5
R2	-0.476*				-0.451**	-0.444*				-0.410*
	(-1.901)				(-2.119)	(-1.853)				(-1.793)
FERC		0.032**			0.026**		0.027*			0.025*
		(2.288)			(2.142)		(1.896)			(1.936)
DEV			0.034**		0.032*			0.030*		0.037*
			(2.123)		(1.797)			(1.833)		(1.773)
MKT				0.074***	0.042				0.065**	0.058
				(2.825)	(0.889)				(2.411)	(0.824)
Intercept	0.098*	0.040	0.018	-0.027	0.024	0.126***	0.143**	0.028	-0.074	0.045
	(1.987)	(1.053)	(1.023)	(-1.049)	(0.364)	(2.827)	(2.133)	(1.277)	(-1.419)	(0.619)
R^2	0.091	0.101	0.097	0.113	0.203	0.114	0.132	0.103	0.125	0.204

This table reports the results of the cross-country regressions which examine the relation between market efficiency and the profitability-controlled asset growth effect. The dependent variables are the within-country time-series averages of the alternative asset growth effect measures, SPREAD2 and SLOPE2, which are given in local currency and control for the effect of firm-level profitability. Panel A reports the regressions results when the equal- or value-weighted SREPAD2 is used as the dependent variable. In July of each year t, we sort stocks within each country into terciles based on return on equity (ROE) and further divide each ROE group into quintiles based on the asset growth rate (AG). We subsequently form five AG portfolios by combining all the stocks that are ranked into the same AG quintile but belong to the different ROE terciles. SPREAD2 is then given by the equal-weighted or value-weighted average of the annual return difference between the bottom and top AG portfolios formed in this way, where their returns are cumulated from July of year t to June of year $t+1$. The value weighting of SPREAD2 is based on firms' market capitalizations in June of year t. Panel B presents the regressions results when the equal- or value-weighted SLOPE2 is used as the dependent variable. SLOPE2 is given by negative one times the time-series average of the coefficients, which are obtained by regressing buy-and-hold stock returns from July of year t to June of year $t+1$ on both AG and ROE measured over year $t-1$. The regressions are either equal-weighted or value-weighted. The value-weighted version of SLOPE2 is based on the weighted-least-squares regressions, where the weights are proportional to firms' market capitalizations in June of year t. The explanatory variables are market efficiency proxies, including stock return synchronicity R2, future earnings response coefficient FREC, the developed-market indicator DEV, and the importance of stock market MKT, which are explained in detail in Appendix A. These variables are explained in detail in Appendix A. The t-statistics reported in parentheses are computed using robust standard errors. Statistical significance at the 1%, 5%, and 10% levels are indicated by ***, **, and *, respectively.

Table 9: Cross-country Analysis: Limits-to-Arbitrage and the Asset Growth Effect

Panel A: SPREAD as dependent variable

	Equal-weighted SPREAD				Value-weighted SPREAD			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
IRISK	0.018*			0.022**	0.027*			0.037**
	(1.896)			(2.018)	(1.964)			(2.209)
DVOL		0.009		0.023		-0.003		0.023
		(0.464)		(1.430)		(-0.074)		(0.735)
SHORT			-0.008	-0.007			0.034	0.026
			(-0.454)	(-0.339)			(1.413)	(0.831)
Intercept	-0.051	0.018	0.031**	-0.073**	-0.078*	0.011	-0.031	-0.168**
	(-1.560)	(1.383)	(2.026)	(-2.058)	(-1.747)	(0.725)	(-0.526)	(-2.307)
R^2	0.100	0.008	0.010	0.175	0.112	0.002	0.032	0.126

Panel B: SLOPE as dependent variable

	Equal-weighted SLOPE				Value-weighted SLOPE			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
IRISK	0.014			0.027	0.025			0.022
	(1.453)			(1.290)	(1.133)			(0.924)
DVOL		-0.004		0.007		0.013		0.026
		(-0.237)		(0.233)		(0.148)		(0.389)
SHORT			-0.009	-0.025			-0.035	-0.081
			(-0.129)	(-0.330)			(-0.726)	(-0.972)
Intercept	0.015	0.015	0.021	-0.053	-0.034	0.020	0.046	-0.028
	(0.336)	(0.577)	(0.292)	(-0.393)	(0.765)	(0.682)	(0.853)	(-0.334)
R^2	0.011	0.002	0.003	0.064	0.014	0.004	0.008	0.051

This table reports the results of the cross-country regressions which examine the relation between limits to arbitrage and the asset growth effect. The dependent variables are the within-country time-series averages of the asset growth effect measures, SPREAD and SLOPE, given in local currency. SPREAD is the equal-weighted or value-weighted average of the annual return difference between the bottom and top asset growth bucket portfolios, where their returns are cumulated from July of year t to June of year $t+1$. The value weighting of SPREAD is based on firms' market capitalizations in June of year t. SLOPE is given by negative one times the time-series average of the coefficients, which are obtained by regressing buy-and-hold stock returns from July of year t to June of year $t+1$ on the asset growth rates measured over year $t-1$. The regressions are either equal-weighted or value-weighted. The value-weighted version of SLOPE is based on the weighted-least-squares regressions, where the weights are proportional to firms' market capitalizations in June of year t. Panel A reports the regression results where the equal- or value-weighted SPREAD is used as the dependent variable. Panel B presents the regression results where the equal- or value-weighted SLOPE is used as the dependent variable. The explanatory variables are the limits to arbitrage proxies, including idiosyncratic stock return volatility IRISK, dollar trading volume DVOL, and permission for equity short-sale SHORT, defined in Appendix A. The t-statistics reported in parentheses are computed using robust standard errors. Statistical significance at the 1%, 5%, and 10% levels are indicated by ***, **, and *, respectively.

Table 10: Cross-country Analysis: Investor Protection, Accounting Quality, and the Asset Growth Effect

Panel A: SPREAD as dependent variable

	Equal-weighted SPREAD							Value-weighted SPREAD						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
CR	0.004						0.015	0.005						0.022
	(0.560)						(1.241)	(0.331)						(1.157)
AD		-0.002					0.005		0.004					0.005
		(-0.181)					(0.249)		(0.421)					(0.286)
AS			-0.014				-0.248**			0.018				-0.168
			(-0.449)				(-2.327)			(0.423)				(-0.969)
ACCT				0.001			0.002				0.003***			0.004***
				(0.661)			(1.376)				(2.746)			(2.791)
EMS					-0.001		0.001					-0.005**		-0.002
					(-1.239)		(0.630)					(-2.474)		(-0.667)
UK						0.028**	0.025						0.030	0.016
						(2.349)	(0.183)						(1.529)	(1.144)
FR						0.013	-0.088						-0.009	-0.248*
						(0.925)	(-0.777)						(-0.620)	(-1.895)
GE						0.034	-0.117						-0.008	-0.277*
						(1.466)	(-0.960)						(-0.314)	(-1.941)
SC						0.054***	-0.066						0.050	-0.232
						(2.902)	(-0.500)						(1.596)	(-1.642)
Intercept	0.012	0.032	0.033*	-0.014	0.052***			0.006	-0.005	0.012	-0.104	0.087***		
	(0.691)	(0.900)	(1.710)	(-0.218)	(3.827)			(0.325)	(-0.127)	(1.178)	(-2.734)	(2.952)		
R^2	0.005	0.003	0.004	0.022	0.044	0.237	0.490	0.003	0.002	0.004	0.091	0.147	0.112	0.384

Panel B: SLOPE as dependent variable

	Equal-weighted SLOPE							Value-weighted SLOPE						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
CR	-0.028						0.019	0.054						0.024
	(-0.987)						(1.206)	(1.393)						(1.471)
AD		0.003					0.013		0.009					0.018
		(0.269)					(1.138)		(0.682)					(1.316)
AS			-0.052				-0.262***			0.013				-0.251*
			(-1.170)				(-2.755)			(0.132)				(-1.983)
ACCT				-0.001			-0.001				0.002			0.003*
				(-0.504)			(-0.065)				(1.273)			(1.803)
EMS					-0.001		0.001					0.003		0.004
					(-1.203)		(0.514)					(0.452)		(1.390)
UK						0.036***	0.034						0.035*	-0.102
						(3.349)	(0.225)						(1.711)	(-0.349)
FR						0.017	-0.043						0.017	-0.162
						(0.792)	(-0.299)						(0.538)	(-1.025)
GE						-0.035	-0.106						-0.026	-0.313
						(-0.621)	(-0.679)						(-0.488)	(-1.255)
SC						0.040	-0.022						0.017	-0.031
						(1.226)	(-0.124)						(1.003)	(-0.942)
Intercept	0.083	0.004	-0.012	0.059	0.044***			-0.095	-0.017	0.032	-0.028	0.023		
	(1.215)	(0.108)	(-0.355)	(0.676)	(3.303)			(-0.833)	(-0.487)	(0.622)	(-0.256)	(1.081)		
R^2	0.044	0.002	0.016	0.013	0.032	0.116	0.322	0.072	0.015	0.009	0.009	0.023	0.073	0.267

This table reports the results of the cross-country regressions which examine the relation of investor protection and accounting quality with the asset growth effect. The dependent variables are the within-country time-series averages of the asset growth effect measures, SPREAD and SLOPE, given in local currency. SPREAD is the equal-weighted or value-weighted average of the annual return difference between the bottom and top asset growth bucket portfolios, where their returns are cumulated from July of year t to June of year $t+1$. The value weighting of SPREAD is based on firms' market capitalizations in June of year t. SLOPE is given by negative one times the time-series average of the coefficients, which are obtained by regressing buy-and-hold stock returns from July of year t to June of year $t+1$ on the asset growth rates measured over year $t-1$. The regressions are either equal-weighted or value-weighted. The value-weighted version of SLOPE is based on the weighted-least-squares regressions, where the weights are proportional to firms' market capitalizations in June of year t. Panel A reports the regression results where the equal- or value-weighted SPREAD is used as the dependent variable. Panel B presents the regression results where the equal- or value-weighted SLOPE is used as the dependent variable. The explanatory variables are proxies for investor protection and accounting quality, including the creditor rights index CR, the revised anti-director rights index AD, the anti-self-dealing index AS, the accounting standards ranking ACCT, the earnings management score EMS, and four legal origin indicators UK, FR, GE, and SC, representing English, French, German, and Scandinavian legal origins, respectively. These country characteristic variables are explained in detail in appendix A. The t-statistics reported in parentheses are computed using robust standard errors. Statistical significance at the 1%, 5%, and 10% levels are indicated by ***, **, and *, respectively.

Table 11: Cross-country Analysis: Optimal Investment Effect vs. Mispricing-based Effect

Panel A: SPREAD as dependent variable: R2 against alternatives

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
R2	-0.286*	-0.333*	-0.304*	-0.285*	-0.251	-0.254*	-0.339**	-0.314	-0.222*
	(-1.864)	(-1.946)	(-1.949)	(-1.778)	(-1.646)	(-1.770)	(-2.079)	(-1.638)	(-1.716)
IRISK	0.018*								
	(1.797)								
DVOL		0.014							
		(0.863)							
SHORT			0.004						
			(0.201)						
CR				0.004					
				(0.464)					
AD					-0.000				
					(-0.022)				
AS						-0.016			
						(-0.559)			
ACCT							0.001		
							(0.766)		
EMS								-0.002	
								(-1.111)	
UK									0.060*
									(1.857)
FR									0.045
									(1.569)
GE									0.053
									(1.608)
SC									0.103***
									(3.297)
Intercept	0.080**	0.098***	0.066*	0.045	0.063*	0.071**	0.030	0.112***	
	(2.234)	(4.124)	(1.933)	(1.392)	(1.761)	(2.251)	(0.421)	(3.605)	
R^2	0.162	0.203	0.088	0.024	0.058	0.063	0.141	0.227	0.237

Panel B: SPREAD as dependent variable: FERC against alternatives

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
FERC	0.042**	0.029*	0.029**	0.034*	0.033*	0.030*	0.025*	0.023 *	0.022
	(2.270)	(1.788)	(2.208)	(1.780)	(1.772)	(1.802)	(1.742)	(1.786)	(1.563)
IRISK	0.025*								
	(1.765)								
DVOL		0.005							
		(0.262)							
SHORT			-0.030*						
			(-1.906)						
CR				0.004					
				(0.516)					
AD					0.003				
					(0.484)				
AS						0.002			
						(0.060)			
ACCT							0.001*		
							(1.745)		
EMS								-0.001	
								(-1.209)	
UK									0.013
									(0.804)
FR									-0.005
									(-0.272)
GE									0.007
									(0.240)
SC									0.037*
									(1.981)
Intercept	-0.091**	-0.003	0.025*	-0.008	-0.008	0.003	-0.080	0.032**	
	(-2.541)	(-0.184)	(1.689)	(-0.360)	(-0.243)	(0.117)	(-1.514)	(2.137)	
R^2	0.163	0.087	0.134	0.103	0.083	0.078	0.171	0.128	0.322

Panel C: SPREAD as dependent variable: DEV against alternatives

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
DEV	0.042***	0.030*	0.045**	0.033	0.033**	0.034**	0.047**	0.031*	0.034**
	(2.77)	(1.868)	(2.505)	(1.608)	(2.216)	(2.243)	(2.557)	(1.977)	(2.095)
IRISK	0.024								
	(1.540)								
DVOL		-0.003							
		(-0.163)							
SHORT			-0.029						
			(-1.351)						
CR				0.000					
				(0.033)					
AD					-0.004				
					(-0.407)				
AS						-0.023			
						(-0.809)			
ACCT							-0.000		
							(-0.471)		
EMS								-0.001	
								(-0.768)	
UK									0.005
									(0.273)
FR									-0.007
									(-0.480)
GE									0.001
									(0.043)
SC									0.032
									(1.326)
Intercept	-0.079**	0.009	0.025	0.004	0.022	0.021	0.028	0.025	
	(-2.582)	(0.671)	(1.562)	(0.220)	(0.592)	(0.937)	(0.473)	(1.616)	
R^2	0.146	0.082	0.165	0.067	0.098	0.104	0.170	0.165	0.272

Panel D: SPREAD as dependent variable: MKT against alternatives

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
MKT	0.064**	0.055**	0.074***	0.049	0.075***	0.076***	0.069***	0.064***	0.056**
	(2.490)	(3.605)	(3.163)	(1.443)	(3.645)	(3.545)	(2.952)	(3.184)	(2.518)
IRISK	0.018								
	(1.462)								
DVOL		0.015							
		(0.867)							
SHORT			-0.013						
			(-0.845)						
CR				-0.001					
				(-0.085)					
AD					-0.010				
					(-1.270)				
AS						-0.039			
						(-1.591)			
ACCT							-0.001		
							(-0.037)		
EMS								-0.001	
								(-0.420)	
UK									-0.025
									(-1.102)
FR									-0.026
									(-1.199)
GE									0.004
									(0.145)
SC									-0.001
									(-0.005)
Intercept	-0.019	-0.024	-0.022	-0.014	0.005	-0.013	-0.029	-0.101	
	(-0.713)	(-0.227)	(-1.059)	(-0.451)	(0.128)	(-0.500)	(-0.496)	(-0.484)	
R^2	0.215	0.058	0.158	0.039	0.155	0.148	0.145	0.232	0.360

Panel E: SLOPE as dependent variable: R2 against alternatives

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
R2	-0.420*	-0.550***	-0.398*	-0.305*	-0.377	-0.389	-0.482*	-0.725*	-0.389*
	(-1.965)	(-3.229)	(-1.727)	(-1.723)	(-1.488)	(-1.522)	(-1.834)	(-1.977)	(-1.777)
IRISK	0.012								
	(0.756)								
DVOL		0.001							
		(0.033)							
SHORT			0.002						
			(0.057)						
CR				0.012					
				(0.729)					
AD					0.003				
					(0.253)				
AS						-0.012			
						(-0.285)			
ACCT							0.001		
							(1.218)		
EMS								0.001	
								(0.323)	
UK									0.074
									(1.551)
FR									0.078
									(1.640)
GE									0.055
									(1.056)
SC									0.138***
									(2.868)
Intercept	0.035*	0.142***	0.077	0.039	0.063	0.084	0.054	0.148**	
	(0.063)	(3.899)	(1.385)	(0.491)	(0.930)	(1.545)	(0.827)	(2.395)	
R^2	0.125	0.205	0.064	0.019	0.062	0.062	0.134	0.196	0.142

Panel F: SLOPE as dependent variable: FERC against alternatives

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
FERC	0.043*	0.040*	0.042**	0.038 *	0.045**	0.048**	0.045**	0.046**	0.039*
	(1.915)	(1.789)	(2.444)	(1.735)	(2.429)	(2.334)	(2.069)	(2.199)	(1.724)
IRISK	0.021								
	(1.550)								
DVOL		-0.019							
		(-0.477)							
SHORT			-0.037						
			(-1.470)						
CR				-0.001					
				(-0.030)					
AD					0.001				
					(0.125)				
AS						-0.007			
						(-0.156)			
ACCT							0.001		
							(0.547)		
EMS								-0.001	
								(-0.216)	
UK									-0.008
									(-0.272)
FR									-0.011
									(-0.488)
GE									-0.017
									(-0.252)
SC									0.027
									(1.064)
Intercept	-0.079	0.010	0.019	0.021	-0.012	-0.004	-0.041	0.006	
	(-1.442)	(0.420)	(0.949)	(0.524)	(-0.232)	(-0.126)	(-0.695)	(0.241)	
R^2	0.117	0.039	0.125	0.027	0.091	0.091	0.108	0.103	0.229

Panel G: SLOPE as dependent variable: DEV against alternatives

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
DEV	0.043*	0.054**	0.061**	0.059*	0.050**	0.050**	0.073**	0.045	0.046*
	(1.847)	(2.127)	(2.347)	(1.826)	(2.383)	(2.307)	(2.196)	(1.415)	(2.019)
IRISK	0.021								
	(1.273)								
DVOL		-0.033							
		(-0.852)							
SHORT			-0.034						
			(-1.025)						
CR				0.006					
				(0.389)					
AD					0.000				
					(0.028)				
AS						-0.004			
						(-0.121)			
ACCT							-0.001		
							(-0.871)		
EMS								0.000	
								(0.204)	
UK									0.003
									(0.170)
FR									-0.001
									(-0.007)
GE									-0.001
									(-0.019)
SC									0.018
									(0.495)
Intercept	-0.074	0.006	0.023	-0.003	-0.010	0.003	0.040	0.005	
	(-1.282)	(0.365)	(0.862)	(-0.056)	(-0.010)	(0.115)	(0.890)	(0.143)	
R^2	0.088	0.154	0.143	0.051	0.114	0.115	0.183	0.083	0.209

Panel H: SLOPE as dependent variable: MKT against alternatives

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
MKT	0.046*	0.062*	0.072**	0.068*	0.081***	0.076**	0.068**	0.056*	0.067**
	(1.776)	(1.987)	(2.542)	(1.892)	(3.019)	(2.699)	(2.285)	(1.850)	(2.289)
IRISK	0.012								
	(0.863)								
DVOL		0.018							
		(1.142)							
SHORT			-0.006						
			(-0.240)						
CR				0.004					
				(0.315)					
AD					-0.010				
					(-1.136)				
AS						-0.020			
						(-0.642)			
ACCT							0.000		
							(0.289)		
EMS								0.001	
								(0.719)	
UK									-0.034
									(-1.184)
FR									-0.033
									(-1.270)
GE									-0.005
									(-0.125)
SC									0.005
									(0.133)
Intercept	-0.059	-0.029	-0.023	-0.021	0.002	-0.022	-0.036	-0.018	
	(-1.070)	(-0.901)	(-0.693)	(-0.263)	(0.047)	(-0.776)	(-0.856)	(-0.448)	
R^2	0.057	0.097	0.118	0.037	0.145	0.123	0.131	0.111	0.342

This table reports the results of cross-country regressions that examine the effect of market efficiency jointly with the effect of limits to arbitrage and the effect of investor protection and accounting quality. The dependent variables are the within-country time-series averages of the asset growth effect measures, SPREAD and SLOPE, given in local currency. SPREAD is the equal-weighted average of the annual return difference between the bottom and top asset growth bucket portfolios, where their returns are cumulated from July of year t to June of year $t+1$. SLOPE is given by negative one times the time-series average of the coefficients, which are obtained by regressing buy-and-hold stock returns from July of year t to June of year $t+1$ on the asset growth rates measured over year $t-1$. In each regression, the explanatory variables include one of the four market efficiency proxies (R2, FERC, DEV, and MKT) and a proxy for either limits to arbitrage (IRISK, DVOL, and SHORT) or investor protection and accounting quality (CR, AD, AS, ACCT, EMS, and four legal origin indicators). The legal origin indicators are always included jointly. These country characteristics are explained in detaile in Appendix A. The t-statistics reported in parentheses are computed using robust standard errors. Statistical significance at the 1%, 5%, and 10% levels are indicated by ***, **, and *, respectively.