

# An examination of investor sentiment effect on G7 stock market returns

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## Abstract

This paper examines the relationship between investor sentiment and G7 stock market returns. Using a range of investor sentiment proxies, including investor survey, equity fund flow, closed-end equity fund (CEEF) discount and equity put-call ratio, we examine if investor sentiment has a significant influence on value and growth stock returns as well as aggregate market returns. Using monthly data for the period January 1995-December 2007, our results depict a negative relationship between investor sentiment and future returns. We find results that are consistent with previous studies in that when investor sentiment is high (low), future returns are low (high). Our panel results display evidence of commonality across all the sentiment measures with the value stocks having a particularly strong effect relative to growth stocks. Furthermore, the effect of survey sentiment on future returns gradually decreases beyond the one-month forecast horizon. We observe evidence of price pressure on value stocks and the overall market due to increases in concurrent equity fund flow. Finally, the discount of CEEFs is also found to proxy for investor sentiment, with a narrower discount being associated with an increase (decrease) in value (growth) stocks.

**Keywords:** Investor sentiment, Consumer confidence, Mutual funds, Closed-end funds, Put-Call ratio

**JEL Classification:** G12, G14, G23, G13

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# 1 Introduction

Classical asset pricing theory (CAPM) assumes financial markets to be always efficient, though the degree of efficiency may vary. It rules out the element of investor sentiment in asset pricing. The CAPM states that security prices will be at par with their fundamental value due to the presence of rational investors. It further states that arbitrageurs play a significant role in minimizing security mispricing caused by irrational investors. Doubts about the validity of market efficiency emerged following the October 1987 market crash. It strengthened further as researchers began to find evidence of security prices sometimes underreacting to earnings announcements (Jegadeesh and Titman 1993; Chan, Jegadeesh, and Lakonishok 1996) and overreacting to certain news in a consistent manner (Kothari and Shanken 1997; Lo and MacKinlay 1999). Previous studies have attempted to explain these price anomalies by the presence of investors underreaction and overreaction (e.g. De Bondt and Thaler 1985, 1987; Barberis, Shleifer, and Vishny 1998; Daniel, Hirshleifer, and Subrahmanyam 1998; Hong and Stein 1999). Security mispricing has also been linked to noise trader theory, where researchers have shown that some investors do indeed trade on noise instead of on fundamentals (Black 1986; De Long et al. 1990).

Recent evidence, including Baker and Wurgler (2006) and Brown and Cliff (2005), has highlighted the role of uninformed demand shocks and limits to arbitrage as potential explanations. Brown and Cliff (2005) highlighted that investor sentiment is driven by persistent uninformed demand shocks, while limits to arbitrage will deter informed traders from trading. Baker and Wurgler (2006) showed that stocks that have subjective valuations and are difficult to arbitrage are mostly affected by investor sentiment. Shleifer and Vishny (1997) derived a model where they showed that in extreme circumstances, professional arbitrageurs may not be successful in bringing security prices back to their fundamental values. Furthermore, Gallagher and Taylor (2001) found evidence supporting the ‘risky arbitrage’ hypothesis. They showed that the market log dividendprice ratio adjustment, toward the fundamental equilibrium, varies nonlinearly with the size of the deviation from the fundamental equilibrium. Hirshleifer (2001) highlighted the role that investor psychology plays in determining security prices.

In this study, we examine the level of influence that different sentiment measures have on value and growth stock returns for a sample of international markets using a detailed range of sentiment proxies.<sup>1</sup> The sentiment proxies included in our study are consumer confidence index, equity fund flow, closed-end equity fund (CEEF) discount and equity put-call ratio (PCR). The vast majority of empirical studies have examined the case of the USA and found mixed results for the sentiment-stock return relationship. For instance, Baker and Wurgler (2006) showed that investor sentiment significantly affects the cross-

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<sup>1</sup>We considered stock returns of G7 nations which consist of the USA, Canada, UK, France, Germany, Italy and Japan.

section of stock returns. These stocks usually tend to be small, young, highly volatile, unprofitable, non-dividend-paying, extreme-growth and distressed stocks. However, Lemmon and Portniaguina (2006) showed that the value stocks in the USA are significantly affected by changes in consumer confidence index after allowing conditional market beta to be a function of consumer confidence index. The discount of closed-end funds, which was considered as a measure of small investor sentiment by Zweig (1973) and Lee, Shleifer, and Thaler (1991), has been subsequently challenged by several authors (e.g. Chen, Kan, and Miller 1993; Chordia and Swaminathan 1998; Elton, Gruber, and Busse 1998). Given these mixed findings for the USA, we examine the influence of a range of sentiment measures on value and growth stocks for G7 countries.<sup>2</sup> In particular, we examine the success of consumer confidence index and equity PCR in forecasting future stock returns. We also examine the relationship between equity fund flow and stock returns and determine whether CEEF discount plays any role in the return generating process. The role of investor sentiment is examined at the level of both individual countries and a panel of G7 countries. The cross-sectional nature of sentiment proxies and the cross-country analysis will provide considerably greater power to our tests and also a natural sensitivity test to the previously reported results using US data.

This paper contributes to the existing literature in the following areas. First, we investigate the effect of different sentiment measures on stock returns across G7 nations. To our knowledge, this is the first study to examine the effect of investor sentiment, using an extensive range of sentiment proxies, on stock returns of G7 nations.<sup>3</sup> Besides investor survey, we also examine the effect of equity fund flow, CEEF discount and equity PCR on stock returns. Schmeling (2009) and Verma and Soydemir (2006) have shown that investor survey has a significant effect on international stock returns. We assess whether other sentiment proxies (equity fund flow, CEEF discount and equity PCR) display similar effects on stock returns. Second, we examine the extent of the value-growth relationship for G7 markets. Previous studies have mainly examined the effect of investor sentiment on aggregate market returns. A small number of studies (Brown and Cliff 2004; Lemmon and Portniaguina 2006; Schmeling 2009) have determined investor sentiment relationship with value and growth stocks. As Bird and Casavecchia (2007) have shown price momentum, measure of market sentiment, to be effective in timing the acquisition of value and growth stocks, we investigate whether different sentiment proxies could be considered as useful measures in enhancing the performance of value and growth investment strategies. Furthermore, Barberis and Shleifer (2003) have highlighted that investors pursue style investing, wherein all assets are grouped into different styles (e.g. large-cap stocks, growth stocks, US government bonds, etc.) and later funds are allocated to these styles rather than to an individual

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<sup>2</sup>Aggregate market results are also presented for all countries and sentiment proxies.

<sup>3</sup>Schmeling (2009) and Verma and Soydemir (2006) examine the influence of sentiment on international stock returns using only survey-based measures.

security. Given the popularity of these investment management strategies (and/or style investing), it would be informative to indicate how the wave of investor sentiment can influence value and growth stocks as well as the overall market. We believe that our findings will be useful to investors who are willing to consider implementing behavioral factors in their investment strategy. Third, we are motivated to explore the relationship among different sentiment measures across individual G7 countries. As our study consists of stock returns of highly developed and industrialized nations, we expect the sentiment effect on stock returns to be similar across G7 nations. Our cross-country results will provide some insights into whether any commonality exists among different sentiment measures across G7 countries. Finally, our panel study will shed some light on whether certain controversial sentiment measures (e.g. CEEF discount and equity fund flow) can be indeed considered as measures of sentiment.

Our panel results display evidence of commonality across all the sentiment measures, with value stocks having a particularly strong effect relative to growth stocks. We find results that are consistent with those reported in recent studies examining a survey-based measure of sentiment on the US stock returns (Fisher and Statman 2000, 2003). Our results indicate that when the beginning of period survey sentiment is high (low), subsequent returns are low (high). Furthermore, we find that the effect of survey sentiment decreases with an increase in forecast horizon. Our cross-country results are particularly informative in relation to the role of limits to arbitrage. The effect of survey sentiment is stronger for all the countries for the three-month forecast horizon and this effect gradually decreases as the forecast horizon is extended beyond three months. Our results for the equity fund flow effect on stock returns are consistent with the findings of survey sentiment and are particularly noteworthy given the previously reported results (Warther 1995). We find evidence of a positive relationship between concurrent equity fund flow and stock returns and a negative relationship between lagged equity fund flow and stock returns. Our panel study findings indicate the presence of temporary price pressure on value stocks and aggregate market, reflecting the implications of extending the analysis beyond the case of the USA.<sup>4</sup>

Consistent with our investor survey and equity fund flow results, we find a significant relationship between changes in CEEF discount and stock returns, indicating that the size of discount plays a significant role in the return-generating process. Particularly, we observe that a decrease in CEEF discount yields positive returns for value stocks and negative returns for growth stocks. We further find that the significance of CEEF discount does not change when we add industry-return indices as non-systematic asset pricing factors. Finally, we find that information contained in equity options volume data can be used as a sentiment indicator in predicting value stock returns. We find that a low PCR yields positive returns for value stocks by 6 basis points over the next month. However, we do

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<sup>4</sup>Warther (1995) and Edelen and Warner (2001) did not find any evidence of price pressure on US stocks due to an increase in concurrent fund flow.

not find any effect of equity PCR on the one-month forecasted returns of growth stocks and overall market. The rest of the paper is structured as follows. In Section 2, we discuss a suitable sentiment proxy. In Section 3, we give details on the data adopted, data sources and the methodology. In Section 4, we discuss empirical results for the USA and other G7 countries. In Section 5, we report panel G7 results for each sentiment measure. Finally, we conclude the paper in Section 6.

## 2 A Suitable Sentiment Proxy

The behavioral explanation of the presence of investor sentiment causing security mispricing continues to remain a controversial topic in the finance literature.<sup>5</sup> Researchers have shown that investors sometimes base their investment decisions on variables other than the company fundamentals. For instance, Green and Hwang (2009) highlighted that small investors categorize stocks on the basis of price, as they observe the shift in comovement following splits to be greater for large and high-priced stocks when investor sentiment is high. Furthermore, Kumar and Lee (2006) showed that the retail investors' trading activities play a significant role in explaining return comovements of small-cap, value (high book-to-market ratio), lower priced stocks as well as stocks with low institutional ownership. Previous studies have identified different sentiment measures (e.g. investor survey, trading volume, mutual fund flow, dividend premium, insider trading, closed-end fund discount (CEFD), initial public offering (IPO) first-day returns, etc.) that reflect investor optimism and pessimism.<sup>6</sup> However, as noted earlier, the vast majority of research has focused solely on the USA. To our knowledge, only the survey proxies have been examined on an international basis. We examine sentiment-return relationship for individual G7 countries and include a detailed list of sentiment measures in our study.

We first consider investor survey as a measure of individual investor sentiment.<sup>7</sup> Surveys are regularly conducted internationally to determine investors' perception of stock market and the overall economic conditions. The level of confidence determines investor optimism and pessimism. Investor optimism is usually associated with higher returns and vice versa. In the USA, investor surveys are regularly conducted by the following organizations: American Association of Individual Investors (AAII), Investors Intelligence (II), University of Michigan Consumer Confidence Index Survey, the Conference Board and UBS Gallup Survey. These surveys ask investors different questions concerning employment, present and future financial situations, household income, etc. Researchers have shown that information contained in survey results are useful predictors of stock returns. The survey

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<sup>5</sup>See Subrahmanyam (2007) for a detailed survey of literature on behavioral finance.

<sup>6</sup>See Baker and Wurgler (2007) for detailed explanation of each of these sentiment measures.

<sup>7</sup>Details about different types of survey conducted by G7 countries are given in Appendix 1.

sentiment-return relationship has been extensively researched for the case of the USA. For instance, Fisher and Statman (2003) found that an increase in the consumer confidence index is associated with an increase in the bullishness of individual investors. Lemmon and Portniaguina (2006) found consumer confidence index to be useful in forecasting both small-cap stock returns and also the returns of stocks with low institutional ownership. Using II survey data, Brown and Cliff (2005) found that investor optimism is associated with low subsequent returns as valuation levels return to intrinsic value. Similarly, Qiu and Welch (2006) found consumer confidence index to be a useful predictor of excess returns on small decile stocks.

The findings of survey sentiment-return relationship for the non-US market are in line with the US studies. For instance, Schmeling (2009) examined the effect of consumer confidence index on stock returns of 18 industrialized countries and found a negative relationship between consumer confidence index and future stock returns. They also found the effect of sentiment to be greater for countries where stock markets are less institutionalized, have low market integrity and where investors are more prone to a herd-like behavior. Grigaliuniene and Cibulskiene (2010) found evidence of a negative relationship between consumer confidence index and aggregate market returns of the Scandinavian stock market. They observed that stocks that are hard to value and difficult to arbitrage are mainly affected by investor sentiment. Finter, Niessen-Ruenzi, and Ruenzi (2010) investigated the sentiment-return relationship of German stock market and also found similar results.<sup>8</sup> Verma and Soydemir (2006) studied the spillover effects of the US individual and institutional investor survey sentiment on international stock market returns. They found that the US investor sentiment had significant influence on international stock market returns, though the effect of sentiment on stock market returns was different for countries depending on the trade ties with the USA and its institutional structure.<sup>9</sup> The research to date on the USA and internationally conclusively indicates the existence of a relationship between survey sentiment and stock returns.

However, the evidence on the other sentiment proxies is mixed for the USA and has not been examined to date for the other markets. For example, does CEFD represent investor sentiment? If stock market is considered to be efficient, then the fund net asset value (NAV) should be the same as the fund share price (as there are a fixed number of shares issued in a closed-end fund). However, it has been observed that a closed-end fund starts trading

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<sup>8</sup>By employing vector autoregressive (VAR) models and Granger causality tests, Canabas and Kandir (2009) found that previous stock portfolio returns of the Turkey stock market influence investor sentiment. They further observed that only the turnover ratio seems to have a forecasting potential whereas CEFD, mutual fund flows, odd-lot sales-to-purchases ratio and repo holdings of mutual funds are not significant in forecasting future stock returns.

<sup>9</sup>Also see Zouaoui et al. (2011), who found the significance of investor sentiment in predicting the stock market crisis of 15 European countries and the U.S. They further showed that the impact of sentiment is more pronounced on the countries that are culturally prone to a herd-like behavior and less institutionalized.

at an average of 10% discount within 120 days of trading (Weiss 1989). Thus, the size of the discount, which is the difference between fund NAV and fund share price, is considered to be a measure of investor sentiment by many practitioners. Zweig (1973) carried out the first study adopting CEFD and found that CEFD can be used as a measure of an individual investor's expectations. The puzzle surrounding CEFD was further explored by Lee, Shleifer, and Thaler (1991), who found that when CEFD is high (low), investors are pessimistic (optimistic) about the future returns. By using three different sentiment proxies (CEFD, the ratio of odd-lot sales to purchases and net mutual fund redemptions), Neal and Wheatley (1998) found CEFD and mutual fund net redemptions to be positively related to small firm expected returns and very little evidence of odd-lot ratio to be a predictor of the small firm returns. Using individual investor survey data from AAI, Brown (1999) found an unusual level of individual investor sentiment to be associated with greater volatility in closed-end funds. However, Elton, Gruber, and Busse (1998) and Doukas and Milonas (2004) found no evidence of small investor sentiment, measured by CEFD, as a priced factor in the return generating process.<sup>10</sup> Thus, there is mixed evidence about whether CEFD plays any significant role in the return-generating process. An important distinction between our study and previous work is that we only consider 'equity funds' and specifically exclude 'bond funds' within the closed-end fund family.

Many practitioners also consider equity fund flow to be a measure of investor sentiment. Previous studies, including Warther (1995), have shown that the increase in a fund flow is associated with the increase in stock prices. The price pressure effect and the information effect are regularly cited to indicate the existence of a positive relationship between mutual fund flow and stock returns. Warther (1995) left this question open for further research after finding the evidence of a positive relationship between US mutual fund flows and subsequent market returns with weekly data and a negative relationship between returns and subsequent fund flows using monthly data. Similarly, Edelen and Warner (2001) found a positive relationship between daily equity fund flow and concurrent market returns. Using data from the USA and Japan, Brown et al. (2003) showed that daily mutual fund flow can be considered as an instrument of investor sentiment. Frazzini and Lamont (2006) considered mutual fund flows as a sentiment measure and found that high sentiment predicts low future returns and growth stocks tend to be the usual victims of high sentiment.<sup>11</sup> Given the mixed findings cited above and the relevance of fund flow as a measure of investor sentiment, we examine the extent of the price pressure effect on stock prices due to increases in equity fund flow.

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<sup>10</sup>Also see Chen, Kan, and Miller (1993), Chopra et al. (1993*a*, 1993*b*), Brauer (1993), Chordia and Swaminathan (1998), Spiegel (1999) and Russel (2005) for detailed study of CEFD.

<sup>11</sup>Indro (2004) examined the relationship between net aggregate equity fund flow and investor survey and found that when net aggregate equity fund flow is higher during any given week, individual investors become more bullish in the same week.

Finally, we examine the role of equity options volume in determining the predictability of the security prices. Previous studies have shown that the information contained in the non-price derivative measures is helpful in predicting future stock price movements. Some of these measures include open interest, volatility index (VIX) and equity PCR. Bhuyan and Chaudhury (2001) and Mukherjee and Mishra (2004) found that the information content of the open interest is helpful in determining the future level of the underlying asset prices. Ahoniemi (2008) found that the ARIMA (1, 1, 1) model augmented with generalized autoregressive conditional heteroskedasticity (GARCH) errors produces a forecasted accuracy of directional change in the VIX of up to 58.5%. Researchers have also shown that the information contained in equity options volume data, specifically equity PCR, may be helpful in predicting the direction of the stock market, particularly in the short term. The market would interpret a high equity PCR as an indication of pessimism in the stock market and vice versa. Easley, O'Hara, and Srinivas (1998) developed an asymmetric information model where they showed that the informational content in the volume of directional options trades contains information about future stock prices. Bandopadhyaya and Jones (2008) found PCR to be a better measure than VIX for predicting future returns. Furthermore, Pan and Poteshman (2006) studied the relevance of information content in the equity options volume data in determining the future stock price movement. They observed that the stocks with a low PCR outperform stocks with a high PCR over the next day by 40 basis points and by 1% over 1 week. Finally, Lee and Song (2003) found that value stocks outperform growth stocks when PCR is low and growth stocks marginally outperform or perform equally well with regard to value stocks when the PCR is high.

In summary, an increase in consumer confidence represents investors' bullishness. Therefore, higher confidence is associated with higher stock returns. Similarly, when investor optimism grows, equity PCR is relatively low, which subsequently results in positive performance of stocks. At the same time, the discount on closed-end funds narrows when investors become optimistic about future stock returns. Finally, if fund flow is viewed as a measure of investor sentiment, then an increase in fund flow should depict the price pressure on stocks.

### 3 Sentiment Proxies and Methodological Issues

To study the effect of investor sentiment on value and growth stocks as well as on the aggregate market of G7 nations, we employed monthly returns data for the period January 1995 – December 2007 from the Kenneth French's data library.<sup>12</sup> Table 1 provides a

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<sup>12</sup>The returns were sourced from [http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data\\_library.html](http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html). Stock market returns are from the value weighted portfolio including dividends in the US dollar. We segregated the aggregate stock market returns into value and growth stocks returns



detailed account of different sentiment proxies that were adopted. Consumer confidence index data for the US market were taken from the University of Michigan Surveys of Consumers. The consumer confidence index data for Canada and Japan were obtained from the Conference Board of Canada and the Cabinet Office, Japan, respectively.<sup>13</sup> The data for the UK, France, Germany and Italy were obtained from ‘Directorate Generale for Economic and Financial Affairs’ (DG ECFIN). The details of consumer confidence index calculations are given in Appendix 1.

We obtained the equity fund flow data for the USA from the Investment Company Institute (ICI) and those for Canada from the Investment Funds Institute of Canada (IFIC). The fund flow data for the UK market were sourced from the Investment Management Association, UK (IMA). The equity fund flow data and total net equity fund assets for Canada and the UK were converted to US dollars by considering the month-end foreign exchange rate. The data for France, Germany, Italy and Japan were all obtained from Lipper, Thomson Reuters, and were made available in the US dollars. The equity fund flow data from Lipper were available from January 2002 onwards, whereas those for the USA, Canada and UK were available from January 1995 onwards.<sup>14</sup> Following Indro (2004), we normalized the equity fund flow for each country by taking the percentage of current equity fund flow to its respective total net equity fund assets.

The CEEF data for G7 nations were obtained from Morningstar.<sup>15</sup> We specifically excluded ‘bond funds’ within a closed-end fund family. For each country, we obtained monthly NAV and price data in the US dollars and then calculated each fund’s discount, which we refer to as the CEEF discount. Following Lee, Shleifer, and Thaler (1991) and Doukas and Milonas (2004), we constructed a value-weighted index of discount (VWD) for each country at monthly level:

$$\text{VWD}_t = \sum_{i=1}^{n_t} \text{weight}_t \text{Discount}_{it} \quad (1)$$

where

$$\text{weight}_i = \frac{\text{NAV}_{it}}{\sum_{i=1}^{n_t} \text{NAV}_{it}} \quad (2)$$

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by considering the top 30% of stocks sorted by book-to-market ratio as value stocks and the bottom 30% of stocks sorted by book-to-market ratio as growth stocks.

<sup>13</sup>The consumer confidence index data for Canada (until December 2001) and Japan (until March 2004) were available on a quarterly frequency. Monthly observations were estimated via interpolation by adopting a piecewise cubic spine methodology.

<sup>14</sup>We have used net equity fund flow data including distributions for the reasons given in Appendix 2. This appendix also details the procedure of collecting and maintaining equity fund flow data by different sources.

<sup>15</sup>Refer to Appendix 3 for a detailed data description of CEEFs considered in our research.

$$\text{Discount}_{it} = \frac{(\text{NAV}_{it} - \text{Price}_{it})}{\text{NAV}_{it}} \times 100 \quad (3)$$

$\text{NAV}_{it}$  = Net asset value of each individual CEEF  $i$  at time  $t$

$\text{Price}_{it}$  = Market price of each individual CEEF  $i$  at time  $t$

$n_t$  = the number of funds with the available  $\text{NAV}_{it}$  and  $\text{Price}_{it}$

We also constructed the change in value-weighted index of discount ( $\Delta\text{VWD}$ ) and used it as a proxy to measure CEEF discount effect on value and growth stock returns:

$$\Delta \text{VWD}_t = \text{VWD}_t - \text{VWD}_{t-1} \quad (4)$$

To calculate equity PCR, we obtained equity options volume data from various sources. The equity derivatives data for the USA, Italy and Japan were obtained from Chicago Board of Options Exchange (CBOE), Borsa Italiana and Tokyo Derivatives Exchange, respectively, while those for Canada and Germany were obtained from Montreal Derivatives Exchange and Deutsche Borse Group, respectively. The equity derivatives data for both the UK and France were sourced from NYSE Euronext.<sup>16</sup> Following Pan and Poteshman (2006), we calculated equity PCR as follows:

$$\text{Put-Call Ratio}_{it} = \frac{\text{Put Volume}_{it}}{\text{Put Volume}_{it} + \text{Call Volume}_{it}} \quad (5)$$

where put volume for country  $i$  is the total number of put contracts traded in a month  $t$  and call volume in country  $i$  is the total number of call contracts traded in a month  $t$ . In our computation of equity PCR, we considered total equity options volume data (including European and American options). Hence, it takes into account all the four different equity options trades, ‘open buys’ and ‘close buys’ initiated by the buyer to open a new long position and close the existing short position, respectively, and ‘open sells’ and ‘close sells’ initiated by the seller to open a new position and close the existing long position, respectively. Our constructed equity PCR differs from that reported by Pan and Poteshman (2006), who studied the effect of ‘open-buy’ PCR on the prediction of  $t$ -day-ahead stock returns.

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<sup>16</sup>Data on the end-of-the-month total equity call and put options traded have been adopted for the USA, Italy and Japan. For Canada and Germany, data on the end-of-the-month total call and put options traded for each individual security have been adopted. The end-of-the-day equity put and call options traded for each individual security were made available for the UK and France. To arrive at the total equity call and put options traded in any given month, we did a summation of the end-of-the-day call and put contracts traded for each individual security.

The descriptive statistics of stock market returns, consumer confidence index and equity fund flow are reported in Table 2. In this table, we also report the presence of autocorrelation in the consumer confidence index series at different lags. Due to the presence of a high autocorrelation in the series, we tested for a unit root in the series. Our results of the panel unit root test indicate that we are dealing with stationarity in consumer confidence index series.<sup>17</sup> To study the effect of consumer confidence index on value stock and growth stock returns and aggregate market returns, we estimated a panel fixed-effect regression of the following form:

$$r_{t+k}^i = \delta_0^{i,(k)} + \delta_1^{(k)} CC_t^i + \delta_2^{(k)} \gamma_t^{i,(k)} + \xi_{t+k}^{i,(k)} \quad (6)$$

where  $k$  is the number of months from time  $t$  for each country  $i$ . The right-hand side of the equation includes consumer confidence (CC) index for each country  $i$  and several other macro-economic variables, including annual percentage change in consumer price index, annual percentage change in industrial production, de-trended six-month certificate of deposit rate, term spread and dividend yield, which are incorporated in  $\gamma$ . These macro-economic variables were considered in our regression so as to remove the effect of common risk factors on returns.<sup>18</sup> We estimated the above equation using the panel fixed-effect approach in which all countries enter the regression jointly. This approach will allow us to have different intercepts for each country and constant slope coefficients. The panel fixed effect was studied over the forecast horizon from 1 to 24 months. To account for biased coefficient estimates and standard errors, we employed the moving-block bootstrap simulation procedure to overcome the predictive nature of regression. The moving-block bootstrap was performed by employing a block length of six observations.<sup>19</sup> The influence of survey sentiment measures of individual G7 countries on their respective stock returns was also examined over the forecast horizon from 1 to 12 months. We estimated its coefficient by employing generalized method of moments (exactly identified) and employed a similar bootstrapping procedure (Schmeling 2009). The coefficient of individual countries for the forecast horizon from 12 to 24 months was insignificant and, therefore, it is not reported here to conserve space.

Due to the presence of a high autocorrelation in fund flow series (refer to Table 2), we tested for a unit root in the series. The null hypothesis of a unit root was strongly rejected, a result which is consistent with the consumer confidence survey results. The presence of a high autocorrelation in the series indicates that fund flow is highly predictable. As a result, we employed the traditional Box-Jenkins method to identify the time-series

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<sup>17</sup>We do not report the results of panel unit root test to conserve space.

<sup>18</sup>The macro-economic variables have also been considered in sentiment-return relationship study by Baker and Wurgler (2006), Lemmon and Portniaguina (2006) and Schmeling (2009).

<sup>19</sup>A range of block length have been implemented with similar results in all cases.

properties of the equity fund flow and decompose the net equity fund flow into expected and unexpected equity fund flows (Warther 1995). By performing the Breusch and Godfrey test of autocorrelation, we determined different autoregressive time-series (AR) models for each country (refer to Table 2) and used those models to determine the expected fund flow. The unexpected fund flow was then calculated by taking the difference between the actual fund flow and expected fund flow. To study the effect of equity fund flow on value stocks, growth stocks and overall market, we again ran the panel fixed-effect regression of the following form:

$$r_t^i = \delta_0^{i,(k)} + \delta_1^{(k)} \text{FF}_{t-k}^i + \xi_t^{i,(k)} \quad (7)$$

where  $k$  is the number of lags employed from time  $t$  for each country  $i$ . We adopted different models to study the effect of equity fund flow (FF) at different lags on stock returns. In model<sup>FF</sup> 1, we regressed returns on equity fund flow at  $t$ ,  $t-1$ ,  $t-2$  and  $t-3$ . In model<sup>FF</sup> 2, we regressed returns on equity fund flow at  $t-1$ ,  $t-2$  and  $t-3$ . The sign of the coefficients in model<sup>FF</sup> 1 and model<sup>FF</sup> 2 will reveal if equity fund flow is predictable. In model<sup>FF</sup> 3, we regressed returns on expected fund flow at  $t$  and unexpected fund flow at  $t$ ,  $t-1$  and  $t-2$ . The results of model<sup>FF</sup> 3 will indicate if an increase in equity fund flow leads to an increase in stock returns. To confirm if the increases in concurrent stock returns are due to increases in fund flow, we performed a test for price pressure hypothesis in model<sup>FF</sup> 4. In this model, we regressed the unexpected equity fund flow on returns at  $t-1$ ,  $t$  and  $t+1$ . We also ran a similar regression at different lags for each individual country to determine the significance of fund flow on stock returns.

The descriptive statistics of value-weighted index of CEEF discount and equity PCR are reported in Table 3. From the table, it is evident that Canadian market has the highest mean VWD, 22.84%, with the highest standard deviation, 4.70%, in comparison with the Japanese one. Despite Japan having the highest standard deviation of 5.56%, it is the only country with the lowest mean VWD of 5.15%. In order to determine the effect of CEEF discount on stocks returns, we ran two different models. In model<sup>VWD</sup> 1, we ran a panel fixed effect regression, where we studied the relation between value stock and growth stock returns against  $\Delta VWD$  and aggregate market returns, (Lee, Shleifer, and Thaler 1991; Doukas and Milonas 2004).

$$r_t^i = \delta_0^i + \delta_1 \Delta VWD_t^i + \delta_2 \text{Aggregate returns}_t^i + \xi_t^i \quad (8)$$

where  $r_t^i$  are either value stock returns or growth stock returns at time  $t$  for each country  $i$ ,  $\Delta VWD$  is the change in value-weighted index of discounts for each country  $i$  at time  $t$ . Consistent with Elton, Gruber, and Busse (1998) and Doukas and Milonas (2004), in model<sup>VWD</sup> 2 we adopted industry-return indices, unsystematic components, along with

$\Delta VWD$  and aggregate market returns. This test will allow us to determine the sensitivity of value stock returns and growth stock returns against  $\Delta VWD$ , industry-return indices and aggregate market returns.<sup>20</sup> Similarly, we also ran model<sup>VWD</sup> 1 and model<sup>VWD</sup> 2 for each individual country so as to determine the significance of investor sentiment, measured by  $\Delta VWD$ , in the return-generating process.

From the statistics of equity PCR given in Table 3, we can see that the Japanese market is the only market that has the highest mean PCR of 0.49 and highest standard deviation of 20.32% whereas the Canadian derivatives market has both the lowest mean PCR of 0.28 and standard deviation of 4.44%.<sup>21</sup> To study the effect of equity PCR on future stock returns, we again ran the panel fixed-effect regression of the following form:

$$r_{t+k}^i = \delta_0^{i,(k)} + \delta_1^{(k)} \text{PCR}_t^i + \xi_{t+k}^{i,(k)} \quad (9)$$

where  $k$  is the number of months from time  $t$  for each country  $i$ . We ran a panel fixed-effect regression starting from the year January 2002 as for almost all the countries equity derivatives data were available from 2002 onwards (except for the USA and Japan, for which data were available from January 1995 and July 1997 onwards, respectively). We also ran a similar regression for each individual country starting from the date from which the data were first available.<sup>22</sup>

## 4 Empirical Results

### 4.1 U.S. Results

Given the volume of studies examining particular sentiment measures from a US perspective and the ambiguity of the results to date for this market, we began our analysis with the USA. A comparison with the other G7 countries will be reported in the next section. Tables 4-6 report cross-country results for different sentiment measures and their effects on value and growth stock returns as well as aggregate market returns, respectively. The results reported in column 1 of Table 4 (panel A) show that US value stocks are not influenced by survey sentiment for the one-month and three-month forecast horizons; however,

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<sup>20</sup>FTSE industry returns (e.g. FTSE Banking, FTSE Basic materials, FTSE Industrials and FTSE Consumer goods) were chosen for two reasons, viz. (a) they represent, almost, more than three-quarters of the stocks in which CEEF invests for each of the respective markets, and (b) the ease in data availability for the same time horizon. FTSE industry indices were sourced from Datastream.

<sup>21</sup>Liu (2010) found evidence of equity options listing in Japan reflecting significant increase in price and volatility and concluded that this increase may be due to the difference in regulatory environments across different markets.

<sup>22</sup>Refer to Table 1 for detailed data source and time horizon for which equity derivatives data is available.

growth stocks are significantly affected (Table 5, panel A). We observed that a one-standard deviation shock in survey sentiment leads to a decrease in growth stock returns by 12 basis points over the next month. This effect continues to remain over the three-month forecast horizon. Our findings are consistent with the findings of Baker and Wurgler (2006), who found that sentiment has a significant effect on a cross-section of future stock returns and growth stocks, in particular.<sup>23</sup> We also found that survey sentiment has a significant effect on aggregate market returns (Table 6, panel A). In particular, we found that a one-standard deviation shock to survey sentiment results in a fall in aggregate market returns by 10 basis points over the next month and by 12 basis points over the next three months. These results are consistent with the previous findings reported by Brown and Cliff (2005) and Fisher and Statman (2003).<sup>24</sup>

In panel B (Tables 4-6), we report the results using the equity fund flow as a proxy for sentiment. Given that we found a positive and statistically significant coefficient for concurrent equity fund and an insignificant coefficient for lagged equity fund in in model<sup>FF</sup> 1 and model<sup>FF</sup> 2 respectively, we tested to determine if concurrent unexpected fund flow has any effect on stock returns.<sup>25</sup> As indicated in model<sup>FF</sup> 3, we regressed returns on expected fund flow at  $t$  and unexpected fund flow at  $t$ ,  $t-1$  and  $t-2$ . We found a positive and statistically significant coefficient for unexpected fund flow on value stock returns, growth stock returns and aggregate market returns at time  $t$ . The results indicate that a one-standard deviation shock in unexpected fund flow results in an increase in value stock returns by 3.51%. An argument could be that this increase is due to the existence of price pressure. We tested the price pressure hypothesis in model<sup>FF</sup> 4 where concurrent unexpected fund flow are regressed on stock returns at  $t-1$ ,  $t$  and  $t+1$ .<sup>26</sup> The lack of a significant negative coefficient at  $t+1$  implies that we cannot identify the source of the increase in returns. The increase in security prices may be either due to the price-pressure effect or the information effect. Our results are consistent with Warther (1995), who noted that the fund flow-stock price relationship may be a result of price pressure or information effects.<sup>27</sup> Furthermore, we observed the presence of a significant positive correlation coefficient between investor survey and equity fund flow, indicating that investor optimism is associated with an increase in

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<sup>23</sup>By allowing conditional market beta to be a function of consumer confidence, Lemmon and Portniaguina (2006) show that value stocks are significantly affected by changes in consumer confidence.

<sup>24</sup>Brown and Cliff (2005) show that a higher level of investor optimism is associated with subsequent lower aggregate market returns and higher capitalization growth stocks are the main victims of survey sentiment. Fisher and Statman (2003) also found that investor optimism is associated with higher stock prices.

<sup>25</sup>The results of model<sup>FF</sup> 1 and model<sup>FF</sup> 2 are not reported here to conserve space but are available from authors upon request.

<sup>26</sup>We do not report the results of model<sup>FF</sup> 4 to conserve space.

<sup>27</sup>Edelen and Warner (2001) attribute the presence of positive association between daily fund flow and concurrent market returns to either price pressure or information effect.

equity fund flow and vice-versa.<sup>28</sup>

In panel C of table 4 and 5, we report the results of model<sup>VWD</sup> 2 where we studied the effect of a change in the index of discount of CEEF on stock returns after considering industry-return indices as non-systematic asset pricing factors.<sup>29</sup> Our results of a change in index of discount of CEEF on value stock returns are particularly noteworthy. A significant negative coefficient of  $\Delta VWD$  indicates that a 1% point decrease in  $\Delta VWD$  is associated with an increase in value stock returns by 30 basis points. However, we found a positive and statistically significant coefficient of  $\Delta VWD$  for growth stock returns (Table 5, panel C), indicating that a 1% decrease in  $\Delta VWD$  results in a decrease in growth stock returns by 14 basis points. We further got a significant coefficient of industry-return indices (not reported here) coupled with substantial improvement in  $R^2$ . Interestingly, our results differ from that of Lee, Shleifer, and Thaler (1991), who found that a narrowing of the discount is associated with a positive performance of small stocks. Besides, we consider only closed-end ‘equity’ funds that have core investment focus only in the US market. Our findings, therefore, reveal that a change in index of discount of CEEF does enter the return generating process, where a decrease in discount is associated with positive performance of value stocks and negative performance of growth stocks. The difference in performances of value and growth stocks may be due to the fact that owners and traders of CEEF are usually individual investors as documented by Weiss (1989) and Lee, Shleifer, and Thaler (1991). As Kumar and Lee (2006) have shown that the retail investors tend to overweight value stocks than the growth stocks, it, therefore, appears that an increase in investor optimism is associated with a narrowing discount and thus simultaneous increase in value stock returns.

The findings of the equity PCR effect on stock returns (see panel D of Tables 4 and 5 and panel C of Table 6) reveal that a low equity PCR is an indicator of future investor gains in the overall market and growth stocks in months  $t+1$  and  $t+2$ . For instance, when equity PCR is low, the overall market outperforms in the next month by 7 basis points and in month  $t+2$  by 6 basis points.<sup>30</sup> Similarly, an investor who buys growth stocks that have a zero equity PCR and sells stocks that have an equity PCR of 1 could yield 8 basis points over the next month and 7 basis points in two months from then onwards. Our results, therefore, indicate that the information contained in the equity options volume data can be helpful in determining future movements in stock prices. Our findings also confirm the previous results that investor sentiment influence on asset returns centers around growth stocks. Our results are consistent with those reported by Pan and Poteshman (2006), who

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<sup>28</sup>We calculated the correlation coefficient between equity fund flow and stock returns using Spearman Pairwise correlation test. The results are not reported here to conserve space.

<sup>29</sup>We also tested model<sup>VWD</sup> 1, where we regressed returns on change in index of discount of CEEF and aggregate market returns. The results of model<sup>VWD</sup> 1 are not reported here for the sake of brevity.

<sup>30</sup>We do not report coefficients of equity PCR beyond three months as they are insignificant.

found an evidence of options volume containing information about future stock prices.<sup>31</sup> We also observed the presence of a significant negative correlation coefficient between equity PCR and survey (not reported here), further indicating that investor optimism is associated with a low equity PCR.

## 4.2 International Comparison

Panel A of Tables 4-6 also reports the predictive power of survey sentiment of individual G7 countries for value and growth stock returns as well as aggregate market returns for different forecast horizons from 1 to 12 months.<sup>32</sup> Our general findings indicate that there exists a negative survey sentiment relationship where high (low) investor sentiment is associated with subsequent low (high) returns. When compared with the USA where only growth stocks and aggregate market are influenced by survey sentiment, we observed that in Canada the effect exists for the three-month forecasted returns for both value stocks and growth stocks as well as for the overall market. The differences in sample size of survey participants and structure of the survey are considered to be the likely reasons. For instance, Conference Board, Canada, surveys at least 2000 households measuring the index on the basis of only four questions, whereas the University of Michigan surveys at least 500 households asking them 50 questions. However, the index of consumer sentiment is derived from only five questions.<sup>33</sup> As questions asked in sentiment surveys across different countries are similar, the results are comparable across individual G7 countries. Consistent with the USA, we also observed that survey sentiment has a significant effect on the one-month forecasted returns of the overall market for other countries (e.g. France, Germany and Italy). Interestingly, we did not find any effect of survey sentiment on the one-month forecasted returns for the UK and Japan. Specifically for Japan, we observed that although the consumer confidence survey represents the most comprehensive survey (accounting for 6000 households), there is no significant effect of survey sentiment on value stocks, growth stocks and the overall market. The effect of survey sentiment disappears for all the countries beyond the six-month forecast horizon, except for value stocks in Germany and Italy and growth stocks in the UK. We, therefore, conclude that the difference in significance levels across individual countries may be due to the fact that the number of survey respondents may not be the same as that of the equity market participants.

The results of model<sup>FF</sup> 3, where returns were regressed on concurrent expected fund

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<sup>31</sup>However, our results differ from those reported by Lee and Song (2003), who found that value stocks outperform growth stocks when equity PCR is low. The different results may be due to the different approach adopted by Lee and Song (2003) in calculating equity put-call ratio (PCR). They calculated equity PCR by dividing trading volume of equity put options by trading volume of equity call options.

<sup>32</sup>The coefficients of survey sentiment are not statistically significant for the forecast horizon greater than 12 months. Hence, they are not reported here to conserve space.

<sup>33</sup>Refer Appendix 1 for a detailed description of surveys conducted across G7 countries.



flow, concurrent unexpected fund flow and lagged unexpected fund flow, for the other countries are reported in Tables 4-6 (see panel B, columns 27). Our general findings indicate that an increase in concurrent unexpected fund flow causes an increase in security prices. The lagged component of unexpected equity fund flow for all countries is statistically insignificant, except for the value stock returns of the UK. Both France and Germany display no effect of concurrent unexpected equity fund flow on growth stock returns. Overall, we found the existence of a positive relationship between concurrent unexpected fund flow and security prices. There was no evidence of price pressure in any individual G7 country, with the exception of value stocks in France. This indicates that with an increase in optimism, French investors tend to overweight value stocks causing their price to overshoot. We also found Japan to be the only country where inflow of unexpected equity funds has a negative effect on growth stock returns and aggregate market returns at  $t$  and  $t+1$ . Furthermore, we also observed a significant negative correlation coefficient between equity fund flow and stock returns for Japan (not reported here), indicating the presence of homogeneity in Japanese investors' outlook about future stock returns. This finding is consistent with the results reported by Brown et al. (2003).<sup>34</sup> We, therefore, conclude that the increase in fund flow results in an increase in stock prices for all individual G7 countries, with the exception of Japan. Our results to date are consistent with those obtained for the USA, where the authors have found a positive relationship between fund flow and stock returns (Warther 1995; Edelen and Warner 2001). With the exception of France, we are unable to explain if the presence of a positive association between fund flow and concurrent security returns is either due to price pressure effect or due to information effect.

We report the results of model<sup>VWD</sup> 2 in panel C of Tables 4 and 5.<sup>35</sup> For value stock returns, we did not find a statistically significant relationship for  $\Delta VWD$  in any of the country cases (see Table 4, panel C). However, we found that  $\Delta VWD$  enters the return-generating process for growth stock returns of Canada and the UK (Table 5, panel C). This indicates that growth stocks of Canada and the UK perform well when discounts on closed-end funds widen and vice versa. Our findings are similar to those for the USA, where we observed that an increase in growth stock returns is associated with an increase in CEEF discount. Model<sup>VWD</sup> 2 also shows substantial improvement in  $R^2$  over model<sup>VWD</sup> 1 for both value stocks and growth stocks. Our results differ from the findings of Lee, Shleifer, and Thaler (1991), who found that a narrowing discount of the US closed-end funds is associated with a positive performance of small stocks. Overall, we found that the discount on CEEF enters the return-generating process for growth stocks of Canada and the UK only.

The results of equity PCR effect on stock returns are given in the last panel of Tables

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<sup>34</sup>Also see the work of Ihara, Kato, and Tokunaga (2001), who found evidence of the existence of herding behavior in the Japanese stock market.

<sup>35</sup>We do not report the coefficients of industry-return indices to conserve space.

46. We did not find any evidence of equity PCR effects on value stocks, growth stocks or overall market returns in  $t+1$  and  $t+2$  for any of the remaining G7 countries, with the exception of Canada. For the Canadian market, we found a result which is inconsistent with the theory and those reported previously for the USA. Our results indicate that growth stocks and the overall market in Canada perform well over the next month when the equity PCR is high. The high PCR generally indicates pessimism in the market as there are more put options traded than call options. However, the reported results indicate that an investment in growth stocks with a high equity PCR can help an investor to fetch 46 basis points in month  $t+1$  and 37 basis points in month  $t+2$ . This irrational behavior of Canadian investors seems to be sporadic and unexplainable. We believe that there may be some form of herding behavior among Canadian investors and they indeed follow a contrarian strategy as it is highly unlikely that a high equity PCR can lead to subsequently higher returns. We also observed the presence of a significant positive correlation coefficient between Canadian investor survey survey and equity PCR (not reported here), further strengthening our belief that investor optimism is associated with a high equity PCR. Therefore, the findings of Canadian equity options volume data are not consistent with the previous studies on the US equity options volume data.<sup>36</sup>

## 5 G7 Panel Analysis

### 5.1 Consumer confidence Index

The results of the panel fixed-effect regression of stock returns on consumer confidence index are reported in Table 7. It can be seen that there is a negative survey sentiment-return relationship for value stocks, growth stocks and aggregate market returns over different forecast horizons from 1 to 24 months. The results indicate that a one-standard deviation shock in survey sentiment leads to a decrease in aggregate market returns (refer to panel C) by 48 basis points over the next month. The effects of survey sentiment on value stock returns and growth stock returns are similar. For instance, we found that a one-standard deviation shock in survey sentiment decreases value stock returns (refer panel A) by 59 basis points over the next month. Furthermore, we also found the effect of survey sentiment to be greater on the three-month forecasted returns of value stocks, growth stocks and aggregate market. This effect is gradually reduced over the forecasted returns of 6, 12 and 24 months.

The reductions in persistence of sentiment on returns for value stocks, growth stocks and aggregate market are similar across all the forecast horizons. We also found that consumer confidence has a consistently greater impact on value stocks than on growth stocks and

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<sup>36</sup>Pan and Poteshman (2006) have shown that stocks with low PCR outperform stocks with a high PCR by 1% over the next week.

the aggregate market for all forecasting horizons. For instance, at 1% significance level, growth stocks and aggregate market returns decrease by an average of 60 basis points over the next three months, whereas value stocks decrease by 79 basis points for the same time horizon. Our results are consistent with the previous studies, where authors have found both negative survey sentiment-return relationship and value stocks to be more influenced by a survey sentiment than growth stocks (Schmeling 2009). Lemmon and Portniaguina (2006) also showed that survey sentiment has a significant effect on value stock returns for the USA after controlling for conditional market betas. Previous studies on the US market have shown that an increase in investors' confidence is associated with higher stock returns followed by lower returns (see Fisher and Statman 2000, 2003; Brown and Cliff 2005; Baker and Wurgler 2006). Our panel findings, therefore, strengthen the belief that investor optimism (pessimism) is associated with subsequent lower (higher) returns.

## 5.2 Equity Fund Flow

In Table 8, we report the results of all the four models used in our panel study of equity fund flow effect on stock returns. As noted earlier, in model<sup>FF</sup> 1 we regressed stock returns at  $t$  on equity fund flow at  $t$  to  $t-3$ . The results show that the stock returns are significant and positively related to concurrent equity fund flow and significant and negatively related to lagged equity fund.<sup>37</sup> It can be seen that a one standard deviation shock, 0.95%, to equity fund flow, is associated with an increase in aggregate market returns by 59 basis points in the same month (see panel C). The increase in returns is greater for value stocks than that for the growth stocks. For instance, value stocks increases by 84 basis points at time  $t$ , whereas growth stocks increases by only 56 basis points. However value stocks, growth stocks and the overall market decrease in subsequent months, indicating the presence of a negative relation between returns and lagged equity fund flows.

Warther (1995) pointed out that the negative coefficient of lagged fund flow could be due to the possibility of stock prices overreacting to net sales at time  $t$  and then reverting in the subsequent months or the lagged fund flow could be responsible for the expected concurrent equity fund flows, thus affecting returns in the subsequent months. Therefore, in model<sup>FF</sup> 2, we regressed returns at  $t$  on equity fund flow at  $t-1$  to  $t-3$ . The insignificant negative coefficients at all lags of model 2 indicate the presence of a lagged fund flow effect on expected concurrent equity fund. We, therefore, examined model<sup>FF</sup> 3, where we regressed returns at time  $t$  on expected and unexpected concurrent equity fund flows and unexpected equity fund flow at  $t-1$  and  $t-2$ . The results of model<sup>FF</sup> 3 show that the coefficient on unexpected concurrent equity fund flow is highly significant and has a positive effect on value stocks, growth stocks, and aggregate market returns. For instance,

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<sup>37</sup>We do not report the insignificant coefficients at lags greater than 3 to conserve space.

a one-standard deviation shock, 0.95%, to the unexpected concurrent equity fund flow will power up the aggregate stock market returns by 0.82% and value stock returns and growth stock returns by 1.02% and 0.81%, respectively. However, we observed that the coefficients of expected concurrent net equity fund flow and unexpected lagged equity fund flow are insignificant. Our panel results, therefore, imply the possibility of the presence of temporary price pressure on stocks due to an increase in concurrent unexpected fund flow.

If the increase in unexpected equity fund flow causes a temporary price pressure on concurrent returns, then we should find a significant negative coefficient of subsequent returns. We report the results of price pressure hypothesis in the final column of Table 8. From the results, it can be seen that there is no evidence to support the feedback trader hypothesis, which states that fund flow should lag returns, as mutual fund investors are generally considered to be feedback traders. The results further show evidence of price reversals for value stock returns and aggregate market returns as we found a significant negative coefficient of subsequent returns. Therefore, we note that the causality running from equity fund flow to returns for value stocks and overall market is due to the price pressure effect. We also found a positive correlation coefficient between equity fund flow and investor survey sentiment (result not reported here), indicating that an increase in consumer confidence is associated with corresponding increase in flow of money into mutual funds.

### 5.3 Closed-end equity funds

The panel results of CEEF discount as a measure of investor sentiment are reported in Table 9. The results of model<sup>VWD</sup> 1, where we regressed value and growth stock returns at  $t$  on  $\Delta VWD$  and aggregate market returns, show that a 1% decrease in  $\Delta VWD$  is associated with an increase in value stock returns by 19 basis points and a decrease in growth stock returns by 11 basis points. The significant coefficient suggest that investor sentiment, as measured by  $\Delta VWD$ , has a significant influence on both value stocks and growth stocks. If we were to assume that discount on CEEF plays a systematic role in asset pricing, then we need to find its relativeness to non-systematic asset pricing factors in the return-generating process. Hence, we examined the significance of  $\Delta VWD$  by incorporating industry-return indices along with aggregate market returns (see model 2 in Table 9).<sup>38</sup> We found significant  $\Delta VWD$  for both value stocks and growth stocks at 5% and 1% levels, respectively. The decrease in  $\Delta VWD$  by 1% increases value stock returns by 10 basis points and decreases growth stock returns by 7 basis points. Our panel study, therefore, reveals that CEEF discount does enter the return-generating process.

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<sup>38</sup>Industry-return indices were also considered as non-systematic asset pricing factors in the study by Elton et al. (1998) and Doukas and Milonas (2004).

As Kumar and Lee (2006) documented that the US retail investors tend to overallocate value stocks than growth stocks in their portfolio, it, therefore, appears that investor optimism is associated with a narrowing discount and thus an increase in value stock returns.<sup>39</sup> This conclusion is based on the assumption that closed-end funds are primarily owned and traded by individual investors. Previous studies, including Lee, Shleifer, and Thaler (1991), found average institutional ownership of US closed-end funds to be only 6.6%, thus concluding that closed-end funds are primarily owned and traded by individual investors. Weiss (1989) also found that after two calendar quarters of the IPO of closed-end funds, institutional ownership of US closed-end funds is about 5% when compared with 26.02% of control sample of equity IPOs. We, therefore, assumed that individual ownership remains more or less similar across other G7 countries. The lack of availability of individual ownership data of CEEF restricted us to arrive at actual individual ownership of CEEF for other G7 countries. Thus, the persistence of  $\Delta VWD$  significance coupled with an increase in  $R^2$  for both value stocks and growth stocks indicates that the discount on CEEF plays a systematic role in the return-generating process.

## 5.4 Equity Put-Call ratio

The panel results of equity PCR effect on value stocks, growth stocks and aggregate market returns are reported in Table 10. We observed a significant negative coefficient of equity PCR in month  $t$ , indicating that a low equity PCR is associated with higher returns in the same month  $t$ . The presence of a significant negative correlation coefficient between equity PCR and survey (not reported here) further adds to the fact that investor optimism is associated with a low equity PCR. Our panel results show that only value stocks are significantly affected over the next month  $t+1$ . The negative coefficient of equity PCR for value stocks at  $t+1$  (see panel A) indicates that if an investor buys value stocks when the PCR is 0 or close to 0 and sells value stocks when the PCR is 1 or close to 1, a yield of 6 basis points over the next month could be achieved. Our results show consistency with the previously reported results for the USA by Lee and Song (2003), who showed that value stocks in the USA outperform growth stocks when the PCR is low. We also noted that investors can yield very low returns (6 basis points) in  $t+1$  and this may be due to the information content in options volume being incorporated in the stock price in the same month  $t$ .<sup>40</sup> Pan and Poteshman (2006) found the effect of PCR on stock returns to be decreasing beyond 18 days and showed that stocks with a low PCR outperform stocks

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<sup>39</sup>The significant negative correlation coefficient between survey and discount on CEEF (not reported here) further indicates that investor optimism is associated with a lower discount.

<sup>40</sup>We were unable to test how frequently the information contained in equity options volume data gets incorporated in the security prices due to lack of availability of daily and weekly equity derivatives data for other countries (except for the USA).

with a high PCR over the next day by 40 basis points and by 1% over the next week. The insignificant coefficient on equity PCR for growth stocks and aggregate market for month  $t+1$  indicates that equity PCR is not useful in predicting returns for growth stocks and overall market. The implication is that the information contained in equity options volume data gets fully incorporated in security prices as we move further to month  $t+2$  and beyond.

## 6 Conclusion

In this paper, we have examined the effect of investor sentiment on value and growth stocks as well as aggregate market returns of G7 nations. The vast majority of previous studies on sentiment-return relationship have only examined the case of the USA, examined the sentiment variable in isolation, generally considered sentiment-aggregate market return relationship and generally found mixed results. Very few studies have examined non-US data, restricting their analysis to survey sentiment measure (Verma and Soydemir 2006; Schmeling 2009). In our study, we adopted a range of sentiment proxies (including consumer confidence index, equity fund flow, CEEF discount and equity PCR) and examined their influence on value stocks, growth stocks and overall G7 market returns. We examined the influence of investor sentiment on stock returns of individual countries as well as a panel of G7 country cases. Our panel findings indicate that value stocks, in particular, are consistently affected by investor sentiment. We observed that when investor sentiment is high (low), future returns are low (high).

We found evidence that survey sentiment has the strongest effect on value stocks rather than on growth stocks. This finding is particularly noteworthy, as the vast majority of researches to date have examined the case of the USA and found sentiment effects mainly driving growth stock returns. We also found evidence of price pressure on value stocks and the overall market due to an increase in fund flow and we conclude that fund flow can indeed be considered a measure of investor sentiment. Our finding is informative to investors who maintain a global portfolio of stocks and want to decide on timing the acquisition of stocks based on the level of confidence in the international markets. Particularly, investors should exercise caution while investing in value stocks during the period of high sentiment as these stocks will generally yield negative returns in the subsequent months. Unlike previous evidence for the USA (Elton, Gruber, and Busse 1998, etc.), our international perspective provides evidence that the discount of CEEFs does enter the return-generating process. We observed that a narrowing of the CEEF discount is associated with an increase (decrease) in value (growth) stock returns. An increase in investor optimism is associated with an increase in value stock returns, as individual investors (considered to be primary holders of closed-end funds) tend to overweight value stocks than growth stocks (Kumar

and Lee 2006). Therefore, similar to equity fund flow, we conclude that a discount of CEEFs reflects the level of investor sentiment and it indeed enters the return-generating process. Our results of the equity PCR effect on stock returns are particularly informative to investors trying to seek an information edge from equity options volume data. We observed that when equity PCR is low, value stocks outperform by only 6 basis points over the next month, although no effect was found for either growth stocks or the overall market. We, therefore, note the minimal usefulness of equity PCR in forecasting stock returns, as the effect disappears beyond the one month forecasted returns.

Having observed the evidence of commonality across different sentiment measures with value stocks being strongly affected by investor sentiment, we believe that the investors' behavior is consistent with the 'adaptive expectation hypothesis'. As studies have shown that value stocks outperform growth stocks for samples of data consistent with those studied here, investor tend to overweight value stocks when sentiment is high, expecting that it would continue to yield positive returns.<sup>41</sup> Therefore, investor optimism is followed by an increase in demand of value stocks, putting pressure on its prices and thereby leading to its rise. After the wave of positive sentiment has passed, the value stock prices would decline in subsequent months, returning to the valuation levels.

Finally, as well as extending the analysis of investor sentiment to an international perspective and the implications of our results for the behavioral finance literature, there are a number of practical investment implications. In particular, we believe that our findings in relation to the extent of influence of different sentiment measures on value and growth stocks as well as overall market will be helpful to investors who are willing to incorporate sentiment inputs in their investment strategies. Of the sentiment measures that we have examined in our study, we believe that investor would be better served if they base their investment decisions on the outcome of consumer confidence index, as the effect of survey sentiment is consistently observed across all the countries. The other sentiment measures (equity fund flow and CEEF discount) may be used in conjunction with a survey sentiment measure to determine the potential outcome of investment decisions. The consistent findings of our panel study for each sentiment measure suggest the development of potential investment strategies in value and growth stocks.

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<sup>41</sup>A number of studies have reported the outperformance of value over growth stocks (see Capaul, Rowley, and Sharpe 1993; Bauman, Conover, and Miller 1998; Lee and Song 2003).

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**Table 1: Data Sources**

Country	Time Horizon	Source
<b>Panel A: Consumer Confidence Index</b>		
U.S.	Jan 1995-Dec 2007	The University of Michigan Consumer Surveys
Canada	Jan 1995-Dec 2007	The Conference Board, Canada
U.K.	Jan 1995-Dec 2007	Directorate Generale for Economic & Financial Affairs (DG ECFIN)
France	Jan 1995-Dec 2007	Directorate Generale for Economic & Financial Affairs (DG ECFIN)
Germany	Jan 1995-Dec 2007	Directorate Generale for Economic & Financial Affairs (DG ECFIN)
Italy	Jan 1995-Dec 2007	Directorate Generale for Economic & Financial Affairs (DG ECFIN)
Japan	Jan 1995-Dec 2007	The Cabinet Office, Japan
<b>Panel B: Equity Fund Flow</b>		
U.S.	Jan 1995-Dec 2007	The Investment Company Institute
Canada	Jan 1995-Dec 2007	The Investment Fund Institute of Canada
U.K.	Jan 1995-Dec 2007	The Investment Management Association, U.K.
France	Jan 2002-Dec 2007	Lipper, Thomson Reuters
Germany	Jan 2002-Dec 2007	Lipper, Thomson Reuters
Italy	Jan 2002-Dec 2007	Lipper, Thomson Reuters
Japan	Jan 2002-Dec 2007	Lipper, Thomson Reuters
<b>Panel C: Closed End Equity Fund</b>		
U.S.	Jan 1995-Dec 2007	Morningstar, Inc
Canada	Jan 1995-Dec 2007	Morningstar, Inc
U.K.	Jan 1995-Dec 2007	Morningstar, Inc
France	Jan 1995-May 2004	Morningstar, Inc
Germany	Jan 1995-Dec 2007	Morningstar, Inc
Italy	Jan 1995-Jan 2003	Morningstar, Inc
Japan	Jan 1995-Dec 2007	Morningstar, Inc
<b>Panel D: Individual Equity Options Volume</b>		
U.S.	Jan 1995-Dec 2007	The Chicago Board of Options Exchange
Canada	Dec 2000-Dec 2007	Bourse De Montreal Inc
U.K.	Jan 2000-Dec 2007	NYSE Euronext
France	Jan 2002-Dec 2007	NYSE Euronext
Germany	Jan 2001-Dec 2007	Deutsche Borse Group
Italy	Jan 2001-Dec 2007	Borsa Italiana
Japan	Jul 1997-Dec 2007	Tokyo Stock Exchange

Notes: A detailed list of data sources of different sentiment proxies (consumer confidence index, equity fund flow, CEEF discount and equity putcall options volume) is given. A list of the time horizons for each data source and for each individual country is also given.

**Table 2: Descriptive Statistics: Stocks Returns, Consumer Confidence Index and Equity Fund Flow**

Country	Market		Value		Growth		CC Index			Equity Fund Flow			
	$\mu$	$\sigma$	$\mu$	$\sigma$	$\mu$	$\sigma$	$\mu$	$\sigma$	$\rho(1)$	$\mu$	$\sigma$	$\rho(1)$	AR Model
U.S.	1.00	4.24	1.19	3.86	0.95	4.49	94.63	8.71	0.88	0.53	0.53	0.71	3
Canada	1.41	5.17	1.31	6.13	1.28	6.73	89.07	13.19	0.93	0.80	1.11	0.60	4
U.K.	1.00	3.70	1.12	4.84	0.97	3.61	-3.74	4.02	0.81	0.23	0.22	0.62	15
France	1.25	5.07	1.40	6.45	1.24	5.32	-14.35	8.26	0.93	0.47	0.58	0.29	2
Germany	1.12	5.78	1.78	6.82	1.08	6.60	-8.61	8.51	0.95	-0.21	0.66	0.21	9
Italy	1.23	6.17	1.29	7.71	1.11	6.33	-11.69	5.66	0.89	-1.13	1.10	0.35	3
Japan	0.20	5.55	0.99	7.51	-0.14	5.67	41.85	4.54	0.95	0.65	2.41	0.08	12

Notes: The descriptive statistics of aggregate market returns, value stock and growth stock returns, consumer confidence index and equity fund flow of G7 countries are reported.  $\mu$  denotes the average returns of the G7 countries and  $\sigma$  denotes the standard deviation of returns for each country. Autocorrelation ( $\rho$ ) at Lag 1 is reported for consumer confidence index and equity fund flow for each country. The last column reports the AR model used for each country to predict expected fund flow.

**Table 3: Descriptive Statistics: VWD and Equity PCR**

Country	Value Weighted Discount (%)					Equity Put Call Ratio				
	Mean	Min	Max	Std Dev	Obsv	Mean	Min	Max	Std Dev (%)	Obsv
U.S.	7.82	0.47	15.01	3.84	156	0.36	0.24	0.68	9.20	156
Canada	22.84	14.22	34.84	4.70	156	0.28	0.18	0.39	4.44	85
U.K.	9.72	4.59	14.94	2.37	156	0.45	0.37	0.59	4.62	96
France	15.60	1.98	26.01	3.95	113	0.45	0.33	0.58	5.74	72
Germany	14.71	5.74	25.00	3.93	156	0.45	0.23	0.60	5.83	84
Italy	14.19	3.14	25.69	4.27	97	0.43	0.27	0.53	4.85	84
Japan	5.15	-8.38	19.90	5.56	156	0.49	0.10	0.88	20.32	126

Notes: The descriptive statistics of VWD and equity PCR are reported. The VWD is calculated by taking the sum of individual CEEF's weight multiplied by its discount. The equity PCR is equity put volume divided by equity call volume and equity put volume.

**Table 4: Cross-Country Analysis: Investor sentiment effect on value stock returns**

	US		Canada		UK		France		Germany		Italy		Japan	
	Coeff	R <sup>2</sup>	Coeff	R <sup>2</sup>	Coeff	R <sup>2</sup>	Coeff	R <sup>2</sup>	Coeff	R <sup>2</sup>	Coeff	R <sup>2</sup>	Coeff	R <sup>2</sup>
<b>Panel A: Consumer Confidence Index</b>														
R <sub>t+1</sub>	-0.02 (0.64)	0.06	-0.13 (0.02)**	0.08	0.02 (0.76)	0.04	-0.18 (0.04)**	0.07	-0.20 (0.12)	0.04	-0.27 (0.00)***	0.09	0.01 (0.90)	0.02
R <sub>t+3</sub>	-0.04 (0.24)	0.08	-0.12 (0.05)**	0.07	0.00 (0.95)	0.03	-0.11 (0.17)	0.03	-0.36 (0.00)***	0.06	-0.40 (0.00)***	0.10	-0.22 (0.23)	0.04
R <sub>t+6</sub>	-0.01 (0.72)	0.10	-0.00 (0.97)	0.04	0.04 (0.18)	0.07	-0.06 (0.43)	0.03	-0.19 (0.00)***	0.03	-0.29 (0.00)***	0.06	-0.08 (0.63)	0.06
R <sub>t+12</sub>	-0.09 (0.00)***	0.09	0.02 (0.61)	0.03	0.11 (0.28)	0.08	-0.07 (0.37)	0.04	-0.08 (0.32)	0.02	-0.26 (0.02)**	0.09	-0.25 (0.17)	0.06
<b>Panel B: Equity Fund Flow</b>														
Expected Fund Flow <sub>t</sub>	-0.06 (0.94)		-0.73 (0.44)		2.03 (0.44)		-0.09 (0.99)		-0.51 (0.87)		0.32 (0.87)		0.69 (0.27)	
Unexpected Fund Flow <sub>t</sub>	6.63 (0.00)***		1.45 (0.01)***		5.97 (0.07)*		2.21 (0.10)*		4.56 (0.00)***		2.75 (0.00)***		-0.49 (0.12)	
Unexpected Fund Flow <sub>t-1</sub>	0.70 (0.38)		-0.01 (0.98)		2.13 (0.53)		-2.42 (0.34)		0.63 (0.61)		-0.27 (0.75)		-0.29 (0.36)	
Unexpected Fund Flow <sub>t-2</sub>	0.73 (0.32)	0.40	-0.09 (0.91)	0.05	-5.53 (0.07)*	0.05	-1.88 (0.45)	0.11	1.67 (0.18)	0.25	0.10 (0.90)	0.21	-0.38 (0.23)	0.09
<b>Panel C: Closed-End Equity Fund Discount</b>														
Intercept	0.49 (0.00)***		0.25 (0.29)		0.10 (0.67)		0.17 (0.55)		0.79 (0.00)***		0.49 (0.21)		0.90 (0.00)***	
Δ VWWD	-0.30 (0.01)***		-0.17 (0.17)		0.26 (0.33)		-0.02 (0.84)		-0.14 (0.20)		0.09 (0.50)		-0.07 (0.38)	
Aggregate Returns	0.33 (0.00)***		0.03 (0.73)		0.96 (0.00)***		-0.12 (0.38)		0.46 (0.00)***		0.28 (0.02)**		0.49 (0.00)***	
R <sup>2</sup>		0.78		0.79		0.67		0.85		0.79		0.85		0.84
<b>Panel D: Equity Put-Call Ratio</b>														
R <sub>t</sub>	-0.07 (0.02)**	0.03	-0.61 (0.00)***	0.21	-0.52 (0.00)***	0.20	-0.34 (0.00)***	0.10	-0.27 (0.04)**	0.05	-0.15 (0.31)	0.01	-0.04 (0.30)	0.01
R <sub>t+1</sub>	-0.02 (0.47)	0.01	0.09 (0.57)	0.01	-0.11 (0.34)	0.01	-0.16 (0.20)	0.02	-0.02 (0.88)	0.01	0.14 (0.35)	0.01	0.00 (0.90)	0.01
R <sub>t+2</sub>	-0.04 (0.23)	0.01	0.09 (0.54)	0.01	-0.12 (0.33)	0.01	-0.18 (0.16)	0.03	-0.05 (0.70)	0.01	0.15 (0.32)	0.01	0.04 (0.22)	0.01
R <sub>t+3</sub>	-0.02 (0.46)	0.01	-0.08 (0.59)	0.01	-0.31 (0.00)***	0.08	-0.23 (0.07)*	0.05	-0.13 (0.35)	0.01	-0.19 (0.21)	0.02	0.06 (0.12)	0.02

Notes: In panel A, we report the value stock returns predictability of consumer confidence index across different forecast horizons. In panel B, we report model<sup>F</sup> 3, where value stock returns are regressed on expected equity fund flow at  $t$ ,  $t-1$  and  $t-2$ . In panel C, we report model<sup>VWWD</sup> 2, where value stock returns are regressed on Δ VWWD, aggregate market returns and four different FTSE indices. The coefficients of FTSE indices are not reported here to conserve space. In panel D, we report the value stock returns predictability of equity PCR across different forecast horizons. The p-values are reported below the coefficient values. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels respectively.

**Table 5: Cross-Country Analysis: Investor sentiment effect on growth stock returns**

	US		Canada		UK		France		Germany		Italy		Japan	
	Coeff	R <sup>2</sup>	Coeff	R <sup>2</sup>	Coeff	R <sup>2</sup>	Coeff	R <sup>2</sup>	Coeff	R <sup>2</sup>	Coeff	R <sup>2</sup>	Coeff	R <sup>2</sup>
<b>Panel A: Consumer Confidence Index</b>														
R <sub>t+1</sub>	-0.12 (0.01)***	0.09	-0.09 (0.07)*	0.09	0.01 (0.86)	0.06	-0.18 (0.01)***	0.06	-0.04 (0.52)	0.03	-0.20 (0.00)***	0.03	-0.11 (0.40)	0.01
R <sub>t+3</sub>	-0.12 (0.05)**	0.08	-0.17 (0.00)***	0.09	-0.10 (0.16)	0.04	-0.08 (0.26)	0.05	-0.30 (0.00)***	0.08	-0.23 (0.00)***	0.03	-0.19 (0.15)	0.03
R <sub>t+6</sub>	-0.10 (0.07)*	0.07	-0.04 (0.24)	0.02	0.19 (0.00)***	0.13	-0.09 (0.23)	0.03	-0.13 (0.30)	0.05	-0.12 (0.22)	0.01	-0.01 (0.91)	0.03
R <sub>t+12</sub>	-0.20 (0.00)***	0.12	-0.04 (0.44)	0.07	0.10 (0.34)	0.11	-0.14 (0.00)***	0.04	-0.20 (0.11)	0.03	-0.04 (0.64)	0.04	0.07 (0.43)	0.07
<b>Panel B: Equity Fund Flow</b>														
Expected Fund Flow <sub>t</sub>	0.02 (0.98)		-0.48 (0.63)		-0.50 (0.79)		-0.90 (0.88)		-3.83 (0.18)		-1.05 (0.55)		0.63 (0.20)	
Unexpected Fund Flow <sub>t</sub>	7.58 (0.00)***		2.27 (0.00)***		6.55 (0.00)***		-0.99 (0.30)		1.61 (0.11)		1.83 (0.00)***		-0.53 (0.03)**	
Unexpected Fund Flow <sub>t-1</sub>	-0.39 (0.68)		0.88 (0.28)		1.68 (0.50)		-0.91 (0.62)		-0.54 (0.64)		0.11 (0.88)		-0.22 (0.37)	
Unexpected Fund Flow <sub>t-2</sub>	0.78 (0.37)		-1.02 (0.23)		-1.72 (0.45)		-1.02 (0.57)		-0.15 (0.89)		-0.17 (0.79)		-0.18 (0.47)	
R <sup>2</sup>		0.38		0.10		0.06		0.06		0.08		0.08		0.16
<b>Panel C: Closed-End Equity Fund Discount</b>														
Intercept	-0.09 (0.20)		-0.31 (0.03)**		0.02 (0.81)		-0.01 (0.96)		-0.07 (0.71)		-0.22 (0.05)**		-0.37 (0.00)***	
Δ VWD	0.14 (0.01)***		0.19 (0.01)***		0.34 (0.00)***		0.09 (0.28)		-0.04 (0.64)		0.03 (0.48)		0.02 (0.50)	
Aggregate Returns	1.03 (0.00)***		1.68 (0.00)***		1.06 (0.00)***		1.44 (0.00)***		1.60 (0.00)***		1.23 (0.00)***		1.18 (0.00)***	
R <sup>2</sup>		0.96		0.94		0.88		0.89		0.87		0.98		0.97
<b>Panel D: Equity Put-Call Ratio</b>														
R <sub>t</sub>	-0.13 (0.00)***	0.07	-0.25 (0.11)	0.03	-0.30 (0.00)***	0.13	-0.12 (0.18)	0.03	-0.28 (0.04)**	0.05	-0.07 (0.57)	0.01	0.01 (0.59)	0.01
R <sub>t+1</sub>	-0.08 (0.04)**	0.03	0.46 (0.00)***	0.09	-0.07 (0.41)	0.01	-0.06 (0.52)	0.01	-0.01 (0.94)	0.01	0.13 (0.30)	0.01	0.03 (0.17)	0.02
R <sub>t+2</sub>	-0.07 (0.08)*	0.02	0.37 (0.03)**	0.06	-0.12 (0.17)	0.02	-0.06 (0.50)	0.01	-0.10 (0.46)	0.01	0.05 (0.67)	0.01	0.03 (0.22)	0.01
R <sub>t+3</sub>	-0.03 (0.39)	0.01	0.03 (0.82)	0.01	-0.13 (0.11)	0.03	-0.01 (0.90)	0.01	-0.15 (0.26)	0.02	-0.20 (0.10)*	0.03	0.02 (0.43)	0.01

Notes: In panel A, we report the growth stock returns predictability of consumer confidence index across different forecast horizons. In panel B, we report model<sup>F</sup> 3, where growth stock returns are regressed on expected equity fund flow at  $t$ ,  $t-1$  and  $t-2$ . In panel C, we report model<sup>VWD</sup> 2, where growth stock returns are regressed on Δ VWD, aggregate market returns and four different FTSE indices. The coefficients of FTSE indices are not reported here to conserve space. In panel D, we report the growth stock returns predictability of equity PCR across different forecast horizons. The p-values are reported below the coefficient values. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels respectively.



**Table 6: Cross-Country Analysis: Investor sentiment effect on aggregate market returns**

	US		Canada		UK		France		Germany		Italy		Japan	
	Coeff	R <sup>2</sup>	Coeff	R <sup>2</sup>	Coeff	R <sup>2</sup>	Coeff	R <sup>2</sup>	Coeff	R <sup>2</sup>	Coeff	R <sup>2</sup>	Coeff	R <sup>2</sup>
<b>Panel A: Consumer Confidence Index</b>														
R <sub>t+1</sub>	-0.10 (0.02)**	0.07 (0.08)*	-0.07 (0.08)*	0.08	0.01 (0.82)	0.05	-0.16 (0.01)***	0.06	-0.12 (0.03)**	0.04	-0.22 (0.00)***	0.04	-0.07 (0.60)	0.02
R <sub>t+3</sub>	-0.12 (0.04)**	0.08 (0.18)**	-0.13 (0.00)***	0.09	-0.11 (0.18)	0.05	-0.06 (0.30)	0.05	-0.31 (0.00)***	0.09	-0.26 (0.00)***	0.05	-0.18 (0.17)	0.03
R <sub>t+6</sub>	-0.09 (0.06)*	0.07 (0.25)	-0.03 (0.25)	0.03	0.12 (0.04)**	0.11	-0.07 (0.29)	0.04	-0.11 (0.26)	0.05	-0.14 (0.11)	0.02	0.01 (0.94)	0.04
R <sub>t+12</sub>	-0.18 (0.00)***	0.11 (0.47)	-0.02 (0.47)	0.04	0.10 (0.31)	0.09	-0.12 (0.00)***	0.04	-0.17 (0.08)*	0.03	-0.09 (0.30)	0.05	0.00 (0.97)	0.08
<b>Panel B: Equity Fund Flow</b>														
Expected Fund Flow <sub>t</sub>	-0.22 (0.80)	-0.33 (0.67)	-0.33 (0.67)	-0.10 (0.95)	-0.10 (0.95)	0.07	-1.35 (0.84)	0.08	1.82 (0.52)	0.13	-0.27 (0.87)	0.05	0.53 (0.29)	0.11
Unexpected Fund Flow <sub>t</sub>	7.68 (0.00)***	1.77 (0.00)***	1.77 (0.00)***	6.92 (0.00)***	6.92 (0.00)***	0.07	0.22 (0.83)	0.01	2.68 (0.01)**	0.07	1.86 (0.00)***	0.01	-0.54 (0.04)**	0.01
Unexpected Fund Flow <sub>t-1</sub>	-0.05 (0.95)	-0.31 (0.62)	-0.31 (0.62)	2.06 (0.42)	2.06 (0.42)	0.01	-1.26 (0.53)	0.02	0.17 (0.88)	0.01	0.04 (0.95)	0.01	-0.25 (0.33)	0.02
Unexpected Fund Flow <sub>t-2</sub>	0.77 (0.32)	-0.63 (0.34)	-0.63 (0.34)	-2.96 (0.21)	-2.96 (0.21)	0.03	-0.68 (0.73)	0.02	0.50 (0.66)	0.01	-0.27 (0.67)	0.04	-0.19 (0.47)	0.01
R <sup>2</sup>	0.44	0.09	0.09	0.07	0.07	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.11
<b>Panel C: Equity Put-Call Ratio</b>														
R <sub>t</sub>	-0.12 (0.00)***	0.07 (0.00)***	-0.33 (0.00)***	0.09	-0.36 (0.00)***	0.18	-0.24 (0.01)***	0.08	-0.30 (0.01)***	0.07	-0.06 (0.60)	0.01	0.01 (0.69)	0.01
R <sub>t+1</sub>	-0.07 (0.06)*	0.02 (0.04)**	0.25 (0.04)**	0.05	-0.04 (0.68)	0.01	-0.07 (0.45)	0.01	-0.00 (0.97)	0.01	0.10 (0.40)	0.01	0.03 (0.29)	0.01
R <sub>t+2</sub>	-0.06 (0.10)*	0.02 (0.07)*	0.23 (0.07)*	0.04	-0.06 (0.49)	0.01	-0.12 (0.25)	0.02	-0.05 (0.69)	0.01	0.06 (0.60)	0.01	0.03 (0.17)	0.02
R <sub>t+3</sub>	-0.03 (0.45)	0.01 (0.85)	-0.02 (0.85)	0.01	-0.16 (0.07)*	0.03	-0.11 (0.27)	0.02	-0.09 (0.44)	0.01	-0.20 (0.07)*	0.04	0.03 (0.27)	0.01

Notes: In panel A, we report the aggregate market returns predictability of consumer confidence index across different forecast horizons. In panel B, we report model<sup>FF</sup> 3, where aggregate market returns are regressed on expected equity fund flow at  $t$ ,  $t-1$  and  $t-2$ . In panel C, we report the aggregate market returns predictability of equity PCR across different forecast horizons. The p-values are reported below the coefficient values. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels respectively.

Table 7: Panel fixed effects regression: Consumer confidence index

Forecast Horizon	1 month	3 months	6 months	12 months	24 months
<b>Panel A: Value stock returns</b>					
Survey Sentiment	-0.59	-0.79	-0.66	-0.49	-0.16
p-value	(0.00)***	(0.00)***	(0.03)**	(0.09)*	(0.63)
R <sup>2</sup>	0.02	0.02	0.02	0.02	0.03
Obs	1085	1071	1050	1008	924
<b>Panel B: Growth stock returns</b>					
Survey Sentiment	-0.49	-0.60	-0.47	-0.32	-0.30
p-value	(0.00)***	(0.00)***	(0.06)***	(0.28)	(0.27)
R <sup>2</sup>	0.02	0.02	0.02	0.02	0.04
Obs	1085	1071	1050	1008	924
<b>Panel C: Aggregate market returns</b>					
Survey Sentiment	-0.48	-0.60	-0.44	-0.33	-0.26
p-value	(0.00)***	(0.00)***	(0.05)**	(0.22)	(0.27)
R <sup>2</sup>	0.02	0.03	0.02	0.02	0.04
Obs	1085	1071	1050	1008	924

Notes: The results of panel fixed-effect regression of value stock returns, growth stock returns and aggregate market returns on consumer confidence index and different macro-economic variables are reported. The coefficients of macro-economic variables are not reported here for the sake of brevity. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels respectively.

Table 8: Panel fixed effect regression: Equity fund flow

Independent Variables	Model <sup>FF</sup> 1		Model <sup>FF</sup> 2		Model <sup>FF</sup> 3		Model <sup>FF</sup> 4	
	Coeff	p-value	Coeff	p-value	Coeff	p-value	Coeff	p-value
<b>Panel A: Value stock returns</b>								
Fund Flow <sub>t</sub>	0.88	(0.00)***						
Fund Flow <sub>t-1</sub>	-0.40	(0.06)*	-0.21	(0.32)				
Fund Flow <sub>t-2</sub>	-0.46	(0.03)**	-0.34	(0.11)				
Fund Flow <sub>t-3</sub>	-0.49	(0.01)***	-0.37	(0.08)*				
Expected Fund Flow <sub>t</sub>					0.17	(0.68)		
Unexpected Fund Flow <sub>t</sub>					1.07	(0.00)***		
Unexpected Fund Flow <sub>t-1</sub>					-0.31	(0.22)		
Unexpected Fund Flow <sub>t-2</sub>					-0.30	(0.25)		
Value stocks Returns <sub>t-1</sub>							-0.05	(0.92)
Value stocks Returns <sub>t</sub>							2.27	(0.00)***
Value stocks Returns <sub>t+1</sub>							-1.42	(0.01)***
R <sup>2</sup>	0.04		0.02		0.03		0.03	
<b>Panel B: Growth stock returns</b>								
Fund Flow <sub>t</sub>	0.59	(0.00)***						
Fund Flow <sub>t-1</sub>	-0.30	(0.13)	-0.17	(0.37)				
Fund Flow <sub>t-2</sub>	-0.34	(0.08)*	-0.26	(0.18)				
Fund Flow <sub>t-3</sub>	-0.38	(0.05)**	-0.29	(0.13)				
Expected Fund Flow <sub>t</sub>					0.10	(0.78)		
Unexpected Fund Flow <sub>t</sub>					0.85	(0.00)***		
Unexpected Fund Flow <sub>t-1</sub>					-0.09	(0.71)		
Unexpected Fund Flow <sub>t-2</sub>					-0.39	(0.10)*		
Growth stocks Returns <sub>t-1</sub>							1.01	(0.12)
Growth stocks Returns <sub>t</sub>							1.61	(0.01)***
Growth stocks Returns <sub>t+1</sub>							-0.88	(0.17)
R <sup>2</sup>	0.02		0.01		0.03		0.02	
<b>Panel C: Aggregate market returns</b>								
Fund Flow <sub>t</sub>	0.62	(0.00)***						
Fund Flow <sub>t-1</sub>	-0.32	(0.07)*	-0.18	(0.29)				
Fund Flow <sub>t-2</sub>	-0.30	(0.10)*	-0.21	(0.24)				
Fund Flow <sub>t-3</sub>	-0.40	(0.02)**	-0.31	(0.08)*				
Expected Fund Flow <sub>t</sub>					0.12	(0.73)		
Unexpected Fund Flow <sub>t</sub>					0.86	(0.00)***		
Unexpected Fund Flow <sub>t-1</sub>					-0.17	(0.41)		
Unexpected Fund Flow <sub>t-2</sub>					-0.30	(0.17)		
Aggregate Returns <sub>t-1</sub>							0.87	(0.22)
Aggregate Returns <sub>t</sub>							2.14	(0.00)***
Aggregate Returns <sub>t+1</sub>							-1.30	(0.06)*
R <sup>2</sup>	0.03		0.01		0.03		0.02	

Notes: The results of panel fixed-effect regression of G7 countries value stock returns, growth stock returns and aggregate market returns on equity fund flow at different lags are reported. Model<sup>FF</sup> 1 reports the regression of stock returns on equity fund flow at  $t$ ,  $t-1$ ,  $t-2$  and  $t-3$ . Model<sup>FF</sup> 2 reports the regression of stock returns on equity fund flow at  $t-1$ ,  $t-2$  and  $t-3$ . Model<sup>FF</sup> 3 reports the regression of stock returns on expected fund flow at  $t$  and unexpected fund flow at  $t$ ,  $t-1$  and  $t-2$ . Model<sup>FF</sup> 4 reports the regression of unexpected equity fund flow on returns at  $t-1$ ,  $t$  and  $t+1$ . \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels respectively.

**Table 9: Panel fixed effect regression: Closed-end equity fund discount**

	Model <sup>VWD</sup> 1				Model <sup>VWD</sup> 2			
	Value stock returns		Growth stock returns		Value stock returns		Growth stock returns	
	Coeff	p-value	Coeff	p-value	Coeff	p-value	Coeff	p-value
Intercept	0.09	(0.78)	-0.04	(0.80)	0.13	(0.67)	-0.04	(0.79)
$\Delta$ VWD	-0.19	(0.00)***	0.11	(0.00)***	-0.10	(0.05)**	0.07	(0.00)***
Aggregate returns	1.00	(0.00)***	1.03	(0.00)***	0.36	(0.00)***	1.29	(0.00)***
Banking					0.25	(0.00)***	-0.12	(0.00)***
Basic materials					0.29	(0.00)***	-0.11	(0.00)***
Industrials					0.08	(0.00)***	-0.01	(0.26)
Consumer goods					0.02	(0.29)	-0.01	(0.38)
R <sup>2</sup>	0.67		0.89		0.76		0.91	

Notes: The results of panel fixed-effect regression of value stock returns and growth stock returns on change in the index of CEEF discount ( $\Delta VWD$ ) and aggregate market returns in model<sup>VWD</sup> 1 and change in index of CEEF discount ( $\Delta VWD$ ), aggregate market returns, FTSE Banking, FTSE Basic materials, FTSE Industrials and FTSE Consumer goods indices in model<sup>VWD</sup> 2 are reported. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels respectively.

**Table 10: Panel Fixed effects regression: Equity Put Call Ratio**

	$R_t$	$R_{t+1}$	$R_{t+2}$	$R_{t+3}$
<b>Panel A: Value stock returns</b>				
PCR	-0.12	-0.06	-0.02	-0.07
p-value	(0.00)***	(0.04)**	(0.49)	(0.01)***
R <sup>2</sup>	0.04	0.01	0.01	0.01
Obs	504	497	490	483
<b>Panel B: Growth stock returns</b>				
PCR	-0.05	-0.02	-0.01	-0.03
p-value	(0.02)**	(0.38)	(0.72)	(0.29)
R <sup>2</sup>	0.02	0.01	0.01	0.01
Obs	504	497	490	483
<b>Panel C: Aggregate market returns</b>				
PCR	-0.07	-0.03	-0.01	-0.04
p-value	(0.00)***	(0.26)	(0.78)	(0.13)
R <sup>2</sup>	0.02	0.01	0.01	0.01
Obs	504	497	490	483

Notes: The results of panel fixed-effect regression of value stock returns, growth stock returns and aggregate market returns on equity PCR for the period January 2002-December 2007 are given. The equity PCR is equity put volume divided by equity call volume and equity put volume. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels respectively.

## **Appendix A: Consumer confidence index calculation**

Consumer surveys have been carried out in almost all the developed countries for more than 20 years. These surveys are conducted to study consumers' present and future financial situations and their outlook on the economy over the next year. The questions in the surveys are very much similar across all the countries. For instance, the University of Michigan surveys at least 500 consumers households about their present and future financial situations, their business and economic outlook over next 1 and 5 years, respectively, and also about their willingness to spend on durable goods in the near future. Similarly, the Conference Board of Canada surveys Canadian households about their present and future financial situations and their level of optimism about the current economic conditions and over the next six months. Besides studying the consumers' current and future financial situations and their outlook on the economy, DG ECFIN also seeks to find the likelihood of consumers' ability to save money over the next 12 months. DG ECFIN conducts consumer survey on at least 2000 households of the UK, Germany and Italy each and 3300 households of France. Of all the countries, Japan surveys maximum households, that is, 6000 households. Its survey questionnaire consists of questions similar to that of the USA and Canada, for example, consumers' perception of the economy, price expectation and their present and future financial situations. Overall, the consumer survey questions are similar across the G7 countries and hence the outcome of the survey is easily comparable. However, the calculation of index differs across countries. For instance, DG ECFIN employs 'Dainties' method, while Japan employs X-11 of the Census Bureau USA. For ease of comparison, we standardized consumer confidence survey measures across all the countries.

## **Appendix B: Equity fund flow data calculation**

Here, the reasons for using the net equity fund flow data including distributions are detailed. The procedure in which the data are maintained by different sources is also discussed. The ICI of the USA is the national trade association for the investment company industry. Almost all the mutual funds, CEEFs, exchange-traded funds and unit investment trust domiciled in the USA are the members of ICI. For each fund, ICI collects the following information - net new sales, reinvested dividends, net redemptions and net switches between the funds. To determine the significance of net fund flow, previous studies (Warther 1995; Indro 2004) have used net sales excluding distributions. A similar breakdown of net sales including and excluding distributions is maintained by IFIC. The IMA maintains the net sales of equity funds of all the mutual fund managers domiciled in the UK. The net sales data maintained by the IMA include distributions and are net of switches made between the funds and net redemptions. We sourced equity fund flow data for France, Germany, Italy and Japan from Lipper, subsidiary of Thomson Reuters. Lipper maintain the database of fund flow with effect from January 2002. They calculate net sales of a given fund as a

difference between total equity fund assets between two months after stripping the performance of all the assets within the fund. The fund flow data maintained by them include reinvested distributions and also take into account both the net redemptions and the net switches between the funds. In order to have consistent data across all the countries, we decided to use net equity fund flow data including distributions valued in the US dollars. For this reason, we have employed value-weighted stock returns including reinvested distributions provided by Kenneth French.

### **Appendix C: Details of CEEFs data**

Here, different types of closed-end funds collected by Morningstar that are considered in our research are discussed. For each fund, Morningstar gathers NAV and price data. NAV data are sourced directly from the fund manager, whereas price data are obtained from trading exchanges. In our research, we have considered only conventional CEEFs. ‘Bond funds’ are specifically excluded. Also within CEEFs, we did not consider fund warrants, C-shares and split funds in our analysis. Fund warrants were not considered as they do not have NAV, whereas C-shares are a way of raising money by an existing fund and hence are not considered as conventional closed-end funds. Split funds are investment trusts with a fixed life, where the shares are divided into more than one category. The simplest form of split funds is a split between capital shares and income shares. The other variations of closed-end funds, which are not in their conventional form, include zero dividend preference shares, highly geared shares, participating income shares and stepped preference shares. These funds have been specifically excluded from our discount calculation. Lastly, CEEFs for which neither NAV data nor price data were available were excluded from our VWD calculation.