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Does market openness mitigate the impact of culture? An examination of international momentum profits and post-earnings-announcement drift

Jiaqi Guo[a]

Phil Holmes[b]

Abstract

We hypothesise cognitive dissonance arising from the interaction of individualism and sentiment drives cross-country variations in momentum returns and post-earnings-announcement-drift (PEAD) and that market openness mitigates the impact of culture. Empirical analysis of a sample of over 40 stock markets across the globe, supports the hypotheses. Results suggest returns to momentum and PEAD are driven by cognitive dissonance resulting from differences in culture, but the effects of individualism are reduced in more open markets. Mitigating effects are stronger for capital market integration and capital market openness measures than for financial openness. Results from robustness tests support our main findings.

JEL classification: G14, G15, G41

Keywords: Individualism; Sentiment; Culture; Openness; Momentum; Post-earnings-announcement drift

Corresponding author: [b] Professor Phil Holmes, Leeds University Business School, University of Leeds, Leeds, LS2 9JT, UK. Tel: +44(0) 113 343 1677. Email: prh@lubs.leeds.ac.uk

[a] Dr Jiaqi Guo, Birmingham Business School, University of Birmingham, Edgbaston Park Road, Birmingham B15 2TT, UK. Tel: +44(0) 121 414 3559. Email: j.guo.3@bham.ac.uk

1. Introduction

Culture has been shown to have an important impact on a wide range of financial behaviour. In relation to financial market anomalies, Chui, Titman and Wei (2010) show a positive relation between individualism and momentum returns, while Dou, Truong and Veeraraghavan (2016) demonstrate that profits resulting from post-earnings-announcement drift (PEAD) are significantly related to both individualism and uncertainty avoidance. [1] While cultural individualism has been shown to be of relevance to these anomalies, to date it is not clear *why* cultural factors might influence the level of returns. We hypothesize that cognitive dissonance (Festinger, 1957) is the main driver of the anomalies and that differences in cultural beliefs cause cognitive dissonance to arise in different situations within different countries. Antoniou, Doukas and Subrahmanyam (2013) are the first to investigate how cognitive dissonance may impact on momentum returns. They examine the U.S. market and demonstrate that the strategy only generates returns in optimistic periods. Their argument is based on the view that cognitive dissonance arises when good (bad) news arises under pessimistic (optimistic) sentiment states leading to a slower diffusion of news. Thus momentum is driven by winners (losers) when sentiment is negative (positive). The cost of short selling bad news stocks (losers) leads to momentum being greater in optimistic periods. In discussing Chui et al.'s (2010) findings that momentum profits are more marked in countries where individualism is more prevalent they state

[1] In addition to culture being important in explaining profits from market anomalies, it has been shown to be of relevance to other areas of finance. For example, Aggarwal, Kearney and Lucey (2012) find national culture impacts significantly on foreign portfolio investment decisions, Kanagaretnam, Lim and Lobo (2011) report that culture impacts earnings management by banks, while the capital structure of individual firms is found to be affected by national culture by Chui, Lloyd and Kwok (2002). Recently, Jakob and Nam (2017) find culture influences the way markets react to the arrival of new information. Fu and Zhang (2019) find CFO culture background significantly impacts stock price crash risk. Lee, Switzer and Wang (2019) show the culture factor i.e. individualism plays a crucial role in determining small investors' risk taking behaviour.

"This raises the question of whether the asymmetric momentum pattern we have documented for the United States, where individualistic attitudes are considered to be higher than in other cultures, gains support in countries characterized by less individualism. Exploration of this issue would seem to be an interesting area for future research." (Antoniou et al. 2013, pages 273-4). In light of this, our first research question seeks to examine how individualism affects cognitive dissonance and, hence, returns from momentum and PEAD strategies. Specifically, we propose that cognitive dissonance is affected by the interaction of (Hofstede's measure of) individualism and sentiment and test this view using data across more than 40 countries[2] worldwide.

While national culture is believed to be deep-rooted and, as Hofstede (1993, page 92) argues, will "change only very slowly if at all", the dominant culture in markets is likely to be affected by the degree of market openness. Intuitively, when the country has less restrictive capital account controls, is more open to foreign investor participation or has higher foreign portfolio investments, the effect of culture on domestic investor behaviour should be attenuated by the attitudes of foreigners. In turn, this is likely to impact the extent to which culture influences market prices. For example, Eun, Wang and Xiao (2015) find that stock price synchronicity is lower (higher) in countries characterised by individualism (collectivism), but that in countries with greater openness to international trade and investment, stock price synchronicity is less affected by culture. These arguments suggest that the impact of culture on market anomalies may vary depending not only on aspects of national culture, but also the extent to which the market under investigation is influenced by the actions of individuals from a different culture. No previous study has examined this issue. To address this gap in the literature, our second research question involves investigating the extent to which financial and capital market openness mitigate the impact of

[2] For brevity, we use the term country to refer to either country or region throughout the paper.

national culture on momentum profits and PEAD. We use three measures of market openness (the Chinn-Ito measure of financial openness, the extent of capital market integration and a measure of capital market openness based on the proportion of portfolio equity holdings held by foreign investors). These measures not only vary between countries, but also across time within a country. By examining these three different measures we can establish not only whether market openness mitigates the impact of culture, but also which type of market openness, if any, is most important in this regard.

We develop hypotheses related to first the impact of culture on profits from momentum and PEAD strategies and second the mitigating effects of market openness on this culture-anomalies relationship. Our empirical analysis first finds that while there is clear evidence of significant returns to country-average momentum and PEAD portfolios, there are differences across sentiment states: momentum returns are significantly lower in pessimistic states than optimistic state; and for PEAD greater returns are earned for good news stocks under pessimism and bad news stocks under optimism, consistent with slower diffusion of news in the face of cognitive dissonance. Empirical results next demonstrate that there are significant differences in returns to both momentum and PEAD strategies between high and low individualism countries both when no account is taken of sentiment (in all cases returns in the former group are substantially and significantly higher) and when analysing optimistic and pessimistic states separately. The results provide clear evidence of an interaction between culture and sentiment: For high individualism countries there are significant differences between optimistic and pessimistic states for momentum and PEAD for both good news and bad news stocks, whereas for low individualism countries, this is only the case for PEAD for stocks with bad news. The findings for both momentum and PEAD are consistent with our first hypothesis, suggesting that cognitive

dissonance is an important driver of the differences across countries. These findings are confirmed by multivariate analysis. Our analysis of the impact of market openness on the relation between individualism, sentiment, cognitive dissonance and returns to the anomalies provides support for our second hypothesis that openness mitigates the impact of culture. The findings are stronger for the capital market measures than for the Chinn-Ito measure of financial openness which considers the degree of regulatory restrictions on capital account transactions. This is not surprising, given that the two capital market measures relate more directly to the degree of participation of foreign investors in domestic markets. Furthermore, our findings are supported by a range of robustness tests. Taken together the findings suggest that returns to momentum and PEAD strategies are driven by cognitive dissonance, affected by culture, and that the cultural effect is mitigated by the degree of capital market openness.

In terms of related literature, Chui et al. (2010) and Dou et al. (2016) explore the role of culture (i.e., individualism) on momentum and earnings momentum. These studies suggest culture can play a role in explaining asset pricing anomalies and cross-sectional stock returns across countries. However, both studies do not link investor sentiment to the effect of culture. Altanlar, Guo and Holmes (2019) consider the role of cognitive dissonance in explaining the differences of the two anomalies between markets in western and eastern countries. They argue that differences in views relating to change explain variations in both momentum profits and PEAD, since culture will cause cognitive dissonance to arise in different scenarios across countries. However, Altanlar et al. (2019) only consider comparisons between five western and five eastern cultures and differences relating to views of change and do not consider the impact of individualism. In our study, we directly link sentiment to culture and examine this issue in more than 40 countries.

Our study is the first to examine how market openness affects the cultural effect on cross-sectional stock returns and market anomalies. To the best of our knowledge, Eun et al. (2015) is the only study to show that market openness attenuates the domestic cultural effect in asset pricing. They find the cultural effect on stock price comovements is weakened when the country is more open. We complement this line of literature on market anomalies. If domestic investor behaviour is different across cultures which drives market anomalies (e.g., Antoniou et al., 2013; Stambaugh, Yu and Yuan, 2012), then the local cultural effect on the anomalies should be weakened when the market is more open as more foreign investors participate in the market. We empirically find consistent evidence.

The rest of the paper is organised as follows: the next section develops our hypotheses. Section 3 provides a discussion of our data and methodology and is followed by the main empirical analysis (section 4) and robustness tests (section 5). A conclusion is presented in section 6.

2. Hypothesis development

Building on the arguments of Antoniou et al. (2013), we consider how news diffuses through financial markets.[3] When good (bad) news concerning a stock occurs during optimistic (pessimistic) periods, cognitive dissonance will be absent, since both the nature of the news and sentiment are consistent. Hence, news will diffuse quickly. However, good (bad) news arriving during pessimistic (optimistic) periods provides contradictory signals and, if cognitive dissonance is important, news will diffuse slowly.

In the psychology literature individualism and collectivism have been related to the concepts of independent and interdependent self-construal. Individuals with strong independent

[3] Antoniou et al. (2013) base their reasoning on the model of Hong and Stein (1999), who argue that slow diffusion of news is the cause of momentum profits.

self-construal (for example, those from countries in Europe or North America) place great value on self-integrity and are likely to be strongly affected by cognitive dissonance. In contrast people with a sense of interdependent self-construal (e.g. from East Asian countries) place greater weight on the obligations and responsibilities within a group and will be less concerned with self-consistency. As such they are likely to experience weaker cognitive dissonance.[4] This leads to our first hypothesis: the effect of investor sentiment on momentum profits and PEAD will be more pronounced in individualistic cultures than in collectivistic cultures, since people in high individualistic cultures will experience stronger cognitive dissonance than those in low individualistic cultures.

We next examine whether stock market openness mitigates the effect of local culture and investor sentiment on the two anomalies. Since foreigners will not all be affected by the same culture as locals, the activities of the former group are expected to weaken the effect of culture and investor sentiment on domestic market trading behaviour and, hence, stock market anomalies (see Eun et al., 2015). Thus, the more open the market to foreigners, the weaker the effect of local culture and sentiment on the anomalies is expected to be. This leads to our second hypothesis: the impact of the interaction of investor sentiment and individualism on momentum profits and PEAD will be attenuated by greater financial and capital market openness.

3. Data and Methodology

3.1 Hofstede's Individualism Index

[4] See Cross et al. (2011) for a deeper discussion of the concepts of independent and interdependent self-construal.

Hofstede individualism index values are obtained from psychological surveys of value scores from IBM employees from the Hofstede website.[5] The individualism index is derived based on the country mean scores on 14 questions about employees' attitudes toward private lives and their own work. The values for the 45 countries in our sample, listed in table I, are shown in the second column. The U.S. has the highest individualism value (91), followed by Australia (90) and the United Kingdom (89), while Indonesia has the lowest level (14) followed by Taiwan (17), Korea (18) and China (20).

3.2 Stock Market Data

To be included in our sample we require a country to have at least five years of stock market and sentiment data, with the latter measured by a consumer confidence index. Furthermore, each country is required to have an individualism index value. Several stock selection criteria are applied, consistent with prior studies, to avoid our results being biased by small, thin-traded and illiquid stocks. First, for each month we exclude any stock with market capitalization below its market's fifth percentile (Chui, et al., 2010). Second, to address issues relating to outliers, stock returns larger (less) than 100% (-95%) are set to 100% (-95%).[6] Our third criterion seeks to ensure sufficient stocks for momentum portfolios. Specifically, given that we form momentum portfolios based on stock return quintiles, for any month we require that a country is only included if it has a minimum of 50 stocks with available data in that month, thus ensuring at least ten stocks in each quintile. Finally, given that we employ the widely used 6/6-ranking/holding period momentum strategy for analysis, we require that any delisted stock has a return history of at least 8 months to be included. Based on the above, our sample consists of 45 countries for the momentum analysis.

[5] See https://geert-hofstede.com/national-culture.html for details.
[6] As Ince and Porter (2006) point out, such outliers mainly result from small capitalization stocks.

Further data selection criteria relating to earnings data (see section 3.3) reduce the sample for the analysis of PEAD to 42 countries.[7]

Due to data requirements the sample period differs across countries as shown in the third and fourth columns of table I: the longest sample period is from January 1990 to December 2017 (ten countries)[8], while four countries have sample periods of less than seven years (Israel, Luxembourg, Portugal and Russia). The average over the whole sample is approximately 17 years. For all markets other than the U.S. all common stocks from the XpressFeed Global Database are utilised, while we use all common stocks (share codes 10 and 11) listed in the NYSE, AMEX and NASDAQ from the Centre for Research in Security Prices (CRSP) for the U.S. market. Although we include domestic and foreign stocks in each country in our sample, we only include cross-listed stocks for their home country. To address survivorship bias issues, we include suspended and dead stocks.

[Insert Table I about here]

As well as presenting the individualism measure and start and end dates for each country, the number of firms in the sample at the beginning and end of the sample periods are shown in table I (columns 5 and 6). Once again, the number of stocks varies between different countries: the number of firms in the sample at the start of the sample period ranges from 50 for Luxembourg to 4,236 for the U.S., while the end of period numbers range from 50 (Ireland, Luxembourg and Portugal) to 3,628 (the U.S.). As is shown in the last two columns of table I in 38 of the 45 countries the number of firms in the sample increased over the period investigated, with the number of firms listed in the stock markets of Australia, China, India, Japan and Korea having grown the most.

[7] Of the 45 countries in the momentum sample, the earnings announcement data requirements are not met for the Czech Republic, Portugal and Slovenia.
[8] 1990 is our start date due to the need for, and availability of, sentiment data.

3.3 Earnings Announcement Data

Annual earnings announcement data for the U.S are from Compustat, with data for all other countries coming from Worldscope. In line with the literature we apply selection criteria to determine the sample used in the analysis. First, to be included in the sample companies must have a listing on a major exchange in their home country and must not be cross-listed. In addition, for a firm to be included in the analysis it must be included in the CRSP and Compustat databases (for the U.S.) or the XpressFeed Global and Worldscope databases (for all other markets). As can be seen in Table II the final sample has 39,165 stocks with earnings announcements available and 354,929 earnings announcements.[9] The number of stocks and earnings announcements included in our sample vary substantially across countries. For example, numbers range from 56 firms and 206 announcements for Luxembourg to 8,708 firms and 83,051 announcements for the U.S.

[Insert Table II about here]

3.4 Sentiment Data

In line with prior studies sentiment is measured using the consumer confidence index (see, for example, Fisher and Statman, 2003, Lemmon and Portniaguina, 2006, Schmeling, 2009, and Antoniou et al., 2013). In addition to the fact that prior studies have used this measure, the consumer confidence index benefits from being available for a long period of time for all countries in the sample. Moreover, unlike other measures, it provides a consistent and comparable measure of investor sentiment for the sample countries.[10]

We use the Conference Board (CB) consumer confidence index for the U.S., data is from the "Directorate Generale for Economic and Financial Affairs" (DG ECFIN) for European Union

[9] Individual country sample dates are as shown in table I.

[10] Baker and Wugler (2006) construct a sentiment measure using trading data. However, the necessary trading data used by Baker and Wurgler (2006) are not available for all countries in our sample.

countries and Datastream for all other countries in the sample. Adjustments to the series are undertaken to ensure comparability across countries: Specifically, for series which are not seasonally adjusted, an adjustment is made using the X-12-ARIMA technique, consistent with the seasonally adjusted U.S. series. Furthermore, for the seven series which are quarterly rather than monthly, a transformation is undertaken using the most recent values for months without data (Baker and Wurgler, 2006; Schmeling, 2009). Summary statistics for the sentiment measures are reported in table III. While the descriptive statistics for the actual series vary widely across the sample countries, since sentiment states are defined by whether they are in the top 30% (optimistic), the bottom 30% (pessimistic) or the middle 40% (mild) they provide comparable measures across the sample.

Each month in the sample is identified as being optimistic, mild or pessimistic based on the above percentage cut-offs by following the weighted-rolling average approach of Antoniou et al. (2013). To calculate the month t sentiment value we take the sum of three-sixths of the t-1 consumer confidence index value, two-sixths of the t-2 value and one-sixth of the month t-3 value.[11] For our investigation of momentum we follow Stambaugh et al. (2012) to identify a holding month as optimistic or pessimistic. To be classified as optimistic (pessimistic) its 3-months rolling average sentiment score ending in month t must be in the top (bottom) 30% of the 3-months rolling average sentiment time series scores. Those in the middle 40% are classified as mild states. In relation to the examination of PEAD the announcement month is classified as optimistic (pessimistic) when the weighted average sentiment score for that month is in the top (bottom) 30% of the time series. Again, those in the middle 40% of the time series are classed as mild. To test

[11] Sentiment data is announced with one or two month lags in different countries, so the monthly data refers to the sentiment in the period one or two months earlier.

for the robustness of our results in relation to the sentiment classification we also use 40/20/40 cut-offs and an alternative sentiment definition based on Antoniou et al. (2013).

[Insert Table III about here]

3.5 Momentum Portfolios

We follow Jegadeesh and Titman (1993) in forming momentum portfolios, with both the formation period, J, and holding period, K, being the commonly examined 6 months (robustness tests are undertaken using 12 months as the values for J and K). Using the past J-month cumulative returns stocks are ranked into portfolio quintiles at the end of each month.[12] Momentum portfolios are formed by going long the winner portfolio (the quintile with the highest returns) and short the loser portfolio (the quintile with the lowest returns).

The use of overlapping portfolios (see Jegadeesh and Titman, 1993) allows us to increase the power of our tests. We follow Jegadeesh and Titman (2001) by skipping a month between the formation and holding periods in order to mitigate microstructure bias problems. Analysis is undertaken for both individual countries and country-average portfolios, the latter formed by equally weighting portfolios of the countries in the sample in each month (see, Chui et al., 2010). For a country portfolio to be formed there must be a minimum of two countries with portfolio returns in any particular month.

3.6 PEAD Portfolios

Earnings surprise (SUE) is calculated as the change in actual earnings per share from one year to the next, divided by the stock price 10 days before the announcement (Livnat and Mendenhall, 2006).[13] The cumulative abnormal return for each stock is calculated for the period

[12] Quintiles are used to ensure sufficient stocks in each portfolio.
[13] In the robustness tests we use earnings data from IBES and calculate SUE using analyst forecast measures.

from +2 to +60 trading days after an announcement.[14] Cumulative abnormal returns are calculated using the buy and hold raw return of the stock minus the buy and hold return of the market index as follows:

$$PEAD_{j,y} = \prod_{t=+2}^{t=+60}(1 + r_{j,y,t}) - \prod_{t=+2}^{t=+60}(1 + rm_{y,t}) \qquad (1)$$

$r_{j,y,t}$ is the raw return of stock j for day t relative to the earnings announcement y and $rm_{y,t}$ is the market return from the market index for day t relative to the earnings announcement y.[15] To mitigate the influence of outliers (Griffin et al. 2010; Hung et al., 2014), we winsorize the variables *PEAD* and *SUE* at the top and bottom 1% of their distributions.

Having calculated SUE, stocks are sorted into deciles for each country for each year. Good (bad) news stocks are those in the top (bottom) 30% of the SUE distribution. We then calculate the average cumulative returns of stocks in the good news and bad news portfolios. We follow Hung et al. (2014) to calculate country-average portfolio returns where the country-average portfolio return is the mean PEAD of all firm-year observations in the portfolio (e.g. 42 countries).

3.7 Openness measures

Three openness variables are employed to measure the degree of openness of a country's stock market. For all three measures a value is calculated for each calendar year. The first measure is capital account openness, measured as the Chinn-Ito financial openness index (Chinn and Ito, 2008). The index measures the degree of regulatory restrictions on capital account transactions using information from the IMF's Annual report on Exchange Arrangements and Exchange Regulations. The higher the value, the more open the country is to cross-border transactions, again

[14] As Berkman and Truong (2009) argue approximately half of earnings announcements in the U.S. are made after trading hours. While this may not hold true for all countries in our sample, we take a conservative approach by calculating PEAD from +2 days after an announcement thus mitigating any biasing effects of contemporaneous stock price reactions.

[15] The stock market index for each country is shown in table AIII in the supplementary material.

raising the possibility that the impact of culture will be diluted. The sample period spans 1990 to 2015 and covers 43 of our 45 sample countries (the two without coverage are Luxembourg and Taiwan).

The second proxy is a measure of stock market integration. The advantage of this variable is that it covers all sample countries and the whole sample period, unlike the other two proxies. The motivation for using this measure is that we believe that greater integration results from investors having a wider perspective of what matters in determining returns. Specifically, in the presence of higher integration, investors in one market are likely to take account of not only factors specific to their market (including cultural biases), but also factors relevant in other markets (including alternative cultural biases). Hence, they will dampen the influence of local culture when making buy-sell decisions.

As Pukthuanthong and Roll (2009, page 214) state "A sensible intuitive quantitative measure of financial market integration is the proportion of a country's returns that can be explained by global factors. If that proportion is small, the country is dominated by local or regional influences". In contrast, high integration implies local or regional influences, including the impact of culture, are less important. To construct the integration measure, we collect daily return data from Datastream for each of the 45 sample countries' market indexes, in U.S. dollars. Following Pukthuanthong and Roll (2009) we then select the 17 countries with the longest return series and construct global factors by extracting the first 10 principal components from the daily returns of these stock market indexes for each year.[16] Finally, we regress the daily return of each country's market index on the 10 principal components in each year as follows:

[16] The 17 countries are Australia, Austria, Belgium, Canada, Denmark, France, Germany, Hong Kong, Ireland, Italy, Japan, the Netherlands, Singapore, South Africa, Switzerland, the United Kingdom and the U.S. These countries represent high market capitalisation stock markets over our sample period. While they

$$r_{i,t} = \alpha_i + \sum_{j=1}^{10} \beta_{j,i} PC_{j,i,t} + \varepsilon_{i,t} \qquad (2)$$

Where $r_{i,t}$ is the daily return for country *i* on day *t*, and $PC_{j,i,t}$ is the *jth* principal component on day *t*. In calculating the principal components, we also include the lagged return of U.S. and Canadian markets to account for time zone differences (see Pukthuanthong and Roll, 2009) and exclude country *i*'s market returns when country *i* is one of the 17 countries. For example, we exclude the returns of the U.S. market index from the estimation of the U.S. principal components. The R^2 is used from equation (2) to measure the extent to which the market is integrated with the global market.

Finally, we consider capital market openness, calculated as the total value of portfolio holdings by foreign investors divided by the stock market capitalization of the country. We collect the foreign investors' holding data from the annual *Coordinated Portfolio Investment Survey* (CPIS) and stock market capitalization data from the World Bank's database. The higher the value, the more open the market to foreign investors. The motivation for using this value is the same as for the stock market integration measure. This variable is only available for the sample period of 2001 to 2016 and for 41 countries (it is not available for Croatia, Korea, Nigeria and Taiwan).

4. Empirical results

4.1 Individualism, Sentiment and Cognitive Dissonance: Momentum and PEAD

We begin by examining momentum profits and PEAD across the full sample of countries (45 and 42 respectively), irrespective of individualism, and how these differ between optimistic and pessimistic states.[17] Rather than presenting figures for each country individually, table IV,

are mainly from high individualism culture, major markets from low individualism culture are also included.

[17] In relation to responses to earnings announcements, consistent with Antoniou et al. (2013) our focus is not on earnings momentum (zero-investment portfolios), but on examination of drift in returns for portfolios

panel A shows momentum results and panel B PEAD results (for good and bad news separately) for the country-average portfolios. Results are shown for the whole sample and for optimistic and pessimistic periods. The last column in panel A and the last two in panel B show the differences between optimistic and pessimistic states.[18]

Despite the sample period extending to more recent years, results for momentum are in line with prior research in relation to total momentum profits. The first column of panel A of table IV shows that the momentum returns of the country-average portfolio are 0.798% per month, significant at the one percent level. Examination of individual country results show positive momentum profits in all but 3 of the countries, with 30 of these being significantly positive at 10% or higher (and none of the negative profits being significant). Thus there is clear evidence that the momentum strategy continues to generate significant profits worldwide. However, analysis of columns 2-4 of panel A demonstrates significant differences across sentiment states using the 30/40/30 split described in section 3: while momentum profits are positive and significant for both sentiment states, they are much lower in pessimistic periods, with the difference in momentum profits between optimistic and pessimistic states being statistically significant.[19] Thus, the results in panel A clearly demonstrate that the findings for the whole sample mask significant differences across sentiment states.

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of good news stocks and bad news stocks separately. While zero-investment earnings momentum portfolios can be established for the whole sample period, this is not possible when we consider returns in optimistic and pessimistic states separately, given differences in the frequency of our earnings surprise data (annual) and sentiment state (monthly). If portfolios were to be formed on a monthly basis, the number of stocks in the portfolios would be very low, rendering the results meaningless. Similarly, using annual sentiment data would not allow for sufficient variation in sentiment.

[18] Results for individual countries are briefly discussed below and are shown in the supplementary material, tables AI and AII.

[19] All but two countries (Mexico and Romania) show positive momentum profits during optimistic periods, with 28 positive and statistically significant. During pessimistic states, only five exhibit significant positive momentum profits; returns in 16 countries are negative. The differences between momentum returns in optimistic and pessimistic states are positive (and significant) in 36 (25) of 45 cases.

[Insert Table IV about here]

As far as PEAD is concerned, the country-average results for the whole period (first and second columns of panel B) show significant returns for both good and bad news stocks.[20] As with momentum, the results for the whole sample period demonstrate continued evidence of PEAD following both positive and negative earnings surprises. However, again the results for the whole period mask significant differences across sentiment states. Columns 3-8 of panel B show there is a marked difference in PEAD between optimistic and pessimistic states: while PEAD following good news is significant under both optimism and pessimism, it is much higher under the pessimistic sentiment state, with the difference being sizeable and statistically significant; for bad news stocks PEAD is only evident for the optimistic state (there is reversal for pessimistic periods) and again the difference between states is sizeable and statistically significant.[21] Overall, the findings are consistent with there being slower diffusion of good news during pessimistic periods and bad news during optimistic periods, resulting in higher PEAD in each case. Taken together, the results in table IV clearly demonstrate the difference in momentum returns and PEAD between sentiment states. We now turn to consider the interaction between individualism and sentiment to test our first hypothesis.

Table V presents results where we consider the interaction of individualism and sentiment for both momentum and PEAD. Double sorts are undertaken on the basis of the culture and sentiment indexes.[22] Each of the 45 (momentum) or 42 (PEAD) countries in the sample is categorized into one of three culture measure groups based on their scores on the individualism

[20] Individual country results show that 31 (24) of the 42 countries exhibit PEAD following good (bad) news, with 20 of 31 (9 of 24) exhibiting significant PEAD.
[21] Individual country results show that the difference in PEAD for good (bad) news stocks between optimism and pessimism is significantly negative in 13 (18) countries.
[22] The sentiment split is the same as in table IV.

index (IDV). Specifically, we categorize countries into the top and bottom 30%, with the middle 40% being excluded from the analysis. Results are reported for the country-average portfolios based on these splits. The table is divided into four panels and in each panel returns are shown for the momentum portfolio (winner minus loser), PEAD for good news stocks and PEAD for bad news stocks. Before going on to consider the role of sentiment, panel A provides results split by individualism, but not by sentiment. As the first column of panel A shows, there are clear differences between momentum returns in high and low individualism countries: momentum profits are significant at 5% or higher in both groups, but the profits for the high individualism group are more than double those for the low individualism countries, with the difference being a statistically significant 0.561%. Similarly, it can be seen in the second and third columns that while there is significant PEAD following good and bad news for both culture groups[23], returns for the high individualism culture group are significantly larger than in the low individualism countries. However, to examine the role of cognitive dissonance we need to investigate whether these findings apply in all sentiment states or are driven by differences across states.

[Insert Table V about here]

The results in panels B, C and D allow examination of this issue and testing of the first hypothesis. Returns in optimistic and pessimistic periods are shown for high individualism markets in panel B, while panel C shows results for low individualism countries and panel D presents the differences between high and low individualism countries. The findings provide clear evidence of an interaction between sentiment and culture. For the high individualism group momentum profits are significant under both optimism (one percent level) and pessimism (five percent). However,

[23] The returns for three of the four categories are significant at 5% or higher. For bad news stocks in the low individualism countries returns are significant at the 10% level.

they are much higher under optimism and the difference between optimism and pessimism is sizeable (0.746%, with a *t*-statistic of 3.11), positive and significant for this group. In contrast momentum returns in low individualism markets (panel C) in addition to being low compared to high individualism countries, are significantly different from zero under optimistic states, insignificant under pessimistic states, but the difference between the two states is statistically insignificant (-0.517%, with a *t*-statistic of -1.39). Moreover, as panel D shows, for momentum the differences between high and low individualism countries are significantly different both for the optimistic state (0.574%, with a *t*-statistic of 2.04) and for the difference between optimistic and pessimistic states (-0.512%, with a *t*-statistic of -1.92). Overall, the results in relation to the momentum strategy provide clear evidence in support of our first hypothesis: the effect of investor sentiment is more pronounced in individualistic cultures than collectivist cultures.

The results for PEAD in the final two columns of panels B, C and D of table V again provide clear evidence of interaction between sentiment and culture. For the high individualism group, PEAD following good news is significant at the 10% and 1% levels under optimism and pessimism, respectively, but the magnitude of PEAD is much greater under pessimism than under optimism. Indeed, the difference between optimism and pessimism is a significant -1.564%, consistent with good news diffusing more slowly under pessimism. In contrast, PEAD following good news in the low individualism culture group is insignificantly different from zero under both sentiment states. Moreover, the differences between the high and low individualism countries (panel D) are significant for pessimism and the difference between sentiment states. These results suggest that good news diffuses more slowly under pessimism in the high individualism group than in the low individualism group. In other words, underreaction is much stronger in the high individualism countries. In relation to bad news, for high individualism markets, PEAD is only

found under optimism (there is insignificant reversal under pessimism), with the difference between optimism and pessimism being sizeable and significant at the 1% level. This suggests bad news diffuses slowly under optimism for this group. Results in panel C for the low individualism group also show PEAD following bad news stocks only under optimism (no significant difference under pessimism). However, while a similar pattern is found for the two culture groups for bad news, the difference is over 20% larger for the high individualism group. Furthermore, as panel D shows, differences exist between the two culture groups for both optimism and the difference between the two sentiment states, both at the 10% level. The findings suggest that the underreaction of good (bad) news stocks under pessimism (optimism) is stronger in the high individualism group than in the low individualism group. Thus, the findings in table V are consistent with our first hypothesis in relation to both momentum and PEAD, suggesting that cognitive dissonance resulting from the interaction of individualism and sentiment explains differences in the strength of the anomalies across countries.

To further examine the role of cognitive dissonance in explaining returns to the two anomalies, we investigate the interaction of sentiment and culture in a multivariate regression setting, taking account of other potential determinants of momentum and PEAD. In particular, momentum profits and PEAD returns are regressed on the sentiment index, individualism, the interaction variable between investor sentiment and individualism, and other control variables as in the following models:

$$Mom_{j,t} = \alpha + \beta_1 * IDV + \beta_2 * Sent_{t-1} + \beta_3 * IDV * Sent_{t-1} + \gamma * Control \quad (3)$$

$$Exret_{Good\ news,t} = \alpha + \beta_1 * IDV + \beta_2 * Sent_{t-1} + \beta_3 * IDV * Sent_{t-1} + \gamma * Control \quad (4)$$

$$Exret_{Bad\ news,t} = \alpha + \beta_1 * IDV + \beta_2 * Sent_{t-1} + \beta_3 * IDV * Sent_{t-1} + \gamma * Control \quad (5)$$

Where $Mom_{j,t}$ is the return on the momentum portfolio in country j in month t and $Exret_{i,t}$ is cumulative returns of the good or bad news portfolio for +2 to +60 days minus the corresponding cumulative returns on the market index for country i in year t.[24] IDV_j is a categorical variable that equals 2 if the value of IDV belongs to the top 30% of values of IDV of the sample countries, 1 if it belongs to the middle 40% and 0 if it belongs to the bottom 30%. *Sent* is a categorical variable which equals 2 if the monthly sentiment of each country belongs to the optimistic group, 1 if it belongs to the mild group and 0 if it belongs to the pessimistic group.[25] *IDV*Sent* is the individualism and sentiment interaction variable. Standard errors are clustered by country and time. We follow Chui et al. (2010) and Dou et al. (2015) and others to include other cross-country variables that may explain cross-country variations in momentum profits and PEAD.[26]

Table VI presents the results of three versions of Equations (3), (4) and (5): columns 1-4 relate to momentum; columns 5-8 to PEAD for good news stocks; and columns 9-12 to PEAD for bad news stocks.[27] In each set of four columns the first column shows the expectation of our main variables; the second column presents results when only IDV and SENT are included as independent variables; the third column includes the two variables plus the interaction term; and the fourth column presents results for the same three variables included in the third column, when

[24] The market index for each country is the all share index for that country in all but France, Germany and Italy. For these three countries a widely used alternative is used due to the all share index not being available for the whole sample period. The indexes used are shown in the supplementary material, table AIII.
[25] The sentiment index for each country is obtained from different sources and is measured differently across countries. To make them comparable across countries, we categorize the sentiment index.
[26] Our final set of 19 control variables includes the 15 used by Chui et al. (2010, table V) (all of which were also used by Dou et al. (2015)). PB is used since Zhang (2006) shows this firm characteristic is important in capturing the variation in momentum profits and Dou et al. (2015) find the same for PEAD. In addition, following Griffin et al. (2003) we include GDP and inflation to capture macroeconomic differences and Jacobs (2016) to capture the impact of market development. Details of the control variables are set out in the supplementary material (table AIV).
[27] Although we continue to refer to PEAD for simplicity, recall that we treat significant positive (negative) returns in the period following good (bad) news as PEAD and significant returns in the opposite direction as reversal.

the 19 control variables are included.[28] Overall, across all specifications the estimated coefficients are as expected, will all but one of twenty-four cases being significant at 10% or higher.

Examination of the first four columns shows that the constant term is positive and significant when no control variables are included, but negative and significant at the 10% level in the presence of these variables. The coefficients on individualism (IDV) and investor sentiment (SENT) are positive and significant in all cases, with the inclusion of control variables slightly reducing their magnitude. These findings suggest that the momentum effect is more pronounced during optimistic periods and in high individualistic culture countries. Specifically, momentum profits increase by 0.42% (column 2) when the individualism level moves from low to moderate or from moderate to high, ceteris paribus. Similarly, the momentum strategy earns 0.25% returns per month more when the state of sentiment moves from pessimistic to mild or from mild to optimistic, holding all else constant. In columns 3 and 4 the interaction term between sentiment and individualism is included and results show that the coefficient on the interaction term is significant, with a value of 0.0017-0.0020. Thus, momentum profits are higher still with high levels of both individualism and sentiment. When the interaction term is included the coefficients on both IDV and SENT are also positive and significant, meaning that an increase in the level of individualism or in the state of sentiment will result in an increase in momentum profits when the other factor is at a low level. Specifically, momentum profits increase by 0.3% (columns 3 and 4) as the level of individualism increases when the state of sentiment is pessimistic (SENT is zero) and the profits increase by 0.19% (column 3) or 0.18% (column 4) as the state of sentiment improves when the level of individualism is low (i.e. when IDV is zero). The significance of the

[28] In the interests of brevity we report the results for the control variables in table AV of the supplementary material.

(positive) interaction term suggests that the effect of investor sentiment on momentum profits is more pronounced in individualistic cultures. Note, that even after controlling for other explanatory variables, individualism, sentiment and the interaction term remain significant. The findings in columns 2-4 are again consistent with our first hypothesis in relation to momentum.[29]

[Insert Table VI about here]

In relation to PEAD the results show that the intercept term is positive in all cases, but only significant for good news stocks (columns 6-8 and 10-12). The significant positive intercept in column 6 means that for countries in the low individualism group PEAD for good news is evident during pessimistic periods (i.e. when IDV and SENT both equal zero). The individualism variable (IDV) is shown to be positive and significant across all six columns, while SENT is negative across all six (significant in all but column 8). The results in column 6 suggest that PEAD for good news stocks is more pronounced in highly individualistic countries and during periods of pessimism. For bad news stocks (column 10) when the sentiment state is pessimistic (i.e. SENT = 0) there is evidence of reversal for both of the higher individualism groups, with the reversal increasing as the level of individualism moves from low to medium or medium to high. However, it is replaced by PEAD when sentiment moves from pessimistic to mild or mild to optimistic. The interaction variable between individualism and sentiment (*IDV*Sent*) is shown to be significant (and negative, see columns 7-8 and 11-12), suggesting that the effect of investor sentiment on PEAD for both good and bad news stocks is more prominent in individualistic cultures than in collectivistic cultures, again consistent with our first hypothesis.[30]

[29] As far as control variables are concerned momentum profits decrease in market trading volume, stock market volatility and firm size and increase in dispersion in analyst forecasts, common language, market development and transaction costs. See table AV.

[30] In relation to the control variables PEAD for good news stocks increases in stock market volatility and the level of political risk and decreases in market trading volume, dispersion in analyst forecasts, the level

Overall, the findings in tables V and VI show clear support for the first hypothesis and provide evidence that sentiment and culture interact to affect both momentum profits and PEAD. These results address the issue raised by Antoniou et al. (2013) concerning the extent to which their findings receive support in less individualistic countries and strongly suggest that cognitive dissonance resulting from the interaction of culture and sentiment is a major driver of variations in momentum and PEAD returns.

4.2 Openness, Individualism and Sentiment: Momentum and PEAD

Having found support for our first hypothesis, we now turn our attention to the second: specifically, the view that the impact of the interaction between individualism and sentiment on momentum and PEAD returns will be mitigated by financial and capital market openness. As explained in section 3, three measures of openness are used: the Chinn-Ito financial openness index (Chinn and Ito, 2008) which measures the degree of regulatory restrictions on capital account transactions; the Pukthuanthong and Roll (2009) measure of stock market integration; and capital market openness, calculated as the total value of portfolio holdings by foreign investors divided by the stock market capitalization of the country.

[Insert Table VII about here]

Table VII presents results relating to openness and the interaction of individualism and sentiment on momentum returns. Portfolios are triple sorted by openness, the individualism index and investor sentiment. As previously, individualism and sentiment are sorted into categories representing the top and bottom 30% in each group to give high and low individualism and

of common language, market development, the level of insider trading, the level of corruption and inflation. Returns for bad news stocks increase in stock market volatility, the level of common language and the level of political risk and decrease in dispersion in analyst forecasts, cash flow growth rate volatility, market development and the level of insider trading. See table AV.

optimism and pessimism. For openness we split into the top and bottom 50% for each openness measure. The table has 3 panels, with panel A reporting results in relation to the Chinn-Ito measure, B those relating to the capital market integration measure and C the capital market openness measure. The first two columns in each panel report results for momentum profits for low openness countries split by the level of individualism and sentiment, together with differences across sentiment states. The third column reports differences between the first two columns (high individualism – low individualism for low openness countries). The next three columns report equivalent figures for high openness countries and the final three columns present differences between high and low openness countries for each of the individualism and sentiment categories. Results are comparable to column 1 of table V.[31]

Results in the first column for high individualism countries with low openness consistently show significant positive returns during optimistic periods and insignificant returns during pessimistic periods, with the difference between the two being substantial and significant in all cases. The pattern of significantly higher returns during optimistic periods is similar to those in table V, panel B, column 1. However, compared to the analysis for all levels of openness in table V, when analysis is restricted to only low openness countries the difference is considerably more marked: the difference being between 1.673 and 2.416 in table VII compared to 0.746 in table V. Furthermore, the results in column 2 of table VII for low individualism countries with low openness present a similar pattern to those in table V, panel C, column 1; for two of the three panels in table VII there is no significant difference between returns in optimistic and pessimistic

[31] While the results in table VII (and indeed in tables VIII and IX) are comparable to those in table V, there are differences in samples due to our selection criteria. In particular, following Chui et al. (2010) we require the minimum number of countries in each portfolio in our sample at any point in time to be at least two. The three-way sort in the openness tables (VII-IX) causes a reduction in our sample compared to when the two-way sort is used in table V.

sentiment periods, as was the case in table V. The exception is in panel A, but the difference is only significant at the 10% level. The third column shows that across all three measures of openness there is a significant difference between high and low individualism countries with low openness for the optimistic state and for the difference between optimism and pessimism, consistent with panel D of table V, although again, the difference between sentiment states is higher in table VII than in table V. These findings of a stronger impact of individualism on momentum profits in different states is consistent with our expectations, since the results in table VII columns 1-3 are for the markets where any mitigation effects of openness will be least.

Consideration of the results in columns 4, 5 and 6 of table VII reveal a marked difference for high openness countries. The overall pattern of differences between returns in the two sentiment states being significant for high individualism countries and insignificant for low individualism countries persists for two of the three openness measures (the exception is in panel C where the difference between sentiment states is significant at the 10% level). However, there are substantial differences in terms of the magnitude and significance of the returns between high and low openness countries. Specifically, for high individualism markets with high openness the difference in momentum returns across sentiment states are 50% (0.829 compared to 1.673 in panel A), 37% (0.891 compared to 2.416 in panel B) and 47% (0.891 compared to 1.899 in panel C) of those reported for high individualism, low openness markets. Similarly, in two of the three panels (the exception is panel A) the differences for high openness, low individualism are more than twice those of low openness, low individualism, although it should be recognised that the differences are insignificant (see column 8). Column 6 shows the difference in returns between high and low individualism countries for the two sentiment states and for the difference in returns across sentiment states. In two of the three cases the latter results are insignificant and in the third case

(panel A) the figure is only significant at the 10% level and is only about 71% of the equivalent figure for low openness countries (although as seen in column 9, the difference is not statistically significant). The results across the three panels contrast with the difference in panel D column 1 of table V being significant at the five percent level. From the final three columns of the table we can see the extent of statistical differences between low and high openness countries. Concentrating on the results in the final row of each panel in columns 7-9, three findings are noteworthy: first, as shown in column 7 there is a significant difference between low and high openness countries with high individualism in the impact of sentiment on momentum profits across sentiment states, with the difference being consistent with greater openness mitigating the impact of sentiment; second, no such significant difference exists for low individualism countries (column 8), suggesting openness has a bigger impact on high individualism countries than on low individualism countries; and third, when the three way split is considered (column 9, final row of each panel) there are significant difference in panels B and C, again consistent with the impact of sentiment and individualism on momentum profits being mitigated by market openness. Taken together, the results in table VII demonstrate that the impact of the interaction of sentiment and culture on cognitive dissonance, and hence on differences in momentum returns are reduced when markets have higher openness. While these results hold for all three measures of openness, the impact of openness is greater for the capital market integration and capital market openness measures than for the Chinn-Ito measure of financial openness. Furthermore, the impact of openness is most marked for high individualism countries. Thus, the findings provide clear support for our second hypothesis as far as momentum returns are concerned.

[Insert Tables VIII and IX about here]

Equivalent results relating to PEAD following good and bad news are presented in tables VIII and IX respectively. The layout of the tables is the same as that in table VII. Recall that in relation to table V it was shown that PEAD was significantly higher for high individualism countries than for low individualism countries for good news (bad news) stocks under pessimism (optimism). In relation to good news stocks under pessimism, the results in all three panels of table VIII show that the estimated value for PEAD for high individualism countries with low openness is always higher than that for high individualism countries with high openness, although the difference is only significant in panel A.

Results in the first column for high individualism countries with low openness consistently show significant PEAD during pessimistic periods and significant reversals or weaker PEAD during optimistic periods, with the difference between the two being substantial and significant in all cases. For example, the difference between optimism and pessimism is between -1.600 and -3.719 in column 1 of table VIII compared to -1.564 in table V. Furthermore, in panels B and C the difference between the two sentiment states for high individualism countries is much greater in low openness countries (column 1) than in high openness countries (column 4), with the difference between the two (column 7) being a large and statistically significant -2.675 (panel B) and -4.945 (panel C). In contrast, the results in column 2 of table VIII for low individualism countries with low openness show the difference between optimism and pessimism is almost halved in panels A and B and is not of the expected sign in panel C. The third column shows that across all three measures of openness there is a significant difference between high and low individualism countries with low openness for the difference between optimism and pessimism, consistent with panel D of table V, and, the difference is higher in table VIII than in table V in two openness cases, especially in the case of capital market openness (-7.444 in panel C compared to -1.047 in table

V). These findings of a stronger impact of individualism on PEAD of good news in different states compared to table V is consistent with our expectations, especially in low capital market openness markets. This is because the results in table VIII columns 1-3 are for markets where mitigation effects of openness will be least.

We next turn to consider the results in columns 4-6 of table VIII for high openness countries. While there is a significant difference between high and low individualism countries with high openness for the difference between optimism and pessimism in two out of the three cases (panels A and B), the difference between optimism and pessimism in both high and low individualism is not always of the expected sign. For example, for high individualism markets with high openness the differences between the two sentiment states are 0.365 and 1.226 for the two capital market measures and -2.506 for the Chinn-Ito financial openness. The results suggest there is no sentiment effect on PEAD of good news in high individualism countries when the countries are more accessible to foreign investors (high capital market openness), which is consistent with expectations. Similarly, in all three panels the differences between the two sentiment states for low individualism-high openness countries are positive (see column 5), suggesting no sentiment effect in these cases.

Furthermore, in panels B and C the difference between the two sentiment states for high individualism countries is much greater in low openness countries (column 1) than in high openness countries (column 4), with the difference between the two (column 7) being a large and statistically significant -2.675 (panel B) and -4.945 (panel C). The final column of table VIII also shows the impact of sentiment on the difference between high and low individualism countries varies with market openness, with the strongest mitigation effect being the capital market openness measure. Turning to table IX for bad news stocks, consideration of the findings across low and

high openness countries reveals that the pattern relating to PEAD under optimism and the differences between sentiment states is similar to that for good news stocks under pessimism and the differences between sentiment states.[32] Taken together these findings clearly suggest that the impact of sentiment and culture on PEAD becomes weaker as countries become more open, particularly in relation to the two capital market measures of openness. Thus, it is clear that openness plays an important role in mitigating the impact of culture and sentiment on both momentum profits and PEAD returns, particularly for the capital market measures of openness.

5. Robustness Tests

The results to date support our hypotheses relating to the interaction of culture (individualism), sentiment and cognitive dissonance in driving momentum and PEAD and the mitigating impact of market openness. We check the robustness of our results by undertaking a number of additional tests.

5.1 Robustness Tests for the Impact of Individualism and Sentiment on Momentum and PEAD

In relation to our first hypothesis we repeat the analysis for momentum returns using (a) value-weighted returns instead of the equally-weighted returns in table V; (b) risk-adjusted returns using the global Fama-French (FF) -3 factor model; (c) risk-adjusted returns using the global FF-5 factor model;[33] [34] (d) a 12/12 month momentum strategy (rather than the 6/6 used in table V);

[32] For example, for bad news stocks under optimism the level of PEAD for high individualism countries is higher in low openness countries than high openness countries (significant in panels A and B). Similarly, in all panels the difference between the two sentiment states for high individualism countries is much greater in low openness countries (column 1) than in high openness countries (column 4), with the difference between the two (column 7) being a statistically significant -1.707 (panel A) and -4.514 (panel B).

[33] The FF-3 risk factors are market risk, size and value and the two additional factors of the FF-5 risk model are profitability and investment.

[34] The daily and monthly returns of the global Fama-French 3- or 5- risk factors are taken from Kenneth French's Web site.

(e) sentiment determined using the approach of Antoniou et al. (2013)[35]; (f) 40/20/40 splits for sentiment and (g) sentiment measured using the implied volatility index[36]. For risk-adjusted momentum profits, we regress momentum raw returns on the risk factors of the relevant model. Specifically, the regression model is $r_{mom,t}^{Adj} = r_{mom,t} - \sum_t \beta_i f_{i,t}$, where $r_{mom,t}$ represents the momentum raw returns in month *t*, $f_{i,t}$ is the realization of factor *i* in month *t*, and β_i is the beta loading of factor *i*.

In the interests of brevity, details of the results of these additional tests in relation to momentum are available in table AVI of the supplementary material. The layout of that table is the same as in the first column of table V. Consistent with table V, panel A, in all seven cases momentum returns are significantly higher for high individualism countries than for low individualism ones. Similarly, consistent with panel B of table V across all tests momentum returns in high individualism countries are significantly higher in optimistic periods compared to periods of pessimism. Similarly, consistent with panel C, table V results, in five out of seven cases the difference between returns across sentiment states is insignificant for low individualism markets. Furthermore, where returns differences are significant, the magnitude is much smaller than for high individualism markets and in all cases the differences between high and low individualism countries are positive and in four out of seven cases, the differences are significant (see panel D of table AVI). Thus, the results of the additional tests provide evidence of robustness for findings for our first hypothesis in relation to momentum profits.

[35] Specifically, a high-sentiment holding month (optimistic) is one in which the sentiment states of all formation months are optimistic and a low-sentiment month (pessimistic) is one in which the sentiment states of all formation months are pessimistic.

[36] The implied volatility index is available for 16 stock markets including Australia, Brazil, Canada, China, France, Germany, Hong Kong, India, Japan, Korea, Mexico, the Netherlands, Russia, South Africa, United Kingdom and the U.S. The higher value of the index corresponds to lower sentiment (pessimism). We thank an anonymous referee for this suggestion of using implied volatility as an alternative measure of sentiment.

Results of robustness tests in relation to PEAD are also provided in the supplementary material (table AVII). Those results are directly comparable to the final two columns of table V.[37] The results relating to good news stocks are clearly in line with those in table V, with returns being higher for high individualism than low individualism countries and significantly different in four of the five cases. Results in relation to bad news stocks are less clear cut: for the FF-5 adjustment and the 40/20/40 sentiment splits the results are consistent with column 3 of table V. However, this is not the case for the FF-3 adjustment, using the alternative measure of SUE or implied volatility as a measure for sentiment. The pattern and significance of the results of additional tests in relation to good news stocks are in line with table V: in all 5 cases returns are significantly higher under pessimism than optimism for good news stocks in high individualism countries, while there is no significant difference across sentiment states for good news stocks in low individualism countries in four out of five cases (the exception is the alternative measure of SUE). Regarding the bad news stocks, returns are significantly lower under optimism than pessimism in both high and low individualism countries, but the magnitude of the return difference between the two sentiment states is comparably smaller in low individualism than high individualism in four cases. Finally, in all cases the differences for good news stocks between high and low individualism countries are negative and significant. In addition, for bad news stocks, the differences between the two cultures are negative (and significant) in four (three) out of four cases. Thus our findings for our first hypothesis in relation to PEAD are also robust.

Finally in relation to our first hypothesis we undertake analysis for stocks that are both winners (losers) from a momentum perspective and characterised by good (bad) news from a

[37] In the interests of brevity, more detail on the table, including description of the variables are provided in the supplementary material, below table AVII.

PEAD perspective. This allows us to undertake a much sharper analysis of our first hypothesis by examining the interaction of momentum and PEAD. In table X we present cumulative abnormal returns from day 2 to day 60 following an earnings announcement. Panel A (B) reports results for high (low) individualism countries. Results are clearly consistent with those in table V, columns 2 and 3: For winner/good news stocks in high individualism countries returns are significantly higher in pessimistic states compared to optimistic states, while no significant difference is found for low individualism markets. Similarly, for loser/bad news stocks PEAD is significantly higher for optimistic than pessimistic states for both high and low individualism countries, but the difference is much greater for the former group and the difference between the two individualism groups is significantly different and of the expected sign. Hence, the additional robustness tests in relation to our first hypothesis provide strong support to our main findings.

[Insert Table X about here]

5.2 Robustness Tests for the Mitigating Effect of Openness

In order to investigate robustness in relation to the role of openness we repeat analysis for momentum using the same seven tests used in the previous section, plus an additional test relating to an alternative openness cut-off (top and bottom 40% rather than the previous top/bottom 50%). Each of the seven robustness tests is undertaken in relation to the three openness measures. Given the number of tests undertaken, results are presented in the supplementary material in tables AVIII – AXV. The results are comparable to those in table VII (and table V for no split by openness). Results reveal that while there are some differences from the baseline results, there is strong and consistent support for the main findings in relation to[38]: the difference between optimistic and

[38] In the interests of brevity, details of results which support these main findings are set out in the supplementary material, immediately after table AXV. Similarly, detailed arguments relating to PEAD

pessimistic states for high individualism-low openness countries; countries with low openness and low individualism having much smaller differences between the two sentiment states; differences between high individualism and low individualism countries with low openness under optimism and the differences between optimistic and pessimistic periods; there being much less difference between high and low individualism results for high openness countries; major differences for high individualism between high and low openness countries when considering differences in momentum returns across sentiment states; differences in returns across sentiment states for high openness, low individualism versus low openness, low individualism countries (these results are consistent with the findings reported in table VII, confirming that openness has a bigger impact on high individualism countries than low individualism ones); and the three way split. Thus, the results from a range of robustness tests show that the main findings hold: specifically, for momentum returns greater openness reduces the impact of the interaction between individualism and sentiment, with the capital market measures being more important in facilitating mitigation than the capital account measure.

We next repeat analysis for PEAD using the same five tests used in the previous section, plus the additional test using the alternative openness cut-off (top and bottom 40% rather than the previous top/bottom 50%). As for momentum, each of the robustness tests is undertaken in relation to the three openness measures and are reported in tables AXVI to AXXVII in the supplementary material. Once again, results are consistent with the earlier findings for the impact of openness on PEAD. Specifically, we obtain similar results for: good (bad) news stocks under pessimism (optimism) in relation to high individualism-low openness countries having higher returns than

robustness tests in tables AXVI to AXXVII are set out in the supplementary material after the table AXXVII.

high individualism-high openness countries; the equivalent results for low individualism countries but of smaller magnitude; the differences across sentiment states between high and low-openness for high individualism countries; and the range of differences between high individualism and low individualism across openness. Thus, once again the robustness tests confirm the role of openness in mitigating the impact of culture on the returns to the anomaly. They also show that the impact of openness holds primarily for capital market openness measures. Thus, overall, the earlier findings regarding the impact of openness on returns to the two anomalies are robust.

6. Conclusion

This paper contributes to the literature on the role of culture on financial market anomalies and, importantly, examines the extent to which market and financial openness mitigate the effects of culture. Using a sample of over 40 countries we examine how the interaction of sentiment and individualism impacts momentum and PEAD returns. We hypothesise that cognitive dissonance is affected by this interaction and that this, in turn, determines the prevalence and magnitude of the returns to the two strategies. We further hypothesise that while cultural attributes change only very slowly through time, the impact of individualism within a market will be mitigated when the market is open to investors and influences from other cultures. Results provide clear support for our hypotheses. First, while empirical analysis confirms that both strategies yield significant returns when country-average portfolios are considered, there are substantial variations across sentiment states and between high and low individualism countries. Significant differences are found in the level of returns to the two strategies (including for PEAD for both good and bad news stocks) between optimistic and pessimistic states in high individualism countries. In contrast, there is no significant difference in returns across sentiment states for either momentum or PEAD following good news for low individualism countries. The findings from both univariate and

multivariate analysis are consistent with cognitive dissonance explaining cross-country differences and support our first hypothesis. Our second hypothesis concerning the mitigating effects of openness also receives empirical support. Differences between high and low individualism countries are found to be much greater for low openness countries than for high openness countries. The results of a range of robustness tests support the findings relating to both hypotheses.

Taken together, the analysis in this paper suggests that cross-country differences in the returns to the momentum and PEAD strategies are driven by cognitive dissonance resulting from differences in culture, but that the effects of individualism are reduced when markets are more open. The mitigating effects of openness are stronger for the capital market integration and capital market openness measures than for the financial openness measure. This is, perhaps, unsurprising, given that the two capital market measures relate more directly to the involvement of foreign investors within a market. These results are important not only in adding to understanding of the drivers of momentum and PEAD returns, but also in providing insight into how the effects of the slow changing cultural influences can be affected by opening a market to participants from countries with different cultural attributes.

Understanding the reasons behind the excess returns from momentum and PEAD across countries provides important insights to investors seeking to exploit these two strategies. For example, the finding that sentiment impacts on the level of profits arising in high individualism countries, can be used to guide the timing of trades related to these anomalies. Moreover, how openness impacts on these returns, suggests that the way in which culture impacts on the level of profits from momentum and PEAD may change even when the country-specific culture changes only slowly. Stambaugh, Yu and Yuan (2012) and Birru (2018) investigate the effect of sentiment and investor mood on a broad set of anomalies. This raises the question of whether our findings

on the relation between culture, sentiment and market openness on momentum and PEAD which are news-based anomalies hold for a broad set of anomalies. Investigation of this issue would be an intriguing area for future research.

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Table I. Stock Market Descriptive Statistics

Table I shows descriptive statistics for the 45 stock markets in the sample along with scores on the individualism index and the start and end dates of the data. It also reports the number of firms for each country at the start and end month of the sample period. For the following countries data from two stock exchanges are used due to there being more than one major exchange: China (Shanghai & Shenzhen); Japan (Tokyo & JASDAQ); Russia (Russia Trading System & MICEX); Korea (Korea & KOSDAQ); and the U.S. (NYSE&AMEX&NASDAQ). Data for the U.S market is from CRSP, while that for all other countries in the sample are from the XpressFeed Global.

Country/ region	IDV	Start date	End date	No. of Firms at start date	No. of Firms at end date
Argentina	46	2003M10	2017M12	54	70
Australia	90	1990M1	2017M12	264	1,683
Austria	55	1994M2	2017M12	68	68
Belgium	75	1991M8	2017M12	54	140
Brazil	38	2005M12	2017M12	51	183
Bulgaria	30	2007M11	2017M12	106	123
Canada	80	1999M5	2017M12	665	508
Chile	23	2005M8	2017M12	102	167
China	20	1996M9	2017M12	163	3,156
Croatia	33	2008M4	2017M12	101	113
Czech Republic	58	1996M4	2006M8	147	55
Denmark	74	1994M9	2017M12	64	140
Finland	63	1996M12	2017M12	74	130
France	71	1990M1	2017M12	209	680
Germany	67	1990M1	2017M12	167	695
Greece	35	1996M12	2017M12	52	173
Hong Kong	25	2000M4	2017M12	165	253
India	48	2010M6	2017M12	1,736	3,023
Indonesia	14	2001M7	2017M12	178	487
Ireland	70	2000M1	2017M12	50	50
Israel	54	2011M6	2017M12	392	402
Italy	76	1990M1	2017M12	55	279
Japan	46	1990M1	2017M12	1,521	3,190
Korea	18	1999M3	2017M12	655	1,872
Luxembourg	60	2011M3	2017M12	50	50
Mexico	30	2001M1	2017M12	55	117
Netherlands	80	1990M1	2017M12	110	139
New Zealand	79	1994M11	2017M12	87	137
Nigeria	30	2008M7	2017M12	137	161
Norway	69	1992M10	2017M12	59	180
Poland	60	2001M8	2017M12	141	749
Portugal	27	1996M12	2003M4	57	50
Romania	30	2010M3	2017M12	87	143
Russia	39	2011M2	2017M12	62	216
Saudi Arabia	25	2010M6	2017M12	122	166
Slovenia	27	2006M8	2017M12	51	52
South Africa	65	1990M1	2017M12	120	258
Spain	51	1990M1	2017M12	81	179
Sweden	71	1996M1	2017M12	101	620
Switzerland	68	1992M4	2017M12	51	231
Taiwan	17	2009M12	2017M12	1,375	1,584
Thailand	20	1999M7	2017M12	299	637
Turkey	37	2004M1	2017M12	251	375
United Kingdom	89	1990M1	2017M12	805	1,377
U. S	91	1990M1	2017M12	4,236	3,628

Table II. Earnings Announcements Descriptive Statistic

Table II reports descriptive statistics for the earnings announcements of the 42 stock markets. The name of the country, the number of firms with earnings announcements available and the number of announcements for each country are presented. The earnings announcements data are from Worldscope for all countries, except for the U.S which are from the IBES U.S Summary File.

Country/region	Firms	Announcements	Country/region	Firms	Announcements
Argentina	88	921	Japan	4,903	68,308
Australia	2,365	19,971	Korea	2,133	19,693
Austria	135	1,180	Luxembourg	56	206
Belgium	193	1,888	Mexico	133	1,129
Brazil	197	1,349	Netherlands	287	3,078
Bulgaria	149	970	New Zealand	201	1,749
Canada	993	5,698	Nigeria	101	380
Chile	196	1,511	Norway	311	2,319
China	2,682	23,790	Poland	359	2,289
Croatia	90	615	Romania	61	304
Denmark	277	2,712	Russia	195	834
Finland	175	2,050	Saudi Arabia	153	806
France	1,151	10,335	South Africa	388	2,115
Germany	1,075	10,224	Spain	215	2,229
Greece	337	3,539	Sweden	455	2,598
Hong Kong	254	3024	Switzerland	334	3,681
India	2,681	15,573	Taiwan	1,492	9,626
Indonesia	511	4,197	Thailand	553	4,651
Ireland	94	715	Turkey	339	2,972
Israel	450	1,869	United Kingdom	3,359	26,602
Italy	424	4,178	U. S	8,708	83,051
Total				39,165	354,929

Table III. Sentiment Descriptive Statistics

Table III reports summary statistics for the consumer confidence index proxy for investor sentiment for each country, along with the source, frequency of the consumer confidence index and whether the index is seasonally adjusted or not. It also presents the number of observations (N), mean (u), standard deviation (σ), minimum (Min) and Maximum (Max) of the consumer confidence index. If a series of the consumer confidence index is not seasonally adjusted, the X-12-ARIMA method is used to adjust the series, and if a series of the consumer confidence is not in monthly frequency, it is transformed into a monthly frequency by using the last available values for months that have no data. The figures of all statistics in the table are seasonally adjusted.

Country/region	Source	Frequency	Seasonally Adjusted(SA)/ Non-Seasonally Adjusted(Non-SA)	N	Min	Max	Mean(u)	SD(σ)
Argentina	Datastream	Monthly	Non-SA	171	34.4	61.1	48.7	6.1
Australia	DG ECFIN	Monthly	SA	336	96.5	102.0	100.0	1.1
Austria	DG ECFIN	Monthly	SA	287	98.0	102.1	100.1	0.9
Belgium	DG ECFIN	Monthly	SA	317	98.1	102.7	100.3	0.9
Brazil	Datastream	Monthly	SA	145	64.8	112.8	93.5	12.1
Bulgaria	DG ECFIN	Monthly	SA	122	-50.1	-22.4	-35.9	7.3
Canada	Datastream	Monthly	SA	224	96.8	101.9	100.1	1.0
Chile	Datastream	Monthly	Non-SA	151	75.8	142.0	116.7	16.1
China	Datastream	Monthly	Non-SA	256	97.2	123.6	108.0	4.7
Croatia	DG ECFIN	Monthly	SA	117	-51.5	-13.7	-32.6	10.6
Czech Republic	DG ECFIN	Monthly	SA	124	96.2	101.7	98.7	1.7
Denmark	DG ECFIN	Monthly	SA	280	99.0	102.3	101.0	0.7
Finland	DG ECFIN	Monthly	SA	253	96.7	104.0	101.0	1.4
France	DG ECFIN	Monthly	SA	336	98.0	101.6	99.7	0.8
Germany	DG ECFIN	Monthly	SA	336	96.1	102.5	99.9	1.4
Greece	DG ECFIN	Monthly	SA	253	95.4	103.0	99.4	1.9
Hong Kong	Datastream	Quarterly	Non-SA	212	49.0	115.8	86.3	16.0
India	Datastream	Monthly	Non-SA	91	49.0	71.2	64.1	4.0
Indonesia	Datastream	Monthly	Non-SA	199	99.1	100.6	100.0	0.4
Ireland	DG ECFIN	Monthly	SA	216	93.8	104.7	100.0	2.6
Israel	Datastream	Monthly	SA	79	98.8	100.9	100.0	0.5
Italy	DG ECFIN	Monthly	SA	336	96.6	103.0	100.2	1.4
Japan	Datastream	Monthly	SA	336	95.8	102.1	99.7	1.2
Korea	Datastream	Monthly	SA	226	96.7	102.9	100.0	1.2
Luxembourg	DG ECFIN	Monthly	SA	82	95.9	104.5	100.0	2.3
Mexico	Datastream	Monthly	SA	204	96.5	103.5	100.0	1.6
Netherlands	DG ECFIN	Monthly	SA	336	97.8	102.1	100.3	1.1
New Zealand	Datastream	Quarterly	Non-SA	278	96.9	102.2	100.2	1.0
Nigeria	Datastream	Quarterly	Non-SA	110	-32.1	5.8	-9.7	9.2
Norway	Datastream	Quarterly	SA	303	-20.6	35.7	17.3	13.8
Poland	DG ECFIN	Monthly	SA	197	98.1	101.9	100.0	1.1
Portugal	DG ECFIN	Monthly	SA	76	98.2	102.0	100.9	1.0
Romania	DG ECFIN	Monthly	SA	94	-63.3	-10.4	-30.9	13.4
Russia	Datastream	Quarterly	Non-SA	83	89.7	102.4	99.1	3.1
Saudi Arabia	Datastream	Monthly	Non-SA	94	51.6	67.9	59.7	3.5
Slovenia	DG ECFIN	Monthly	SA	100	98.1	101.9	99.0	1.2
South Africa	Datastream	Quarterly	SA	336	97.4	102.9	100.2	1.3
Spain	DG ECFIN	Monthly	SA	336	95.9	102.2	100.0	1.4
Sweden	DG ECFIN	Monthly	SA	267	96.3	103.3	100.0	1.6
Switzerland	Datastream	Quarterly	SA	309	95.9	103.1	100.2	1.6
Taiwan	Datasream	Monthly	Non-SA	97	67.0	91.4	80.6	5.1
Thailand	Datastream	Monthly	SA	222	57.8	109.0	73.2	10.5
Turkey	Datastream	Monthly	SA	168	93.5	108.2	100.0	3.1
United Kingdom	DG ECFIN	Monthly	SA	336	96.5	102.5	100.1	1.3
U. S	Datastream	Monthly	SA	336	96.7	102.8	100.0	1.4

Table IV. International Momentum Profits, Post-Earnings-Announcement-Drift and Investor Sentiment

Table IV presents the results for country-average momentum profits and post-earnings-announcement-drift (PEAD). Panel A reports the average monthly percentage momentum returns for the whole period and during the two sentiment states (optimistic and pessimistic) and the difference of momentum returns between optimistic and pessimistic states for the country-average portfolio for the 45 countries listed in Table I from Jan.1990 to Dec.2017, using the periods for individual countries as shown in Table I. The momentum returns are the returns of the winner portfolio minus the returns of the loser portfolio. For each country, stocks are ranked into quintiles based on their past 6-month cumulative returns and they are held for 6 months. In order to increase the power of the test, overlapping portfolios are formed. To mitigate microstructure issues, 1 month is allowed between the end of the formation period and the beginning of the holding period. Panel B presents the percentage PEAD for good news and bad news stocks, for the whole period and during the two sentiment periods and the difference in PEAD between the two sentiment periods for the country-average portfolio for the 42 countries listed in Table II from Jan.1990 to Dec.2017, using the periods for individual countries as shown in Table I. For PEAD, the drift is calculated as the cumulative abnormal returns of stocks during +2 to +60 trading days following the earnings announcement and the abnormal returns are buy and hold stock returns minus buy and hold market returns. Stocks in each country are ranked on earnings surprise (SUE) using annual earnings announcements. SUE is calculated as the difference between current and last year's earnings, scaled by stock prices 10 days prior to the earnings announcement. The good (bad) news portfolio consists of stocks in the top (bottom) 30% of earnings surprises in each year in each country. For momentum (PEAD), to identify a particular holding month (announcement month) as optimistic or pessimistic; the corresponding sentiment score is calculated using the weighted average scheme as follows. Weights 3, 2 and 1 are given to the month t-1, t-2 and t-3. If the weighted average score of the holding month/announcement month belongs to the top (bottom) 30% of the time series of rolling average sentiment scores, it is defined as optimistic (pessimistic), with the rest being mild states. For momentum, the country-average portfolio is formed by putting equal weight on the portfolios of the countries in each month. At least 2 countries are required in the portfolio at any point in time. For PEAD, the country-average portfolio is the mean average of all firm-year observations in the portfolio. The t-statistics for momentum are calculated using Newey-West (1987) standard errors, where the lag is set to K-1 and the number of holding months is K=6. The t-statistics for PEAD are calculated using clustered standard errors at the firm level. The corresponding t-statistics are reported in parentheses and asterisks refer to the level of significance: *** (1%), ** (5%), * (10%).

Panel A. Country-average momentum profits

	Whole Period	Optimistic	Pessimistic	Opt. - Pess.
Country-average	0.798	1.102	0.664	0.438
	(5.69)***	(8.42)***	(2.51)**	(2.01)**

Panel B. Country-average PEAD

	Whole Period		Optimism		Pessimism		Opt. - Pess.	
	Good news	Bad news	Good news	Bad news	Good news	Bad news	Good news	Bad news
Country-average	1.560	-0.279	0.689	-1.718	1.936	0.479	-1.247	-2.197
	(19.61)	(-3.43)	(4.38)	(-10.84)	(13.67)	(3.28)	(-7.44)	(-12.88)
	***	***	***	***	***	***	***	***

Table V. Momentum, Post-Earnings Announcement-Drift, Individualism and Investor Sentiment

Table V presents the average monthly returns (%) of momentum strategy and post-earnings-announcement-drift (%) for good news and bad news stocks for the country-average portfolio sorted by investor sentiment and the Individualism index. Panel A reports momentum profits and PEAD for good and bad news sorted by individualism. Panels B and C present momentum profits and PEAD for good news and bad news stocks across sentiment states in the high and low individualism culture groups, respectively. At the end of each month (year), momentum (PEAD) portfolios for each country are constructed and all countries in the sample are sorted into three groups using the top/bottom 30% cut-offs based on their individualism index and sentiment index. Panel D presents the differences in momentum profits and PEAD of good news and bad news between high and low individualism countries, respectively. See Table IV for the detailed description of the construction of the country-average portfolio and the definition of sentiment states. The t-statistics for momentum are calculated using Newey-West (1987) standard errors, where the lag is set to K-1 and the number of holding month is, K=6. The t-statistics for PEAD are calculated using clustered standard errors at the firm level. The corresponding t-statistics are shown in parentheses and asterisks refer to the level of significance: *** (1%), ** (5%), * (10%).

	Momentum	PEAD	
		Good news	Bad news
Panel A. Momentum and PEAD for high and low individualism countries			
High IDV	1.022(6.32)***	1.652(13.51)***	-0.609(-4.67)***
Low IDV	0.461(2.03)**	0.687(3.79)***	-0.348(-1.94)*
High. - Low.	0.561(3.01)***	0.965(7.13)***	-0.261(-1.71)*
Panel B. High individualism			
Optimism	1.336(6.42)***	0.360(1.69)*	-2.396(-10.86)***
Pessimism	0.590(2.25)**	1.924(8.32)***	0.291(1.39)
Opt. - Pess.	0.746(3.11)**	-1.564(-6.81)***	-2.687(-11.91)***
Panel C. Low individualism			
Optimism	0.472(2.46)**	0.242(0.56)	-2.064(-4.53)***
Pessimism	0.300(1.20)	0.759(1.62)	0.111(0.40)
Opt. - Pess.	0.172(0.56)	-0.517(-1.39)	-2.175(-4.76)***
Panel D. High. - Low.			
Optimism	0.864(3.31)***	0.118(0.31)	-0.332(-1.77)*
Pessimism	0.290(0.98)	1.165(3.21)***	0.180 (0.61)
Opt. - Pess.	0.574(2.04)**	-1.047(-2.17)**	-0.512 (-1.91)*

Table VI. Determinants of Momentum Profits and Post-Earnings-Announcement Drift across Countries

Table VI presents results from regressing monthly momentum returns and PEAD on the categorical individualism index (IDV), categorical sentiment (sent) variables and an interaction term between individualism and sentiment, respectively. IDV is a categorical variable that equals 2 if the value of IDV belongs to the top 30% of values of IDV of the sample countries, 1 if it belongs to the middle 40% and 0 if it belongs to the bottom 30%. Sent is a categorical variable which equals 2 if monthly sentiment of each country belongs to the optimistic group, 1 if it belongs to the mild group and 0 if it belongs to the pessimistic group. IDV*SENT is the individualism and sentiment interaction variable. Models (3), (6) and (9) report the results with control variables, including firm characteristics, financial market development, institutional quality and macroeconomic variables. The firm characteristics variables include the natural logarithm of market trading volume (LnTV), the natural logarithm of stock market volatility (LnV), the natural logarithm of analyst coverage (LnCov), the natural logarithm of the dispersion in analyst forecasts (LnDisp), the cash flow growth rate volatility (VolFCF), the logarithm of median firm size (LnSize) and the average price to book ratio (PB). The financial market development variables include total private credit expressed as the ratio of GDP (CREDIT), the average common language dummy variable (LANG), and the market development (DEVELOP) indicator equals to 1(0) if the country is classified as a developed (developing) country. The institutional quality variables include the insider index (INSIDER), the ICRG corruption index (CORRP), the natural logarithm of the transaction cost index (LnTRAN), the ICRG political risk index (POLITICAL) and the investor protection index (PROTECTION). The macroeconomic variables include the GDP growth rate (GDP) and inflation rate (Inflation). Standard errors are clustered by country and time. For brevity, only coefficients of IDV, SENT and the interaction between IDV and SENT are reported. The corresponding t-statistics are reported in parentheses and asterisks refer to the level of significance: *** (1%), ** (5%), * (10%).

	Momentum				PEAD				PEAD			
					Good news				Bad news			
	(1) Expectation	(2)	(3)	(4)	(5) Expectation	(6)	(7)	(8)	(9) Expectation	(10)	(11)	(12)
Intercept		0.0027 (2.03)**	0.0024 (1.99)**	-0.0019 (-1.69)*		0.0051 (3.19)***	0.0070 (2.71)***	0.0043 (2.91)***		0.0011 (0.38)	0.0024 (0.78)	0.0023 (0.74)
IDV	+	0.0042 (4.26)***	0.0031 (2.71)***	0.0030 (2.00)**	+	0.0047 (3.22)***	0.0043 (3.11)***	0.0041 (2.96)***	+	0.0029 (3.69)***	0.0027 (3.16)***	0.0024 (2.41)**
SENT	+	0.0025 (2.19)**	0.0019 (1.83)*	0.0018 (1.78)*	-	-0.0037 (-2.31)**	-0.0033 (-2.11)**	-0.0021 (-1.59)	-	-0.0141 (-2.88)***	-0.0099 (-2.35)**	-0.0111 (-1.93)*
IDV*SENT	+		0.0017 (1.98)**	0.0020 (1.93)*	-		-0.0021 (-2.03)**	-0.0019 (-1.73)*	-		-0.0083 (-2.18)**	-0.0066 (-1.99)**

Table VII. Openness, Momentum, Individualism and Investor Sentiment

Table VII presents the average monthly momentum returns (%) for the country-average portfolio triple sorted by openness, the Individualism index and investor sentiment. Panel A reports the results using the Chinn-Ito financial openness. Panels B and C present the results using capital market integration and capital market openness, respectively. For each country, momentum portfolios are sorted into three groups using the top/bottom 50% cut-offs based on openness measure, the 30% cut-offs based on their individualism index and sentiment index. See Table IV for the detailed description of the construction of country-average portfolio and the definition of sentiment states. At least 2 countries are required in the portfolio at any point in time. Chinn-Ito financial openness is constructed as in Chinn and Ito (2008) and measures the degree of capital account openness of a specific country. Capital market integration is introduced by Pukthuanthong and Roll (2009) and measures the extent to which the domestic stock market is integrated with the global market. Capital market openness is measured as the total value of portfolio equity holdings by foreign investors scaled by the country's stock market capitalization. The t-statistics are calculated using Newey-West (1987) standard errors, where the lag is set to K-1 and the number of holding month is, K=6. The corresponding t-statistics are shown in parentheses and asterisks refer to the level of significance: *** (1%), ** (5%), * (10%).

	Low Openness			High Openness			Low. - High.		
	High IDV	Low IDV	High-Low	High IDV	Low IDV	High-Low	High IDV	Low IDV	High-Low
Panel A. Chinn-Ito Financial Openness									
Optimism	1.374	0.832	0.542	1.471	0.090	1.381	-0.097	0.742	-0.839
	(4.45)***	(3.78)***	(1.99)**	(5.84)***	(0.31)	(2.08)**	(-0.61)	(2.11)**	(-1.93)*
Pessimism	-0.299	0.210	-0.509	0.642	0.015	0.627	-0.941	0.195	-1.136
	(-0.45)	(0.59)	(-0.61)	(2.45)**	(0.04)	(1.89)*	(-2.67)***	(0.39)	(-2.12)**
Opt. - Pess.	1.673	0.622	1.051	0.829	0.075	0.754	0.844	0.547	0.297
	(4.69)***	(1.81)*	(2.39)**	(2.71)***	(0.26)	(1.91)*	(2.34)**	(1.63)	(0.31)
Panel B. Capital Market Integration									
Optimism	1.479	0.562	0.917	1.467	1.364	0.103	0.012	-0.802	0.814
	(3.64)***	(2.29)**	(2.11)**	(5.81)***	(1.96)**	(0.21)	(0.11)	(-1.22)	(1.71)*
Pessimism	-0.937	0.139	-1.076	0.576	0.379	0.197	-1.513	-0.240	-1.273
	(-1.21)	(0.49)	(-1.41)	(1.64)	(0.74)	(0.33)	(-2.11)**	(-0.66)	(-1.81)*
Opt. - Pess.	2.416	0.423	1.993	0.891	0.985	-0.094	1.525	-0.562	2.087
	(4.56)***	(1.53)	(2.19)**	(2.31)**	(1.43)	(-0.21)	(2.25)**	(-0.79)	(2.43)**
Panel C. Capital Market Openness									
Optimism	1.520	0.267	1.253	1.538	0.436	1.102	-0.018	-0.169	0.151
	(4.62)***	(0.75)	(2.51)**	(4.92)***	(0.97)	(2.34)**	(-0.09)	(-0.26)	(0.23)
Pessimism	-0.379	-0.165	-0.214	0.647	-0.611	1.258	-1.026	0.446	-1.427
	(-0.36)	(-0.49)	(-0.38)	(1.82)*	(-0.76)	(2.42)**	(-2.15)**	(0.87)	(-2.29)**
Opt. - Pess.	1.899	0.432	1.467	0.891	1.047	-0.156	1.008	-0.615	1.623
	(5.17)***	(0.93)	(2.73)***	(2.17)**	(1.81)*	(-0.22)	(2.09)**	(-0.70)	(2.47)**

Table VIII. Openness, Post-Earnings-Announcement Drift of Good news, Individualism and Investor Sentiment

Table VIII presents post-earnings-announcement-drift (%) for bad news stocks for the country-average portfolio triple sorted by openness, the Individualism index and investor sentiment. Panel A reports the results using the Chinn-Ito financial openness. Panels B and C present the results using capital market integration and capital market openness, respectively. At the end of each year, PEAD portfolios for each country are constructed and all countries in the sample are sorted into three groups using the 50% cut-offs based on the openness measure, the top/bottom 30% cut-offs based on their individualism index and sentiment index. See Table IV for the detailed description of the constructions of country-average portfolio and the definition of sentiment states. At least 2 countries are required in the portfolio at any point in time. Chinn-Ito financial openness is constructed as in Chinn and Ito (2008) and measures the degree of capital account openness of a specific country. Capital market integration is introduced by Pukthuanthong and Roll (2009) and measures the extent to which the domestic stock market is integrated with the global market. Capital market openness is measured as the total value of portfolio equity holdings by foreign investors scaled by the country's stock market capitalization. The t-statistics are calculated using clustered standard errors at the firm level. The corresponding t-statistics are shown in parentheses and asterisks refer to the level of significance: *** (1%), ** (5%), * (10%).

	Low Openness			High Openness			Low. - High.		
	High IDV	Low IDV	High - Low	High IDV	Low IDV	High - Low	High IDV	Low IDV	High - Low
Panel A. Chinn-Ito Financial Openness									
Optimism	3.563	0.211	3.352	0.030	5.223	-5.193	3.533	-5.012	8.545
	(4.21)***	(0.38)	(3.27)***	(0.13)	(2.91)***	(2.61)***	(3.79)***	(-2.77)***	(4.48)***
Pessimism	5.163	1.040	4.123	2.536	2.943	-0.407	2.627	-1.903	4.530
	(5.61)***	(2.62)**	(3.51)***	(5.58)***	(1.80)*	(-0.49)	(2.61)**	(-1.56)	(3.18)***
Opt. - Pess.	-1.600	-0.829	-0.771	-2.506	2.280	-4.786	0.906	-3.109	4.015
	(-1.91)*	(-1.99)**	(-1.66)*	(-9.66)***	(1.77)*	(-2.41)**	(1.39)	(-2.01)**	(3.01)***
Panel B. Capital Market Integration									
Optimism	-0.589	-0.584	-0.005	1.941	2.242	-0.301	-2.530	-2.826	0.296
	(-2.11)**	(-1.24)	(-0.10)	(6.01)***	(4.00)***	(-0.51)	(-6.35)***	(-6.13)***	(0.29)
Pessimism	1.721	0.606	1.115	1.576	-1.972	3.548	0.145	2.578	-2.433
	(3.97)***	(1.99)**	(1.87)*	(5.54)***	(-2.57)**	(4.13)***	(0.36)	(3.11)***	(-2.41)**
Opt. - Pess.	-2.310	-1.190	-1.120	0.365	4.214	-3.849	-2.675	-5.404	2.729
	(-5.13)***	(-2.36)**	(-1.97)**	(0.63)	(4.56)***	(-4.22)***	(6.69)***	(-8.15)***	(2.49)**
Panel C. Capital Market Openness									
Optimism	-2.486	5.176	-7.662	2.419	2.218	0.201	-4.905	2.958	-7.863
	(-3.26)***	(5.24)***	(4.63)***	(5.22)***	(1.64)	(0.25)	(-5.33)***	(2.36)**	(-4.88)***
Pessimism	1.233	1.451	-0.128	1.193	0.536	0.657	0.040	0.915	-0.875
	(2.53)**	(2.21)**	(-0.49)	(3.91)***	(0.30)	(0.41)	(0.11)	(1.63)	(-1.31)
Opt. - Pess.	-3.719	3.725	-7.444	1.226	1.682	-0.456	-4.945	2.043	-6.988
	(-3.63)***	(3.01)***	(4.71)***	(3.77)***	(1.26)	(-0.24)	(-5.37)***	(1.99)**	(-3.37)***

Table IX. Openness, Post-Earnings-Announcement Drift of Bad news, Individualism and Investor Sentiment

Table IX presents post-earnings-announcement-drift (%) for bad news stocks for the country-average portfolio triple sorted by openness, the Individualism index and investor sentiment. Panel A reports the results using the Chinn-Ito financial openness. Panels B and C present the results using capital market integration and capital market openness, respectively. At the end of each year, PEAD portfolios for each country are constructed and all countries in the sample are sorted into three groups using the 50% cut-offs based on the openness measure, the top/bottom 30% cut-offs based on their individualism index and sentiment index. See Table IV for the detailed description of the constructions of country-average portfolio and the definition of sentiment states. At least 2 countries are required in the portfolio at any point in time. Chinn-Ito financial openness is constructed as in Chinn and Ito (2008) and measures the degree of capital account openness of a specific country. Capital market integration is introduced by Pukthuanthong and Roll (2009) and measures the extent to which the domestic stock market is integrated with the global market. Capital market openness is measured as the total value of portfolio equity holdings by foreign investors scaled by the country's stock market capitalization. The t-statistics are calculated using clustered standard errors at the firm level. The corresponding t-statistics are shown in parentheses and asterisks refer to the level of significance: *** (1%), ** (5%), * (10%).

	Low Openness			High Openness			Low. - High.		
	High IDV	Low IDV	High - Low	High IDV	Low IDV	High - Low	High IDV	Low IDV	High - Low
Panel A. Chinn-Ito Financial Openness									
Optimism	-3.864	-1.510	-2.354	-2.897	-0.016	-2.881	-0.967	-1.494	0.527
	(-4.09)***	(-3.04)***	(-2.59)***	(-9.16)***	(-0.01)	(-3.89)***	(-2.03)**	(-2.61)**	(0.76)
Pessimism	1.510	1.162	0.348	0.770	3.420	-2.650	0.740	-2.258	2.998
	(1.78)*	(3.02)***	(0.51)	(2.98)***	(2.13)**	(-2.03)**	(1.33)	(-1.91)*	(2.18)**
Opt. - Pess.	-5.374	-2.672	-2.702	-3.667	-3.436	-0.231	-1.707	0.764	-2.471
	(-5.11)***	(-4.01)***	(-3.71)***	(-11.33)***	(-2.22)**	(-0.39)	(-2.67)***	(0.91)	(2.04)**
Panel B. Capital Market Integration									
Optimism	-2.993	-2.899	-0.094	-1.421	1.952	-3.373	-1.572	-4.851	3.279
	(-7.82)***	(-6.52)***	(-0.14)	(-4.25)***	(1.89)*	(-4.33)***	(-3.58)***	(-8.52)***	(2.51)**
Pessimism	2.457	0.270	2.187	-0.485	-1.395	0.910	2.942	1.665	1.277
	(6.28)***	(0.90)	(4.81)***	(-1.58)	(-1.62)	(1.55)	(7.69)***	(2.18)**	(1.71)*
Opt. - Pess.	-5.450	-3.169	-2.281	-0.936	3.347	-4.283	-4.514	-6.516	2.002
	(-10.11)***	(-7.13)***	(-4.01)***	(-2.13)**	(2.31)**	(-4.51)***	(9.13)***	(-9.13)***	(1.97)**
Panel C. Capital Market Openness									
Optimism	-2.121	0.624	-2.745	-1.270	-0.234	-1.036	-0.851	0.858	-1.709
	(-4.12)***	(0.70)	(-4.22)***	(-2.77)***	(-0.16)	(-2.08)**	(-1.03)	(1.06)	(-2.01)**
Pessimism	0.420	1.287	-0.867	0.282	1.558	-1.276	0.138	-0.271	0.409
	(1.02)	(1.93)*	(-1.59)	(0.85)	(0.85)	(-1.31)	(0.48)	(-0.31)	(0.61)
Opt. - Pess.	-2.541	-0.663	-1.878	-1.552	-1.792	0.240	-0.989	1.129	-2.118
	(-2.92)***	(-0.61)	(-2.02)**	(-2.81)***	(-1.11)	(0.29)	(-1.61)	(1.40)	(-2.49)**

Table X. Interaction between Momentum and Post-Earnings-Announcement Drift, Individualism and Investor Sentiment

Table XII presents cumulative abnormal returns for the (2, 60) intervals around positive (negative) earnings for winner (loser) stocks sorted by investor sentiment and the Individualism index. See Table IV for the detailed description of the construction of momentum portfolio, country-average portfolio and the definition of sentiment states. We identify firms with an earnings announcement in month t+1 and perform an event study to examine the post-earnings-announcement-drift. SUE is calculated as the difference between the current and last year's earnings divided by stocks prices 10 days prior to the earnings announcement. The top (bottom) 30% are good (bad) news firms. Portfolios for each country are constructed and all countries in the sample are sorted into three groups using the top/bottom 30% cut-offs based on their individualism index. Panel A reports the results for PEAD for the high individualism culture group. Panel B presents the results for PEAD for the low individualism culture group. The t-statistics are calculated using clustered standard errors at the firm level. The corresponding t-statistics are shown in parentheses and asterisks refer to the level of significance: *** (1%), ** (5%), * (10%).

	Winner and Good news	Loser and Bad news
Panel A. High individualism countries by sentiment states		
Optimism	1.214(2.67)***	-3.689(-7.12)***
Pessimism	1.758(3.39)***	0.175(0.28)
Opt. - Pess.	-0.544(-1.81)*	-3.864(-8.13)***
Panel B. Low individualism countries by sentiment states		
Optimism	1.111(1.52)	-2.671(-3.08)***
Pessimism	1.031(1.31)	-0.989(-1.50)
Opt. - Pess.	0.080(0.31)	-1.682(-2.12)**
Panel C. High - Low individualism countries by sentiment states		
Optimism	0.103(0.42)	-1.018(-1.99)**
Pessimism	0.727(1.62)	1.164(1.73)*
Opt. - Pess.	-0.624(-1.59)	-2.182(-2.29)**