

Individualism and Momentum around the World*

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Individualism and Momentum around the World

Abstract

This paper examines the relationship between individualism and the profitability of momentum strategies across countries. Using an index constructed by Hofstede (2001) as a measure of the degree of individualism, and stock return data for more than 20,000 individual firms from forty-one countries during the 1984 – 2003 period, we find that the momentum effect is significantly higher in countries that rank high on Hofstede's individualism index. This finding continues to hold, even after controlling for other country-level variables that are likely to proxy for the efficiency of capital markets, such as the legal protection of investors and the quality of accounting standards. Our result is also robust to an alternative measure of individualism adopted from the GLOBE, and our bootstrap analysis suggests that the positive relationship between individualism and momentum is unlikely to occur by chance.

JEL Classification: C13; C53; G14

Key Words: International momentum; Individualism; Overconfidence; Self-attribution bias; Behavioral finance; Legal protection of investors

1. Introduction

There is now a substantial literature that examines what is generally referred to as the momentum effect -- the observation that stocks that perform the best in the recent past continue to perform well in the future. For example, Jegadeesh and Titman (1993, 2001) find that stocks in the United States that realize the best (worst) returns over the past 3 to 12 months continue to perform well (poorly) over the subsequent 3 to 12 months, and that these return differences do not appear to be related to risk. The profitability of momentum strategies occurs throughout the world (see Rouwenhorst (1998) for a study of momentum in Europe and Griffin, Ji, and Martin (2003) for a study of momentum around the world). However, there are important exceptions, most notably in Asia (see, for example, Chui, Titman, and Wei (2003a)).

This paper provides an explanation for why momentum strategies appear to be profitable in some countries but not in others. Although we consider other potential explanations, our central focus is on cultural differences across countries that can potentially be related to behavioral biases. In particular, we consider cultural differences that are likely to be associated with investor overconfidence and self-attribution bias.¹ Our interest in this avenue of research stems from the Daniel, Hirshleifer, and Subrahmanyam (DHS, 1998) model that illustrates how the momentum effect can be generated because of these behavioral biases.²

Our empirical tests are based on the idea that behavioral biases like overconfidence and self-attribution bias are likely to have a cultural component that differs across countries (Markus

¹Self-attribution bias refers to the tendency of people to claim credit for their success and to blame other persons or environments for their failure (see Miller and Ross (1975) and Zuckerman (1979)). It is also commonly known as self-serving bias in the psychology literature.

² There are two other explanations, which are also very important and useful but are not directly related to the issue we study here. Barberis, Shleifer and Vishny (1998) propose the conservatism bias of investors as a possible explanation of momentum. Hong and Stein (1998) argue that momentum arises because information diffuses relatively slowly amongst stock market participants.

and Kitayama (1991), Heine and Lehman (1995), and Heine et al. (1999)).³ Although we are not aware of a direct measure of either overconfidence or self-attribution bias, there exists an index developed by Hofstede (2001) which, based on survey evidence, measures what he calls individualism in 50 different countries.⁴ According to Hofstede (2001), individualism pertains to the degree to which people tend to focus on their internal attributes, such as their own abilities, to differentiate themselves from others. As we will argue in more detail in Section 2, since people in more individualistic cultures tend to focus more on how their abilities differentiate them from their peers, people in individualistic cultures are more likely to exhibit overconfidence and self-attribution bias.

To the best of our knowledge, this measure of individualism is new to the finance literature. However, since the establishment of Hofstede's cultural framework in 1980 (Hofstede (1980)), Hofstede's cultural values are widely accepted and have been used by many researchers in other disciplines in business.⁵ Moreover, the survey conducted by Hofstede is regarded as the most comprehensive and comparative study in terms of both the range of countries and the number of respondents involved (Kagitcibasi (1997)).

Our analysis of stock returns in forty-one countries indicates that the momentum effect is stronger in countries with higher indexes of individualism. In particular, average returns on zero cost (long minus short) monthly momentum portfolios are more than 0.5 percent higher in

³ These studies suggest that self-attribution bias is more common in cultures that emphasize on independent self-construal rather than in cultures that emphasize on interdependent self-construal.

⁴ Specifically, based on a survey involving more than 120,000 respondents from 50 countries, Hofstede (2001) classifies cultures into five dimensions. These cultural dimensions include individualism, masculinity, power distance, uncertainty avoidance, and long-term orientation. In other words, cultures differ in their emphasis on these five dimensions. Among these five cultural dimensions, individualism is the most closely related to overconfidence and self-attribution bias.

⁵ For example, Schultz, Johnson, Morris, and Dyrnes (1993) and Kachelmeier and Shehata (1997) have applied Hofstede's measures of cultural values to accounting, Franke, Hofstede, and Bond (1991), Yeh and Lawrence (1995), and Weber, Shenkar, and Raveh (1996) to economics, Nakata and Sivakumar (1996) and Aaker and Williams (1998) to marketing, and Geletkanycz (1997) and Tan, Wei, Watson, Clapper and McLean (1998) to management.

countries with individualism indexes in the top 30% than in those countries with indexes in the bottom 30%. In multivariate tests, we find that this relationship continues to hold, even after controlling for other country-level variables that may be related to cross-country differences in market efficiency. These characteristics include a dummy variable for whether the legal system is common law versus civil law, a measure of anti-director rights, a corruption perception index, a measure of accounting standards, and a measure of the risk of earnings management. We find that some of these variables also explain cross-country differences in momentum, but the evidence is not as strong and not as robust as our evidence on individualism.⁶

Although we believe we are the first to consider whether cross-country differences in momentum are related to behavioral biases, our study is tangentially related to previous research that suggests that overconfidence can explain cross-sectional differences in momentum within the United States. In particular, Daniel and Titman (1999) suggests that overconfidence is likely to have a relatively greater influence on investors when they analyze fairly vague and subjective information, suggesting that stocks that require more judgment to value will exhibit stronger momentum. Their evidence that growth stocks (that presumably are less straightforward to value) exhibit greater momentum than value stocks tends to support this hypothesis. A more recent study by Chui, Titman, and Wei (2003b) documents that real estate investment trusts (REITs) exhibit significantly more momentum after 1990, following changes in the industry that made REITs more difficult to value. In contrast to these earlier studies, this study examines cross-sectional differences in the behavioral biases of investors, rather than in cross-sectional differences in the stocks that these investors evaluate.

⁶ Hong, Lee, and Swaminathan (2003) in a smaller sample also relate these legal and accounting variables to momentum profits.

In a related study examining investors outside of the U.S., Grinblatt and Keloharju (2000) find language and culture influence investors' stockholdings and their trading preferences in Finland. While Grinblatt and Keloharju focus on the cultural differences within a country, we emphasize the across-country differences and show how culture, in particular individualism, influences investors' trading behavior, and in turn, the profitability of momentum trading strategies.

This study also contributes to the literature on the effect of institutional factors on the profitability of momentum strategies. While Chui, Titman, and Wei (2003a) and Hong, Lee, and Swaminathan (2003) document that investor protection influences the profitability of momentum strategies. Their sample sizes are relatively small. Chui, Titman, and Wei study only eight Asian markets, while Hong, Lee, and Swaminathan examine only eleven markets. In contrast, we have investigated a much large sample with a total of forty-one countries and find that the relation between the institutional factors considered in these earlier papers and momentum is not particularly robust after controlling for cultural differences.

The remainder of this paper is organized as follows. In Section 2, we discuss the implications of individualism on overconfidence and self-attribution bias. In Section 3, we describe the data and methodology used in the paper. In Section 4, we report the results of momentum profits for each country and the average country momentum profit. Section 5 reports our major results on the relationship between individualism and momentum profitability, while Section 6 shows results from robustness checks. Finally, Section 7 concludes the paper.

2. Individualism, Overconfidence, and Self-attribution Bias

Social psychologists make the distinction between what they call individualistic and collectivistic cultures. According to Hofstede (2001), individualism pertains to the degree to which people in a country tend to have an *independent* rather than an *interdependent* self-construal, and the reverse is the case for collectivism.⁷ Hofstede goes on to say that in individualistic cultures, “the ties between people are loose: Everyone is expected to look after herself/himself and her/his immediate family only” (Hofstede (2001, p. 225)). Indeed, starting from their childhood, children in individualistic cultures learn to base their personal identity on themselves (Hofstede (2001)). In contrast, Hofstede (2001) argues that children in collectivistic cultures learn to base their personal identity on the social system, and Markus and Kitayama (1991, p. 227) suggest that people in collectivistic cultures view themselves “not as separate from the social context but as more connected and less differentiated from others.”

The evidence in the psychology literature suggests that there is likely to be a link between individualistic cultures and overconfidence. For example, Markus and Kitayama (1991) argue that in individualistic cultures people are motivated to think positively about themselves and focus on their own internal attributes, such as their abilities. Moreover, Heine et al. (1999, pp. 769-770) argue that children in individualistic cultures “are encouraged to think about themselves positively as *stars*, as *winners*, as *above average* and as the *repositories of special qualities*,” and as a result, people in individualistic cultures tend to overestimate their abilities. Indeed, Markus and Kitayama (1991) and Heine et al. (1999) review a relatively large body of

⁷ The independent construal of self is defined as “a conception of the self as an autonomous, independent person.” (Markus and Kitayama (1991, p. 226)) and the interdependent construct of self is defined as “seeing oneself as part of an encompassing social relationship and recognizing that one’s behavior is determined, contingent on, and to a large extent organized by what the actor perceives to be the thoughts, feelings, and actions of others in the relationship” (Markus and Kitayama (1991, p. 227)). These definitions of independent and interdependent self-construals are widely used in social psychology. See, for example, Heine and Lehman (1995), Heine et al. (1999), Hofstede (2001), and Gelfand et al. (2002).

evidence from cross-cultural psychological experiments and surveys, which show that while people in *individualistic cultures*, such as the United States tend to believe that their abilities are *above average*, people in collectivistic cultures, such as Japan, do not have this belief.

There is also a link between individualistic cultures and self-attribution bias, which Zuckerman (1999, p. 245) describes as the tendency of people to “enhance or protect their *self-esteem* by *taking credit for success* and *denying responsibility for failure*.” Since “maintaining self-esteem requires separating oneself from others and seeing oneself as different from, and better, than others” (Markus and Kitayama (1991, p. 242)), people with the independent view of self tend to have high self-esteem.⁸

In contrast to the independent view of self, people with the interdependent view of self do not think that enhancing self-esteem can help them to be more connected to others. It was suggested that, for people with interdependent selves, “seeing oneself as *average*, however, would more likely serve their cultural mandate of maintaining interpersonal harmony” (Heine and Lehman (1995, p. 596)). As a result, the interdependent construal of self is only weakly related to self-esteem (Henie et al. (1999)). Since individualism is said to foster an independent construal of self and collectivism it is said to foster an interdependent construal of self, people in individualistic cultures tend to put more emphasis on their self-esteem than people in collectivistic cultures do. Indeed, children in individualistic cultures are educated to care about their self-esteem. In individualistic cultures, “the purpose of education is to enable the child to stand on his or her own two feet” (Hofstede (2001, p. 227)) and “good educators are supposed to reinforce the students’ self-esteem” (Hofstede (2001, p. 235)). This tendency to maintain and to

⁸ After a review of a large body of psychological experiments, Henie et al. (1999, p. 778) conclude that “independence bears a clear relation with self-esteem.”

promote self-esteem in individualistic cultures therefore results in pervasive self-attribution bias as well as overconfidence (Markus and Kitayama (1991) and Kagicibasi (1997)).

3. Data Description and Summary Statistics

3.1 Data description

To measure individualism, we use Hofstede's (2001) individualism index (*Indv*), which is calculated for 66 countries.⁹ In addition, with the exception of the U.S. sample that comes from CRSP, we use Datastream International data for stock returns in 55 countries. Our sample period is from February 1980 to June 2003.¹⁰ The sampling period for each country varies because data in each country is available on Datastream International starting at different dates.¹¹

Information about the legal system, anti-director rights, and accounting standards is taken from La Porta, Lopez-de-Silanes, Shleifer, and Vishny (LLSV, 1998), while the risk of earnings management is taken from Leuz, Nanda, and Wysocki (2003). The index on anti-director rights reflects how well the legal system protects the rights of minority shareholders against the managers or dominant shareholders in the corporate decision-making process. The higher the index, the better is the legal protection of investors in this country. The index on accounting standards measures the quality of accounting information. The higher the index value of a country, the better is the accounting standards in this country. The risk of earnings management

⁹ The scores on individualism are directly calculated from the survey data that are collected from the national subsidiaries of IBM for 50 countries out of these 66 countries. For the other 16 countries, their scores on individualism are estimated from various sources. For the details of these sources, please refer to Hofstede (2001). Out of the 16 countries that are not in the IBM set, only three are included in our final sample due to other data requirements. These countries are Bangladesh, China, and Poland.

¹⁰ Before February 1980, we can only obtain limited data on selected stocks in some of the countries in our sample from Datastream International.

¹¹ We calculate the stock returns adjusted for dividends from the stock return index provided by Datastream International. On months when a stock is not traded, Datastream International carries forward its return index in the previous month to the current month. Therefore, a stock return of zero may be a result of no trading. To remedy this problem, we compute a stock's return in the current month only if the trading volume of this stock is positive in the current month as well as in the previous month. Monthly trading volume on individual stocks is also collected from Datastream International.

index is the aggregate earnings management scores reported in Leuz, Nanda, and Wysocki (2003). The higher the index of a country, the higher is the risk of earnings management in that country. Unfortunately, the risk of earnings management index is available for only 31 countries. Following Hong, Lee, and Swaminathan, our corruption perception index is obtained from Transparency International. The lower the index score of a country, the higher is the corruption level in that country. In contrast to the previous four indices, the corruption perception index is available on an annual basis.¹²

We include only common stocks, both domestic and foreign stocks, which are listed on the major stock exchange(s) in each country.¹³ A cross-listed stock is included only in its home country sample.¹⁴ The quality of stock market data obtained from Datastream International, in particular in the emerging markets, is not as good as the data from CRSP. To mitigate this problem, we follow the screening procedure suggested by Hong, Lee, and Swaminathan (2003). In particular, we exclude stocks whose market capitalization is below the 5th percentile of all the stocks within each country in each month and we include stock returns only with values within the 1 percentile and the 99 percentile of the return distribution in each month for each country. This procedure not only helps us filter out suspicious stock returns in each country in our sample, but also ensures that the momentum effect in each country is not driven primarily by small and illiquid stocks. In order to calculate the past six-month cumulative returns on individual stocks

¹² Annual data on *Cpix* are available from Transparency International from 1995. Mean scores on *Cpix*, however, are available over the periods from 1980 to 1985 and from 1988 to 1992. The mean scores in each country for the period from 1980 to 1985 (1988 to 1992) are used as annual scores over the years from 1980 to 1985 (1988 to 1992). We calculate the *Cpix* scores for each country in 1986 and 1987 as the average of their means scores over the periods from 1980 to 1985 and from 1988 to 1992. We compute the *Cpix* scores on each country in 1993 and 1994 as the average of their scores in 1995 and their mean scores over the period from 1988 to 1992.

¹³ If a stock has multiple share classes, we only include its primary class in our sample. For example, only the A-shares in the Chinese stock market and the Bearer-shares in the Switzerland stock market are included in our sample.

¹⁴ We collect data on the stocks that are in the “Research” stocks list and the “Dead” stocks list. Both lists are provided by Datastream International. Including stocks from the “Dead” stocks list helps alleviate the survival bias in our sample.

as well as to measure the returns on the momentum portfolios, we also require each stock in our sample to have a return history of at least eight months.¹⁵

Since we need a reasonable number of stocks to form momentum portfolios, we require each country to have at least 30 stocks that meet our stock selection criteria in any month during our sample period. Furthermore, we require each momentum portfolio in each country to have a return history of at least five years. Because of the last two criteria, our sample includes only forty-one countries, which include more than 20,000 individual stocks.

3.2 *Summary statistics*

Table 1 lists the countries included in our study along with the total market capitalization of their stock exchanges. Table 1 also reports the average firm size and the number of firms that meet our sample requirements at three different times: the first month of the sampling period, December 1996, and June 2003.¹⁶

[Insert Table 1 here]

The evidence in this table indicates that most of the stock markets in our sample experienced tremendous growth in total market capitalization and the number of firms listed. As of June 2003, the U.S. had the largest market capitalization with a value of US\$10,391 billion and Bangladesh had the smallest market capitalization with a value of only US\$1.866 billion. China experienced the fastest growth rate of 440% while the Philippines experienced the most negative growth rate of -74%. In terms of the number of listed firms in June 2003, the U.S. has the largest number with 4,544, while Ireland has the smallest number with 32.

¹⁵ We start to measure the returns on the winner/loser portfolios one month after the portfolio formation.

¹⁶ The sample periods used to calculate values in Table 1 starts 12 months after the actual sample periods, since we need to use twelve observations on returns to compute the returns for momentum portfolios.

Table 2 reports information about relevant institution variables in the countries we examine. Panel A of Table 2 reports information about the legal system (*Legal*), anti-director rights (*Anti*), the corruption perception index (*Cpix*), accounting standards (*Acct*), and the risk of earnings management (*Emgt*) for each country. Consistent with LLSV (1998), the level of corruption for common law countries is similar to that of civil law countries in our sample. Panel A of Table 2 also reports the Hofstede (2001) individualism index (*Indv*) for each country in our sample.

Panel B of Table 2 shows that the institutional variables are correlated with each other. We define a legal dummy variable (*DL*) to capture the effect of the legal origin. The legal dummy variable takes a value of one if the country belongs to the common-law origin, and it takes a value of zero, otherwise. All variables are positively correlated with each other except for the risk of earnings management that is negatively correlated with other variables. In particular, the legal dummy variable is significantly positively correlated with anti-director rights and accounting standards, whereas it is significantly negatively correlated with the risk of earnings management. The anti-director rights index is significantly negatively correlated with the risk of earnings management. The corruption perception index is significantly positively correlated with the accounting standards and the individualism index. Finally, the risk of earnings management is significantly negatively correlated with accounting standards and individualism.

4. Returns on Momentum Portfolios

In this section we report, for each country, the profitability of momentum strategies that form portfolios based on the stocks' past six-month returns and hold the stocks for six months. For each market, stocks with the performance in the bottom one-third are assigned to the loser

(L) portfolio, while those in the top one-third are assigned to the winner (W) portfolio. These portfolios are equally weighted. We use the top and bottom one-third rather than the 10% cutoffs used by Jegadeesh and Titman (1993) because of the smaller sample sizes in most countries. In addition, to minimize the effect of the bid-ask bounce and the lead-lag effect, we skip one month between the ranking period and the holding period. The returns are all measured in U.S. dollars.¹⁷

As in Jegadeesh and Titman (1993), to increase the power of our tests we construct overlapping momentum portfolios. For instance, the winner portfolio formed in November (i.e., the holding period return starts next January) is the equally weighted combination of those stocks with the cumulative returns in the top one-third over the previous June to November period (the W portfolio in November), over the previous May to October period (the W portfolio in October) and so on up to over the previous January to June period (the W portfolio in June). If a stock has a missing return during the holding period, we replace it with the corresponding value-weighted market return. If the stock return is no longer available, we rebalance the portfolio at the end of the month.

Panel A of Table 3 presents the average U.S. dollar monthly returns (%) of the winner portfolio, the loser portfolio and the winner-minus-loser portfolio in each of the forty-one countries. The result in Table 3 indicates that all but five countries (Argentina, Korea, the Philippines, Taiwan, and Turkey) exhibit positive momentum profits; these profits are statistically significant in 21 countries. The momentum strategy generates the highest profits in Poland (1.622% per month), and next in order are New Zealand (1.297% per month), Canada

¹⁷ Our findings in this study are virtually the same if we measure returns in local currencies. To save space, we only present the results obtained from the returns measured in U.S. dollars.

(1.124% per month), and the U.K. (0.999% per month).¹⁸ The only major market that does not exhibit significant momentum is Japan.

[Insert Table 3 here]

Panel B of Table 3 reports the momentum profits from portfolio strategies that exploit the momentum strategy around the world. We refer to the first as the country-average momentum portfolio and the second as the country-neutral momentum portfolio.¹⁹ The country-average portfolio is a portfolio that puts equal weight on each country-specific momentum portfolio in this portfolio. That is, each country has the same weight in the “country-average” portfolios. The minimum number of countries in each portfolio in our sample at any point in time must be at least two. The result in Panel B of Table 3 indicates that the average monthly return on the country-average portfolio over the period from March 1981 to June 2003 is about 0.54% per month (t-value=6.48), which is close to the one observed in the U.S.²⁰

The formation of the country-neutral portfolio is similar to that of the momentum portfolio in each country. More specifically, at the end of each month, all stocks in the ‘W’ portfolio in each country are assigned to the ‘global W’ portfolio and all stocks in the ‘L’ portfolio in each country are assigned to the ‘global L’ portfolio. Again, the minimum number of countries in each portfolio in our sample at any point in time must be at least two. These

¹⁸ The momentum portfolio in Poland only has a return history of five years. Therefore, comparing with other countries, the statistics on the momentum portfolio in Poland is less reliable.

¹⁹ We also consider one more momentum strategy that classifies winners and losers based on the past six-month returns on all stocks in our sample. This momentum strategy yields similar profits as the country-average and the country-neutral portfolios. In particular, the average monthly return on this strategy over the period from March 1981 to June 2003 is about 0.59% per month (t-value=3.17). To save space, the results on this strategy are not reported.

²⁰ Even though our sample includes 37 countries that are also appeared in the study of Griffin et al. (2003), our findings are not directly comparable to those in their study. Griffin et al. (2003) classify the top (bottom) 20% of stock returns as winner (loser), while this study uses the top and bottom one-third designations. Furthermore, our sample ends in June 2003, while their sample ends in December 2000. As a result, the Asian financial crisis will have a stronger impact on their results. Nonetheless, they report an average momentum profit for all their countries of 0.49% per month with a t-statistic of 2.95, which is close to the average returns on our country-average portfolio of 0.54% per month with a t-statistic of 6.48.

equal-weighted portfolios are held for six months. The country-neutral winner (loser) portfolio is an overlapping portfolio that consists of ‘global W’ (‘global L’) portfolios in the previous six ranking months. Returns on these portfolios are measured one month after ranking. Returns on the winner and loser portfolios are the simple average of the returns on the six ‘global W’ and the six ‘global L’ portfolios, respectively. The country-neutral momentum portfolio is the zero-cost, winner minus loser (W-L) portfolio.²¹ The average monthly momentum profit on the country-neutral portfolio is about 0.58% per month with a t-value of 4.44.

5. Individualism and the Profitability of Momentum Strategies

5.1 Result from individualism-sorted portfolios

In this section, we investigate the effect of individualism on the profitability of momentum strategies across countries. We classify countries into three groups, from low (bottom 30%) to high (top 30%), based on their scores on the individualism index (*Indv*). Country-average and country-neutral portfolios are formed in each *Indv*-sorted group of countries. Since we require that each portfolio consist of at least two countries, the sample period starts from February 1984 and ends in June 2003.²²

Table 4 presents the average monthly returns on these *Indv*-sorted momentum portfolios. The evidence reveals that momentum profits monotonically increase with the score of the individualism index. The average return on the high *Indv* country-average portfolio is about 0.84% per month with a t-value of 6.76, and the spread between the average returns on the high

²¹ In the country-average portfolio, each country will have the same weight no matter how many stocks are in each country. However, those countries with more stocks will have more weight in the country-neutral portfolio. That is, each stock has the same weight in the country-neutral portfolio. Therefore, stock markets with fewer stocks listed tend to affect the returns on the country-average portfolio more than the returns on the country-neutral portfolio.

²² Average returns on the country-average and country-neutral portfolios of all countries over the period from February 1984 to June 2003 are reported in Panel B of Table 3.

Indv and the low *Indv* country-average portfolios is about 0.53% per month, which is highly significant with a t-value of 3.42. Similar findings are obtained using country-neutral portfolios.

[Put Table 4 here]

5.2 Multivariate Fama-MacBeth regressions

Previous studies indicate that the momentum effect is positively related to the legal protection of investors (Chui, Titman, and Wei (2003a) and Hong, Lee, and Swaminathan (2003)).²³ Since the result in Panel B of Table 2 indicates that the individualism index is highly correlated to other institutional variables, our previous finding on the relationship between individualism and the momentum effect may be a manifestation of the underlying institutional variables. To explore this possibility, we investigate the following multivariate Fama-MacBeth (1973) regression, which examines the effect of individualism on momentum profits, controlling for the institutional variables described earlier:

$$Mom_{it} = \alpha_o + \beta_1 Indv_i + \beta_2 DL_i + \beta_3 Anti_i + \beta_4 Cpix_{i\tau} + \beta_5 Acct_i + \beta_6 Emgt_i + \varepsilon_{it}, \quad (1)$$

where Mom_{it} is the return on the momentum portfolio in the i -th country during month t . $Indv_i$, DL_i , $Anti_i$, $Acct_i$, and $Emgt_i$ are, respectively, the individualism index, the legal dummy, the anti-director rights index, the accounting standards index, and the risk of earnings management index of country i . $Cpix_{i\tau}$ is the corruption perception index of country i in year τ and ε_{it} is the error terms.

The averages of the time-series estimates from these month-by-month, cross-sectional regressions are reported in Table 5. Based on the results from univariate regressions, we find

²³ Using data from eight countries in Asia, Chui, Titman, and Wei (2003a) find that momentum effect is stronger in common law countries. Using data from eleven countries, Hong, Lee, and Swaminathan (2003) find that the corruption perception index (*Cpix*) is positively related to momentum effect and it is the best empirical measure of investor protection in explaining the cross-country variation in momentum effect in their study.

that all estimated coefficients have their expected signs and that all except for the estimated coefficient on the accounting standards are statistically significant. These findings indicate that the momentum effect increases with both the levels of individualism and investor protection. However, when the momentum returns are regressed on the individualism index and one of the investor protection variables, we find that only the coefficient on the anti-director rights index is significant. On the contrary, the coefficient on the individualism index is always positive and significant.

[Put Table 5 here]

In the multivariate regression involving all the explanatory variables, we find that only the estimated coefficient on the individualism index is significant.²⁴ This estimated coefficient is positive, suggesting that momentum returns are positively related to individualism. It is interesting to note that the estimated coefficient on the individualism index has about the same magnitude as in the univariate regression. The estimated coefficient on *Indv* of 0.010 – 0.012 indicates that the momentum profit will increase by 0.10 – 0.12% per month for every 10-points increase in the Hofstede's individualism index (the index ranges from 20 to 91). The result from the multivariate regression suggests that the relationship between the momentum effect and individualism is unlikely to be caused by the correlations between the individualism index and the investor protection variables. In contrast, the insignificance of the estimated coefficients on investor protection variables seems to indicate that the previously documented relationship between the momentum effect and investor protection may simply reflect the relationship between individualism, which is correlated with these investor protection measures, and the momentum effect.

²⁴ Since the risk of earning management is not available for ten countries, to check the robustness of our result, we also perform a multivariate regression excluding the risk of earnings management index. The result remains virtually the same.

6. Robustness Checks

6.1 *An alternative index for individualism*

Fernandez, Carlson, Stepina, and Nicholson (1997) reexamine Hofstede's country classification using recent data from nine countries and find that there are significant shifts in the scores that Hofstede assigned to these countries.²⁵ However, Fernandez et al. (1997) document that only Mexico has a substantial change in its score on the individualism index. In a recent study involving 9,400 pilots in 19 countries, Merritt (2000) replicates the study of Hofstede's cultural indexes. Based on the data collected during the period 1993-1997, Merritt (2000) finds that the cultural indexes calculated from the pilot sample are highly correlated with the cultural indexes obtained from Hofstede's study, which suggests that the scores on Hofstede's cultural indices are quite stable over time. To investigate whether our results are affected by the possible changes in the individualism scores that Hofstede assigned to each country, we collect cultural values from the GLOBE (Global Leadership and Organizational Behavior Effectiveness) project.

In the early 1990s, a group of scholars started the GLOBE project with a focus on culture and leadership in 61 countries involving thousands of middle managers in various industries in these countries (House, Javidan, Hanges, and Dorfman (2002)). In this project, national cultures are classified into nine dimensions: performance orientation, future orientation, assertiveness, power distance, human orientation, institutional collectivism, in-group collectivism, uncertainty avoidance, and genders egalitarianism. Among these dimensions, the institutional collectivism is intended to reflect the same constructs as Hofstede's individualism (House, Javidan, Hanges, and

²⁵ Whether the scores on Hofstede's cultural indices have been shifted substantially over time during the past 20 plus years is still debatable. It is generally agreed that cultural beliefs have led to the development of societal structures and these structures, in turn, reinforce the cultural beliefs that led to their establishment (Greif (1994) and Hofstede (2001)). These societal structures, such as the legal system, are quite stable over time. Therefore, Hofstede (2001) argues that the country scores on his cultural indices are quite persistent over time.

Dorfman (2002)). Therefore, the index on institutional collectivism can be regarded as an updated index for the Hofstede's individualism index.

We collect the country scores on the GLOBE's institutional collectivism index from various publications (Javidan and House (2001), Ashkanasy, Trevor-Roberts, and Earnshaw (2002), Bakacsi, Sandor, Andras, and Viktor (2002), Gupta, Surie, Javidan, and Chhokar (2002), Jesuino (2002), Kabasakal and Bodur (2002), and Szabo, Brodbeck, Hartog, Reber, Weibler, and Wunderer (2002)). Through these sources we are able to find the scores on the GLOBE's institutional collectivism index for thirty-one countries in our sample. The GLOBE's institutional collectivism index, however, reflects the degree of collectivism in each country, i.e., the higher a country's score in this index, the higher is its degree of collectivism. To be consistent with Hofstede's individualism index, we define a new variable $Indv_{GLOBE}$ to be equal to the GLOBE's institutional collectivism index times -1. Therefore, a higher value of $Indv_{GLOBE}$ of a country indicates that this country has a higher degree of individualism.

Using $Indv_{GLOBE}$ instead of Hofstede's individualism index ($Indv$) in Equation (1), we employ the Fama-MacBeth procedure to re-estimate this equation. The results are reported in Table 6. Consistent with our previous result, we find that the estimated coefficients on $Indv_{GLOBE}$ are always positive and significant. This finding indicates the momentum profit is positively related to individualism, even when we have used the updated scores on Hofstede's individualism index and with fewer countries.²⁶ However, we also notice that the estimated coefficient on the corruption perception index is significantly positive and the estimated

²⁶ Because of data availability on $Indv_{GLOBE}$, the multivariate regression analysis in this analysis consists of only twenty-four countries. To check whether our result is sensitive to sample size, we replace $Indv_{GLOBE}$ with Hofstede's individualism index ($Indv$) and re-estimate the Fama-MacBeth regression. We find that the estimated coefficients on $Indv$ and on the dummy variable of legal origin are both significantly positive. This suggests that the significantly positive relation between individualism and momentum is not due to the measure of individualism or the sample size.

coefficient on the risk of earning management is significantly negative.²⁷ These results suggest that the momentum profit may be also positively related to investor protection, when the updated scores on Hofstede's individualism index are used in the regressions. That is, both individualism and investor protection may have independently contributed to the momentum profitability.

[Put Table 6 here]

6.2 *Bootstrap analysis*

Up to this point we have shown that the profitability of momentum strategies is higher in countries that rank highly in terms of individualism, and that the difference between the momentum returns in countries with high and low individualism scores is statistically significant. However, it is still possible that the cross-country relation between momentum and individualism could be due to chance. To illustrate why this is the case, consider the possibility that we did our test with only two countries, say the U.S., which has significant momentum, and Japan, which does not. Based on an analysis of just these two countries we probably do not want to conclude that momentum is more profitable in countries with more individualistic cultures, or for that matter, lower rice consumption. However, given the spirit of our previous tests, one could draw such a conclusion from an analysis of only the U.S. and Japan, because momentum profits in the U.S., which has lower per capita rice consumption, is significantly greater than momentum profits in Japan. In summary, using our time-series tests, we have established that momentum profits are higher in individualistic cultures than in collectivist cultures. However, we have not established the significance of the cross-sectional relation between momentum and individualism.

²⁷ The estimated coefficients on *Indv*_{GLOBE} and the corruption perception index are still significantly positive when they are estimated from a multivariate regression excluding the risk of earning management index, which is not available for all countries.

To test whether the cross-sectional relation between individualism and momentum profits are statistically significant, we perform the following bootstrap test. Specifically, we randomly generate data by randomly assigning individualism scores and other country characteristics to the forty-one countries in our sample. In this random assignment, the U.S. may be assigned the individualism scores and characteristics of Brazil, and Japan may be assigned the individualism scores and characteristics of Australia. We generate 1,000 random assignments, and for each random assignment, we repeat the multivariate regressions reported in Tables 5 and 6.

Panel A of Table 7 reports the average coefficients and their standard deviations from these regressions using Hofstede's index on individualism. We compute the bootstrap t -statistics for our estimated β_i ($\hat{\beta}_i$) that is shown in Table 5 as $(\hat{\beta}_i - \bar{\hat{\beta}}_i) / S_{\hat{\beta}_i}$, $i = 1, 2, 3, 4, 5, 6$, where $\bar{\hat{\beta}}_i$ and $S_{\hat{\beta}_i}$ are the mean and standard deviation of the empirical distribution of the estimated β_i from the bootstrap analysis, respectively. Since we randomly assign the set of independent variables to each country, the $\bar{\hat{\beta}}_i$ s should all be approximately equal to zero. The bootstrap t -statistics reported in Panel A of Table 7 indicate that while the estimated coefficient on *Indv* is significantly positive with a t -value of 3.00, all other coefficients are not statistically significant. However, the insignificance of coefficients on all investor protection variables may be due to multi-collinearity. To check whether it is the case, we compute a F -statistic to test the hypothesis that all coefficients on investor protection variables (i.e., the legal origin dummy, the anti-director rights index, the accounting standards index, the risk of earnings management index, and the corruption perception index) are jointly equal to zero. We compute the empirical distribution of this F -statistic based on the 1,000 bootstrapped random samples. We find that the F -statistic is 1.17 with a bootstrapped p -value of 0.418, which suggests that the insignificance of coefficients on investor protection variables is not due to multi-collinearity.

[Put Table 7 here]

We repeat the above analysis by using GLOBE's individualism index and the results are reported in Panel B of Table 7. The bootstrap t-statistics suggest that while the estimated coefficients on $Indv_{Globe}$ and $Cpix$ are significantly positive, the estimated coefficient on $Emgt$ is significantly negative.²⁸

In summary, the bootstrap results in Panels A and B of Table 7 are almost identical to those reported in Tables 5 and 6, respectively. These findings indicate that the observed positive relationship between individualism and the momentum effect is unlikely to be caused by chance. Our bootstrap findings also suggest that the momentum effect is positively related to the perception of corruption and the risk of earnings management. However, the significance of the empirical measures for investor protection depends on the index we use to measure individualism.

7. Conclusion

It is always interesting to compare the profitability of investment strategies across international markets. In addition to providing a robustness check on results generated from the excessively mined U.S. data, a cross-country study can potentially provide evidence on how cultural differences as well as institutional differences affect the efficiency of financial markets.

The Jegadeesh and Titman (1993) momentum effect provides a major challenge to the efficient market hypothesis. Looking just at U.S. data, one might conclude that the momentum effect is both too persistent (i.e., it generates positive returns in all post-war decades) and is too

²⁸ We also compute a *F-statistic* to test the hypothesis that coefficients on all investor protection variables are jointly equal to zero. We find that the *F-statistic* is 3.23 with a bootstrapped p-value of 0.017.

strong (i.e., it generates implausibly high Sharpe ratios) to be explained by risk. Moreover, the momentum strategies generated with global data provide Sharpe ratios that are even higher.²⁹

Although most stock markets exhibit a momentum effect, not all do. Indeed, momentum is not significant in Japan, and seems to be less important in Asia in general. These cross-country differences provide a challenge to the risk-based as well as the behavioral theories. The risk-based theorists must explain why momentum returns are risky in the U.S. and Europe but not in Japan, while the behavioral theorists must explain why the Japanese are not subject to the same psychological biases as their Western counterparts.

The evidence in this paper indicates that culture can have an important effect on stock return patterns, which is consistent with the idea that investors in different cultures interpret information in different ways and are subject to different biases. In particular, in less individualistic cultures like Japan, investors may place less weight on information that they come up with on their own, and place more weight on the consensus of their peers. In other words, they may act less like the overconfident investors described by Daniel, Hirshleifer and Subrahmanyam (1998). Hence, our evidence that momentum is less profitable in countries with less individualistic cultures can be viewed as support for the Daniel, Hirshleifer and Subrahmanyam (1998) model.

²⁹ We construct a global market portfolio as a portfolio that has equal weight on each country's value-weighted market portfolio in our sample. We also construct a momentum portfolio that consists of a \$1 investment in the U.S. one-month T-bill, a \$1 in the country-average winner portfolio, and a \$1 short position in the country-average loser portfolio. Annual returns on these portfolios are calculated from July of year t to June of year $t+1$. The Sharpe ratios of these portfolios are computed over the period from July 1981 to June 2003. We find that the Sharpe ratio of the global market portfolio is 0.795, while the Sharpe ratio of the momentum portfolio is 1.313. The latter is about 65% larger than the former. We find similar result, when the country-average portfolio is replaced by the country-neutral portfolio in the momentum portfolio. For a reference, the Sharpe ratio of the U.S. market portfolio is 0.389, while the Sharpe ratio of the U.S. momentum portfolio is 0.631.

One might be tempted to conclude from our evidence that investors in more individualistic cultures are in some sense more rational and that their financial markets are more efficient. We would be quite hesitant to draw such a conclusion. Indeed, it is possible that investors in less individualistic cultures are subject to other biases that generate even more important market inefficiencies. For example, investors in less individualistic cultures may place too much credence on consensus opinions, and may thus exhibit herd like overreaction to the conventional wisdom.

To briefly follow up on this idea we evaluate the returns of high and low book-to-market portfolios in twenty-three countries over the period from January 1975 to December 2003. These portfolio returns, which were downloaded from Ken French's web site, are sorted into three groups, from low (bottom 30%) to high (top 30%), based on their scores on the Hofstede's individualism index (*Indv*). The average monthly *BM* effect for the low-*Indv*, median-*Indv*, and high-*Indv* groups are 0.654%, 0.325%, and 0.242%, respectively. The difference in the *BM* effect between the low-*Indv* and the high-*Indv* groups is 0.411% per month with a t-statistic of 2.11.

Taken together, the evidence that the momentum effect is stronger in more individualistic countries and the preliminary evidence that the book-to-market effect is stronger in less individualistic countries are consistent with the idea that investors have a tendency to underreact to information in the more individualistic cultures and to overreact to information in the less individualistic cultures. While this evidence is consistent with the existence of a link between overconfidence and the tendency to underreact and overreact to information, it is not consistent with the Daniel, Hirshleifer and Subrahmayam (1998) model, which suggests that the book-to-market effect as well as the momentum effect should be stronger when overconfidence is more

prevalent. Perhaps, this suggests that overconfidence can influence these return patterns through other channels.

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Table 1
Summary Statistics

Our sample consists of data on individual stocks from forty-one markets around the world. We require each country in our sample to have a score on the Hofstede's individualism index. Except for the U.S market data, all our data are collected from Datastream International. For the U.S. market, the data are obtained from the CRSP database before January 2002 and from Datastream International afterward. Within each country, we delete stocks whose market capitalization is below 5 percentile of all stocks in each month. For Datastream data, we also exclude stocks whose return is below the 1 percentile or above the 99 percentile of the return distribution in each month in each country. Furthermore, we require each country to have at least 30 stocks with observations on market capitalization and return in each month during our sample period and each country should have sufficient data for us to measure the returns on the momentum portfolios for at least five years. We only include common stocks (both domestic and foreign stocks) that are listed on the major exchange(s) in each country. A cross-listed stock will only be included in its home country sample. This table reports the name of the major exchange(s) and the market capitalization (in million US dollars) in each country at three different times: the first month when we start to measure the returns on the momentum portfolios, December 1996, and June 2003. The first month varies across countries because data in each country are available on Datastream starting from different months. To match the data from Datastream, the first month for the U.S. market is set to February 1980. Also reported is the average market capitalization (in million US dollars). The number of firms used to calculate the statistics is reported in parentheses.

Country (Stock Exchange)	Period	Market capitalization (US\$ million)	Start month	Dec. 1996	June 2003
Argentina (Buenos Aires)	199409 – 200306	Market capitalization	40,027	43,472	72,040
		Average market cap.	785	836	1,533
		# of firms	[51]	[52]	[47]
Australia (Australian)	198103 – 200306	Market capitalization	34,019	252,420	399,806
		Average market cap.	301	361	420
		# of firms	[113]	[699]	[953]
Austria (Vienna)	198904 – 200306	Market capitalization	6,707	27,816	36,619
		Average market cap.	224	376	581
		# of firms	[30]	[74]	[63]
Bangladesh (Dhaka)	199302 – 200306	Market capitalization	181	3,200	1,866
		Average market cap.	3	33	11
		# of firms	[52]	[97]	[172]
Belgium (Brussels)	198103 – 200306	Market capitalization	3,007	70,848	135,291
		Average market cap.	84	730	960
		# of firms	[36]	[97]	[141]
Brazil (Sao Paulo)	199510 – 200306	Market capitalization	46,371	71,521	82,499
		Average market cap.	909	1,300	1,031
		# of firms	[51]	[55]	[80]
Canada (Toronto)	198102 – 200306	Market capitalization	65,165	367,872	594,456
		Average market cap.	281	503	743
		# of firms	[232]	[731]	[800]
Chile (Santiago)	199008 – 200306	Market capitalization	7,637	48,195	50,390
		Average market cap.	99	482	622
		# of firms	[77]	[100]	[81]
China (Shanghai & Shenzhen)	199310 – 200306	Market capitalization	21,948	78,145	421,841
		Average market cap.	348	261	421
		# of firms	[63]	[299]	[1,001]
Denmark (Copenhagen)	198905 – 200306	Market capitalization	10,960	41,623	63,344
		Average market cap.	183	285	592
		# of firms	[60]	[146]	[107]
Finland (Helsinki)	199311 – 200306	Market capitalization	11,683	45,175	125,003
		Average market cap.	325	655	1,116
		# of firms	[36]	[69]	[112]

Table 1 (Continued)

Country (Stock Exchange)	Period	Market capitalization (US\$ million)	Start month	Dec. 1996	June 2003
France (Paris)	198103 – 200306	Market capitalization	29,621	577,609	1,061,535
		Average market cap.	264	1,221	1,763
		# of firms	[112]	[473]	[602]
Germany (Frankfurt)	198103 – 200306	Market capitalization	50,560	497,033	744,429
		Average market cap.	444	1,869	1,090
		# of firms	[114]	[266]	[683]
Greece (Athens)	198902 – 200306	Market capitalization	2,127	22,205	75,567
		Average market cap.	47	133	279
		# of firms	[45]	[167]	[271]
Hong Kong (Hong Kong)	198103 – 200306	Market capitalization	29,177	403,067	454,667
		Average market cap.	572	995	830
		# of firms	[51]	[405]	[548]
India (Mumbai)	199102 – 200306	Market capitalization	30,279	86,631	144,827
		Average market cap.	123	143	234
		# of firms	[246]	[607]	[620]
Indonesia (Jakarta)	199105 – 200306	Market capitalization	11,482	82,924	34,289
		Average market cap.	159	538	171
		# of firms	[72]	[154]	[200]
Ireland (Dublin)	199610 – 200306	Market capitalization	24,240	25,060	56,341
		Average market cap.	757	808	1,761
		# of firms	[32]	[31]	[32]
Israel (Tel Aviv)	199402 – 200306	Market capitalization	36,927	21,878	57,281
		Average market cap.	116	53	214
		# of firms	[319]	[416]	[268]
Italy (Milan)	198103 – 200306	Market capitalization	18,835	181,345	459,231
		Average market cap.	299	1,106	2,087
		# of firms	[63]	[164]	[220]
Japan (Tokyo & JASDAQ)	198103 – 200306	Market capitalization	319,721	3,022,424	2,245,732
		Average market cap.	444	1,379	881
		# of firms	[720]	[2,191]	[2,550]
Korea (Korea & KOSDAQ)	198508 – 200306	Market capitalization	5,281	116,626	252,071
		Average market cap.	25	187	197
		# of firms	[212]	[625]	[1,277]
Malaysia (Kuala Lumpur & MESDAQ)	198702 – 200306	Market capitalization	16,151	229,979	124,361
		Average market cap.	99	659	264
		# of firms	[163]	[349]	[471]
Mexico (Mexico City)	199210 – 200306	Market capitalization	30,899	36,518	29,618
		Average market cap.	858	849	846
		# of firms	[36]	[43]	[35]
Netherlands (Amsterdam)	198103 – 200306	Market capitalization	26,171	378,936	395,114
		Average market cap.	198	2,578	2,949
		# of firms	[132]	[147]	[134]
New Zealand (New Zealand)	198902 – 200306	Market capitalization	6,352	28,620	26,446
		Average market cap.	138	341	273
		# of firms	[46]	[84]	[97]
Norway (Oslo)	198202 – 200306	Market capitalization	1,953	47,357	66,721
		Average market cap.	56	401	565
		# of firms	[35]	[118]	[118]

Table 1 (Continued)

Country (Stock Exchange)	Period	Market capitalization (US\$ million)	Start month	Dec. 1996	June 2003
Pakistan (Karachi)	199308 – 200306	Market capitalization	3,960	7,382	11,433
		Average market cap.	48	70	69
		# of firms	[82]	[106]	[166]
Philippines (Manila)	199104 – 200306	Market capitalization	6,350	65,421	16,999
		Average market cap.	163	485	185
		# of firms	[39]	[135]	[92]
Poland (Warsaw)	199805 – 200306	Market capitalization	7,312	n.a.	28,122
		Average market cap.	141		168
		# of firms	[52]		[167]
Portugal (Lisbon)	198902 – 200306	Market capitalization	2,398	23,226	35,173
		Average market cap.	65	306	748
		# of firms	[37]	[76]	[47]
Singapore (Singapore)	198402 – 200306	Market capitalization	12,999	143,856	116,983
		Average market cap.	167	692	313
		# of firms	[78]	[208]	[374]
South Africa (Johannesburg)	198103 – 200306	Market capitalization	26,014	145,395	116,386
		Average market cap.	566	471	443
		# of firms	[46]	[309]	[263]
Spain (Madrid)	198804 – 200306	Market capitalization	41,868	179,438	376,313
		Average market cap.	891	1,742	3,517
		# of firms	[47]	[103]	[107]
Sweden (Stockholm)	198308 – 200306	Market capitalization	5,747	149,602	157,762
		Average market cap.	169	850	565
		# of firms	[34]	[176]	[279]
Switzerland (Zurich)	198103 – 200306	Market capitalization	15,294	82,246	42,898
		Average market cap.	312	904	572
		# of firms	[49]	[91]	[75]
Taiwan (Taiwan)	198908 – 200306	Market capitalization	78,375	243,889	265,252
		Average market cap.	1,912	956	735
		# of firms	[41]	[255]	[361]
Thailand (Thailand)	198802 – 200306	Market capitalization	6,376	84,954	55,175
		Average market cap.	89	254	196
		# of firms	[72]	[335]	[281]
Turkey (Istanbul)	198911 – 200306	Market capitalization	2,430	21,781	35,607
		Average market cap.	66	134	148
		# of firms	[37]	[162]	[240]
United Kingdom (London)	198102 – 200306	Market capitalization	190,163	1,492,189	1,723,565
		Average market cap.	128	1,353	1,314
		# of firms	[1,485]	[1,103]	[1,312]
United States (NYSE, AMEX & NASDAQ)	198102 – 200306	Market capitalization	1,266,709	7,629,690	10,390,507
		Average market cap.	286	1,094	2,287
		# of firms	[4,424]	[6,975]	[4,544]

Table 2
Institutional Characteristics for Sample Countries

Panel A of this table reports each country's investor protection scores and its Hofstede's index on Individualism (*Indv*). The investor protection variables are the legal origin (*Legal*), the anti-director right (*Anti*), the accounting standard (*Acct*), the risk of earning management (*Emgt*), and the corruption perception index (*Cpix*). The source of law origin, accounting standard (with lower scores, lower accounting quality), and anti-director right (with lower scores, lower protection levels) is adopted from La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998). The risk of earning management (with lower scores, lower risk levels) is the aggregate earnings management scores reported in Leuz, Nanda, and Wysocki (2003). The corruption perception index (with lower scores, higher corruption levels) is obtained from Transparency International. The source of the index on individualism (*Indv*, with lower scores, lower the levels) is adopted from Hofstede (2001). Each country only has one score on each institutional variable except for the *Cpix*. This table reports the average *Cpix* for each country over the period from 1986 to 2003. These average *Cpix* will be used in the correlation analysis. Panel B of this table shows the correlation coefficients among these institutional characteristics. To compute the correlation between legal origins and other variables, we define one dummy variable, *DL*, for the legal origins. *DL* takes the value of one for common law countries and it takes the value of zero, otherwise. The *p-values* are in parentheses.

Panel A: Investor protection measures and individualism

Country	Investor protection					Culture
	<i>Legal</i>	<i>Anti</i>	<i>Cpix</i>	<i>Acct</i>	<i>Emgt</i>	<i>Indv</i>
Argentina	French-Civil	4	4.52	45	n.a.	46
Australia	English-Common	4	8.47	75	4.8	90
Austria	German-Civil	2	7.40	54	28.3	55
Bangladesh	n.a.	n.a.	0.54	n.a.	n.a.	20
Belgium	French-Civil	0	6.89	61	19.5	75
Brazil	French-Civil	3	3.61	54	n.a.	38
Canada	English-Common	5	8.96	74	5.3	80
Chile	French-Civil	5	6.52	52	n.a.	23
China	n.a.	n.a.	3.79	n.a.	n.a.	20
Denmark	Scandinavian-Civil	2	9.24	62	16.0	74
Finland	Scandinavian-Civil	3	9.21	77	12.0	63
France	French-Civil	3	7.12	69	13.5	71
Germany	German-Civil	1	7.99	62	21.5	67
Greece	French-Civil	2	4.74	55	28.3	35
Hong Kong	English-Common	5	7.29	69	19.5	25
India	English-Common	5	2.87	57	19.1	48
Indonesia	French-Civil	2	1.36	n.a.	18.3	14
Ireland	English-Common	4	7.83	n.a.	5.1	70
Israel	English-Common	3	7.33	64	n.a.	54
Italy	French-Civil	1	7.41	62	24.8	76
Japan	German-Civil	4	6.94	65	20.5	46
Korea	German-Civil	2	3.96	62	26.8	18
Malaysia	English-Common	4	5.18	76	14.8	26
Mexico	French-Civil	1	2.82	60	n.a.	30
Netherlands	French-Civil	2	8.91	64	16.5	80
New Zealand	English-Common	4	9.33	70	n.a.	79
Norway	Scandinavian-Civil	4	8.73	74	5.8	69
Pakistan	English-Common	5	2.07	n.a.	17.8	14
Philippines	French-Civil	3	2.43	65	8.8	32
Poland	n.a.	n.a.	4.67	n.a.	n.a.	60
Portugal	French-Civil	3	5.91	36	25.1	27

Table 2 (Continued)

Country	Legal	Investor protection				Culture
		Anti	Cpix	Acct	Emgt	Indv
Singapore	English-Common	4	9.10	78	21.6	20
South Africa	English-Common	5	5.97	70	5.6	65
Spain	French-Civil	4	5.66	64	18.6	51
Sweden	Scandinavian-Civil	3	8.95	83	6.8	71
Switzerland	German-Civil	2	8.80	68	22.0	68
Taiwan	German-Civil	3	5.32	65	22.5	17
Thailand	English-Common	2	2.58	64	18.3	20
Turkey	French-Civil	2	3.78	51	n.a.	37
United Kingdom	English-Common	5	8.41	78	7.0	89
United States	English-Common	5	7.73	71	2.0	91

Panel B: Correlations between investor protection measures and individualism

	Anti	Cpix	Acct	Emgt	Indv
<i>Legal Dummy</i>	0.621	0.150	0.443	-0.445	0.129
<i>(DL)</i>	(0.000)	(0.357)	(0.008)	(0.012)	(0.429)
<i>Anti</i>		0.160	0.290	-0.546	0.028
		(0.336)	(0.091)	(0.002)	(0.867)
<i>Cpix</i>			0.524	-0.332	0.693
			(0.001)	(0.068)	(0.000)
<i>Acct</i>				-0.665	0.399
				(0.000)	(0.018)
<i>Emgt</i>					-0.547
					(0.001)

Table 3
Momentum Profits by Country

At the end of each month, all stocks in each country are ranked in ascending order based on the past six-month cumulative returns. Stocks in the bottom one-third are assigned as the ‘L’ portfolio and those in the top one-third as the ‘W’ portfolio. These equal-weighted portfolios are held for six months. To increase the power of tests, overlapping portfolios are constructed. The winner (loser) portfolio is an overlapping portfolio that consists of ‘W’ (‘L’) portfolios in the previous six ranking months. For instance, a winner portfolio formed in November comprises one-third of the stocks with the highest cumulative returns over the previous June to November period, the previous May to October period, and so on up to the previous January to June period. Returns on these portfolios are measured one month after ranking. Returns on the winner and loser portfolios are the simple average of the returns on the six ‘W’ and the six ‘L’ portfolios, respectively. For example, the January return on the winner portfolio is the simple average of the January returns on the six ‘W’ portfolios that are constructed from June to November in the previous years. If a stock has missing return during the holding period, it is replaced by the corresponding value-weighted market return. If the stock return is no longer available, the portfolio is rebalanced at the end of the month. The momentum portfolio (W-L) is a zero-cost, winner minus loser portfolio. Panel A of this table reports the average monthly returns (%) on these portfolios in U.S. dollar for each country.

Country-average portfolio is a portfolio that puts equal weight on each country-specific momentum portfolio in this portfolio. The formation of country-neutral portfolio is similar to that of the momentum portfolio in each country. Specifically, at the end of each month all stocks in each country are ranked in ascending order based on past six-month cumulative returns. Stocks in the top one-third of past returns in each country are assigned to the ‘W’ portfolio and the bottom one-third stocks are assigned to the ‘L’ portfolio. The minimum number of countries in each portfolio in our sample at any point in time must be at least two. These equal-weighted portfolios are held for six months. Similar to the country-specific momentum portfolio, the country-neutral portfolio is an overlapping portfolio. The average monthly returns (%) on these country-average and country-neutral portfolios in U.S. dollar are reported in Panel B. Corresponding *t*-statistics are in parentheses.

Panel A: By country

Country	Winner (W)	Loser (L)	W minus L
Argentina	0.254 (0.30)	0.260 (0.25)	-0.007 (-0.01)
Australia	1.477 (3.46)	0.504 (1.07)	0.973 (4.68)
Austria	0.754 (1.77)	0.335 (0.82)	0.420 (2.02)
Bangladesh	2.006 (1.94)	1.024 (1.07)	0.982 (2.44)
Belgium	1.497 (5.32)	0.856 (2.98)	0.640 (4.71)
Brazil	1.693 (1.51)	1.042 (0.80)	0.651 (1.61)
Canada	1.443 (4.43)	0.319 (0.81)	1.124 (5.82)
Chile	1.855 (3.37)	1.051 (1.91)	0.804 (3.53)
China	1.812 (1.13)	1.069 (0.76)	0.743 (1.99)
Denmark	1.131 (3.75)	0.247 (0.748)	0.883 (4.56)
Finland	1.466 (2.64)	0.693 (1.10)	0.774 (2.28)
France	1.672 (4.64)	0.875 (2.20)	0.798 (4.39)
Germany	1.063 (3.48)	0.294 (0.77)	0.769 (3.53)
Greece	2.413 (2.63)	1.573 (1.68)	0.840 (2.35)
Hong Kong	1.400 (2.35)	0.816 (1.25)	0.584 (2.65)
India	1.807 (2.07)	0.857 (0.86)	0.950 (2.71)
Indonesia	1.205 (0.90)	1.088 (0.68)	0.117 (0.23)
Ireland	1.190 (2.14)	0.764 (1.23)	0.426 (1.19)
Israel	0.406 (0.47)	-0.048 (-0.05)	0.453 (1.67)
Italy	1.061 (2.58)	0.341 (0.76)	0.720 (4.20)

Table 3 (Continued)

Country	Winner (W)	Loser (L)	W minus L
Japan	0.895 (2.09)	0.870 (1.81)	0.024 (0.13)
Korea	1.524 (1.92)	1.876 (1.97)	-0.352 (-0.77)
Malaysia	1.527 (1.83)	1.320 (1.31)	0.206 (0.57)
Mexico	0.862 (1.19)	0.757 (0.93)	0.105 (0.35)
Netherlands	1.586 (5.34)	0.870 (2.57)	0.716 (4.26)
New Zealand	1.901 (4.12)	0.605 (1.18)	1.297 (4.93)
Norway	1.571 (3.83)	0.936 (2.02)	0.635 (2.75)
Pakistan	1.411 (1.63)	1.072 (1.06)	0.339 (0.84)
Philippines	0.534 (0.60)	0.543 (0.46)	-0.009 (-0.02)
Poland	0.625 (0.60)	-0.997 (-0.93)	1.622 (3.36)
Portugal	0.718 (1.77)	0.359 (0.47)	0.360 (1.21)
Singapore	1.022 (1.75)	0.940 (1.27)	0.082 (0.29)
South Africa	1.474 (3.04)	0.852 (1.63)	0.622 (2.46)
Spain	0.945 (2.26)	0.437 (0.90)	0.508 (2.07)
Sweden	1.290 (3.17)	0.756 (1.42)	0.534 (1.74)
Switzerland	1.102 (3.77)	0.570 (1.87)	0.532 (3.74)
Taiwan	0.303 (0.35)	0.414 (0.43)	-0.110 (-0.30)
Thailand	1.799 (2.20)	1.400 (1.37)	0.399 (0.82)
Turkey	2.672 (1.82)	2.946 (1.94)	-0.274 (-0.63)
United Kingdom	1.559 (4.67)	0.560 (1.55)	0.999 (7.17)
United States	1.602 (4.74)	1.013 (2.27)	0.589 (2.25)
Average	1.330(16.07)	0.782 (8.54)	0.548 (8.38)

Panel B: All countries

Portfolio formed method	Period	Winner (W)	Loser (L)	W minus L
Country-average	198103-200306	1.462 (5.60)	0.925 (3.23)	0.537 (6.48)
	198402-200306	1.542 (5.39)	0.983 (3.13)	0.559 (6.06)
Country-neutral	198103-200306	1.397 (5.24)	0.819 (2.63)	0.578 (4.44)
	198402-200306	1.369 (4.76)	0.779 (2.28)	0.591 (4.11)

Table 4
Momentum Profits and Individualism

Country-average portfolio is a portfolio that puts equal weight on each country-specific momentum portfolio in this portfolio. The formation of country-neutral portfolio is similar to that of the momentum portfolio in each country. Specifically, at the end of each month all stocks in each country are ranked in ascending order based on past six-month cumulative returns. Stocks in the top one-third of past returns in each country are assigned to the ‘W’ portfolio and the bottom one-third stocks are assigned to the ‘L’ portfolio. The minimum number of countries in each portfolio in our sample at any point in time must be at least two. These equal-weighted portfolios are held for six months. To increase the power of our tests, overlapping portfolios are constructed. The winner (loser) portfolio is an overlapping portfolio that consists of ‘W’ (‘L’) portfolios in the previous six ranking months. Returns on these portfolios are measured one month after ranking. Returns on the winner and loser portfolios are the simple average of the returns on the six ‘W’ and the six ‘L’ portfolios, respectively. If a stock has missing return during the holding period, it is replaced by the corresponding value-weighted market return. If the stock return is no longer available, the portfolio is rebalanced at the end of the month. The momentum portfolio is the zero-cost, winner minus loser (W-L) portfolio. The average monthly returns (%) on these country-average and country-neutral portfolios in U.S. dollar are reported in Panel A. Panel B reports the average monthly returns on these country-average and country-neutral portfolios classified by Hofstede’s individualism index (with lower scores, lower the degree of individualism). At the end of each month all countries in our sample are allocated into three groups, from low (bottom 30%) to high (top 30%) based on their scores on the individualism index. Country-average (or Country-neutral) portfolios are formed in each individualism-sorted group. The corresponding t-statistics are in parentheses.

Portfolio formed method	Period	Index on individualism	Winner (W)	Loser (L)	W minus L
Country-average	198402-200306	Low	1.559 (4.03)	1.250 (2.89)	0.308 (2.22)
		2	1.493 (4.61)	1.001 (2.90)	0.492 (4.75)
		High	1.574 (5.82)	0.735 (2.41)	0.838 (6.76)
		High minus Low	0.015 (0.05)	-0.515 (-1.42)	0.530 (3.42)
Country-neutral	198402-200306	Low	1.475 (3.57)	1.276 (2.69)	0.200 (1.20)
		2	1.209 (3.50)	0.908 (2.42)	0.301 (2.20)
		High	1.542 (4.96)	0.774 (2.00)	0.768 (3.74)
		High minus Low	0.067 (0.19)	-0.502 (-1.24)	0.569 (2.59)

Table 5
Fama-MacBeth Regressions of Momentum Profits on Hofstede's Individualism Index

Monthly returns on country-specific momentum portfolio are regressed on the Hofstede's index on individualism (*Indv*, a lower score indicates a lower the degree of individualism), the legal origin dummy variable (*DL*), the scores on anti-director rights (*Anti*, a lower scores indicates a lower investor protection level), the corruption perception index (*Cpix*, a lower score indicates a higher corruption level), the score on accounting standards (*Acct*, a lower score indicates a lower accounting quality), and the score on the risk of earnings management (*Emgt*, a higher score indicates a lower accounting quality). The variable *DL* takes the value of one if the country adopts common law and it takes the value of zero, otherwise. All independent variables for each country, except for *Cpix*, have the same values across years. In contrast, the values of *Cpix* for each country may change across years. Annual data on *Cpix* are available from Transparency International from 1995. Mean scores on *Cpix*, however, are available over the periods from 1980 to 1985 and 1988 to 1992. The mean scores on each country for the period from 1980 to 1985 (1988 to 1992) are used as annual scores over the years from 1980 to 1985 (1988 to 1992). We calculate the *Cpix* scores for each country in 1986 and 1987 as the average of their mean scores over the periods from 1980 to 1985 and from 1988 to 1992. We compute the *Cpix* scores for each country in 1993 and 1994 as the average of their scores in 1995 and their mean scores over the period from 1988 to 1992. This table reports the time-series averages of cross-sectional OLS estimates of the coefficients. All *t*-statistics are in parentheses.

Test period	Intercept	Indv	DL	Anti	Cpix	Acct	Emgt
198402-200306	0.017 (0.10)	0.010 (3.80)					
198402-200306	0.467 (4.79)		0.226 (2.28)				
198402-200306	0.350 (2.64)			0.060 (2.22)			
198402-200306	0.103 (0.47)				0.069 (2.32)		
198402-200306	-0.053 (-0.14)					0.009 (1.53)	
198402-200306	0.895 (5.39)						-0.022 (-3.10)
198402-200306	-0.086 (-0.51)	0.011 (3.84)	0.176 (1.71)				
198402-200306	-0.230 (-1.11)	0.011 (4.04)		0.056 (2.06)			
198402-200306	0.044 (0.19)	0.011 (3.95)			-0.007 (-0.26)		
198402-200306	-0.033 (-0.08)	0.011 (3.75)				-0.000 (-0.04)	
198402-200306	0.014 (0.04)	0.010 (3.05)					-0.002 (-0.29)
198402-200306	-0.495 (-0.80)	0.014 (3.35)	0.207 (1.35)	0.021 (0.34)	-0.006 (-0.21)		0.011 (0.83)
198402-200306	0.556 (0.56)	0.012 (2.79)	0.26 (1.57)	0.011 (0.17)	0.016 (0.51)	-0.014 (-1.48)	0.001 (0.04)

Table 6
Fama-MacBeth Regressions of Momentum Profits on GLOBE's Institutional Collectivism Index

Collectivism index is obtained from various publications related to the GLOBE (Global Leadership and Organizational Behavior Effectiveness) research program. GLOBE's institutional collectivism index, with low scores reflecting higher degree of individualism, is intended to reflect the same constructs as Hofstede's individualism index. We define the variable $Indv_{GLOBE}$ as GLOBE's institutional collectivism index times -1. Monthly returns on country-specific momentum portfolio are regressed on $Indv_{GLOBE}$ with more negative scores reflecting lower degree of individualism, the legal origin dummy variable (DL), the scores on anti-director rights ($Anti$ with lower scores reflecting lower investor protection levels), the corruption perception index (CPI with lower scores reflecting higher corruption levels), the score on accounting standard ($Acct$ with lower scores reflecting lower accounting quality), and the score on the risk of earning management ($Emgt$ with higher scores reflecting lower accounting quality). The variable DL takes the value of one for common law countries and it takes the value of zero, otherwise. All independent variables for each country, except for $Cpix$, have the same values across years. In contrast, the values of $Cpix$ for each country may change across years. There are 31 countries in the sample. This table reports the time-series averages of cross-sectional OLS estimates of the coefficients. All t -statistics are in parentheses.

Test period	Intercept	$Indv_{GLOBE}$	DL	$Anti$	$Cpix$	$Acct$	$Emgt$
198402-200306	1.547 (3.45)	0.228 (2.18)					
198402-200306	0.439 (3.90)		0.269 (2.53)				
198402-200306	0.304 (1.84)			0.075 (2.08)			
198402-200306	0.067 (0.27)				0.075 (2.29)		
198402-200306	-0.080 (-0.18)					0.010 (1.49)	
198402-200306	0.896 (5.29)						-0.021 (-2.87)
198402-200306	1.623 (3.66)	0.277 (2.65)	0.309 (2.90)				
198402-200306	1.594 (3.53)	0.327 (2.87)		0.114 (2.89)			
198402-200306	1.275 (2.90)	0.320 (2.73)			0.100 (2.84)		
198402-200306	0.950 (1.85)	0.403 (3.48)				0.021 (2.70)	
198402-200306	2.964 (5.21)	0.449 (3.84)					-0.028 (-3.63)
198402-200306	2.523 (4.22)	0.477 (3.60)	0.029 (0.15)	-0.002 (-0.04)	0.069 (1.86)		-0.023 (-2.34)
198402-200306	3.054 (3.71)	0.431 (3.14)	0.109 (0.53)	-0.019 (-0.25)	0.081 (2.18)	-0.011 (-1.09)	-0.028 (-2.37)

Table 7

Fama-MacBeth Regressions of Momentum Profits on Individualism: Results from Bootstrap analyses

We randomly generate data by randomly assigning individualism scores, based on either Hofstede's index or GLOBE's index, and the scores on institutional variables to the forty-one countries in our sample. In this random assignment, the U.S. may be assigned the scores on individualism and the institutional variables of Brazil, and Japan may be assigned the scores on individualism and the institutional variables of Australia. The institutional variables are the legal origin dummy variable (*DL*), the scores on anti-director rights (*Anti*), the corruption perception index (*Cpix*), the score on accounting standards (*Acct*), and the score on the risk of earnings management (*Emgt*). We generate 1,000 random assignments. For each random assignment, we repeat the multivariate regression as discussed in Tables 5 and 6. This table reports the descriptive statistics of the time-series averages of cross-sectional OLS estimates of the coefficients that are estimated from each of the 1,000 bootstrap samples. Also reported are the bootstrap t-statistics on individualism and the institutional variables. Panel A shows the result from the sample using Hofstede's individualism index, while Panel B reports the result from the sample using GLOBE's individualism index. The second column reports the estimated coefficients ($\hat{\beta}_i$) from Table 5 or Table 6, the third and the fourth columns report the mean regression coefficients ($\bar{\beta}_i$) and their corresponding standard deviations ($S_{\bar{\beta}_i}$) from the bootstrap analysis, respectively, and the last column shows the bootstrap t-statistics ($(\hat{\beta}_i - \bar{\beta}_i) / S_{\bar{\beta}_i}$).

	Coefficients from Table 5 or 6 ($\hat{\beta}_i$)	Coefficients from bootstrap ($\bar{\beta}_i$)	Standard deviation from bootstrap ($S_{\bar{\beta}_i}$)	Bootstrap t-statistic $(\hat{\beta}_i - \bar{\beta}_i) / S_{\bar{\beta}_i}$
<i>Panel A: Hofstede's individualism index</i>				
Indv	0.012	-0.000	0.004	3.00
DL	0.260	0.004	0.156	1.64
Anti	0.011	-0.003	0.066	0.21
Cpix	0.016	0.001	0.037	0.41
Acct	-0.014	0.000	0.009	-1.56
Emgt	0.001	-0.000	0.014	0.07
<i>Panel B: GLOBE's individualism index</i>				
Indv _{GLOBE}	0.431	-0.000	0.127	3.39
DL	0.109	-0.012	0.184	0.66
Anti	-0.019	0.004	0.071	-0.32
Cpix	0.081	-0.001	0.029	2.83
Acct	-0.011	-0.000	0.009	-1.22
Emgt	-0.028	0.000	0.011	-2.55