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**Do culture, sentiment and cognitive dissonance explain the “above suspicion” anomalies?\***

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*JEL Classification:* G14, G41, G4

*Keywords:* Culture, Investor Sentiment, Cognitive Dissonance, Momentum, Post-Earnings-Announcement-Drift

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## **Do culture, sentiment and cognitive dissonance explain the “above suspicion” anomalies?**

### **Abstract**

We investigate how cognitive dissonance arising from interactions between sentiment and culture affects momentum and post-earnings-announcement-drift (PEAD). We focus on differing views relating to change between Western and East Asian cultures. Building on Hong and Stein (1999) and recognising Westerners' (Easterners') belief in continuation (reversal), we propose cognitive dissonance arises in different circumstances and to differing degrees in the two cultures, resulting in it being a key driver of the anomalies. Results support our hypotheses, suggesting sentiment and culture interact to impact cognitive dissonance, explaining differences in the anomalies across countries evident in prior literature.

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## 1. Introduction

In his review of long-term returns and behavioural finance Fama (1998, page 304) poses and answers a question: “Which anomalies are above suspicion? The post-earnings-announcement drift... has survived robustness checks, including extension to more recent data.... The short-term continuation of returns documented by Jegadeesh and Titman (1993) is also an open puzzle, but it is still rather new and further tests are in order.” Since Fama’s paper considerable research has continued to support the robustness of the findings in relation to post-earnings-announcement-drift (PEAD), and the further tests of momentum which Fama called for have generally confirmed the earlier findings, meaning that this anomaly remains “an open puzzle”.<sup>1,2</sup> Numerous arguments have been put forward to try to explain these anomalies, both from a theoretical perspective and in terms of empirical analysis. For example, behavioural based theoretical models have been developed by Daniel et al. (1997), Barberis et al. (1998) and Hong and Stein (1999) based on either psychological biases (e.g. overconfidence, representativeness, self-attribution bias) or bounded rationality within a heterogeneous trader model. In terms of empirical evidence, examples include the role of market state (Cooper et al., 2004), macroeconomic risk or

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<sup>1</sup> See, for example, Liu et al. (2003), Hung et al. (2014) and Dou et al. (2015) in relation to PEAD and Antoniou et al. (2013), Forner and Marhuenda (2003) and Wang and Xu (2015) in relation to returns momentum.

<sup>2</sup> When we refer to momentum profits we mean price or returns momentum, in line with prior literature. Some prior studies examining post-earnings announcement drift use the term earnings momentum. For example, Dou et al. (2015) use the terms earnings momentum and PEAD interchangeably. However, for reasons set out in our hypotheses development we distinguish between earnings momentum (profits resulting from zero-investment portfolios) and PEAD (where we do not examine zero-investment portfolios). Rather, we treat significant positive (negative) returns in the period following good (bad) news as PEAD. Significant returns in the opposite direction are referred to as reversal.

conditions (Chordia and Shivakumar, 2002, Liu and Zhang, 2008), international rather than national risk (Fama and French, 2012, Asness et al., 2013), culture (Chiu et al., 2010, Dou et al., 2015), sentiment (Antoniou et al., 2013), the role of aspects of information (diffusion, asymmetry) and conservatism (Doukas and McKnight, 2005, Chen et al., 2017a, Da et al., 2014), arbitrage risk (Mendenhall, 2004), security analyst experience (Mikhail et al., 2003), transaction costs (Agyei-Ampomah, 2007), dispersion in analysts' forecasts and analyst forecast errors (Dische, 2002, Kang et al., (2017)) and corruption and investor protection (Hong et al., 2003), among others. However, despite this work the reasons for the existence of profits from momentum strategies and PEAD remain unclear. Moreover, while the evidence for the anomalies is extensive, it is not found for all international markets. The potential role of cognitive dissonance in explaining momentum returns is first proposed by Antoniou et al. (2013). They examine the relationship for the U.S. market, with empirical results providing support for their hypothesis. In this paper we seek to extend their work to determine not only whether cognitive dissonance explains the existence of these anomalies, but also if it accounts for differences across countries, by examining the interaction between culture and sentiment and how it impacts on investor behaviour.

There is general agreement that momentum strategies are profitable in many western markets (see for example, Jegadeesh and Titman (1993), Antoniou et al. (2013) for the U.S., Rouwenhorst (1998) for 12 European countries and Griffin et al. (2003) and Chui et al. (2010) for 40 and 41 markets worldwide respectively, with both including the U.S., Canada and a wide range of western European markets). However, the same is not true for East and South East Asian (henceforth ESEA) markets.<sup>3,4</sup> For example,

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<sup>3</sup> For simplicity we will use the terms ESEA, east and eastern interchangeably.

<sup>4</sup> The findings in these studies that momentum is more prevalent in what are usually believed to be more mature markets is given support in relation to other anomalies. For example, Jacobs (2016, page 271) examines 11 anomalies (including momentum) and finds that mispricing “appears to be at least as prevalent in developed markets as in emerging markets”. Jacobs also argues that “the results are also in

Griffin et al. (2005) find that momentum “profits are highly significant in all regions except for Asia... the momentum profits for Asia are decidedly weaker than those around the world, particularly for Europe.” (2005, page 2522). Insignificant momentum profits are found for all ESEA countries in the sample. Similarly, Chui et al. (2010) find momentum returns to be insignificantly different from zero for China, Indonesia, Japan, Korea, Malaysia, the Philippines, Singapore, Taiwan and Thailand, although they are significant for Hong Kong, in contrast to the findings of Griffin et al. (2005). Similarly, in relation to earnings momentum, Hong et al. (2003) examine 11 markets and find significant profits for all of the western markets in their sample and only one (Hong Kong) of six ESEA markets. However, while Dou et al. (2015) find a significant relationship between zero-investment earnings momentum strategies and culture, they find significant positive returns for most of the major western and ESEA markets (the exception being Singapore, where returns are insignificantly different from zero). Thus, while there is a clear split between western and ESEA markets for momentum, the picture is mixed for earnings momentum. Nonetheless, as Dou et al. (2015) show, culture is clearly related to PEAD, as it has been shown to be for momentum by Chui et al. (2010).

Despite culture having been shown to be of relevance to these anomalies, to date no satisfactory explanation has been provided of the differential returns previously found between western and ESEA markets. To examine this issue, we consider cultural differences relating to views of change (belief in continuation or reversal).<sup>5</sup> Specifically, we argue that different views of change, combined with sentiment

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line with the idea that biased beliefs tend to be stronger in developed markets” (2016, page 281), consistent with our argument that culture may impact the extent of the anomalies.

<sup>5</sup> This contrasts with prior studies of the impact of culture on the anomalies, which have focused on individualism and uncertainty avoidance. While individualism and uncertainty avoidance have proved useful in examining various issues in finance, for reasons set out below, differences relating to views of change across cultures, when combined with sentiment, allow clearer hypotheses to be developed in

lead to cognitive dissonance arising differentially across cultures.<sup>6</sup> Chang et al. (2016, page 268) define cognitive dissonance “as the discomfort that arises when a person recognizes that he or she makes choices and/or holds beliefs that are inconsistent with each other (Festinger, 1957). This discomfort is particularly acute when one of the beliefs in question relates to the individual’s self-concept (e.g., Gecas, 1982).” They establish that cognitive dissonance impacts the disposition effect and state “The question of what other effects cognitive dissonance may have on market behavior and agency relationships is worthy of future study.” (page 299). We seek to address this question in relation to the momentum and PEAD anomalies, using a framework in the spirit of Hong and Stein’s (1999) heterogeneous trader model. We develop hypotheses concerning differential returns between the two cultures based on cognitive dissonance arising from sentiment and views of change and undertake tests for the largest five western and five ESEA markets with available data.<sup>7</sup> Support is found for our hypothesised relationships and the impact of cognitive dissonance.

Our study contributes to the behavioural finance, anomalies and psychology literature and particularly to the growing body of evidence on the role of sentiment and culture in financial decision making. However, while others have examined the roles of sentiment and culture in explaining anomalies separately, we provide the first investigation of the joint impact of sentiment and culture. More importantly, by considering cultural differences relating to views of change, rather than individualism and

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relation to cognitive dissonance. Individualism or uncertainty avoidance *per se* cannot capture the full impact of culture on cognitive dissonance and, hence, investor behaviour.

<sup>6</sup> Sentiment has been seen to have relevance in finance, including to the two anomalies considered here (e.g., Antoniou et al., 2013, Livnat and Petrovits., 2009, Stambaugh et al., 2012). However, to date its interaction with culture and how this impacts on cognitive dissonance have not been investigated.

<sup>7</sup> The five largest markets with the required data for the west are Canada, France, Germany, the UK and the U.S., while those for ESEA are China, Hong Kong, Japan, Korea and Thailand. We focus on these markets given their importance in terms of market capitalization.

uncertainty avoidance, our work draws on, and extends, that of Chui et al. (2010), Dou et al. (2015) and Antoniou et al. (2013), among others, and demonstrates that the interaction of sentiment and culture affects cognitive dissonance and the extent of momentum profits and PEAD. Moreover, our results are consistent with the interaction explaining differences previously documented in the literature in the existence and strength of these anomalies between western and ESEA cultures.

The paper proceeds as follows: the next section discusses issues relating to culture, sentiment and cognitive dissonance and develops testable predictions concerning momentum profits and PEAD and how these differ across cultures. Section 3 presents the data and methodology and is followed by the main empirical analysis. Robustness tests are undertaken in section 5, which is followed by a conclusion.

## **2. Cultural Views of Change, Information-Based Traders and Feedback Traders: Hypothesis Development**

Antoniou et al. (2013) examine the impact of cognitive dissonance on momentum (and earnings surprises) by considering the role of sentiment. They show that momentum profits in the U.S. market are evident only during optimistic periods, attributing this to cognitive dissonance. We extend their work using arguments in the spirit of Hong and Stein (1999) to consider differences between western and eastern cultures. In particular, we consider the interaction of cultural beliefs and sentiment and the impact on cognitive dissonance. Hong and Stein (1999) propose a heterogeneous trader model with two types of trader, both of which are boundedly rational: newswatchers and momentum (or positive feedback) traders. The former base decisions on private signals, without taking account of past or current prices.<sup>8</sup> In contrast, momentum traders' decisions are based on past prices only. The model leads to underreaction in the short-run and long-term overreaction in relation to news. We employ two measures of news: we

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<sup>8</sup> Wang and Zu (2013) argue that momentum may result from informed traders choosing to time their trades, with it being optimal to trade late on private information in some circumstances, consistent with the slow diffusion of information.

follow Zhang (2006) by using past stock price changes as the first measure of news. They argue “If investors follow the direction of new information, a partition based on price momentum... [is one] way to distinguish good news from bad”. (2006, page 110). The second measure is earnings surprises which are commonly used in the literature as a proxy for news.<sup>9</sup>

While culture plays no part in the Hong and Stein model, they argue “our results are attributable to the assumption that momentum traders make “simple” forecasts—i.e., they can only run univariate regressions. But even if one accepts this restriction at face value, it begs the following question: Why do *all* traders have to use the *same* single forecasting variable? Why not allow for some heterogeneity in trading styles, with different groups focusing on different predictive variables?” (1999, page 2159). They extend the analysis to consider the possibility of contrarian traders and find that such traders have a moderate stabilizing effect, with overall implications largely unchanged. However, recognizing that there may be “heterogeneity in trading styles”, raises the question of whether cultural biases may impact on trading behaviour. Moreover, such biases may impact not only on feedback traders, but also on newswatchers. In other words, it is possible that *at least for some* information-based investors (newswatchers in the Hong and Stein framework), account is taken of news and expectations based on cultural biases. Allowing for such biases for both information-based and feedback traders will lead to different predictions for investors characterized by different cultural biases.<sup>10</sup>

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<sup>9</sup> While earnings announcements are available to market participants at the same time, the diffusion of the implications of such announcements will depend on how investors interpret the data, including their determination of the level of surprise which an announcement contains.

<sup>10</sup> While these arguments are developed in a manner consistent with the spirit of Hong and Stein (1999), we recognise that in their model newswatchers pay no attention to past or current prices (or earnings). The notion that newswatchers may trade on the basis of something (e.g. earnings announcements) in addition to private information is also presented in Antoniou et al. who “hypothesize that “newswatchers” will underreact more strongly when they receive information that contradicts their sentiment due to cognitive

The cross-cultural psychology literature argues that people from western and ESEA cultures are characterized by different cognitive processes, which impact on views of change and continuity.<sup>11</sup> For example, Spencer-Rodgers et al. (2010, pages 297–298) state “The culture and cognition literature... has characterized East Asian thought as emphasizing *holistic thinking* and Western thought as emphasizing *analytical thinking*... holistic thinkers predict... greater change and more cyclical patterns of change, rather than stability or gradual linear change... [and are] more comfortable with and accepting of contradiction”. In contrast analytical thinkers are more likely to predict that current patterns will persist and will be less comfortable with contradiction. As Ji et al. (2001, page 450) state “The view that things change from one extreme to the other extreme has long been popular in the East, whereas notions of linearity and irreversibility continue to be dominant in the West.” Experimental evidence supports these arguments. For example, Ji et al. (2008) examine stock buy-sell decisions of North American and Chinese university students and investors within an experimental setting and find those from the west (east) had a greater tendency to predict price trends would continue (reverse). These differences appear to be deep-rooted and wide-ranging. For example, Ji (2008) examines Chinese and Canadian children aged 7-11 and reports that Canadians were less likely to predict change than were the Chinese. Similarly, Spina et al. (2010) find evidence that predictions of regression towards the mean are more common among Chinese participants than their Canadian counterparts in a wide range of scenarios relating to gymnastic competition, health and weather. Moreover, Ji et al. (2001) undertake experimental studies across topics including personal relationships, economic and cancer death rate trends, and expectations about patterns of lifetime happiness using Chinese and American participants and find that “Americans were more likely than Chinese to make predictions consistent with suggested trends, whereas Chinese were more likely

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dissonance” (2013, page 246). Given the differences from Hong and Stein we refer to culturally biased information-based traders rather than using the term “newswatchers”.

<sup>11</sup> For more detail on these arguments see Peng and Nisbett (1999), Nisbett et al. (2001), Spencer-Rodgers et al. (2010) and references in these papers.

than Americans to predict a reversal in trends.” (page 452). These differences are of particular relevance to the two anomalies considered here, since they suggest that individuals from the two cultures will have different expectations about continuation or reversal in stock prices or earnings surprises. This is important since during optimistic or pessimistic periods cultural expectations of change will cause investors to experience cognitive dissonance in different situations, affecting their responses to news. Furthermore, using arguments relating to independent and interdependent self-construal, Spencer-Rodgers et al. (2010) argue investors from the east are expected to be less disturbed by, and more accepting of, contradiction, i.e. more comfortable with cognitive dissonance.<sup>12</sup>

Consistent with Hong and Stein (1999), we assume that information-based traders make forecasts on the basis of news and that news diffuses slowly through the information-based trading population. However, we argue that such investors may also be influenced by sentiment (as Antoniou et al., 2013 argue) and cultural bias. Specifically, based on the above arguments, western investors are assumed to believe in continuation, while investors in ESEA markets expect reversion. If the three factors (news, sentiment and cultural beliefs) all impact in the same direction, then there is no cognitive dissonance and we expect traders to respond without delay to news, which will diffuse relatively quickly. However, cognitive dissonance will be evident when the three factors do not suggest similar future price movements. In such situations, investors will respond more slowly (underreact) and in turn, momentum profits or PEAD will be larger. On the basis that recent price movements or earnings announcements reflect news diffusing slowly through this group of traders, news being good (bad) is proxied by whether stocks are recent winners (losers) or characterized by positive (negative) earnings surprises. Given their belief in continuation, investors from the west will experience no cognitive dissonance when there is good (bad) news and the state of sentiment is optimistic (pessimistic), but will experience cognitive dissonance otherwise. In contrast, eastern investors believe that good or bad news will mean revert, but are more

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<sup>12</sup> For further discussion of independent and interdependent self-construal see Cross et al. (2011) and Markus and Kitayama (1991).

comfortable with contradiction and will, therefore, experience weaker cognitive dissonance. Hence, these investors will experience relatively weak cognitive dissonance in optimistic and pessimistic states for both good and bad news stocks, since the nature of the news always contradicts their belief in mean reversion, whatever the sentiment. Table 1 summarizes situations in which cognitive dissonance will be experienced for the two cultural groups of information-based traders.

[Insert Table 1 about here]

Now consider the role of feedback traders. In Hong and Stein's (1999) model, such traders are momentum or positive feedback traders, consistent with the cultural beliefs of westerners. However, the same cannot be said for investors from the east. Rather, given their belief in reversal, it is appropriate to consider (at least some) such investors to be negative feedback (or contrarian) traders, meaning they will trade counter to the behaviour of information-based traders. This means that any momentum or PEAD effect arising from the actions of information-based traders will be accentuated in western markets by (positive) feedback traders, but dampened in ESEA markets by (negative) feedback traders.<sup>13</sup> The above arguments lead to the following hypotheses in relation to momentum:

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<sup>13</sup> If momentum is purely a result of underreaction to news, then the cultural belief in reversal would be expected to lead to *higher unconditional* momentum in ESEA countries. This would be consistent with the BSV (representative trader) model (Barberis et al., 1998) which also predicts subsequent overreaction, but would be inconsistent with prior evidence. However, if momentum results from overreaction (e.g. as in the DHS model (Daniel et al., 1998)), then belief in reversal would lead to *lower* momentum in such countries, since overreaction will be dampened by the actions of those who believe in reversal. In the context of the Hong and Stein (1999) (heterogeneous trader) model, the response of momentum (i.e. positive feedback) traders to an initial underreaction leads to just such an overreaction to news, whereas contrarian (i.e. negative feedback) traders have a stabilizing effect. Hong and Stein (1999, page 2146) state "Later momentum buyers... lose money, because they get in at a price above the long-run equilibrium... sometimes, a price increase is the result not of news but just of previous rounds of

H1i: momentum profits will be significantly greater in western markets than in ESEA markets.

H1ii: for western markets momentum returns will be driven by loser stocks in optimistic periods and by winner stocks in pessimistic periods.

H1iii: due to it being costly to sell loser stocks, the momentum effect will be stronger during optimistic periods than pessimistic periods for western markets.

H1iv: for ESEA markets there will be no significant difference in momentum profits between optimistic and pessimistic states.

In addition, given the expectation of strong momentum profits during optimistic periods for western markets (H1iii), but weak effects for ESEA markets:

H1v: momentum profits will be greater during optimistic periods for western markets than for ESEA markets.

As was the case with (returns) momentum, we expect differences in the overall level of earnings momentum returns between the two cultures. Specifically:

H2i: earnings momentum returns will be significantly greater in western markets than in ESEA markets.

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momentum trade.” Thus, the presence of negative feedback traders would lead to less momentum overall. Similarly, less discomfort with cognitive dissonance also means that momentum will be lower in ESEA markets.

Consideration of how the different cultures respond to earnings announcements in different sentiment states requires analysis of PEAD for good and bad news separately, rather than analysing zero-investment earnings momentum portfolios.<sup>14</sup> Following our earlier arguments (and table 1), we expect PEAD to be evident in western markets when earnings surprises are negative (positive) and sentiment is optimistic (pessimistic), but not otherwise. For ESEA markets, weak cognitive dissonance will result in limited or no PEAD for all combinations of sentiment and earnings surprises. This leads to these hypotheses relating to PEAD:

H2ii: for positive earnings surprises in western markets PEAD will be greater during pessimistic states than optimistic states and for negative earnings surprises in western markets PEAD will be greater during optimistic states than pessimistic states.

H2iii: for ESEA markets limited PEAD may arise for any combination of sentiment and earnings surprise due to weak cognitive dissonance in each combination. However, the extent of PEAD will be greater in western markets than ESEA markets for positive earnings surprises during pessimistic periods and negative earnings surprises when sentiment is optimistic.

We examine hypotheses 1-2 using data for the five largest western and five largest ESEA markets for which all relevant data is available for our sample period.

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<sup>14</sup> It is not possible to form zero-investment earnings momentum portfolios in different sentiment states due to different data frequencies. In particular, as explained in section 3 below, good and bad news portfolios for each country are formed on the basis of earnings surprises within a year (i.e. on an annual basis). In contrast, the sentiment state is determined on a monthly basis. Our approach is consistent with that used for table 10 in Antoniou et al. (2013).

### **3. Data and Methodology**

#### *3.1. Stock Market Data*

Our sample countries are the five largest from each of the west and the east for which data is available. Each sample country must have both stock market data and sentiment data measured by a consumer confidence index for a period of at least 5 years. To ensure our results are not driven by small, thin-traded and illiquid stocks, several selection criteria are applied. First, a stock with market capitalization below the fifth percentile in its market is excluded in any month to remove small and illiquid stocks (Hong, et al., 2003; Chui, et al., 2010). Second, if stock returns are larger (less) than 100% (-95%), the returns are set equal to 100% (-95%) to filter out stock return outliers.<sup>15</sup> Third, to have a reasonable number of stocks for momentum portfolios, each country is required to have at least 30 stocks with available market capitalization data in any month. Finally, since K-month holding period returns (K=6) and past J-month cumulative returns (J=6) on each individual stock are required,<sup>16</sup> each stock must have a return history of a minimum of 8 months if it is delisted. Further data selection criteria relating to earnings and analyst forecast data (see section 3.2) are applied for the analysis of earnings momentum and PEAD.

Analysis covers the period January 1991 to December 2013.<sup>17</sup> Table 2 presents descriptive statistics for the stock market data. The sample period for each country is different due to data availability, as shown in the first two columns of the table. For the U.S. market, all common stocks (share codes 10 and 11) listed in the NYSE and AMEX from the Centre for Research in Security Prices (CRSP) are used, and for the other markets, all common stocks from Datastream International are used. Both domestic and foreign stocks listed on the major stock exchange in each country are included in the

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<sup>15</sup> The stock outliers are mainly from small capitalization stocks (Ince and Porter, 2006).

<sup>16</sup> We use the 6-month/6-month momentum strategy as it is commonly examined in momentum studies.

<sup>17</sup> We start our sample in 1991 due to the need for, and availability of, sentiment data.

sample, but cross-listed stocks are only counted in their home country. Suspended and dead stocks are included to mitigate survivorship bias.

[Insert Table 2 about here]

In addition to the sample periods, table 2 reports the number of firms included in the sample at the start and end dates used for each of the 10 countries (final two columns). The average sample period for all countries is approximately 19 years and the sample period varies across countries. For example, all but one of the western countries have sample periods of 23 years (the period for Canada is approximately 11 years), whereas of the ESEA countries only Japan has data for the full period. The other four ESEA market sample periods range from just over 13 years to approximately 15 and a half years. There is also considerable variation in the number of stocks across countries. For instance, at the start of the sample period, the U.S. has the highest number of firms (2126) whereas Thailand has the least (366). Furthermore, the last two columns of table 2 reveal that the number of firms in all of the ESEA markets expanded over the sample period, while for Western markets the number decreased in four of the five (Germany being the exception).

### *3.2. Earnings Announcement and Analyst Forecast Data*

The earnings announcement and analyst forecast data are from the IBES International Summary File for all countries, except for the U.S. which are from the IBES U.S. Summary File. Several selection criteria are applied to reach our final sample. First, companies must be listed on a major exchange in their home country and cross-listed companies are deleted. Second, firms must be represented in both the Datastream and IBES databases for international markets and in the CRSP and IBES databases for the U.S. market. Table 3 reports the descriptive statistics of earnings announcements and forecast data for each country. Our final sample includes 20,461 stocks with earnings announcements available, 114,434 earnings announcements and 819,434 forecasts for the west and 7586 stocks with earnings announcements available, 60,455 earnings announcements and 261,343 forecasts for the east, for the

period from January 1991 to December 2013.<sup>18</sup> There is considerable variation in the number of stocks, earnings announcements and forecasts across countries. For example, the U.S. has the largest number of firms (12,100), earnings announcements (62,430) and forecasts (489,251), followed by Japan and the UK. Thailand has the least number of firms (737), earnings announcement (2668) and forecasts (20,567).

[Insert Table 3 about here]

### 3.3. *Sentiment Data*

We use the consumer confidence index as a measure of sentiment. Such an index is discussed in detail by Lemmon and Portniaguina (2006) and has been widely used for the U.S. market (Fisher and Statman, 2003, Lemmon and Portniaguina, 2006, Antoniou et al., 2013) and international stock markets (Schmeling, 2009) as an investor sentiment proxy. There are additional reasons to employ this measure. First, it is available for all sample countries and spans a reasonably long period of time. Second, although the sample period and frequency of the consumer confidence indexes vary, it is the only consistent measure of investor sentiment comparable across the sample countries using survey data.<sup>19</sup>

For the U.S, the Conference Board (CB) consumer confidence index is employed (Fisher and Statman, 2003; Lemmon and Portniaguina, 2006; Antoniou et al., 2013). For all European countries in the European Union, data is from the “Directorate Generale for Economic and Financial Affairs” (DG ECFIN) (Schmeling, 2009). For the remaining countries, data is obtained from Datastream. As the consumer confidence index is measured differently across countries, adjustments are applied to make them comparable. First, if a series is not seasonally adjusted (China and Hong Kong), the X-12-ARIMA technique is used to adjust it; this is used by the Conference Board to seasonally adjust the U.S. consumer confidence series. Second, if a series is not monthly (Hong Kong), it is transformed into such a frequency using the last available values for months that have no data (Baker and Wurgler, 2006; Schmeling, 2009).

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<sup>18</sup> The sample dates for individual countries are as in table 2.

<sup>19</sup> In the robustness test, we follow Baker et al. (2012) to construct a sentiment measure for each of the ten countries using market trading data.

Table 4 reports summary statistics of the consumer confidence index for each country. As shown in the table, the mean and other summary statistics of consumer confidence for each country vary substantially. Nonetheless, these measures can serve as consistently comparable proxies across countries because cutoffs in percentages (e.g. top or bottom 30%) are used to define the state as optimistic, mild or pessimistic.

[Insert Table 4 about here]

To identify the sentiment state for a specific month, we follow Antoniou et al. (2013) for both momentum and PEAD. First, the data of the monthly consumer confidence index for each country is collected. Second, the investor sentiment score for the specific month is calculated using a weighted-rolling average scheme. Specifically, portfolios are formed at the end of month  $t$  and the sentiment score for the formation month  $t$  is the sum of  $(3/6)$  multiplied by the consumer confidence index score for month  $t$ ,  $(2/6)$  multiplied by the consumer confidence score for month  $t-1$  and  $(1/6)$  multiplied by the consumer confidence score for month  $t-2$ .<sup>20</sup> A month is categorized as optimistic (pessimistic) if its 3-months rolling average sentiment score ending in month  $t$  belongs to the top (bottom) 30% of the 3-months rolling average sentiment time series values, with the rest being mild states. To make sure that our results are not sensitive to the definition of sentiment states, robustness tests (reported in section 5) are carried out using different cut-offs (40/20/40).

In relation to the momentum analysis, we need to determine whether each holding month for each country is optimistic or pessimistic. To this end we identify whether its corresponding formation months are optimistic or pessimistic, following Antoniou et al. (2013). Since each holding month is associated with six different formation months as six overlapping formation portfolios are formed in the momentum strategy, it is necessary to identify whether the formation months as a whole are optimistic or pessimistic. If all of the formation months are classified as optimistic (pessimistic), the corresponding holding month

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<sup>20</sup> The sentiment data is announced with  $n$ -month lags ( $n=1$  or  $2$ ) across countries, so the data of sentiment in  $t$ ,  $t-1$  and  $t-2$  relates to the data in month  $t-n$ ,  $t-n-1$  and  $t-n-2$ .

is denoted as optimistic (pessimistic) and the rest of the months are denoted as mild. For PEAD if the weighted average score of the 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.<sup>21</sup>

### *3.5. Momentum Portfolios*

Momentum portfolios are formed following Jegadeesh and Titman (1993). The strategy selects stocks on the basis of stock returns over the past  $J$  months and holds them for  $K$  months. At the end of each month, securities are ranked into portfolio deciles in ascending order based on their past  $J$ -month cumulative returns. The portfolio with the highest returns is the top decile and is called the “winner” portfolio and the portfolio with the lowest returns is the bottom decile and is called the “loser” portfolio. The strategy takes a long position in the winner portfolio and a short position in the loser portfolio, held for  $K$  months. We focus on the six-month ranking and holding period ( $J=K=6$ ) momentum strategy which is commonly examined in momentum studies.<sup>22</sup> To increase the power of the tests, overlapping portfolios are constructed as documented in Jegadeesh and Titman (1993). Moreover, to mitigate microstructure bias issues, one month is skipped between the end of the formation period and the beginning of the holding period (Jegadeesh and Titman, 2001). In addition to undertaking analysis for individual countries, country-average portfolios are also formed, following Chui et al. (2010): the country-average portfolio puts equal weight on the portfolios of all available countries in each month. At least two countries are required in the portfolio at any point in time.

### *3.6. PEAD Portfolios*

We begin by calculating earnings surprises (SUE) as the actual earnings per share minus the last median analyst consensus forecast before the earnings-announcement date, scaled by stock prices 10 days

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<sup>21</sup> An alternative definition of sentiment is used to examine the sensitivity of the results (see section 5).

<sup>22</sup> Ranking stocks into portfolio quintiles yields similar results that are not reported for brevity, but are available from the authors on request. In the robustness tests we also use  $J=K=12$ .

prior to the earnings announcement.<sup>23</sup> To examine PEAD or reversal we take the cumulative abnormal returns of stocks during +2 to +60 trading days following the earnings announcement.<sup>24</sup> The cumulative abnormal return is computed as the buy and hold raw return of the stock minus the buy and hold return on the market index as follows:

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

$r_{j,y,t}$  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  $y$ .

In each year, all sample stocks are sorted according to the SUE within each country. The top 30% includes stocks with the highest positive earnings surprise, defined as stocks with “good news”, while the bottom 30% contains stocks with the largest negative earnings surprise, defined as stocks with “bad news”. Returns on these portfolios are calculated as average cumulative returns of stocks in the portfolios. Once again, country-average portfolios are formed, this time following Hung et al. (2014): the country-average portfolio is the mean average of PEAD of all firm-year observations in the portfolio (e.g. 5 countries in the west or ESEA).

#### 4. Empirical Analysis

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<sup>23</sup> Gu and Wu (2003) suggest the median analyst forecast is a better proxy for the market expectation of earnings compared to the mean forecast. The mean analyst forecast is also used in the robustness tests.

<sup>24</sup> Berkman and Truong (2009) report almost 50 percent of earnings announcements were made outside trading hours in the U.S. in a recent period. They suggest calculating PEAD from day +2 following the announcement date to avoid biasing PEAD upward by any contemporaneous stock price reaction. While we do not know the proportion of after-hours earnings announcements in the international stock markets (IBES and Bloomberg do not provide a complete time stamp), we choose to be conservative in our estimations by starting on day +2.

#### *4.1. Views of Change, Sentiment and Cognitive Dissonance: Momentum in Western and ESEA Cultures*

Hypotheses 1i-1v relate to differences between western and ESEA countries as a result of differing views of change and how this impacts on momentum. Table 5 presents results relating to the ten markets analysed, with panel A providing results for the individual countries and panel B results for western and ESEA country-averages.<sup>25,26</sup> The first column shows returns to momentum portfolio without a split by sentiment. Columns 2-4 (5-7) show returns to winner, loser and momentum portfolios during optimistic (pessimistic) periods and the final three columns show differences in winner, loser and momentum returns between sentiment states.<sup>27</sup> It is clear from the first column of panel A that for all five western countries momentum profits are positive, with returns being significant in four (the exception being Canada). In contrast, in no ESEA market are momentum profits significant. Findings in panel A of significantly positive momentum profits in four out of five western markets, but insignificant returns for all five ESEA markets confirm the findings in prior literature and are consistent with H1i: momentum profits are significantly greater in western markets. The hypothesis receives further support in panel B,

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<sup>25</sup> Our focus here is on beliefs relating to continuation or reversal. Hence, we consider only stocks that are absolute winners or losers, rather than the relative winners or losers normally included when forming momentum portfolios. Thus in this part we only include winner stocks that have positive returns and loser stocks with negative returns. Without this additional filter we would include, for example, winner stocks with negative returns, raising issues about how continuation or reversal applies: to the fact that the stock is a winner or the fact that it has negative returns. For completeness we undertake analysis without this filter. Differences are minor and do not affect conclusions reached. Results are available on request.

<sup>26</sup> While we present and discuss results for individual countries, these results are affected by small sample sizes in some of our analysis. Hence, greater weight can be placed on inferences drawn from results based on country-average portfolios.

<sup>27</sup> Results for the winner and loser portfolios for the whole period are not shown as they are not relevant to the hypotheses. They are available from the authors on request.

column 1, where substantial and significant differences between the two groups are found: momentum profits are significantly positive for the west and insignificantly different from zero for the east, with the difference between the two groups being statistically significant. Thus, there is clear support for hypothesis H1i.

[Insert Table 5 about here]

We now consider the role of sentiment. As shown in panel A, column 4, momentum profits are significantly positive and sizeable under optimism in all five western markets. Returns to winner portfolios are insignificantly different from zero in three cases and significant at ten percent for Canada and the U.S. While returns to loser portfolios are significant in only two cases, the estimates are negative in four cases (again Canada is the exception). For the European markets, the absolute value of returns to loser portfolios are markedly larger than for winner portfolios, with the opposite the case for the U.S. and Canada. Thus, as hypothesized in H1ii, momentum returns are driven by loser stocks in optimistic periods for European markets, although this does not hold for the North American markets.<sup>28</sup> Results in columns 5-7 show momentum profits for western markets are insignificant in all five countries during pessimistic periods, with this being largely due to returns to loser stocks having a sign inconsistent with momentum. In contrast, returns to the winner portfolio are positive in four cases and significant for the European markets. Thus, differences between the winner and loser sides of the momentum portfolio are consistent with the second part of H1ii, momentum returns in western markets during pessimistic periods are driven by winner stocks, although momentum returns themselves are not significant. The final three columns of the table show differences between optimistic and pessimistic states. In all five cases differences are statistically significant and of the expected sign, consistent with H1iii: the momentum effect is stronger

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<sup>28</sup> For the U.S. the returns to loser stocks during optimistic periods are significantly lower than during pessimistic periods, while there is no significant difference to winner stocks between the two states. Thus, consistent with Antoniou et al. (2013), the difference in momentum profits between the two states is primarily due to returns to loser stocks.

during optimistic periods than pessimistic periods for western markets. While results for western markets show a marked and significant difference between sentiment states, for the east there is no such difference, as hypothesized in H1iv. In all cases (optimism and pessimism) momentum returns are insignificantly different from zero, as are the differences in returns between optimistic and pessimistic periods, again consistent with our hypothesis.

Panel B of table 5 shows country-average portfolio results by culture groups. Results in this panel confirm the findings from panel A and are consistent with hypotheses 1i-1iv. In addition, panel B results allow us to directly test H1v; momentum returns during optimistic periods will be greater in western markets than ESEA markets. As the figures in column 4 show, momentum profits are sizeable and significant in western markets during optimistic periods and insignificant for ESEA markets, with the difference being positive and significant at the 5% level. No such differences exist for the pessimistic sentiment state. Thus, results are consistent with H1v. Taken together, results presented in table 5 provide strong support for our argument that cognitive dissonance plays a large part in explaining differences in momentum returns in different markets. Specifically, results are consistent with arguments based on the psychology literature about beliefs relating to continuation and reversal in western and ESEA cultures and how these cultural beliefs interact with sentiment to impact cognitive dissonance.

#### *4.2. Views of Change, Sentiment and Cognitive Dissonance: PEAD in Western and ESEA Cultures*

Testing hypotheses 2i-2.iii requires analysing earnings momentum and PEAD for the five western and five ESEA countries. Table 6 shows market adjusted returns for the period from two days after to sixty days after the earnings announcement. Again, results for each country are shown in panel A and those for country averages for western and ESEA markets in panel B. The first column of the table shows the returns to zero-investment earnings momentum portfolios for the whole period.<sup>29</sup> Columns 2-3 (5-6) show results split by sentiment for good (bad) news stocks (top (bottom) 30% of earnings surprises),

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<sup>29</sup> Results for the good and bad news portfolios are not shown for the whole period as they are not relevant to the hypothesis. They are available from the authors on request.

while columns 4 and 7 show the differences in PEAD between optimistic and pessimistic states for good and bad news stocks respectively. As is clear from the first column, there are substantial and significant differences in returns to earnings momentum strategies between western and ESEA countries. Returns are positive and significant for all five western countries, while this is the case for only three ESEA countries (panel A). Moreover, as the first column of panel B shows, returns to earnings momentum strategies for country-average portfolios are over 85% higher for the western portfolio than for the ESEA portfolio. The difference between the two is significant, providing strong support for hypothesis H2i.

Recall H2ii hypothesizes that for western markets PEAD will be greater in pessimistic states for good news and in optimistic states for bad news. During optimistic periods, only Canada and the U.S. have significant PEAD for positive earnings surprises, with the three European countries yielding negative returns. In contrast four of the five western countries exhibit significant PEAD following good news during pessimistic periods, with Germany the exception with significant reversal. Consistent with H2ii, in four of the five western countries PEAD following good news is significantly higher during pessimistic periods than optimistic periods (the exception is again Germany). As far as country-average results (panel B) are concerned, for good news in western markets there is evidence of PEAD during both optimistic and pessimistic states. However, the latter is considerably higher, with the difference in returns between the two states being highly significant, again consistent with H2ii for good news. Turning to bad news in western markets, the post-announcement returns are negative in all five markets during optimistic periods, with all but the UK being statistically significant at the one percent level. However, when sentiment is pessimistic, only Germany shows significantly negative returns and in the other four cases returns are positive (significant in two), indicating reversal. Again, results are consistent with H2ii, with differences in returns between sentiment states being significant and of the expected sign, except in the case of Germany. In addition, the findings of significant reversal for bad news stocks during pessimistic periods are in line with Antoniou et al. (2013) who find significant reversal of 8.65% for the U.S. (compared to 8.05% in our sample). They are also consistent with investors overreacting when bad news is announced during pessimistic periods, leading to subsequent reversal. Country-average results in panel

B confirm this pattern: returns are significant and negative during optimistic periods, but significant and positive under pessimism. Thus, there is PEAD for optimism, but reversal for pessimism, with the difference being statistically significant, again consistent with H2ii.

[Insert Table 6 about here]

It is also hypothesized (H2iii) that for eastern markets PEAD may be evident in any combination of earnings surprise and sentiment, but PEAD will be greater in western countries than ESEA countries for positive earnings surprises during pessimistic periods and negative earnings surprises when sentiment is optimistic. Again results are consistent with this hypothesis: there is evidence for ESEA markets (panel A) of significant PEAD in all combinations of surprises and sentiment (for example, for two (four) countries when sentiment is optimistic and earnings news is good (bad)). Table 1 and related arguments show that weak cognitive dissonance, and hence drift, could be present in all four combinations of news and sentiment for ESEA markets. Despite this, there are clearly examples where PEAD is not evident for individual countries. For example, for China there are no significant returns for good news stocks with announcements during pessimistic periods and significant reversal for stocks with bad news announced in optimistic periods. A possible explanation for these findings is that given that eastern investors are more comfortable with contradiction, one or two of the three factors impacting on investors (nature of the news, belief in reversal and sentiment) dominates their trading response, particularly during periods of greater uncertainty. Further analysis shows that for China the observations for bad news under optimism are concentrated in 2008, while those for goods news under pessimism mainly occur in the period immediately following the financial crisis. Consistent with sentiment dominating, the three-day cumulative abnormal return (centred on the announcement date) was found to be -0.421 (t statistic -1.61) for the good news-pessimistic combination and 0.489 (t statistic 1.80) for bad news announced when sentiment is optimistic.<sup>30</sup>

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<sup>30</sup> However, our earlier caveat about sample sizes and interpreting individual country results with caution is relevant here.

Results in panel B provide evidence for country-average portfolios: for the east, PEAD is found in three of the four combinations, with reversal for bad news announced during pessimistic periods. The findings of (relatively) small but significant PEAD for ESEA countries in three of the four combinations, is in contrast to no significant momentum profits for these markets in table 5. However, comparison of returns to winner (loser) stocks in table 5, panel B, with those for good (bad) news stocks in table 6, panel B, show significant positive returns in all cases under pessimism (columns 4-5 in table 5 and columns 3 and 6 in table 6). Furthermore, there are economically sizeable returns to winner and good news stocks during optimistic periods, albeit that those to winner stocks are statistically insignificant (column 2 in tables 5 and 6). It is only for losers and bad news stocks under optimism where there is a marked difference (insignificantly different from zero for loser stocks and significantly negative for bad news stocks). While the results for momentum and PEAD are broadly similar, it is not surprising to find some differences, given the very different nature of the two types of news and the fact that accounting data in less developed markets may be less reliable.<sup>31</sup> Examination of columns 4 and 7 in table 6 shows that while differences in returns between sentiment states are of the same sign and significance as for the western culture, those relating to the east are significantly smaller. Furthermore, the final row of table 6, panel B shows the extent of PEAD is significantly greater in western markets than ESEA markets for good news during pessimistic periods and bad news when sentiment is optimistic, consistent with the second part of hypothesis 2iii. Thus, results in table 6 are consistent with our three hypotheses and again suggest cognitive dissonance and cultural differences relating to views of change between the west and the east result in differences in the extent of the anomaly between the two groups.<sup>32</sup>

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<sup>31</sup> Chen et al. (2017b) identify a relationship between accounting quality and PEAD.

<sup>32</sup> In unreported results, we rerun our tests of hypotheses 2ii and 2iii for the most extreme cases of positive and negative news stocks. In particular, we examine winner (loser) stocks with positive (negative) earnings surprises. Hypotheses again receive support, with one exception: results are not consistent with the part of hypothesis 2iii which states the extent of PEAD will be greater in western

## 5. Robustness Tests

Results to date support our hypotheses about the interaction of cultural views of change, sentiment and cognitive dissonance in driving momentum and PEAD. In this section we undertake robustness tests. In the first sub-section we present robustness tests relating to hypotheses 1i-v (momentum returns in the west and ESEA). We then present results of robustness tests undertaken for hypotheses 2i-iii (differences in PEAD across the two culture groups). For these tests we present results for country-average portfolios and do not report results for individual countries.<sup>33</sup>

### *5.1. Momentum, Views of Change, Sentiment and Cognitive Dissonance in Western and ESEA Cultures: Additional Tests*

To examine the robustness of our findings for hypotheses 1i-1v we undertake six additional tests as reported in table 7. The table's six panels report results using: (a) the 12/12 strategy (panel A); (b) the Stambaugh et al. (2012) definition of sentiment (panel B); (c) a 40/20/40 split for sentiment states (panel C); (d) risk adjusted momentum profits, where the adjustment is made based on the Fama-French (2015) 5 factor model, FF5F, (panel D); (e) an alternative sentiment index based on Baker et al. (2012)<sup>34</sup> (panel

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markets than ESEA markets for positive earnings surprises during pessimistic periods, although they are consistent with other aspects of 2iii. It should be noted that for this more restrictive sample, there is considerable clustering by time and country. For example, for winner stocks with good news during pessimistic periods Japan accounts for over 55% of the sample, with over 62% of those observations occurring in a period of 4 consecutive years (of the sample of 23 years). Results are available on request.

<sup>33</sup> Results relating to individual countries are available on request.

<sup>34</sup> The sentiment measure is constructed by Baker et al. (2012) for international markets. They suggest investor sentiment can be captured by variables relating to investors' propensity to speculate. Due to data availability in global markets, they construct a yearly sentiment index using 4 proxies: a volatility premium, the number of IPOs, the average first day IPO return and market turnover.

E); and (f) both the FF5F model and the Baker et al. (2012) sentiment measure (panel F). Results are comparable to those in table 5. As can be seen from panels A-F of table 7, hypotheses H1i-v all receive support across all six different specifications, with two minor exceptions. Specifically, results in panel D (panel E) are not consistent with the view put forward in H1ii that during pessimistic (optimistic) periods momentum profits in western markets would be driven by winner (loser) stocks. However, in all other cases, including when the FF5F risk adjustment and the Baker et al. (2012) sentiment measure are used together (panel F), findings in relation to H1i-v are robust to the different approaches used.

[Insert Table 7 about here]

## *5.2. PEAD, Views of Change, Sentiment and Cognitive Dissonance in Western and ESEA Cultures: Additional Tests*

Finally, we undertake robustness tests in relation to differences in earnings momentum and PEAD across the two culture groups. Table 8 presents results, directly comparable to table 6, panel B, for three additional tests using: (a) the Baker et al. (2012) sentiment measure (panel A); (b) earnings surprises based on mean analyst forecast (panel B); and (c) a 40/20/40 split for sentiment states (panel C). As shown in the table, in all cases, results support our earlier findings and are consistent with hypotheses H2i-iii.

[Insert Table 8 about here]

In summary, the results from a range of additional tests demonstrate that our earlier findings of support for all of our hypotheses are robust. This provides further evidence that culture, sentiment and cognitive dissonance combine to explain the differences in international momentum profits and PEAD.

## **6. Conclusion**

Momentum and PEAD were identified by Fama (1998) as the candidates for “above-suspicion” anomalies. Extensive research since this statement has confirmed this view, and to date no satisfactory explanation for these anomalies has been provided. However, a mixed picture has emerged globally, with

western markets showing clear evidence in relation to the two anomalies, but markets in the east generally being characterized by insignificant momentum profits and the findings in relation to PEAD being mixed. We propose that cognitive dissonance may be a major driver of the two anomalies, with the interaction of sentiment and culture causing this phenomenon to arise in different circumstances and to differing degrees in the west and the east. While previous studies of the two anomalies have examined the roles of sentiment and culture independently, to date no study has examined their joint impact or considered the implications of their interaction on cognitive dissonance and momentum and PEAD.

In this paper we consider the joint effect of culture and sentiment on momentum and PEAD. Previous studies examining the role of culture on these anomalies have concentrated on Hofstede's individualism and uncertainty avoidance measures (see, Chui et al., 2010 and Dou et al., 2015). In contrast, we focus on cultural differences relating to views of change and their interaction with sentiment. This allows us to put forward several hypotheses to explain differences between the east and the west in relation to the two anomalies. We investigate the five largest markets in each of the west and the east for which data is available, given arguments in the psychology literature and prior evidence about differences in beliefs concerning change in the two cultures. Specifically, we recognize that westerners have a strong tendency to believe in continuation, while those from the east are more likely to believe in reversal. Our hypotheses in relation to views of change are developed using an approach in the spirit of Hong and Stein (1999). We also carry out a range of robustness tests which support our findings. Results provide support to all of our hypotheses and provide evidence consistent with cultural biases and sentiment interacting to impact on cognitive dissonance. Results suggest cultural biases concerning continuation and reversal drive the differences found in prior literature in relation to the two anomalies across western and ESEA markets. Thus, our analysis suggests that cognitive dissonance is a major determinant of prior empirical findings relating to both momentum profits and PEAD, a finding which is of interest to both academics and investors seeking to exploit inefficiencies.

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**Table 1: Cognitive Dissonance, News and Sentiment**

This table summarizes the cognitive dissonance (CD) experienced by two cultural groups of information-based traders, westerners and ESEA, in optimistic and pessimistic periods for good news (winner (momentum) or positive earnings surprise (PEAD)) and bad news (loser or negative earnings surprise) stocks.

Sentiment	<u>Westerners – belief in continuation</u>		<u>ESEA – belief in reversal</u>	
	Good news stocks	Bad news stocks	Good news stocks	Bad news stocks
Optimism	No CD	CD	Weak CD	Weak CD
Pessimism	CD	No CD	Weak CD	Weak CD

**Table 2. Stock Market Descriptive Statistics**

This table presents descriptive statistics for the 10 stock markets in the sample along with 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); Korea (Korea & KOSDAQ); and the U.S. (NYSE & AMEX). Data for the U.S market is from CRSP, while that for all other countries in the sample are from Datastream International.

Country (Stock Exchange)	Start date	End date	No. of Firms at start date	No. of Firms at end date
<u>West</u>				
Canada	2002M10	2013M12	1,108	906
France	1991M1	2013M12	827	563
Germany	1991M1	2013M12	407	682
United Kingdom	1991M1	2013M12	1,731	1,288
U. S	1991M1	2013M12	2,126	1,480
<u>ESEA</u>				
China	1998M6	2013M12	866	2,422
Hong Kong	2000M10	2013M12	665	1,231
Japan	1991M1	2013M12	1,886	2,387
Korea	1999M9	2013M12	998	1,655
Thailand	2000M4	2013M12	366	537

**Table 3. Earnings Announcements Descriptive Statistics**

This table reports descriptive statistics for the earnings announcements of the 10 stock markets. The name of the country, the number of firms with earnings announcements available, the number of announcements and the number of forecasts for each country are presented. The earnings announcement data and analyst forecasts data are from the IBES International Summary File for all countries, except for the U.S which are from the IBES U.S Summary File.

Country	Firms	Announcements	Forecasts
<u>West</u>			
Canada	1,550	7,400	63,348
France	1,474	9,888	65,966
Germany	1,297	8,398	66,336
United Kingdom	4,040	26,318	134,533
U. S	12,100	62,430	489,251
Total	20,461	114,434	819,434
<u>ESEA</u>			
China	1,558	8,755	31,773
Hong Kong	1,215	7,650	54,225
Japan	2,753	33,017	123,330
Korea	1,323	8,365	31,448
Thailand	737	2,668	20,567
Total	7,586	60,455	261,343

**Table 4. Sentiment Descriptive Statistics**

This table 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 ( $\mu$ ), standard deviation ( $\sigma$ ) minimum (Min) and Maximum (Max) for 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	Source	Frequency	Seasonally Adjusted(SA)/ Non-Seasonally Adjusted(Non- SA)	N	Mean( $\mu$ )	SD( $\sigma$ )	Min	Max
<u>West</u>								
Canada	Datastream	Monthly	SA	144	105.6	15.3	61.3	127.7
France	DG ECFIN	Monthly	SA	276	-18.7	8.9	-37	3.3
Germany	DG ECFIN	Monthly	SA	276	-9.3	9.5	-32.9	10.9
United Kingdom	DG ECFIN	Monthly	SA	276	-9.5	8.5	-35.2	7.1
U. S	Datastream	Monthly	SA	276	89.9	28.1	25.3	144.7
<u>ESEA</u>								
China	Datastream	Monthly	Non-SA	186	109.9	5.7	97	124.6
Hong Kong	Bloomberg	Quarterly	Non-SA	159	88.9	17.1	49.7	116.4
Japan	Datastream	Monthly	SA	276	41.3	4.8	27.5	50.1
Korea	Datastream	Monthly	SA	172	99.9	1.4	96.6	102.9
Thailand	Datastream	Monthly	SA	165	75.8	10.6	56.4	110.9

**Table 5. Momentum Profits and Investor Sentiment for Western and ESEA Countries**

This table reports the average monthly momentum portfolio returns (%) for the whole period and winner, loser and momentum portfolio returns (%) across sentiment states (optimistic and pessimistic). The final three columns present the differences of the winner, loser and momentum portfolio returns between the two sentiment states for each of the 10 countries in the sample (Panel A) and the country-average portfolios (Panel B). The final row of Panel B shows the differences between the West and ESEA country-average portfolios. For each country, stocks are ranked into quintiles based on their past 6-month cumulative returns and held for 6 months and the past 6-month cumulative returns of each stock in the winner (loser) portfolios must be larger (less) than 0%. The momentum returns are the returns of the winner portfolio minus the returns of the loser portfolio. For each country, stocks are ranked into deciles 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. To identify a particular formation period 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  $t$ ,  $t-1$  and  $t-2$ . If the weighted average score of the formation month belongs to the top 30% of the time series of rolling average sentiment scores, it is defined as optimistic, whereas if the weighted average score of the formation month belongs to the bottom 30% of the time series observations, it is defined as pessimistic, with the rest being mild states. An optimistic (pessimistic) holding period is identified if all formation periods are classified as optimistic (pessimistic), otherwise mild. 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. 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,  $K=6$ . Corresponding  $t$ -statistics are reported in parentheses and asterisks refer to the level of significance: \*\*\* (1%), \*\* (5%), \* (10%).

Panel A. Winner, loser and momentum returns by Country										
Country	Whole Period		Opt.		Pess.		Opt. – Pess.		L	Mom
	Mom	W	L	Mom	W	L	Mom	W		
<u>West</u>										
Canada	0.428(0.97)	1.698(1.89)*	0.382(0.52)	1.316(2.37)**	-0.194(-0.15)	0.536(0.29)	-0.730(-0.68)	1.892(1.98)**	-0.154(-0.08)	2.046(2.13)**
France	0.631(2.71)***	0.597(1.04)	-0.892(-1.40)	1.489(3.55)***	1.743(3.74)***	2.461(5.00)***	-0.718(-1.50)	-1.146(-2.01)**	-3.353(-3.47)***	2.207(2.96)***
Germany	0.876(3.13)***	-0.326(-0.68)	-1.708(-2.08)**	1.382(2.19)**	1.937(4.91)***	1.677(2.67)***	0.260(0.54)	-2.263(-4.98)***	-3.385(-4.01)***	1.122(2.01)**
United Kingdom	1.163(4.19)***	0.412(0.70)	-1.648(-2.64)***	2.060(2.99)***	1.335(2.38)**	1.119(1.25)	0.216(0.42)	-0.923(-1.74)*	-2.767(-3.21)***	1.844(3.01)***
U.S.	0.625(2.52)**	0.925(1.67)*	-0.386(-0.50)	1.311(2.50)**	1.179(1.50)	2.184(1.94)*	-1.005(-1.45)	-0.254(-0.31)	-2.570(-2.01)**	2.316(2.41)**
<u>ESEA</u>										
China	0.170(0.55)	1.622(1.23)	1.906(1.13)	-0.284(-0.31)	0.954(1.01)	1.096(1.26)	-0.142(-0.26)	0.668(0.78)	0.810(0.53)	-0.142(-0.31)
Hong Kong	0.258(0.47)	2.070(1.73)*	2.035(1.76)*	0.035(0.09)	0.265(0.22)	-0.110(-0.07)	0.375(0.63)	1.805(1.71)*	2.145(1.83)*	-0.340(-0.51)
Japan	-0.040(-0.18)	-0.627(-0.95)	-0.922(-1.33)	0.295(0.99)	0.463(0.71)	1.120(1.26)	-0.657(-1.33)	-1.090(-1.31)	-2.042(-1.61)	0.952(1.01)
Korea	0.568(1.42)	-0.471(-0.38)	-1.523(-1.41)	1.052(1.32)	2.265(1.63)	2.395(1.21)	-0.130(-0.14)	-2.736(-1.63)	-3.918(-1.65)	1.182(1.01)
Thailand	0.284(0.69)	0.996(1.12)	0.691(0.63)	0.305(0.44)	3.936(5.99)***	3.631(4.18)***	0.305(0.48)	-2.940(-3.78)***	-2.940(-3.51)***	0.000(0.00)

**Panel B. Country-average Portfolios**

(Continues)

**Table 5** (Continued)

Country– average Portfolio	Whole Period		Opt.		Pess.		Opt. – Pess.		Mom	
	Mom	W	L	Mom	W	L	Mom	W		
West	0.811(2.92)***	0.576(1.34)	–1.011(–1.98)**	1.587(4.98)***	1.336(2.91)***	1.567(2.34)**	–0.231(–0.59)	–0.760(–1.85)*	–2.578(–2.71)***	1.818(2.69)***
ESEA	0.176(0.21)	0.777(1.19)	0.267(0.41)	0.510(1.09)	1.451(2.44)**	1.388(1.78)*	0.063(0.29)	–0.674(–1.09)	–1.121(–1.52)	0.447(0.78)
West– ESEA	0.635(1.99)**	–0.201(–0.24)	–1.287(–2.31)**	1.077(2.46)**	–0.115(–0.21)	0.179(0.31)	–0.294(–0.61)	–0.086(–0.21)	–1.457(–2.37)**	1.371(2.01)**

**Table 6. Post-Earnings-Announcement-Drift and Investor Sentiment for Western and ESEA Countries**

This table reports post-earnings-announcement-drift (%) for good and bad news stocks during optimistic and pessimistic states for each of the 10 countries (Panel A) and the country-average portfolio (Panel B). The final row of Panel B shows the differences between the West and ESEA country-average portfolios. 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. Earnings surprises are measured as actual earnings per share minus the last median analyst consensus forecast before the earnings-announcement dates, scaled by stock prices 10 days prior to the earnings announcement. In each year, stocks in each country are ranked on earnings surprises. The top (bottom) 30% of stocks are defined as stocks with “good” (“bad”) news. Earnings surprises for each stock in the good (bad) news portfolios must be larger (less) than 0. Earnings momentum is calculated as the difference in PEAD between good news stocks and bad news stocks in each year. To identify a particular 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  $t$ ,  $t-1$  and  $t-2$ . If the weighted average score of the formation month belongs to the top 30% of the time series of rolling average sentiment scores, it is defined as optimistic, whereas if the weighted average score of the formation month belongs to the bottom 30% of the time series observations, it is defined as pessimistic, with the rest being mild states. The country-average portfolio is the mean average of all firm-year observations in the portfolio. The  $t$ -statistics are calculated using clustered standard errors at the firm level. Corresponding  $t$ -statistics are reported in parentheses and asterisks refer to the level of significance: \*\*\* (1%), \*\* (5%), \* (10%).

Panel A. PEAD by country							
Country	Earnings Momentum	Good news			Bad news		
		Opt.	Pess.	Opt. – Pess.	Opt.	Pess.	Opt. – Pess.
West							
Canada	3.143 (2.13)**	1.109 (2.19)**	5.060 (7.37)***	-3.951 (-4.11)***	-2.594 (-3.96)***	0.384 (1.50)	-2.978 (-3.99)***
France	2.597 (2.99)***	-0.328 (-0.60)	1.558 (2.41)**	-1.886 (-2.11)**	-2.883 (-4.26)***	0.421 (0.56)	-3.304 (-3.72)***
Germany	1.465 (2.46)**	-2.143 (-3.33)***	-2.372 (-3.21)***	0.229 (0.37)	-3.370 (-4.32)***	-3.780 (-4.35)***	0.410 (0.56)
UK	1.785 (3.82)***	-0.006 (-0.01)	4.183 (7.12)***	-4.189 (-5.11)***	-0.496 (-0.95)	2.064 (2.19)**	-2.560 (-2.21)**
U.S.	2.991 (4.289)***	1.589 (3.09)***	9.260 (14.91)***	-7.673 (-7.22)***	-2.803 (-5.01)***	8.048 (11.32)***	-10.851 (-12.11)***
<u>ESEA</u>							
China	0.614 (0.71)	5.797 (2.48)**	-0.306 (-0.45)	6.103 (2.52)**	7.947 (3.12)***	-3.199 (-2.91)***	11.146 (2.44)**
Hong Kong	3.140 (3.68)***	-1.769 (-1.43)	5.495 (4.07)***	-7.264 (-3.61)***	-3.228 (-1.72)*	3.670 (2.31)**	-6.898 (-2.46)**
Japan	1.274 (4.13)***	1.542 (4.91)***	2.916 (7.81)***	-1.374 (-2.38)**	-0.959 (-3.27)***	2.037 (5.20)***	-2.996 (-4.63)***
Korea	1.944 (1.61)	-5.320 (-4.97)***	2.902 (1.79)*	-8.222 (-5.01)***	-8.818 (-5.12)***	7.559 (3.89)***	-16.377 (-6.81)***
Thailand	4.385 (3.87)***	1.312 (1.09)	4.311 (1.83)*	-2.999 (-1.63)	-2.904 (-2.36)**	0.869 (0.39)	-3.773 (-2.43)**
Panel B. Country-average portfolios							
Country-average Portfolio	Earnings Momentum	Good news			Bad news		
		Opt.	Pess.	Opt. – Pess.	Pess.	Opt.	Pess.
West	2.673 (5.02)***	1.066 (2.03)**	7.180 (7.91)***	-6.114 (-7.03)***	-2.843 (-4.89)***	5.243 (5.82)***	-8.086 (-7.03)***

(Continues)

**Table 6** (Continued)

Country– average Portfolio	Earnings Momentum	Good news				Bad news	
		Opt.	Pess.	Opt.	Pess.	Opt.	Pess.
ESEA	1.440 (4.22)***	0.876 (2.11)**	2.229 (3.88)***	–1.353 (–2.61)***	–1.201 (–2.01)**	1.219 (1.99)**	–2.420 (–2.51)**
West– ESEA	1.233 (1.81)*	0.190 (0.33)	4.951 (3.91)***	–4.761 (–3.42)***	–1.642 (–2.89)***	4.024 (3.03)***	–5.666 (–3.28)***

**Table 7. Momentum Profits and Sentiment for Western and ESEA Countries**

This table reports the average monthly momentum returns (%) for the whole period and winner, loser and momentum portfolio returns (%) across sentiment states (optimistic and pessimistic). The final three columns present the differences of the winner, loser and momentum portfolio returns between the two sentiment states for the country-average portfolios for the West and ESEA countries. The final row of each panel shows the differences between the West and ESEA country-average portfolios. See table 5 for the formation of momentum portfolios, the detailed construction of the country-average portfolio and the definition of sentiment states used in Panels A and D. Panel A shows the results using 12-month ranking and holding periods, with all other panels based on the 6/6 strategy. Panel B reports the results using a different definition of sentiment by Stambaugh et al. (2012). An optimistic sentiment holding month (optimistic) is one in which the 3-month rolling average score of the consumer confidence index in the previous month is in the top 30% of the 3-month rolling average time series values and a pessimistic sentiment holding month (pessimistic) is one in the bottom 30% of the 3-month rolling average time series values, with the rest being mild states. Panel C shows the results for 40% cut-offs of optimistic/pessimistic sentiment using the original definition of sentiment. Panel D shows the results for the FF-5 factor risk adjusted returns. For each momentum portfolio, a time-series of raw returns is formed and is regressed on excess market return, the SMB, HML, OP and Inv factors with risk adjusted according to the FF (2015) 5-factor model. Panel E reports the results for the yearly sentiment index constructed by Baker et al. (2012) using volatility premium, number and 1st-day returns in IPOs, and market turnover. The overall sentiment index is the 1st principal component of the 4 sentiment proxies. Panel F reports the FF-5 risk adjusted returns using the alternative sentiment index used in Panel E. The t-statistics for momentum are calculated using Newey-West (1987) standard errors, where the lag is set to K-1. Asterisks refer to the level of significance: \*\*\* (1%), \*\* (5%), \* (10%).

<b>Panel A. 12/12 ranking/holding period</b>										
Country-average Portfolio	Whole Period		Opt.		Pess.		Opt. – Pess.			
	Mom	W	L	Mom	W	L	Mom	W	L	Mom
West	0.811***	0.732*	-0.912**	1.644***	1.612**	1.435***	0.177	-0.880*	-2.347***	1.467***
ESEA	0.214	0.748*	0.562	0.186	1.675**	1.543**	0.132	-0.927*	-0.981**	0.054
West-ESEA	0.597**	-0.016	-1.474***	1.458***	-0.063	-0.108	0.045	0.047	-1.366***	1.413***

  

<b>Panel B. Different sentiment definition</b>										
Country-average Portfolio	Whole Period		Opt.		Pess.		Opt. – Pess.			
	Mom	W	L	Mom	W	L	Mom	W	L	Mom
West	0.811***	0.671	-0.972**	1.643***	1.898**	1.631***	0.267	-1.227***	-2.603***	1.376***
ESEA	0.176	0.782*	0.431	0.351	1.241**	0.939**	0.302	-0.459	-0.508	0.049
West-ESEA	0.635**	-0.111	-1.403***	1.200***	0.657	0.692*	-0.035	-0.768*	-2.095***	1.327***

  

<b>Panel C. 40% sentiment cut-offs</b>										
Country-average Portfolio	Whole Period		Opt.		Pess.		Opt. – Pess.			
	Mom	W	L	Mom	W	L	Mom	W	L	Mom
West	0.811***	0.698*	-0.756**	1.454***	1.543***	1.792***	-0.249	-0.845**	-2.548***	1.730***
ESEA	0.176	0.823*	0.531	0.330	1.213**	1.412**	-0.199	-0.670	-1.199**	0.529
West-ESEA	0.635**	0.155	-0.969**	1.124**	0.330	0.380	-0.050	-0.175	-1.349***	1.174**

(Continues)

**Table 7** (Continued)

<b>Panel D. The FF-5 factor risk adjustments</b>										
Country-average Portfolio	Whole Period		Opt.		Pess.			Opt. – Pess.		
	Mom	W	L	Mom	W	L	Mom	W	L	Mom
West	0.942***	0.216	-1.200***	1.416***	-0.005	-0.048	0.043	0.221	-1.152***	1.373***
ESEA	0.401*	-0.360	-0.964**	0.604	0.140	-0.061	0.201	-0.500	-0.903**	0.403
West-ESEA	0.541***	0.576	-0.236	0.812**	-0.145	0.013	-0.158	0.721*	-0.249	0.970**
<b>Panel E. The alternative sentiment index</b>										
Country-average Portfolio	Whole Period		Opt.		Pess.			Opt. – Pess.		
	Mom	W	L	Mom	W	L	Mom	W	L	Mom
West	0.811***	1.664***	0.428	1.236***	0.697	0.272	0.425	0.967**	0.156	0.811**
ESEA	0.176	2.994***	2.989***	0.005	-0.694	-0.770	0.076	3.688***	3.759***	-0.071
West-ESEA	0.635**	-1.330**	-2.561***	1.231***	1.391*	1.042	0.349	-2.721**	-3.603***	0.882**
<b>Panel F. The FF-5 factor risk adjustments and the alternative sentiment index</b>										
Country-average Portfolio	Whole Period		Opt.		Pess.			Opt. – Pess.		
	Mom	W	L	Mom	W	L	Mom	W	L	Mom
West	0.942***	0.211	-0.728***	0.939***	0.208	0.132	0.076	0.003	-0.860***	0.863***
ESEA	0.401*	0.056	-0.349	0.405	-0.531	-0.545	0.014	0.587	0.196	0.391
West-ESEA	0.541***	0.155	-0.379**	0.534**	0.739	0.677	0.062	-0.584	-1.056***	0.472**

**Table 8. Post-Earnings-Announcement-Drift and Investor Sentiment for Western and ESEA Countries**

This table reports post-earnings-announcement-drift (%) for good and bad news stocks during optimistic and pessimistic states for the country-average portfolios. 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. Earnings surprises are measured as actual earnings per share minus the last median (mean) analyst consensus forecast before the earnings-announcement dates, scaled by stock prices 10 days prior to the earnings announcement for Panels A and C (Panel B). In each year, stocks in each country are ranked on earnings surprises. The top (bottom) 30% of stocks are defined as stocks with “good” (“bad”) news. Earnings surprises for each stock in the good (bad) news portfolios must be larger (less) than 0%. Earnings momentum is calculated as the difference in PEAD between good news stocks and bad news stocks in each year. See table 6 for the detailed description of the construction of the country-average portfolio and the definition of sentiment states of the announcement month used in Panel B. Panel A shows the results using the alternative sentiment measure based on Baker et al. (2012). Panel C shows the results for 40% cut-offs of optimistic/pessimistic sentiment using the original definition of sentiment. The t-statistics are calculated using clustered standard errors at the firm level. Asterisks refer to the level of significance: \*\*\* (1%), \*\* (5%), \* (10%).

<b>Panel A. The alternative sentiment measure</b>							
Country–average Portfolio	Earnings Momentum	Good news				Bad news	
		Opt.	Pess.	Opt.	Pess.	Opt.	Pess.
West	2.673***	2.922***	9.026***	-6.104***	-1.651***	7.098***	-8.749***
ESEA	1.440***	1.669***	3.711***	-2.042***	1.301***	2.311***	-1.010***
West–ESEA	1.233*	1.253***	5.315***	-4.062***	-2.952***	4.787***	-7.739***

  

<b>Panel B. SUE calculated using mean analyst forecast</b>							
Country–average Portfolio	Earnings Momentum	Good news				Bad news	
		Opt.	Pess.	Opt.	Pess.	Opt.	Pess.
West	2.411***	0.413	6.120***	-5.707***	-2.842***	4.213***	-7.055***
ESEA	1.517***	1.103**	3.418***	-2.315***	-1.011**	1.621***	-2.632***
West–ESEA	0.894*	-0.690	2.702***	-3.392***	-1.831***	2.592***	-4.423***

  

<b>Panel C. 40% sentiment cut-offs</b>							
Country–average Portfolio	Earnings Momentum	Good news				Bad news	
		Opt.	Pess.	Opt.	Pess.	Opt.	Pess.
West	2.673***	0.782***	4.125***	-3.343***	-2.513***	2.341***	-4.854***
ESEA	1.440***	1.611***	2.601***	-0.990**	-0.691	1.701***	-2.392***
West–ESEA	1.233*	-0.829***	2.524***	-2.353***	-1.822***	0.640	-2.462***