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National cultures and the asset growth effect

Robin K. Chou
Department of Finance, National Chengchi University, Taipei City, Taiwan
Kuan-Cheng Ko
College of Management, National Chi Nan University, Puli, Taiwan, and
S. Ghon Rhee
University of Hawai'i at Manoa, Honolulu, Hawaii, USA

Abstract

National cultures significantly explain cross-country differences in the relation between asset growth and stock returns. Motivated by the notion that managers in individualistic and low uncertainty-avoiding cultures have a higher tendency to overinvest, this study aims to show that the negative relation between asset growth and stock returns is stronger in countries with such cultural features. Once the researchers control for cultural dimensions, proxies associated with the q-theory, limits-to-arbitrage, corporate governance, investor protection and accounting quality provide no incremental power for the relation between asset growth and stock returns across countries. Evidence of this study highlights the importance of the overinvestment hypothesis in explaining the asset growth anomaly around the world.

Keywords Asset growth, Individualism, Uncertainty avoidance, Overinvestment, International equity markets

Paper type Research paper

1. Introduction

Several recent studies document a negative relation between corporate investment and future stock returns, which is often referred to as investment or asset growth anomaly (Baker *et al.*, 2003; Titman *et al.*, 2004; Anderson and Garcia-Feijóo, 2006; Cooper *et al.*, 2008). A plausible explanation for this phenomenon is the overinvestment hypothesis, which indicates that managers who are subject to the agency problem are prone to invest in projects with negative net present values, leading to the overinvestment problem (Titman *et al.*, 2004). If investors are unaware of the agency problem of managers' overinvestment, they may overvalue firms with substantial investments. The subsequent underperformance of such firms thus reflects the market correction of initial overvaluation caused by investors.

Follow-up empirical studies mostly document evidence in favor of alternative explanations rather than the overinvestment hypothesis as the underlying cause of the asset growth anomaly. Li and Zhang (2010) and Lipson *et al.* (2011) both indicate that the anomaly is stronger among stocks with higher arbitrage costs, consistent with the mispricing-based explanation. Lam and Wei (2011) provide supportive evidence for both the q-theory with investment frictions and

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limits-to-arbitrage theory in explaining the asset growth effect. In addition to the US market, international evidence from Titman *et al.* (2013) and Watanabe *et al.* (2013) show that the asset growth effect is stronger in more developed financial markets and markets where stocks are more efficiently priced. The evidence is again consistent with the prediction of the q-theory and contradicts the overinvestment hypothesis for the asset growth anomaly.

In this paper, we expand the literature on the asset growth effect by bringing in two dimensions of national cultures associated with managerial overconfidence and uncertainty avoidance to examine the overinvestment hypothesis in an international framework. We propose that the two cultural dimensions play important roles to characterize managers' overinvestment behaviors, which in turn lead to the cross-country differences in the asset growth effect.

First, if managers are overconfident about their abilities or the future prospects of corporate investments, they are more likely to overinvest. A conspicuous feature of overconfidence is proxied by individualism, which reflects the degree to which people focus on their internal attributes, such as their own abilities, to differentiate themselves from others (Hofstede, 1980, 2001). A higher degree of individualism thus signifies stronger overconfidence (Chui *et al.*, 2010; Chen *et al.*, 2015) and more risk-taking decisions by both corporations and households (Li *et al.*, 2013; Shao *et al.*, 2013; Breuer *et al.*, 2014). Second, a potential element of overinvestment is managers' risk attitude toward uncertain outcomes. Because the future output of corporate investment is uncertain, managers who are more willing to accept uncertainty have higher possibilities to overinvest. As a result, managers who are less prone to uncertainty avoidance are more likely to undertake risky investment projects, leading to severer overinvestment problem.

Motivated by the psychological nature of the two cultural dimensions, we posit that managers in more individualistic and low uncertainty-avoiding cultures have higher tendency to overinvest. If overinvestment hypothesis is the underlying reason for the asset growth effect, the two cultural psychologies should have significant impacts on the relation between asset growth and subsequent returns. To explore this issue, we employ the individualism and uncertainty avoidance index developed by Hofstede (1980, 2001) and Hofstede *et al.* (2010) to capture cross-country differences in the asset growth effect.

Confirming Titman *et al.* (2013) and Watanabe *et al.* (2013), we first verify the overall existence of the asset growth effect around the world. During the period from July 1986 to December 2013, we formed decile portfolios based on firms' values of asset growth and calculated the asset growth premium as the difference between bottom and top deciles with equal or value weights within each of the 41 sample countries. We then calculate the average premium across countries, which amounts to a significant profit of 0.540% (0.260%) per month when portfolios are constructed based on equal (value) weights.

We next consider the impacts of individualism and uncertainty avoidance by calculating asset growth premia within groups partitioned by each of the two indices. We show that the average premium among individualistic countries is 0.750% per month, which is remarkably higher than the average premium among collectivistic countries by 0.514%. Analogously, low uncertainty-avoiding countries have a significant asset growth premium of 0.624% per month, which is remarkably higher than the asset growth premium averaged across high uncertainty-avoiding countries by 0.500%. The findings are robust in several ways, including the value-weighted scheme, the exclusion of the US market and denominations using local currencies. Furthermore, we confirm the effectiveness of individualism and uncertainty avoidance in distinguishing the asset growth premia across countries in Fama and MacBeth (1973) cross-sectional regressions, in which we control for size, book-to-market (BM) and momentum effects. These findings indicate that the support for the overinvestment hypothesis based on the two cultural psychologies to explain the asset growth anomaly across countries is quite reliable and consistent.

In a recent study, Artikis *et al.* (2022) also examine the relation between asset growth and stock returns based on an international framework by using data from the European stock markets. They propose that the high asset growth is attributed to the less efficient use of existing capital. Because investors initially do not fully respond to this signal, subsequent negative price reaction occurs to reflect this information. By decomposing asset growth into two components, they show that the effect of the investment growth component on stock returns is stronger in high individualistic countries while the effect of the accounting distortions and/or efficiency component is stronger in low individualistic countries. In their study, individualism is used as a proxy of market development and efficiency. While our argument is built based on the overinvestment hypothesis, individualism plays different roles in Artikis *et al.* (2022) and our study.

To ensure the creditability of our argument associated with the asset growth anomaly and national cultures, it is important to obtain supportive evidence for the overinvestment hypothesis. We do so by considering the impact of investment discretion on the asset growth effect across countries. Motivated by Titman *et al.*'s (2004) argument that firms with lower debt ratios have greater investment discretion and thus higher capacity of overinvestment, we hypothesize stronger impacts of national cultures in the subsample of firms with lower debt ratios. We first show that higher asset growth premium among firms with less debt is a pervasive phenomenon across international equity markets. Taking both firm-level debt ratios and national cultures into consideration simultaneously, we show that the stronger asset growth premia among firms with lower debt ratios are concentrated in countries with high individualistic and low uncertainty-avoiding cultures. This observation thus confirms the support for the overinvestment hypothesis in explaining asset growth premia in international markets.

Our study differs from Artikis *et al.* (2022) in two aspects. The first uniqueness of our study is to highlight the overinvestment hypothesis for the asset growth anomaly based on the notion that managers in more individualistic and low uncertainty-avoiding cultures have higher tendency to overinvest. The use of individualism in Artikis *et al.* (2022), however, is motivated by Papanastasopoulos (2014), who argues that higher overconfidence and lower conservatism enable investors to react more completely to new firm-specific information. Our study is distinct from Artikis *et al.* (2022) in that we emphasize the overinvestment behavior of managers while they focus on investors' reactions.

The second difference is that our sample has a higher coverage as we include 41 international countries, while Artikis *et al.*'s (2022) analyses are conducted based on 16 European countries. European countries on average are relatively more individualistic while Asian countries are mostly collectivistic. The average individualism score of our sample is 50 while their average individualism score is 66. Hence, our study is implemented based on a broader sample that covers both individualistic and collectivistic countries and hence our results are less subject to the sample selection bias.

We next contrast our results with alternative explanations based on proxies of the q-theory. In particular, Titman *et al.* (2013) and Watanabe *et al.* (2013) document that managers in more developed or efficiently priced capital markets have higher willingness or ability to increase investments when the cost of capital is lower, leading to stronger asset growth effects in such markets. We confirm the evidence of Titman *et al.* (2013) and Watanabe *et al.* (2013) that the asset growth premia are higher among countries with higher values of market development or efficiency. However, the explanatory power of market development and efficiency disappears when we take individualism and uncertainty avoidance into consideration. More importantly, the two cultural indices significantly explain the cross-country asset growth premia after controlling for proxies of the q-theory.

In addition to cultural and market development dimensions, we consider the plausible roles of several country-level indices that are associated with limits-to-arbitrage, corporate

governance, investor protection and accounting quality. We demonstrate the dominant roles of individualism and uncertainty avoidance in explaining the differences in the asset growth effect across countries conditional on the impacts of alternative explanations. This evidence again confirms the importance of the overinvestment hypothesis as the underlying reason for the asset growth effect across international equity markets.

Our study contributes to the finance literature and the cross-cultural psychology literature in three ways. First, while existing studies attribute the asset growth effect to the q-theory or limits-to-arbitrage, our study highlights the plausible room for overinvestment to explain the anomaly. In particular, managers' overconfidence implied by high individualism and risk-taking implied by low uncertainty avoidance are two important channels of this overinvestment-driven asset growth effect. In light of this finding, we highlight the importance of behavioral psychology to characterize the mispricing-based explanation of the asset growth effect.

Second, our study expands on the growing importance of national cultures in corporate decisions. Existing studies have demonstrated that national cultures are significantly related to corporate investments (Shao *et al.*, 2013), takeovers (Frijns *et al.*, 2013), risk-taking (Li *et al.*, 2013; Kanagaretnam *et al.*, 2014), cash holdings (Chen *et al.*, 2015) and the cost of debt (Chui *et al.*, 2016). Our study contributes to this growing body of literature by showing that national cultures affect not only managers' investment decisions but also investors' reactions to expanding corporate investments. As potential extensions of our study, whether and how national cultures affect market reactions to other corporate events become interesting issues that deserve further investigation.

Finally, our study enriches the emerging literature that unites national cultures and asset pricing. To the best of our knowledge, Chui *et al.* (2010), Eun *et al.* (2015) and Artikis *et al.* (2022) are the only studies that investigate the impacts of national cultures on stock return patterns in international equity markets [1]. We add to this stream of literature by providing robust evidence that national cultures have significant impacts on the relation between corporate investments and stock returns. Our study also has important implications for practitioners in that investors should be aware of the cultural differences when they trade on the information embedded in corporate investments (or asset growth) across different countries.

The rest of the paper is organized as follows. In Section 2, we discuss the competing explanations of the asset growth anomaly and develop the linkage between national cultures and the overinvestment hypothesis for the anomaly. Section 3 describes the variable selections and the data used in this paper. We present the main results in Section 4 and provide evidence for the overinvestment hypothesis in Section 5. We next demonstrate the validity of our evidence conditional on several alternative explanations in Section 6. Section 7 concludes the paper.

2. Literature review and hypotheses development

2.1 Explanations of the asset growth effect

Baker *et al.* (2003) initiate the investigation on the relation between corporate investment and stock returns by showing that current capital expenditures are negatively associated with future stock returns. Titman *et al.* (2004) and Anderson and Garcia-Feijóo (2006) show that the negative investment-return relation is particularly driven by the underperformance of firms that substantially increase capital expenditures. Cooper *et al.* (2008) use total asset growth to capture a firm's overall investment and find that firms with low asset growth substantially outperform those with high asset growth. Possible explanations for the asset growth anomaly can be categorized into two competing streams, namely, behavioral explanations based on mispricing and the rational explanations based on the q-theory.

One form of mispricing is associated with overinvestment of corporations [2]. Motivated by Jensen's (1986) argument that managers who are empire builders have higher incentive to increase investment expenditure, Titman *et al.* (2004) attribute the asset growth anomaly to managers' overinvestment. If investors underreact to the negative information implied in overinvestment into stock prices, stock prices are subject to decline subsequently. This channel thus leads to the observed negative investment-return relation. In particular, they show that the negative relation between investment and stock returns is stronger among firms with higher capacity to invest, i.e. firms with lower debt ratios and higher free cash flows.

The q-theory of investment, which is proposed by Cochrane (1991, 1996), argues that the asset growth anomaly is induced because of managers' ability to align corporate investment when the expected return, i.e. cost of capital, is lower [3]. Because a lower cost of capital implies a higher net present value of new project, value-maximizing managers tend to increase corporate investment when the expected return is lower, resulting in a negative investment-return relation. Li and Zhang (2010) further propose that compared with frictionless investments, investments with friction are less responsive to changes in the expected return. As a result, the q-theory with investment frictions predicts that the asset growth anomaly is stronger among firms with higher investment frictions.

Li and Zhang (2010), however, indicate weak evidence for the q-theory with investment frictions in explaining the anomaly. In particular, Li and Zhang (2010) and Lipson *et al.* (2011) both indicate that the anomaly is stronger among stocks with higher arbitrage costs, supporting the mispricing-based explanations for the asset growth effect. Lam and Wei (2011), on the other hand, show that proxies for limits-to-arbitrage and the q-theory with investment frictions are often highly correlated, and that evidence based on equally-weighted portfolios is in support of both hypotheses.

The literature has also documented evidence in support of the q-theory in examining the cross-country differences in the asset growth effect. Watanabe *et al.* (2013) propose that managers in more developed or efficiently priced capital markets are more likely to make optimal investments. Their evidence of stronger asset growth effect in developed or more efficient markets is thus consistent with the prediction of the q-theory. Titman *et al.* (2013), on the other hand, initiate the idea of using market development to distinguish the q-theory from the overinvestment hypothesis. They argue that in more developed markets with stronger market disciplines, firm managers have a higher willingness or ability to increase corporate investments when expected returns are lower. In less developed markets where market disciplines are weaker, managers are more subject to social objectives or agency problems than value-maximizing objectives. As a result, the q-theory combined with market disciplines predicts stronger asset growth effect in more developed markets while the overinvestment hypothesis predicts stronger asset growth effect in less developed markets. By showing that the asset growth effect is stronger in more developed markets, Titman *et al.* (2013) support the q-theory and against the overinvestment hypothesis for the asset growth anomaly.

Artikis *et al.* (2022) provide an alternative explanation for the cross-country differences in the asset growth effect. They decompose asset growth into two components related to real investment growth and accounting distortions and/or reduced efficiency, respectively. While both components play significant and complementary roles in affecting the asset growth anomaly in European equity markets, the effect of the real investment growth (accounting distortions and/or reduced efficiency) component on stock returns is stronger in countries with higher (lower) degree of market efficiency. In their study, individualism is used to measure market efficiency because Papanastasopoulos (2014) argues that higher overconfidence and lower conservatism enable investors to react more completely to new firm-specific information.

2.2 Individualism and the asset growth effect

Hofstede (1980, 2001) defines individualism as the degree to which people tend to hold an independent rather than an interdependent self-image or sense of self-esteem. In addition, people in individualistic cultures focus more on how their abilities differentiate them from their peers and hence exhibit overconfidence and self-attribution biases. Motivated by the psychological feature of individualism, the literature suggests that investors in individualistic cultures are more likely to be overconfident about their ability in acquiring and analyzing information. As a result, individualistic cultures exhibit less herding behavior (Beckmann *et al.*, 2008), higher momentum profits (Chui *et al.*, 2010) and lower stock price comovements (Eun *et al.*, 2015).

Individualism also influences corporate investment decisions through the channel of manager overconfidence. Within this channel, Malmendier and Tate (2005) verify the linkage between managers' overconfidence and overinvestment, and a vast literature demonstrates evidence that managers in individualistic cultures are more confident about their ability in making corporate decisions [4]. Based on the implication of individualism for risk-taking, Shao *et al.* (2013) empirically show that firms in individualistic cultures tend to use excess cash to invest more in long-term risky assets.

Given the reliable channel between individualism and overinvestment and the prediction of the overinvestment argument for the asset growth anomaly as discussed above, we propose the first testable hypothesis as follows:

H1. Based on the prediction of the overinvestment hypothesis, the asset growth effect is stronger in individualistic cultures than in collectivistic cultures.

2.3 Uncertainty avoidance and the asset growth effect

The second hypothesis relates the asset growth anomaly to the cultural dimension of uncertainty avoidance. By its definition, uncertainty avoidance refers to the degree to which people feel uncomfortable with a sense of uncertainty or ambiguity (Hofstede, 1980, 2001). As a result, high uncertainty avoidance leads to conservative behavior and low-risk tolerance. The literature provides ample evidence that firms in low uncertainty-avoiding cultures undertake more risk (Li *et al.*, 2013), hold less cash (Chen *et al.*, 2015) and enjoy higher takeover premium (Frijns *et al.*, 2013) and more corporate innovation (Chen *et al.*, 2017).

Uncertainty can also affect corporate investments. Based on the real options model, Dixit and Pindyck (1994), Leahy and Whited (1996) and Bloom *et al.* (2007) suggest that uncertainty increases real option values, making firms more cautious about investment behaviors. We hypothesize that with higher degree of uncertainty avoidance, uncertainty could enhance managers' conservative investment behaviors, resulting in lower possibility of overinvestment. For managers in low uncertainty-avoiding cultures, they are less sensitive to uncertainty when making investment decisions. They thus have higher possibility to overinvest. That is, there is a negative relation between uncertainty avoidance and overinvestment. Combining this negative uncertainty avoidance-overinvestment relation and the overinvestment hypothesis for the asset growth anomaly, we propose the second testable hypothesis as follows:

H2. Based on the prediction of the overinvestment hypothesis, the asset growth effect is stronger in low uncertainty-avoiding cultures than in high uncertainty-avoiding cultures.

It is worth noting that our H1 and H2 are developed based on the predictions of the overinvestment hypothesis for the asset growth effect. In the later part of empirical analyses, we set up the q-theory, limits-to-arbitrage and other dimensions of countrywide indices as alternative explanations to examine the robustness of our results.

3. Data description and variable selection

Our sample consists of listed domestic common stocks from international equity markets for the sample period from July 1982 (which varies with countries) to December 2013. With the exception of the US sample that comes from the Center for Research in Security Prices and Compustat databases, we obtain stock returns and accounting data from Datastream International provided by Thomson Financial. For the main analyses, we convert returns into US dollars. We show in Section 4.2 that our results are virtually the same when returns are measured in local currencies. Following prior literature, we include all domestic common stocks listed on the major exchange(s) in each country and exclude financial firms, closed-end funds, trusts, American depositary receipts, real estate investment trusts and units of beneficial interest. We require individual stocks to have nonnegative book values of equity and sufficient data to compute asset growth and market returns.

Following Chui *et al.* (2010) and Titman *et al.* (2013), we adopt several screening processes and filters for Datastream data. First, we require each country to have at least 30 stocks with available data in any month during our sample period to obtain a reasonable number of stocks to form asset growth portfolios. This criterion results in a final sample consisting of 41 countries [5]. Second, accounting and market variables are winsorized to the 99th percentile and the 1st percentile values within the country. Finally, we set monthly returns of firms that are larger (less) than 100% (−95%) equal to 100% (−95%). The two adjustments enable us to filter out suspicious stock returns and to ensure that extremely small or illiquid stocks do not drive the asset growth effect.

We obtained data on individualism (IDV) and uncertainty avoidance index (UAI) for our sample countries from Hofstede (1980, 2001) and Hofstede *et al.* (2010). The two indices are constructed based on Geert Hofstede's psychological survey of IBM employees with about 88,000 respondents, which was conducted twice (1968 and 1972) in 72 countries. The IDV index is calculated as mean scores on 14 questions for a country about the employees' attitudes toward their work and private lives. The UAI index is calculated as the country's mean scores on three questions that are related to rule orientation, employment stability and stress.

By its definition, higher value of IDV signifies higher possibility that people living in more individualistic cultures are overly optimistic and overconfident (Chui *et al.*, 2010). In addition, lower value of UAI signifies higher possibility of risk-taking because people who live in high uncertainty-avoiding cultures are more risk-averse (Li *et al.*, 2013). According to our hypotheses, higher value of IDV and lower value of UAI represent higher tendency of overinvestment.

A general critique of Hofstede's cultural measures is that they do not change over time (e.g. Baskerville, 2003, 2005; Kirkman *et al.*, 2006). Tang and Koveos (2008) posit that since societal characteristics such as language, religion, climate, ethnic homogeneity and legal origin change very little over time, they are not relevant to the updates of national culture. In addition, Hofstede's cultural measures, especially IDV and UAI, have been widely adopted in international asset pricing and corporate finance studies (e.g. Chui *et al.*, 2010; Frijns *et al.*, 2013; Li *et al.*, 2013; Shao *et al.*, 2013; Chen *et al.*, 2015; Eun *et al.*, 2015; Chui *et al.*, 2016; Chen *et al.*, 2017; Griffin *et al.*, 2017), hence the academic research has widely recognized the creditability of the two measures.

Since our analyses are conducted by differentiating the relation between asset growth and stock returns across countries, which is a concept of cross-sectional comparison, the time variation in national cultures might have limited impact on our results. Hence we consider Hofstede's cultural measures of IDV and UAI in the main analyses of our study. To capture the time variation in national cultures, we follow Ahern *et al.*'s (2015) approach by using data from the World Values Survey (WVS) to construct an alternative proxy of individualism. As mentioned by Ahern *et al.* (2015), the survey was carried out in five waves of surveys in

1981–1984, 1989–1993, 1994–1998, 1999–2004 and 2005–2008. Their measure of individualism is based on the following question:

> How would you place your views on this scale? 1 means you completely agree with the statement on the left; 10 means you agree completely with the statement on the right; and if your views fall somewhere in between, you can choose any number in between. Incomes should be made more equal We need larger income differences as incentives for individual effort

Based on this definition, countries placing greater weight on individual effort are viewed as more individualistic. We use this proxy in further analyses as a robustness check, with the results presented and discussed in Section 4.4 [6].

The main variable of our interest is the growth rate of a firm's total assets. Following Cooper *et al.* (2008), we define a firm's asset growth (TAG) for every July in year t to June in year $t+1$ as its percentage change in total assets (TA) from fiscal year $t-2$ to fiscal year $t-1$, denoted as $TAG_{t-1}=(TA_{t-1}-TA_{t-2})/TA_{t-2}$. To obtain the asset growth premium for each country, we first rank individual stocks in ascending order based on TAG_{t-1} at the end of June in year t. Firms are classified into deciles, with TAG_{t-1} values ranked in the bottom 10% assigned to the AG1 portfolio and those ranked in the top 10% assigned to the AG10 portfolio. The portfolios are held with equal or value weights from July of year t to June of year $t+1$ and are rebalanced at the end of June every year. The asset growth premium of a country is then calculated as the difference in returns between AG1 and AG10 portfolios (AG1−AG10) within the country, which is expected to be positive if the effect exists in the country. We then calculate and test the average returns with t-statistics adjusted for autocorrelation and heteroskedasticity using Newey and West's (1987) standard errors.

Table 1 lists the countries included in our study along with their scores on IDV and UAI, as well as corresponding asset growth premia calculated based on equal and value weights. The average number of firms in a year across all countries is 392, and the average scores on IDV and UAI are 50 and 62, respectively. We also calculate the country-average asset growth premium averaged across all countries, which equal weight each country-specific premium. The country-average premium is 0.431% per month (t-statistic = 3.60) with country-specific portfolios constructed using equal weights and is 0.299% per month (t-statistic = 2.14) with country-specific portfolios constructed using value weights; both are significant at the 5% significance level.

Table 1 also reveals the plausible relations between asset growth premia and national cultures. Taking the portfolios with equal weights as an example, among the 21 countries with IDV scores higher than the average value, 10 out of them have significantly positive asset growth premia. As a comparison, only 3 out of the 20 countries with below-average IDV scores have significantly positive asset growth premia. Corresponding fractions for the value-weighted scheme are 10 of 21 countries and 2 of 20 countries for above- and below-average countries, respectively.

Analogously, a negative relation between asset growth premium and uncertainty avoidance is also observable in Table 1. For equally- (value-)weighted portfolios, 9 (8) out of 21 countries with UAI scores below the average value have significantly positive asset growth premia. Nevertheless, only 4 out of 20 countries with UAI scores above the average value have significantly positive asset growth premia, regardless of the weighting scheme. These observations thus suggest the possibility that asset growth premia are positively correlated with individualism and are negatively correlated with uncertainty avoidance. In addition to these preliminary observations in Table 1, we conduct comprehensive empirical analyses and provide convincing evidence in support of our hypotheses in the following sections.

Table 1.
Summary statistics and asset growth premia across countries

Country	Period	N	IDV	UAI	Equally-weighted returns				Value-weighted returns			
					AG1	AG10	AG1-AG10		AG1	AG10	AG1-AG10	
Argentina	1989–2013	43	46	86	0.841	−0.039	0.881	(1.23)	0.269	0.017	0.253	(0.30)
Australia	1982–2013	588	90	51	1.505	0.321	1.183***	(4.22)	1.128	0.342	0.785**	(2.34)
Austria	1982–2013	66	55	70	0.293	−0.181	0.474	(0.86)	1.236	−0.159	1.395**	(2.12)
Bangladesh	2007–2013	31	20	60	2.452	0.422	2.030	(1.23)	2.386	0.874	1.512	(0.80)
Belgium	1982–2013	103	78	97	0.740	−0.051	0.791**	(2.52)	0.682	0.622	0.060	(0.14)
Brazil	1991–2013	154	38	76	0.474	1.084	−0.610	(-0.82)	1.792	0.837	0.955	(0.82)
Canada	1982–2013	618	80	48	1.292	0.899	0.393	(1.24)	1.294	0.301	0.993**	(2.28)
Chile	1989–2013	107	23	86	0.311	0.862	−0.550	(−1.55)	0.120	1.109	−0.989*	(−1.82)
China	1991–2013	733	20	30	2.476	1.866	0.609	(1.17)	2.404	1.612	0.792	(1.39)
Denmark	1982–2013	144	74	23	0.966	0.190	0.776***	(2.80)	1.130	0.233	0.898***	(2.61)
Finland	1987–2013	109	63	59	0.816	0.224	0.593	(1.25)	0.037	0.101	−0.065	(−0.10)
France	1982–2013	554	71	86	0.982	0.030	0.952**	(2.27)	1.428	−0.452	1.880***	(3.15)
Germany	1982–2013	477	67	65	0.404	−0.738	1.142**	(2.13)	1.011	−0.306	1.317*	(1.70)
Greece	1988–2013	183	35	112	0.141	−0.292	0.432	(0.94)	−0.397	−0.156	−0.241	(−0.30)
Hong Kong	1982–2013	474	25	29	1.471	0.827	0.644**	(2.01)	0.672	0.708	−0.036	(−0.10)
India	1991–2013	268	48	40	1.854	0.142	1.711***	(3.27)	1.328	−0.748	2.076***	(2.61)
Indonesia	1991–2013	221	14	48	0.985	0.646	0.339	(0.86)	−0.031	−0.193	0.162	(0.27)
Ireland	1982–2013	152	70	35	0.319	0.381	−0.063	(−0.16)	1.361	−0.353	1.714*	(1.69)
Israel	1994–2013	186	54	81	0.246	0.506	−0.261	(−0.69)	0.669	0.556	0.113	(0.19)
Italy	1982–2013	220	76	75	0.361	0.229	0.132	(0.45)	−0.011	0.237	−0.249	(−0.55)
Japan	1982–2013	1,808	46	92	0.712	0.406	0.306	(1.53)	0.403	0.329	0.075	(0.27)
South Korea	1984–2013	613	18	85	0.489	0.538	−0.050	(−0.14)	−0.148	0.778	−0.926**	(−2.07)
Malaysia	1982–2013	418	26	36	1.104	1.034	0.070	(0.24)	0.889	0.958	−0.069	(−0.20)
Mexico	1988–2013	91	30	82	0.038	1.038	−1.000**	(−2.09)	0.407	0.705	−0.299	(−0.49)
Netherlands	1982–2013	116	80	53	0.352	0.106	0.246	(0.49)	0.976	1.014	−0.038	(−0.05)
New Zealand	1986–2013	83	79	49	0.413	1.846	−1.432	(−1.24)	1.965	3.299	−1.334	(−1.20)
Norway	1982–2013	133	69	50	0.893	0.567	0.326	(0.88)	0.471	0.835	−0.364	(−0.79)
Pakistan	1992–2013	95	14	70	1.649	0.173	1.476***	(3.12)	1.281	−0.197	1.478**	(2.26)
Philippines	1990–2013	143	32	44	1.132	0.921	0.211	(0.41)	0.124	0.527	−0.404	(−0.59)
Poland	1994–2013	117	60	93	2.016	0.448	1.568	(1.12)	1.978	0.840	1.138	(0.82)
Portugal	1988–2013	58	27	104	0.043	−0.093	0.135	(0.22)	−0.011	−0.251	0.240	(0.36)

(*continued*)

Table 1.

Country	Period	N	IDV	UAI	Equally-weighted returns AG1	AG10	AG1-AG10		Value-weighted returns AG1	AG10	AG1-AG10	
Singapore	1982–2013	245	20	8	1.067	1.022	0.045	(0.17)	0.838	0.792	0.046	(0.15)
South Africa	1982–2013	198	65	49	1.498	0.546	0.952***	(2.91)	0.921	0.619	0.302	(0.83)
Spain	1986–2013	116	51	86	0.415	0.432	−0.017	(−0.05)	0.042	0.332	−0.290	(−0.54)
Sweden	1982–2013	248	71	29	0.959	0.226	0.733**	(2.43)	1.185	0.349	0.836*	(1.87)
Switzerland	1982–2013	207	69	56	0.656	0.256	0.400*	(1.83)	1.029	0.814	0.215	(0.63)
Taiwan	1990–2013	709	17	69	0.570	0.550	0.021	(0.04)	−0.093	0.776	−0.869	(−1.61)
Thailand	1989–2013	351	20	64	0.470	0.451	0.019	(0.05)	−0.907	0.289	−1.196	(−1.65)
Turkey	1989–2013	158	37	85	6.102	6.613	−0.511	(−0.73)	5.797	6.538	−0.742	(−0.86)
UK	1982–2013	1,168	89	35	0.542	−0.307	0.849***	(5.03)	0.777	0.218	0.559*	(1.72)
USA	1982–2013	3,581	91	46	2.081	0.348	1.734***	(6.66)	1.187	0.598	0.589**	(2.48)
Average	–	392	50	62	1.028	0.596	0.431***	(3.60)	0.918	0.618	0.299**	(2.14)

Note(s): Our sample consists of individual stocks from 41 equity markets. We report the sample period and average numbers of firms (N) for each country and its scores on individualism (IDV) and uncertainty avoidance index (UAI). Within each country, we first rank individual stocks in ascending order based on their asset growth (TAG) calculated at the end of the previous fiscal year. We classify firms into deciles, with TAG values ranked in the bottom 10% assigned to the AG1 portfolio and those ranked in the top 10% assigned to the AG10 portfolio. The portfolios are held with equal or value weights from July of each year to June of the next year and are rebalanced at the end of June every year. The asset growth premium of a country is defined as the difference in returns between AG1 and AG10 portfolios within the country. In addition to country-specific statistics, we also report country-average statistics. Numbers in the parentheses are the *t*-statistics calculated using Newey and West's (1987) robust standard errors. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively

Source(s): Author's work

4. Asset growth premia and national cultures

4.1 Portfolio analyses

To examine the impacts of national cultures on the cross-country differences in asset growth premia, we form country-average portfolios based on the level of national cultures. We first classify countries into three groups based on their scores of IDV (or UAI). Within each subgroup of countries, we form country-average AG1, AG10 and AG1−AG10 portfolios. As in Table 1, we conduct empirical analyses based on country-specific asset growth portfolios constructed with equal and value weights, respectively. We then calculate and test the time-series average of the asset growth premium using Newey and West's (1987) adjustment for each subgroup. We first test H1 and present the results based on the classification using IDV in Table 2.

Panel A shows that the asset growth premia exhibits variations with individualism based on the universe of all equity markets in our sample. The asset growth premia based on portfolios constructed with equal weights are 0.236%, 0.350% and 0.750% per month with corresponding *t*-statistics of 5.66, 1.92 and 1.43 for low, median and high IDV groups. This dispersion in asset growth effect results in a significant difference of 0.514% (*t*-statistic = 2.60) between high and low IDV countries. A similar pattern is also observable in value-weighted portfolios, in which country-average asset growth premia are

	Equally-weighted returns			Value-weighted returns		
	AG1	AG10	AG1-AG10	AG1	AG10	AG1-AG10
Panel A: All countries included						
Low	1.202***	0.966**	0.236	0.732*	0.844*	−0.113
	(3.10)	(2.27)	(1.43)	(1.92)	(1.89)	(−0.60)
Median	1.347***	0.997**	0.350*	1.149***	0.992**	0.157
	(3.68)	(2.48)	(1.92)	(2.94)	(2.32)	(0.74)
High	1.033***	0.283	0.750***	1.037***	0.404	0.633***
	(2.85)	(0.75)	(5.66)	(3.15)	(1.10)	(3.73)
High-Low	−0.169	−0.683**	0.514***	0.305	−0.441	0.745***
	(−0.57)	(−2.21)	(2.60)	(1.03)	(−1.40)	(3.02)
Panel B: US markets excluded						
Low	1.224***	0.919**	0.304*	0.729*	0.812*	−0.083
	(3.14)	(2.17)	(1.86)	(1.92)	(1.81)	(−0.44)
Median	1.365***	1.126***	0.239	1.185***	1.043**	0.142
	(3.80)	(2.79)	(1.28)	(3.02)	(2.43)	(0.64)
High	0.900**	0.265	0.635***	1.007***	0.386	0.621***
	(2.49)	(0.69)	(4.26)	(2.96)	(1.02)	(3.29)
High-Low	−0.324	−0.654**	0.331	0.278	−0.426	0.705***
	(−1.06)	(−2.12)	(1.61)	(0.94)	(−1.35)	(2.74)

Note(s): This table reports the country-average asset growth premia across different levels of individualism. For each country, we first rank individual stocks in ascending order based on their asset growth (TAG) calculated at the end of the previous fiscal year. We classify firms into deciles, with TAG values ranked in the bottom 10% assigned to the AG1 portfolio and those ranked in the top 10% assigned to the AG10 portfolio. The portfolios are held with equal or value weights from July of each year to June of the next year and are rebalanced at the end of June every year. The country-specific asset growth premium is defined as the difference in returns between AG1 and AG10 portfolios within the country. We next classify countries into three groups based on their scores of IDV and calculate the country-average asset growth premia within each individualism subgroup. Panel A reports the results based on the universe of all sample countries while Panel B reports the results excluding the US markets. Numbers in the parentheses are the *t*-statistics calculated using Newey and West's (1987) robust standard errors. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively

Source(s): Author's work

Table 2.
Asset growth premia conditional on individualism

−0.113%, 0.157% and 0.633% per month for low, median and high IDV groups with a difference between high and low groups of 0.745% (*t*-statistic = 3.02).

To ensure that the positive relation between individualism and the asset growth effect is not dominated by the US markets, we next investigate the robustness of our results to the sample outside the US markets. We replicate the same procedures with the US markets excluded to construct country-average asset growth premia across different levels of individualism. Panel B indicates that the results remain mostly intact outside the US markets, regardless of the weighting scheme. In particular, the asset growth premium among high IDV countries is 0.635% under equal weights and is 0.621% under value weights. The differences between high and low IDV groups are 0.331% and 0.705% under equal and value weights, respectively. These findings are reliably consistent with the prediction of H1 that individualism relates positively to a country's asset growth premium.

We next turn our attention to the association between uncertainty avoidance and the asset growth effect across countries. According to H2, the overinvestment hypothesis implies a negative relation between the level of uncertainty avoidance and the asset growth premium. Confirming this prediction, we show in Panel A of Table 3 that countries with lower UAI exhibit remarkably higher asset growth premia than those with higher UAI. In particular, the asset growth premium decreases monotonically as UAI increases. The average asset growth

	Equally-weighted returns			Value-weighted returns		
	AG1	AG10	AG1-AG10	AG1	AG10	AG1-AG10
Panel A: All countries included						
Low	1.306***	0.683*	0.623***	1.112***	0.489	0.623***
	(3.39)	(1.66)	(4.96)	(2.96)	(1.17)	(3.80)
Median	1.131***	0.558	0.573***	0.805**	0.654*	0.151
	(3.35)	(1.44)	(4.03)	(2.50)	(1.67)	(0.80)
High	1.120***	0.996***	0.124	1.011***	1.079***	−0.069
	(3.18)	(2.70)	(0.63)	(2.69)	(2.69)	(−0.29)
High-Low	−0.187	0.313	−0.500**	−0.102	0.591**	−0.692**
	(−0.74)	(1.23)	(−2.34)	(−0.39)	(2.27)	(−2.53)
Panel B: US markets excluded						
Low	1.325***	0.752*	0.573***	1.188***	0.581	0.606***
	(3.48)	(1.84)	(4.60)	(3.10)	(1.39)	(3.75)
Median	1.035***	0.485	0.550***	0.740**	0.547	0.193
	(3.10)	(1.24)	(3.72)	(2.25)	(1.36)	(0.94)
High	1.148***	1.098***	0.050	1.028***	1.141***	−0.114
	(3.20)	(2.93)	(0.25)	(2.75)	(2.85)	(−0.49)
High-Low	−0.177	0.346	−0.523**	−0.160	0.560**	−0.720***
	(−0.68)	(1.33)	(−2.42)	(−0.61)	(2.12)	(−2.67)

Note(s): This table reports the country-average asset growth premia across different levels of the uncertainty avoidance index. For each country, we first rank individual stocks in ascending order based on their asset growth (TAG) calculated at the end of the previous fiscal year. We classify firms into deciles, with TAG values ranked in the bottom 10% assigned to the AG1 portfolio and those ranked in the top 10% assigned to the AG10 portfolio. The portfolios are held with equal or value weights from July of each year to June of next year and are rebalanced at the end of June every year. The country-specific asset growth premium is defined as the difference in returns between AG1 and AG10 portfolios within the country. We next classify countries into three groups based on their scores of IDV and calculate the country-average asset growth premia within each uncertainty avoidance subgroup. Panel A reports the results based on the universe of all sample countries while Panel B reports the results excluding the US markets. Numbers in the parentheses are the *t*-statistics calculated using Newey and West's (1987) robust standard errors. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively

Source(s): Author's work

Table 3.
Asset growth premia conditional on uncertainty avoidance index

premia with equal weights are 0.623% and 0.124% for low and high UAI groups, respectively, with a significant difference of −0.500% (*t*-statistic = −2.34) between high and low UAI groups. This observation is robust under value weights or with the US markets excluded (as shown in Panel B). The evidence in Tables 2 and 3 appears to support our hypotheses associated with overinvestment to explain the asset growth effect across countries.

4.2 Asset growth premia in local currency

Since our study focuses on the investment-return relation across international markets, it is important to ensure that our results are not sensitive to the exchange rate risk. To this end, we repeat the same analyses in Section 4.1 using stock returns denominated in local currencies. Table 4 indicates that the country-average asset growth premium denominated in local currencies increases monotonically with individualism (Panel A) and decreases monotonically with uncertainty avoidance (Panel B). This observation is robust to both equal and value weighting schemes. Thus, our evidence regarding the cross-country relation between national cultures and the asset growth effect is affected by the risk exposure to exchange rates.

	Equally-weighted returns			Value-weighted returns		
	AG1	AG10	AG1-AG10	AG1	AG10	AG1-AG10
Panel A: Individualism (IDV)						
Low	1.469***	1.117***	0.352**	0.879***	1.010***	−0.128
	(4.32)	(3.14)	(2.49)	(2.70)	(2.76)	(−0.79)
Median	1.755***	1.193***	0.562***	1.352***	1.049***	0.306*
	(4.87)	(3.27)	(3.49)	(3.82)	(2.88)	(1.74)
High	1.102***	0.494	0.608***	1.042***	0.522*	0.519***
	(3.44)	(1.49)	(4.88)	(3.87)	(1.66)	(3.53)
High-Low	−0.367	−0.623**	0.256	0.163	−0.487*	0.647***
	(−1.31)	(−2.27)	(1.38)	(0.60)	(−1.79)	(3.16)
Panel B: Uncertainty avoidance index (UAI)						
Low	1.545***	0.768**	0.776***	1.232***	0.603*	0.629***
	(4.20)	(2.09)	(6.36)	(3.75)	(1.67)	(4.26)
Median	1.312***	0.624**	0.688***	0.918***	0.630**	0.287*
	(4.41)	(2.02)	(4.62)	(3.32)	(2.05)	(1.83)
High	1.456***	1.392***	0.064	1.124***	1.325***	−0.201
	(4.58)	(4.13)	(0.42)	(3.59)	(3.83)	(−1.09)
High-Low	−0.089	0.623***	−0.712***	−0.108	0.722***	−0.830***
	(−0.36)	(2.62)	(−3.77)	(−0.45)	(3.07)	(−3.87)

Note(s): This table reports the country-average asset growth premia in local currencies across different levels of national cultures. For each country, we first rank individual stocks in ascending order based on their asset growth (TAG) calculated at the end of the previous fiscal year. We classify firms into deciles, with TAG values ranked in the bottom 10% assigned to the AG1 portfolio and those ranked in the top 10% assigned to the AG10 portfolio. The portfolios are held with equal or value weights from July of each year to June of the next year and are rebalanced at the end of June every year. The country-specific asset growth premium is defined as the difference in returns in local currencies between AG1 and AG10 portfolios calculated within the country. We next classify countries into three groups based on their scores of IDV or UAI and calculate the country-average asset growth premia within each individualism subgroup. Panel A reports the results based on individualism while Panel B reports the results based on uncertainty avoidance. Numbers in the parentheses are the *t*-statistics calculated using Newey and West's (1987) robust standard errors. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively

Source(s): Author's work

Table 4.
Asset growth premia in local currency conditional on cultural differences

4.3 Cross-sectional regressions

An alternative way to test our hypotheses is to perform cross-sectional regressions separately for each culture subgroup. One advantage of cross-sectional regressions is that we can incorporate other firm characteristics associated with the cross-sectional variations of stock returns to verify the robustness of our findings. For each month, we first divide the sample into three subsamples (low, median and high) according to individual stocks' values of IDV (or UAI). For each of the subgroups, we perform the following Fama and MacBeth (1973) cross-sectional regressions:

$$R_{i,t} - R_{f,t} = c_0 + c_{1,j} \ln(1 + TAG_{i,t-1}) + c_{2,j} \ln SIZE_{i,t} + c_{3,j} \ln BM_{i,t-1} + c_{4,j} PRET_{i,t} + \varepsilon_{i,t}, \quad (1)$$

where $R_{i,t}$ is stock i's monthly return in US dollars from July of year t to June of year $t+1$; $R_{f,t}$ is the risk-free rate of the corresponding month, which is proxied by the 1-month US T-bill rate; $TAG_{i,t-1}$ and $BM_{i,t-1}$ are stock i's asset growth rate and book-to-market equity ratio in fiscal year $t-1$; $SIZE_{i,t}$ is stock i's market capitalization in June of year t; $PRET_{i,t}$ is stock i's past 12-month cumulative return ending in the previous month [7]; $j = 1, 2, 3$, which represents lowest to highest IDV (or UAI) groups. We include $SIZE_{i,t}$, $BM_{i,t-1}$ and $PRET_{i,t}$ to control for size, book-to-market and momentum effects because they have been documented to explain stock returns in the international framework [8]. We report and test the time-series averages of the monthly estimated coefficients from Fama and MacBeth (1973) cross-sectional regressions using t-statistics calculated with Newey and West (1987) robust standard errors.

According to H1 (H2), we expect $c_{1,3}$ ($c_{1,1}$) to be the most significant and negative of all. In addition, H1 (H2) implies a significantly negative (positive) difference between the average coefficients of $c_{1,3}$ and $c_{1,1}$. Table 5 confirms the predictions. With the US markets included as resented in Panel A, coefficients on Ln(1+*TAG*) are −0.180, −0.139 and −0.586 for low, median and high IDV groups with a difference of −0.406 (t-statistic = −2.45) between high and low groups. Corresponding coefficients are −0.585, −0.477 and 0.019 for low, median and high UAI groups with a difference of 0.603 (t-statistic = 3.66) between high and low groups. Because US-listed stocks account for the largest part of the overall sample, it is important to ensure that our regression results are not dominated by the US markets. We show in Panel B that the results are virtually unchanged when US-listed stocks are excluded from the sample.

Table 5 also confirms Chui *et al.*'s (2010) finding that individualism is positively associated with momentum profits across countries. Coefficients on *PRET* are significantly positive only in the high IDV group, regardless of the exclusion of the US markets. Moreover, we document a negative relation between uncertainty avoidance and momentum profits. That is, both cultural dimensions play important roles in explaining momentum profits in international markets. More importantly, the impacts of national cultures on the asset growth effect are robust when we control for conventional asset pricing anomalies.

4.4 Results based on an alternative proxy of individualism

As mentioned in Section 3, a general critique of Hofstede's cultural measures is that they do not change over time. Ahern *et al.*'s (2015) construct a proxy of individualism using data from the WVS that allows the degree of individualism to change over time because the survey is carried out five times. We apply this alternative measure to repeat our analyses in Sections 4.1 and 4.3 to examine whether our results are robust [9]. We first form three groups according to the country's value of WVS individualism and calculate the country-average asset growth premia for the three groups. As shown in Table 6, we find that the asset growth premia are significantly positive for median and high WVS individualism groups and insignificant for the low WVS individualism group. This evidence remains unchanged regardless of the

Variable	Individualism (IDV) Low	Median	High	High-low	Uncertainty avoidance index (UAI) Low	Median	High	High-low
Panel A: All sample firms included								
Ln(1+*TAG*)	−0.180	−0.139	−0.586***	−0.406**	−0.585***	−0.477***	0.019	0.603***
	(−1.19)	(−0.92)	(−6.14)	(−2.45)	(−5.57)	(−5.08)	(0.13)	(3.66)
Ln*SIZE*	−0.153***	−0.145***	−0.040	0.114*	−0.073*	−0.122***	−0.128***	−0.055
	(−3.39)	(−2.86)	(−1.06)	(1.97)	(−1.72)	(−3.30)	(−2.94)	(−0.87)
Ln*BM*	0.130**	0.050	0.026***	−0.105*	0.001	0.020**	0.080*	0.079
	(2.43)	(1.19)	(2.71)	(−1.93)	(0.03)	(2.30)	(1.66)	(1.33)
PRET	−0.151	−0.063	0.617***	0.768***	0.424**	0.487**	−0.275	−0.699***
	(−0.58)	(−0.36)	(4.25)	(2.95)	(2.25)	(2.56)	(−1.26)	(−3.06)
Panel B: US markets excluded								
Ln(1+*TAG*)	−0.219	−0.109	−0.526***	−0.307*	−0.611***	−0.453***	0.014	0.625***
	(−1.28)	(−0.66)	(−6.70)	(−1.71)	(−4.95)	(−4.27)	(0.09)	(3.44)
Ln*SIZE*	−0.144***	−0.168***	−0.071**	0.073	−0.063	−0.171***	−0.129***	−0.067
	(−3.17)	(−3.24)	(−2.19)	(1.35)	(−1.48)	(−4.88)	(−2.96)	(−1.04)
Ln*BM*	0.135**	0.012	0.014**	−0.121**	0.016	0.010	0.090*	0.074
	(2.55)	(0.32)	(1.99)	(−2.25)	(0.59)	(1.30)	(1.79)	(1.21)
PRET	−0.141	−0.133	0.500***	0.641**	0.394**	0.323*	−0.285	−0.679***
	(−0.54)	(−0.73)	(3.09)	(2.58)	(2.07)	(1.79)	(−1.30)	(−2.95)

Note(s): This table reports the results of cross-sectional regressions across different levels of national cultures. For each month, we first divide the sample into three subsamples (Low, Median and High) according to individual stocks' values of IDV (or UAI). For each of the subgroups, we perform the following cross-sectional regressions

$$R_{i,t} - R_{f,t} = c_0 + c_{1,j} \ln(1 + TAG_{i,t-1}) + c_{2,j} \ln SIZE_{i,t} + c_{3,j} \ln BM_{i,t-1} + c_{4,j} PRET_{i,t} + \varepsilon_{i,t},$$

where $R_{i,t}$ is stock i's monthly return in US dollars from July of year t to June of year $t+1$; $R_{f,t}$ is the risk-free rate of the corresponding month, which is proxied by the 1-month US T-bill rate; $TAG_{i,t-1}$ and $BM_{i,t-1}$ are stock i's asset growth rate and book-to-market equity ratio in fiscal year $t-1$; $SIZE_{i,t}$ is stock i's market capitalization in June of year t; $PRET_{i,t}$ is stock i's past 12-month cumulative return ending in the previous month; $j = 1, 2, 3$, which represents lowest to highest IDV (or UAI) groups. We test the time-series averages of the monthly estimated coefficients from cross-sectional regressions. Panels A and B report the results with the US markets included and excluded, respectively. Numbers in the parentheses are the *t*-statistics calculated using Newey and West's (1987) robust standard errors. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively

Source(s): Author's work

Table 5.
Cross-sectional regressions conditional on cultural differences

weighting scheme used or the exclusion of the US markets. However, the differences in the asset growth premia between high and low WVS individualism groups are insignificant in all cases, a finding that is slightly different from the results obtained in Table 2.

We next perform Fama and MacBeth (1973) cross-sectional regressions of Equation (1) separately for the three WVS individualism groups. As shown in Table 7, the coefficients on Ln(1+*TAG*) are significantly negative for median and high WVS individualism groups, while the coefficients on Ln(1+*TAG*) for the low WVS individualism group are insignificant. Nevertheless, the differences in the coefficients on Ln(1+*TAG*) between high and low WVS individualism groups are insignificant. This finding is consistent with the results observed in Table 6. Overall, the results from Tables 6 and 7 indicate that although the WVS individualism is able to differentiate the asset growth premia across countries, its explanatory power is slightly weaker than Hofstede's IDV measure.

5. Testing the overinvestment hypothesis

While our argument is built based on the notion that individualism and uncertainty avoidance capture the tendency of managers' overinvestment across countries, it is important

	Equally-weighted returns			Value-weighted returns		
	AG1	AG10	AG1-AG10	AG1	AG10	AG1-AG10
Panel A: All countries included						
Low	0.603	0.249	0.353	0.390	0.206	0.184
	(1.34)	(0.51)	(1.40)	(0.87)	(0.40)	(0.67)
Median	1.599***	0.802*	0.797***	1.317***	0.772	0.545**
	(3.75)	(1.68)	(3.78)	(3.09)	(1.55)	(2.11)
High	1.151**	0.303	0.848***	0.821*	0.203	0.618**
	(2.36)	(0.65)	(3.31)	(1.79)	(0.42)	(2.20)
High-Low	0.548	0.054	0.495	0.431	−0.002	0.433
	(1.43)	(0.17)	(1.41)	(1.10)	(−0.01)	(1.07)
Panel B: US markets excluded						
Low	0.478	0.341	0.137	0.336	0.255	0.081
	(1.05)	(0.68)	(0.49)	(0.72)	(0.48)	(0.30)
Median	1.690***	0.898*	0.792***	1.375***	0.888*	0.487*
	(4.04)	(1.85)	(3.59)	(3.27)	(1.75)	(1.82)
High	0.965*	0.159	0.806***	0.745	0.042	0.703**
	(1.93)	(0.34)	(2.96)	(1.58)	(0.09)	(2.41)
High-Low	0.487	−0.182	0.669*	0.409	−0.213	0.622
	(1.20)	(−0.51)	(1.68)	(1.01)	(−0.54)	(1.54)

Note(s): This table reports the country-average asset growth premia across different levels of individualism that is constructed based on the World Value Survey. For each country, we first rank individual stocks in ascending order based on their asset growth (TAG) calculated at the end of the previous fiscal year. We classify firms into deciles, with TAG values ranked in the bottom 10% assigned to the AG1 portfolio and those ranked in the top 10% assigned to the AG10 portfolio. The portfolios are held with equal or value weights from July of each year to June of the next year and are rebalanced at the end of June every year. The country-specific asset growth premium is defined as the difference in returns between AG1 and AG10 portfolios within the country. We next classify countries into three groups based on their scores of IDV and calculate the country-average asset growth premia within each individualism subgroup. Panel A reports the results based on the universe of all sample countries while Panel B reports the results excluding the US markets. Numbers in the parentheses are the *t*-statistics calculated using Newey and West's (1987) robust standard errors. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively

Source(s): Author's work

Table 6. Asset growth premia conditional on individualism using World Value Survey

to demonstrate supportive evidence for the overinvestment hypothesis. Motivated by Jensen's (1986) argument that managers who are empire builders have higher incentive to increase investment expenditure, Titman *et al.* (2004) attribute the asset growth anomaly to the result of overinvestment. Because firms with lower debt ratios have higher capacity and a tendency to overinvest, the overinvestment hypothesis implies a negative relation between asset growth premia and debt ratios of firms.

To test the overinvestment hypothesis, we first investigate whether debt ratios help explain the asset growth effect in the international setting. Within each country, we first classify individual stocks into three groups according to their values of debt ratio, which is defined as the ratio of long-term debt over the sum of long-term debt and the market value of firm's equity. Within each of the three debt-ratio groups, we allocate stocks into deciles according to their values of TAG as defined in Section 3. For each debt-ratio group within a country, we calculate equally- or value-weighted decile portfolio returns and compute the asset growth premium as the difference in returns between low and high deciles. We then calculate the country-average asset growth premium for each debt-ratio group and present the results presented in Panel A of Table 8. The average asset growth premia based on equally weights are 0.439%, 0.456% and 0.238% with corresponding *t*-statistics of 3.24, 3.37 and 1.65 for low, median and high subgroups of debt ratios. We also observe similar patterns

Variable	All sample				US markets excluded			
	Low	Median	High	High-low	Low	Median	High	High-low
Ln(1+*TAG*)	−0.203	−0.519***	−0.412**	−0.210	−0.184	−0.389**	−0.409**	−0.225
	(−0.90)	(−3.13)	(−2.50)	(−0.79)	(−0.76)	(−2.11)	(−2.53)	(−0.82)
Ln*SIZE*	−0.203***	−0.121*	−0.179***	0.024	−0.231***	−0.119*	−0.163***	0.068
	(−3.76)	(−1.82)	(−3.19)	(0.33)	(−4.28)	(−1.70)	(−2.87)	(0.91)
Ln*BM*	0.012	0.004	0.027**	0.015	−0.006	0.019	0.026	0.032
	(0.44)	(0.21)	(2.03)	(0.54)	(−0.22)	(1.32)	(1.65)	(0.92)
PRET	0.173	0.290	0.689***	0.516	0.037	0.394	0.646**	0.610**
	(0.67)	(1.18)	(2.73)	(1.60)	(0.14)	(1.65)	(2.51)	(2.05)

Note(s): This table reports the results of cross-sectional regressions across different levels of individualism scores that are constructed using the World Value Survey. For each month, we first divide the sample into three subsamples (Low, Median and High) according to individual stocks' values of IDV (or UAI). For each of the subgroups, we perform the following cross-sectional regressions

$R_{i,t} - R_{f,t} = c_0 + c_{1,j} \ln(1 + TAG_{i,t-1}) + c_{2,j} \ln SIZE_{i,t} + c_{3,j} \ln BM_{i,t-1} + c_{4,j} PRET_{i,t} + \varepsilon_{i,t}$,

where $R_{i,t}$ is stock i's monthly return in US dollars from July of year t to June of year $t+1$; $R_{f,t}$ is the risk-free rate of the corresponding month, which is proxied by the 1-month US T-bill rate; $TAG_{i,t-1}$ and $BM_{i,t-1}$ are stock i's asset growth rate and book-to-market equity ratio in fiscal year $t-1$; $SIZE_{i,t}$ is stock i's market capitalization in June of year t; $PRET_{i,t}$ is stock i's past 12-month cumulative return ending in the previous month; $j = 1, 2, 3$, which represents lowest to highest IDV (or UAI) groups. We test the time-series averages of the monthly estimated coefficients from cross-sectional regressions. Numbers in the parentheses are the t-statistics calculated using Newey and West's (1987) robust standard errors. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively

Source(s): Author's work

Table 7. Cross-sectional regressions conditional on individualism using World Value Survey

in value-weighted portfolios. The finding thus confirms our expectation that the overinvestment-induced asset growth premium around the world is higher among stocks with lower debt ratios.

We next investigate the impacts of national cultures on the asset growth premia conditional on debt ratios. We hypothesize that since firms with lower debt ratios have higher tendency to overinvest, the impacts of individualism and uncertainty avoidance would be stronger among such firms. To explore this issue, we classify all countries into three groups based on their scores of IDV (or UAI) and calculate the country-average asset growth premia within each debt-ratio and culture subgroup. Several interesting findings emerge from Panels B and C of Table 8. First, the monotonically increasing pattern of the asset growth premium from low to high IDV countries (Panel B) exists in all debt-ratio subgroups. Analogously, the monotonically decreasing pattern of the asset growth premium from low to high UAI countries (Panel C) is also an overall phenomenon across debt-ratio subgroups. The observations verify the importance of national cultures in explaining the cross-country asset growth premia conditional on debt ratios.

Second, Panel B shows that stocks with the lowest debt ratios within the highest IDV countries generate the highest asset growth premium, which amounts to 0.833% (t-statistic = 4.14) under equal weights and 0.520% (t-statistic = 2.23) under value weights. In addition, the highest difference in the asset growth premia between high and low IDV groups exists in the low debt-ratio group. Finally, Panel C indicates that low UAI countries generate significantly positive asset growth premia in low and median debt-ratio groups but insignificant premia in the high debt-ratio group. The difference between high and low UAI countries among low debt-ratio stocks is negative and significant under value weights. Overall, our results from Table 8 suggest that the explanatory abilities of individualism and uncertainty avoidance for the cross-country differences in the asset

	Equally-weighted returns			Value-weighted returns		
	AG1	AG10	AG1-AG10	AG1	AG10	AG1-AG10
Panel A: Portfolios sorted by debt ratio						
Low	1.188***	0.749*	0.439***	0.841**	0.575	0.267*
	(3.54)	(1.94)	(3.24)	(2.49)	(1.45)	(1.67)
Median	1.224***	0.768**	0.456***	1.155***	0.815**	0.340**
	(3.46)	(2.06)	(3.37)	(3.25)	(2.12)	(2.21)
High	0.863**	0.625*	0.238	0.765**	0.663*	0.102
	(2.41)	(1.67)	(1.65)	(2.09)	(1.68)	(0.60)
Panel B: Portfolios sorted by debt ratio and IDV						
Low debt ratio						
Low IDV	1.092***	1.177***	−0.085	0.571	0.938**	−0.368
	(3.18)	(2.76)	(−0.44)	(1.61)	(2.12)	(−1.65)
Median IDV	1.328***	0.778*	0.550**	1.202***	0.597	0.606**
	(3.46)	(1.88)	(2.49)	(2.98)	(1.42)	(2.25)
High IDV	1.124***	0.291	0.833***	0.712*	0.192	0.520**
	(2.81)	(0.67)	(4.14)	(1.79)	(0.43)	(2.23)
High-Low	0.032	−0.886**	0.918***	0.141	−0.747**	0.888***
	(0.11)	(−2.52)	(3.62)	(0.42)	(−2.01)	(2.96)
Median debt ratio						
Low IDV	1.483***	1.151***	0.331	1.207***	1.002**	0.204
	(3.41)	(2.62)	(1.64)	(2.70)	(2.17)	(0.92)
Median IDV	1.220***	0.805*	0.415*	1.232***	0.842*	0.389
	(2.91)	(1.91)	(1.68)	(2.92)	(1.94)	(1.41)
High IDV	0.978***	0.362	0.616***	1.023***	0.617	0.407**
	(2.76)	(0.96)	(3.97)	(2.86)	(1.59)	(2.30)
High-Low	−0.505	−0.790**	0.285	−0.184	−0.386	0.202
	(−1.40)	(−2.44)	(1.13)	(−0.49)	(−1.15)	(0.77)
High debt ratio						
Low IDV	0.962**	1.033**	−0.071	0.833*	0.988**	−0.155
	(2.10)	(2.29)	(−0.30)	(1.72)	(2.12)	(−0.58)
Median IDV	0.811**	0.670	0.141	0.758*	0.579	0.179
	(2.10)	(1.50)	(0.52)	(1.76)	(1.19)	(0.56)
High IDV	0.794**	0.166	0.628***	0.673**	0.430	0.244
	(2.12)	(0.45)	(4.07)	(1.99)	(1.16)	(1.33)
High-Low	−0.168	−0.867**	0.699**	−0.159	−0.558	0.399
	(−0.45)	(−2.49)	(2.53)	(−0.41)	(−1.64)	(1.24)
Panel C: Portfolios sorted by debt ratio and UAI						
Low debt ratio						
Low UAI	1.377***	0.754*	0.623***	0.931**	0.345	0.586***
	(3.49)	(1.75)	(3.45)	(2.44)	(0.81)	(2.83)
Median UAI	1.037***	0.539	0.499**	0.633*	0.430	0.203
	(2.96)	(1.23)	(2.30)	(1.71)	(0.95)	(0.79)
High UAI	1.180***	0.935**	0.245	0.985***	0.942**	0.043
	(3.27)	(2.52)	(1.01)	(2.64)	(2.38)	(0.17)
High-Low	−0.197	0.181	−0.378	0.054	0.597**	−0.543*
	(−0.77)	(0.66)	(−1.39)	(0.20)	(2.12)	(−1.83)
Median debt ratio						
Low UAI	1.452***	0.725*	0.727***	1.318***	0.759*	0.560**
	(3.56)	(1.74)	(4.22)	(3.23)	(1.72)	(2.55)
Median UAI	1.147***	0.426	0.721***	1.010***	0.488	0.521**
	(2.93)	(1.05)	(3.24)	(2.61)	(1.24)	(2.13)

(*continued*)

Table 8.
Cross-cultural asset growth premia conditional on debt ratios

	Equally-weighted returns			Value-weighted returns		
	AG1	AG10	AG1-AG10	AG1	AG10	AG1-AG10
High UAI	1.083***	1.170***	−0.087	1.140***	1.212***	−0.073
	(3.09)	(3.11)	(−0.40)	(3.02)	(2.93)	(−0.29)
High-Low	−0.369	0.445*	−0.814***	−0.179	0.454	−0.632**
	(−1.35)	(1.76)	(−3.32)	(−0.60)	(1.49)	(−2.02)
High debt ratio						
Low UAI	1.011**	0.762*	0.249	0.970**	0.793*	0.178
	(2.36)	(1.82)	(1.20)	(2.26)	(1.85)	(0.80)
Median UAI	0.872**	0.390	0.482**	0.689*	0.416	0.273
	(2.35)	(0.99)	(2.44)	(1.79)	(1.01)	(1.08)
High UAI	0.732**	0.705*	0.028	0.656	0.756*	−0.100
	(2.01)	(1.73)	(0.11)	(1.63)	(1.70)	(−0.35)
High-Low	−0.279	−0.058	−0.222	−0.315	−0.037	−0.278
	(−1.02)	(−0.19)	(−0.71)	(−1.04)	(−0.12)	(−0.87)

Note(s): This table reports the country-average asset growth premia conditional on debt ratios. For each country, we first classify individual stocks into three groups according to their values of debt ratio and then rank individual stocks in ascending order based on their asset growth (TAG) calculated at the end of the previous fiscal year within each group. Within each group of debt ratio, we classify firms into deciles, with TAG values ranked in the bottom 10% assigned to the AG1 portfolio and those ranked in the top 10% assigned to the AG10 portfolio. The portfolios are held with equal or value weights from July of each year to June of the next year and are rebalanced at the end of June every year. The country-specific asset growth premium is defined as the difference in returns between AG1 and AG10 portfolios within each group of the country. Panel A reports country-average asset growth premia across all countries for each group of debt ratio. We next classify all countries into three groups based on their scores of IDV or UAI and calculate the country-average asset growth premia within each debt-ratio and cultural subgroup. Panel B reports the results based on individualism while Panel C reports the results based on uncertainty avoidance. Numbers in the parentheses are the *t*-statistics calculated using Newey and West's (1987) robust standard errors. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively

Source(s): Author's work

Table 8.

growth premia are stronger among stocks with low debt ratios, an observation that is consistent with the overinvestment hypothesis.

6. Asset growth premia controlling for alternative country-level variables

6.1 Alternative country-level variables

The empirical evidence thus far is consistent with the predictions of **H1** and **H2** regarding the overinvestment argument as the underlying reason for the asset growth effect across countries. Since the support for the overinvestment hypothesis seems to be inconsistent with the evidence based on the q-theory documented by Titman *et al.* (2013) and Watanabe *et al.* (2013), comparing between alternative explanations becomes an important issue to verify the robustness of our study. To this end, we set up the q-theory, limits-to-arbitrage, corporate governance, investor protection and accounting quality as alternative hypotheses and examine the joint effects of country-level variables on the cross-country differences in the asset growth anomaly. We introduce the country-level variables here and leave the details of variable constructions in the Appendix.

The first category of variables is associated with the q-theory. In particular, Titman *et al.* (2013) propose that managers in more developed markets have a better ability to align corporate investments when expected returns are lower. As in Titman *et al.* (2013), we include the indicator for developed markets (denoted as DEVP) and three indices of market

development by La Porta *et al.* (2006) [10]. The three proxies of market development include access-to-equity markets (denoted as EQUITY), the ratio of stock market capitalization to gross domestic product (GDP) (denoted as MKTCAP) and the ratio of the total value of shares traded to GDP (denoted as LIQUID). In addition, Watanabe *et al.* (2013) argue that the optimal effect based on the q-theory requires a certain degree of market efficiency. We thus follow Watanabe *et al.* (2013) by including return synchronicity (denoted as R^2), the development status of financial markets (denoted as MKT) and future earnings response coefficient (denoted as FERC) as proxies of market efficiency.

The second category of variables is associated with limits-to-arbitrage. We consider the estimate of trading costs (TCOST) used by Chan *et al.* (2005), Chui *et al.* (2010) and Titman *et al.* (2013). We also follow Watanabe *et al.* (2013) by including idiosyncratic risk (IRISK), dollar trading volume (DVOL) and an indicator of no short-sale restriction (SHORT) which equals one when short selling is allowed in the country and zero otherwise. Among the four indices, TCOST and IRISK are positively associated with limits-to-arbitrage while DVOL and SHORT are negatively associated with limits-to-arbitrage.

The third category includes variables associated with corporate governance and investor protection. As in Titman *et al.* (2013) and Watanabe *et al.* (2013), we include creditor rights index (CR), the revised anti-director rights index (AD), the anti-self-dealing index (AS) and four legal origin dummies. The CR index is developed by La Porta *et al.* (1998) and Djankov *et al.* (2007), while the AD and AS indices are developed by Djankov *et al.* (2008). Countries with higher values of CR, AD and AS generally have better corporate governance. The legal origin dummies, as defined by La Porta *et al.* (2000), include UK (United Kingdom), FR (France), GE (Germany) and SC (Scandinavia). According to their definitions, countries with English legal origin are generally more effective in corporate governance, followed by Scandinavian origin and then German origin, with French origin being the least protective.

Finally, we consider variables associated with accounting quality, including the accounting standard index (ACCT) of La Porta *et al.* (1998) and the earnings management score (EMS) of Leuz *et al.* (2003). In particular, ACCT measures a country's quality of accounting and financial reporting while EMS captures the degree to which corporate insiders can exercise their discretion to manage reported earnings. Thus higher values of ACCT and lower values of EMS signify better accounting quality of the country.

Table 9 shows the cross-sectional Pearson correlations among country-level variables. The two cultural variables (IDV and UAI) are negatively correlated, suggesting that countries with higher individualism and low uncertainty avoidance share some similarities. The two cultural variables are also highly correlated with indices of market development and efficiency. In particular, IDV is positively correlated with DEVP (0.744), EQUITY (0.529) and FERC (0.358) and is negatively correlated with R^2 (0.387); all are significant at the 5% level. UAI also has significantly negative correlations with MKTCAP and MKT (−0.438 and −0.415, respectively). These observations indicate that countries with high IDV and low UAI tend to be more developed and more efficiently priced, thus highlighting the importance of comparison between the two categories of proxies in explaining the asset growth effect across countries.

Table 9 also shows that more individualistic cultures are less prone to limits-to-arbitrage, while lower uncertainty-avoiding cultures have better corporate governance. Specifically, IDV has a significantly negative correlation with TCOST and a significantly positive correlation with SHORT, suggesting that more individualistic cultures have lower trading costs and less short-sale restriction. UAI has significantly negative correlations with CR, AS and UK and a significantly positive correlation with FR. Thus, lower uncertainty-avoiding cultures are prone to better governance and English legal origin, while higher uncertainty-avoiding cultures are more likely to have French legal origin. In addition, both IDV and UAI are significantly correlated with ACCT and EMS but with opposite signs.

Table 9.
Correlations of country-level indices

	UAI	DEVP	EQUITY	MKTCAP	LIQUID	R^2	MKT	FERC	TCOST	IRISK	DVOL	SHORT	CR	AD	AS	ACCT	EMS	UK	FR	GE	SC
IDV	−0.142	*0.744*	*0.529*	0.217	0.064	*−0.387*	0.259	*0.358*	*−0.534*	0.071	0.231	*0.534*	0.089	−0.063	0.001	*0.396*	*−0.542*	0.125	−0.163	−0.144	0.252
UAI		−0.050	−0.281	*−0.438*	−0.194	0.221	*−0.415*	−0.179	−0.096	−0.219	0.096	0.055	*−0.408*	−0.302	*−0.488*	*−0.681*	*0.517*	*−0.487*	*0.538*	0.162	−0.297
DEVP			*0.560*	0.267	0.069	−0.193	*0.505*	*0.343*	*−0.590*	−0.131	0.349	0.255	0.129	−0.042	0.015	0.341	−0.166	0.034	−0.182	−0.040	0.282
EQUITY				*0.543*	*0.451*	−0.081	*0.688*	*0.405*	−0.285	0.196	0.149	0.283	0.326	0.372	0.279	*0.668*	*−0.533*	*0.405*	*−0.503*	−0.028	0.234
MKTCAP					*0.560*	0.029	*0.823*	*0.437*	−0.143	−0.100	−0.109	0.096	0.259	0.282	*0.388*	*0.625*	−0.230	*0.346*	*−0.387*	0.078	−0.005
LIQUID						0.175	*0.617*	0.332	−0.265	−0.130	0.182	0.050	0.142	−0.012	0.123	*0.380*	−0.003	0.055	*−0.391*	*0.431*	−0.017
R^2							0.004	0.018	0.058	−0.270	0.055	−0.121	0.033	−0.078	−0.065	−0.118	*0.477*	−0.218	0.226	0.035	−0.061
MKT								*0.384*	−0.183	0.052	−0.046	0.100	*0.468*	*0.386*	*0.508*	*0.697*	−0.283	*0.446*	*−0.479*	−0.083	0.157
FERC									*−0.344*	−0.184	0.066	0.041	0.294	0.078	−0.050	0.279	0.042	0.144	*−0.331*	0.226	−0.001
TCOST										0.325	*−0.529*	*−0.360*	−0.123	0.233	0.108	−0.190	0.053	0.169	0.138	−0.191	−0.214
IRISK											−0.257	−0.088	−0.063	0.305	0.212	0.200	*−0.442*	*0.417*	−0.176	−0.218	−0.091
DVOL												0.091	−0.119	−0.033	−0.215	0.094	0.097	*−0.339*	0.049	0.220	0.157
SHORT													0.006	0.018	−0.097	−0.017	*−0.376*	0.015	0.015	−0.140	0.140
CR														0.271	*0.419*	0.288	0.121	*0.358*	*−0.429*	0.108	−0.023
AD															*0.415*	*0.462*	−0.361	*0.423*	−0.238	−0.233	0.043
AS																*0.455*	*−0.420*	*0.663*	*−0.507*	−0.180	0.042
ACCT																	*−0.665*	*0.443*	*−0.600*	−0.083	0.348
EMS																		*−0.445*	0.273	*0.487*	−0.296
UK																			*−0.538*	*−0.367*	−0.245
FR																				*−0.367*	−0.245
GE																					−0.167

Note(s): This table reports the cross-sectional Pearson correlations among the country-specific variables, including proxies for market development, market efficiency, limits-to-arbitrage, corporate governance and investor protection and accounting quality. The market development and efficiency proxies include the dummy for developed markets (DEVP), access-to-equity markets (EQUITY), the ratio of stock market capitalization to GDP (MKTCAP), the ratio of the total value of shares traded to GDP (LIQUID), stock return synchronicity (R2), the importance of the stock market in the economy (MKT) and future earnings response coefficient (FERC). The limits-to-arbitrage proxies include the estimate of trading costs (TCOST), the average idiosyncratic risk (IRISK), the average annual dollar trading volume (DVOL) and the indicator of no short-sale restriction (SHORT). The proxies for corporate governance and investor protection include the creditor rights index (CR), the revised anti-director rights index (AD), the anti-self-dealing index (AS) and four legal origin dummies UK, FR, GE and SC, which represent English, French, German and Scandinavian legal origins, respectively. The proxies for accounting quality include the accounting standard ranking (ACCT) and the earnings management score (EMS). The details of the variable constructions are provided in the Appendix. Italic typeface indicates significance at the 5% level

Source(s): Author's work

We also verify the findings of Titman *et al.* (2013) and Watanabe *et al.* (2013) that proxies within the same category have relatively high correlations. For example, 12 out of 21 pairwise correlations among proxies of market development and efficiency are significant. Confirming Watanabe *et al.* (2013), we show that the correlations among the three proxies of corporate governance are all above 0.27 and that the correlation between ACCT and EMS is −0.665. Finally, consistent with existing studies, legal origins are significantly correlated with investor protection and accounting quality. Countries with English legal origins have significantly lower values of EMS and significantly higher values of CR, AD, AS and ACCT. Given the substantial correlations among different sets of country-level indices, investigations of the incremental explanatory power of national cultures conditional on these alternative proxies become an important and interesting issue that is examined in the following subsections.

6.2 Controls of market development and efficiency

We start with the investigations associated with proxies of market development and efficiency because evidence based on both the USA and international markets largely supports the q-theory in explaining the asset growth effect. According to the q-theory, the asset growth premium is higher among more developed and efficiently priced markets. Before formally comparing between the impacts of national cultures and the q-theory, we first verify the evidence documented in Titman *et al.* (2013) and Watanabe *et al.* (2013) that market development and efficiency positively explain the cross-country asset growth premia. We perform cross-sectional regressions of the asset growth premium of a country on its corresponding indices associated with national cultures or market development and efficiency. One advantage of this methodology is that it enables us to compare between different variables implied by different hypotheses. In particular, for every month we regression the difference in returns between AG1 and AG10 portfolios for a country as constructed in Section 3 on a set of country-level indices, in which AG1 and AG10 portfolios are constructed with equal or value weights. We average and test the coefficients from the regressions with *t*-statistics adjusted for autocorrelation and heteroskedasticity using Newey and West's (1987) standard errors.

We first present in Panel A of Table 10 the results based on univariate regressions, i.e. we consider one index as the independent variable as one specification. Consistent with our results from Tables 2 and 3 that the asset growth effect is more pronounced in more individualistic or lower uncertainty-avoiding cultures, we show that the average coefficient on IDV is significantly positive while that on UAI is significantly negative. The significances are detected when the portfolios are constructed using both equal and value weights. For proxies of market development and efficiency, we show that coefficients on DEVP and EQUITY are significantly positive while that on R^2 is significantly negative in both equally- and value-weighted portfolios. The coefficients on LIQUID and FERC are significantly positive under equal weights but insignificant under value weights. These observations indicate that when considered alone, national cultures and market development and efficiency can explain a significant fraction of the cross-country asset growth premia.

We next perform multivariate regressions to compare the relative explanatory power between proxies of national cultures and proxies of market development and efficiency. In particular, we incorporate IDV or/and UAI, as well as all proxies of market development or efficiency to examine whether national cultures subsume the explanatory power of the q-theory for the asset growth effect. Panels B and C reveal that coefficients on IDV are significantly positive while coefficients on UAI are significantly negative in all specifications for both equally- and value-weighted portfolios. In addition, none of the proxies of market development and efficiency consistently exhibits significant coefficients in all specifications in Panels B and C. The results thus suggest that the impacts of national cultures on the asset

Model	IDV	UAI	DEVP	EQUITY	MKTCAP	LIQUID	R^2	MKT	FERC
Panel A: Univariate regressions									
Equal	1.155***	−0.895**	0.528**	0.489**	0.002	0.003*	−3.842**	0.008*	0.426**
weights	(3.58)	(−2.37)	(2.32)	(2.16)	(0.91)	(1.68)	(−2.31)	(1.66)	(2.45)
Value	1.213***	−1.281***	0.666**	0.453*	0.001	−0.001	−6.051***	0.006	0.326
weights	(2.96)	(−2.87)	(2.42)	(1.84)	(0.37)	(−0.52)	(−3.19)	(0.97)	(1.41)
Panel B: Asset growth portfolios formed on equal weights									
Model 1	1.765*		−0.390	0.073	−0.004	0.003	0.668	0.008	0.236
	(1.73)		(−1.20)	(0.11)	(−0.88)	(0.77)	(0.24)	(0.50)	(1.15)
Model 2		−0.719*	−0.127	0.471	−0.005	0.003	−1.466	−0.003	0.292
		(−1.76)	(−0.35)	(1.08)	(−1.09)	(0.74)	(−0.81)	(−0.25)	(1.29)
Model 3	3.166***	−1.248***	−0.711**	−0.624	−0.009*	0.006	4.111	0.026	0.469**
	(3.01)	(−2.87)	(−2.00)	(−0.97)	(−1.94)	(1.64)	(1.36)	(1.62)	(2.04)
Panel C: Asset growth portfolios formed on value weights									
Model 1	2.204**		−0.063	−0.544	0.002	−0.005	−2.036	0.012	0.519
	(2.10)		(−0.15)	(−0.80)	(0.46)	(−1.14)	(−0.72)	(0.65)	(1.62)
Model 2		−1.232**	0.269	0.231	0.001	−0.006	−4.110*	−0.004	0.600*
		(−2.49)	(0.63)	(0.49)	(0.11)	(−1.35)	(−1.94)	(−0.30)	(1.84)
Model 3	3.658***	−1.626***	−0.442	−1.311*	−0.007	0.000	2.581	0.037*	0.789**
	(2.91)	(−3.09)	(−0.97)	(−1.72)	(−1.25)	(0.08)	(0.77)	(1.81)	(2.27)

Note(s): This table reports the cross-sectional regressions of a country's asset growth premium on its corresponding country-level indices associated with national cultures or market development and efficiency. For each country, we first rank individual stocks in ascending order based on their asset growth (TAG) calculated at the end of the previous fiscal year. We classify firms into deciles, with TAG values ranked in the bottom 10% assigned to the AG1 portfolio and those ranked in the top 10% assigned to the AG10 portfolio. The portfolios are held with equal or value weights from July of each year to June of the next year and are rebalanced at the end of June every year. The country-specific asset growth premium is defined as the difference in returns between AG1 and AG10 portfolios within the country. We next regress country's asset growth premium on its corresponding values of country-level variables every month. The variables include IDV, UAI, DEVP, EQUITY, MKTCAP, LIQUID, R^2, MKT and FERC, respectively. We test the average coefficients from the cross-sectional regressions. Panel A reports the estimation results associated with univariate regressions whereas Panels B and C report the results associated with multivariate regressions with equal and value weights, respectively. Numbers in the parentheses are the *t*-statistics calculated using Newey and West's (1987) robust standard errors. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively

Source(s): Author's work

Table 10.
Cross-country analyses controlling for market development and efficiency

growth effect across countries remain strong and robust when we control for the proxies of the q-theory. The explanatory power of market development and efficiency, however, seems to be subsumed by cultural variables. The evidence again confirms the possibility that the overinvestment argument is the underlying reason for the cross-country differences in the asset growth effect.

We also focus our analyses of cross-sectional regressions on the low-debt group. We use the asset growth premium constructed based on low debt-ratio firms for each country as the dependent variable to regress on country-level indices. We report univariate regression results in Panel A and multivariate regression results based on equal and value weights in Panels B and C of Table 11, respectively. The estimation results are statistically similar to those reported in Table 10, with the only exception that coefficients on UAI are mostly insignificant in multivariate regressions. Coefficients on IDV, however, remain positive and significant in all specifications while proxies associated with market development and efficiency all fail to explain the asset growth premia in multivariate regressions. Overall, the results of cross-country regressions suggest that the support for the overinvestment hypothesis in explaining the asset growth effect across countries is quite pronounced and robust when we control for the q-theory as an alternative explanation.

Table 11. Cross-country analyses controlling for alternative indices

Variable	TCOST	IRISK	DVOL	SHORT	CR	AD	AS	ACCT	EMS	Legal origin UK	FR	GE	SC
Panel A: Univariate regressions													
Control	−0.006	0.231*	0.000	0.136	−0.043	0.099	0.030	0.025*	−0.027**	0.467***	−0.354	0.103	0.362
	(−1.19)	(1.89)	(−0.07)	(0.50)	(−0.44)	(0.65)	(0.08)	(1.66)	(−2.19)	(3.06)	(−0.97)	(0.47)	(1.45)
Panel B: Multivariate regressions													
IDV	1.612***	1.064***	1.176**	1.308***	1.201***	1.212***	1.056**	1.633***	1.312**		1.110***		
	(3.33)	(2.60)	(2.32)	(2.76)	(2.91)	(2.77)	(2.53)	(3.98)	(2.32)		(2.65)		
UAI	−1.022**	−0.953**	−1.100**	−0.915**	−1.338***	−1.121**	−1.511***	−1.404***	−0.992**		−1.049*		
	(−2.29)	(−2.15)	(−2.21)	(−2.07)	(−3.04)	(−2.43)	(−3.17)	(−3.04)	(−2.35)		(−1.69)		
Control	0.002	0.175	0.000	−0.293	−0.136	0.112	−0.638	−0.017	0.009	0.286	−0.246	0.393	−0.038
	(0.44)	(1.40)	(0.26)	(−0.90)	(−1.34)	(0.66)	(−1.55)	(−0.93)	(0.49)	(0.81)	(−0.43)	(0.81)	(−0.10)

Note(s): This table reports the cross-sectional regressions of a country's asset growth premium on its corresponding country-level indices associated with limits-to-arbitrage, corporate governance, investor protection and accounting quality. For each country, we first rank individual stocks in ascending order based on their asset growth (TAG) calculated at the end of the previous fiscal year. We classify firms into deciles, with TAG values ranked in the bottom 10% assigned to the AG1 portfolio and those ranked in the top 10% assigned to the AG10 portfolio. The portfolios are held with value weights from July of each year to June of the next year and are rebalanced at the end of June every year. The country-specific asset growth premium is defined as the difference in returns between AG1 and AG10 portfolios within the country. We next regress country's asset growth premium on its corresponding values of country-level variables every month. The variables include TCOST, IRISK, DVOL, SHORT, CR, AD, AS, ACCT, EMS and four dummies of legal origin (UK, FR, GE and SC), respectively. We perform both univariate and multivariate regressions. For the regression concerning legal origins, we include the four dummies simultaneously without the intercept. We test the average coefficients from the cross-sectional regressions. Numbers in the parentheses are the *t*-statistics calculated using Newey and West's (1987) robust standard errors. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively

Source(s): Author's work

6.3 Controls of limits-to-arbitrage, corporate governance, investor protection and accounting quality

The final task of this paper is to examine the effectiveness of national cultures conditional on alternative explanations associated with limits-to-arbitrage, corporate governance, investor protection and accounting quality. To this end, we adopt the same cross-country regression approach as in the previous section but use these alternative proxies as independent variables. In univariate regressions for all proxies but legal origin, we incorporate each variable individually as the independent variable. For the regressions associated with legal origin, we include the four dummies, UK, FR, GE and SC simultaneously without the intercept. For multivariate regressions, we include IDV, UAI and each of the proxies (or the four legal origin dummies without the intercept) in one specification.

We first verify prior studies by showing that most of the alternative variables do not well explain the cross-country asset growth premia only with some minor exceptions. In particular, Watanabe *et al.* (2013) show that ACCT and EMS are positively and negatively correlated with asset growth premia in value-weighted portfolios but not in equally-weighted portfolios. Moreover, countries with English legal origin show higher asset growth premia. With all sample stocks included, we find that only IRISK, ACCT, EMS and UK exhibit significant coefficients in univariate regressions. Thus, our results are quite similar and comparable to those documented in Watanabe *et al.* (2013).

Once we control for the explanatory power of IDV and UAI, as shown in multivariate regressions, all variables associated with limits-to-arbitrage, corporate governance, investor protection and accounting quality have insignificant coefficients. More importantly, both IDV and UAI show significant coefficients in multivariate regressions. The coefficients on IDV remain significantly positive when we concentrate on stocks with low debt ratios, while those on UAI are significantly negative in 2 out of the 10 model specifications. These observations again confirm the robustness of our findings that national cultures play an important role in the cross-country differences in the asset growth premia under several controls of country-level variables.

7. Conclusions

In this paper, we establish an important and robust linkage between national cultures and the asset growth effect in international equity markets. In particular, we hypothesize that overinvestment is the underlying channel because managers in more individualistic and low uncertainty-avoiding cultures have higher tendency to overinvest. Motivated by the prediction of the overinvestment hypothesis, we propose that countries with higher individualism and lower uncertainty avoidance exhibit stronger asset growth premia than counterparties.

Confirming our hypotheses, we empirically show that individualistic countries have an asset growth premium of 0.750% per month, which is remarkably higher than the premium among collectivistic countries by 0.514%. Analogously, low uncertainty-avoiding countries have a significant asset growth premium of 0.624% per month, which is remarkably higher than the asset growth premium averaged across high uncertainty-avoiding countries by 0.500%. The findings are robust in several ways, including the value-weighted scheme, the exclusion of the US market, denominations using local currencies, and an alternative empirical method based on Fama and MacBeth (1973) cross-sectional regressions.

While existing studies mostly attribute the asset growth anomaly to the q-theory or limits-to-arbitrage, our study contributes to the literature by highlighting the plausible room for overinvestment to explain the anomaly. We thus document informative evidence that proxies associated with the q-theory, limits-to-arbitrage and alternative country characteristics provide no incremental explanatory power for the asset growth effect across countries when the impacts of national cultures are taken into account. Nevertheless, the relation between a

country's asset growth premium and its culture dimensions remains significant and robust to controls of these alternative explanations. Overall, our study expands the growing importance of national cultures and enriches the emerging literature that unites national cultures and asset pricing. An important implication of our study to practitioners is that investors should be aware of the cultural differences when they trade on the information embedded in corporate investments (or asset growth) across different countries.

Notes

1. In particular, Chui *et al.* (2010) focus on the cultural explanation of momentum while Eun *et al.* (2015) examine whether individualistic and collectivistic countries exhibit different patterns in stock price synchronicity.
2. Watanabe *et al.* (2013) identify four types of mispricing-based explanations for the asset growth anomaly. Because our study highlights the importance of the overinvestment hypothesis, we do not have a complete introduction to other forms of mispricing. Please refer to their section 2.2 for detailed discussions.
3. The literature also demonstrates evidence in favor of the q-theory in explaining the value premium (Xing, 2008), the accrual premium (Wu *et al.*, 2010) and the innovation anomalies (Chan *et al.*, 2017).
4. In particular, the literature shows that firms in individualistic cultures tend to undertake more risk (Li *et al.*, 2013), invest more in long-term risky assets (Shao *et al.*, 2013), hold less cash (Chen *et al.*, 2015) and incorporate better corporate governance (Griffin *et al.*, 2017).
5. The final list of countries included in our sample is the same with the sample of Chui *et al.* (2010).
6. We appreciate an anonymous reviewer for suggesting the use of this alternative measure.
7. The constructions of $SIZE_{i,t}$, $BM_{i,t-1}$ and $PRET_{i,t}$ are consistent with Fama and French (1992) and Jegadeesh and Titman (1993).
8. Fama and French (1998, 2012) and Hou *et al.* (2011), among others, have examined size and book-to-market effects in international equity markets. The cross-country momentum phenomenon has also been investigated by Rouwenhorst (1998), Griffin *et al.* (2003), Chui *et al.* (2010), Fama and French (2012) and Asness *et al.* (2013).
9. While Hofstede's cultural measures are extensively adopted in the literature, the WVS cultural measures have also been used in prior studies, e.g. Guiso *et al.* (2003) and Gabaix and Landier (2008). After taking a close look, we realize that there could exist sharp differences between the two sets of individualism measures. For example, in Hofstede's IDV measure, the USA has an extremely high value of 91, while South Korea and Taiwan have extremely low values of 18 and 17. This observation is more consistent with the general impression that Americans are more individualistic while Asians are more collectivistic. The WVS individualism values of the USA, South Korea and Taiwan are 0.524, 0.630 and 0.562 in 2001, respectively. This observation suggests that Americans are more collectivistic compared with Asians according to the WVS in 2001.
10. We follow Titman *et al.* (2013) by using the International Monetary Fund (IMF) designations to identify developed markets. Watanabe *et al.* (2013) also define developed markets based on the 2009 International Finance Corporation (IFC) classification as one proxy of market efficiency. In untabulated results, we show that our finding is robust to the use of the IFC classification.
11. To make our results comparable with Titman *et al.* (2013), we use the same period from 1989 to 2010 as in their study to calculate MKTCAP and LIQUID. Our results are virtually unchanged when we extend the calculation to 2013. The data are available at http://data.worldbank.org/indicator.

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Appendix
Country-level indices

(1) Market development (DEVP): An indicator for developed markets based on the IMF classification.

(2) Access-to-equity markets (EQUITY): The score of financial market development based on the annual surveys of business executives' qualitative assessment of the ability of firms to raise equity in local stock markets. The survey data are available from the publications of the Global Competitiveness Report from 1999 to 2006. We use the average of the annual scores for the period from 1999 to 2006 as the proxy of EQUITY.

(3) The ratio of stock market capitalization to GDP (MKTCAP): The average market capitalization for the current year and the previous divided by the country's GDP for the current year. The values are retrieved from the World Bank and are averaged for the period from 1989 to 2010 [11].

(4) The ratio of total value of shares traded to GDP (LIQUID): The total value of shares traded of the market divided by the country's GDP for the current year. The values are retrieved from the World Bank and are averaged for the period from 1989 to 2010.

(5) Return synchronicity (R^2): The R-squared value of a regression of weekly stock returns on contemporaneous, two lead and two lag weekly market returns estimated over the past year.

The country-level R^2 is the R-squared value first averaged across all stocks and then averaged over the sample period.

(6) The development status of financial markets (MKT): A comprehensive measure of market development that aggregates the cross-country ranks of three variables: (1) market capitalization to GDP ratio; (2) the number of publicly listed companies scaled by population; and (3) the number of IPOs scaled by population. In each year, the three variables are ranked across countries and ranks are aggregated for each country. We retrieve the data from the World Bank and are average the time series of the ranks over the entire sample period.

(7) Future earnings response coefficient (FERC): The sum of the coefficients from the following regression:

$$r_{i,t} = \alpha + \beta_0 \Delta EPS_{i,t} + \sum_{\tau=1}^{3} \beta_\tau \Delta EPS_{i,t+\tau} + \sum_{\tau=1}^{3} \gamma_\tau r_{i,t+\tau} + u_{i,t},$$

where $r_{i,t+\tau}$ is stock i's annual return in year $t+\tau$; $\Delta EPS_{i,t+\tau}$ is the change in earnings per share from year $t+\tau-1$ to $t+\tau$, scaled by i's closing price at the end of year $t+\tau$. The regression is estimated for each stock over the entire sample period with at least 12 years of observations to be valid. FERC is defined as $\sum_{\tau=1}^{3} \beta_\tau$.

(8) Trading costs (TCOST): The estimate provided by Elkins-Sherry Co., which is constructed based on commissions, fees and market impact costs for pension funds, investment managers and brokerage houses for the period from September 1996 to December 1998. We obtained the data from Titman *et al.* (2013).

(9) Idiosyncratic risk (IRISK): The value-weighted average of idiosyncratic volatilities of all stocks in a country. From July in year t to June of year t+1, we regress a stock's daily returns on the value-weighted market return and obtain the standard deviation of the residuals from the regression. We then calculate the value-weighted average of the standard deviations across all stocks within a country and average the time series over the entire sample period.

(10) Dollar trading volume (DVOL): The value-weighted average of dollar trading volume for all stocks in a country, where the dollar trading volume is the product of share volume and daily closing price summed from July in year t to June of year t+1. We average the time series of the average dollar trading volume over the entire sample period.

(11) Short selling (SHORT): An indicator of no short-sale restriction, which equals one when short selling is allowed in the country and zero otherwise. We obtain the data from Bris *et al.* (2007).

(12) Creditor rights index (CR): An index of creditors' rights developed by La Porta *et al.* (1998). They evaluate four dimensions rights and assign a score of one if the rights of secured of lenders are defined in laws and regulations and zero otherwise. CR is the sum of the four scores, and its value ranges from zero (weakest creditor rights) to four (strongest creditor rights). We obtain the data from La Porta *et al.* (1998).

(13) Revised anti-director rights index (AD): The sum of six components, three are on shareholder voting and the remaining three are on minority protection. Each component is assigned a value of one if shareholders' rights are protected by laws or regulations. The value ranges from zero (weakest shareholder protection) to six (strongest shareholder protection). We obtained the data from Djankov *et al.* (2008).

(14) Anti-self-dealing index (AS): A survey-based indicator of *ex ante* and *ex post* restrictions on controlling shareholders' self-dealing, which takes a value of one if the control of self-dealing transactions is strong and zero otherwise. We obtained the data from Djankov *et al.* (2008).

(15) UK, FR, GE and SC: Indicators that equal one if a country has English, French, German and Scandinavian legal origin, respectively. We obtain the data from La Porta *et al.* (1998).

(16) Accounting standard index (ACCT): An index of accounting standards based on the reporting or omission of 90 items from annual reports. A higher value of ACCT signifies higher accounting standards. We obtained the data from La Porta *et al.* (1998).

(17) Earnings management score (EMS): An index of earnings management tendency that is given by the average rank across four variables of earning management. A higher value of the EMS signifies poorer earnings quality. We obtain the data from Leuz *et al.* (2003).

Corresponding author
Kuan-Cheng Ko can be contacted at: kcko@ncnu.edu.tw