

# Investors' sentiment and accruals anomaly: European evidence

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## Abstract

**Purpose** – The purpose of this paper is to examine whether investors' sentiment affects accruals anomaly across European countries.

**Design/methodology/approach** – The authors estimate the model using Fama–MacBeth regressions. The sample includes 54,572 firm-year observations for 4,787 European firms during the period 1994–2014.

**Findings** – The authors find that investors' sentiment influences accruals mispricing across European countries. The effect is pronounced for stocks whose valuations are highly subjective and difficult to arbitrage. The cross-country analysis provides evidence that sentiment influences accruals anomaly in countries with weaker outside shareholder rights, lower legal enforcement, lower equity market development, higher allowance of accrual accounting and in countries where herd-like behavior and overreaction behavior are strong.

**Research limitations/implications** – The findings suggest the generalizability of the sentiment-accruals anomaly relation in European countries characterized by different cultural values, levels of economic development and legal tradition.

**Practical implications** – The findings suggest to caution individuals investors. These investors would be wise to take into account the impact of sentiment on the performance of their portfolio. They must keep in mind that periods of high optimism are accompanied by a high level of accruals and followed by low future stock returns.

**Originality/value** – The research supplements previous American studies by showing the significance of the level of sentiment in understanding the accruals anomaly in Europe. Hence, it is important for future studies to consider investor sentiment as an important time-series determinant of the accruals anomaly, particularly for stocks that are hard to value and difficult to arbitrage.

**Keywords** Institutional factors, Cultural dimensions, Behavioural finance, Cross-country study, Accruals anomaly, Investors' sentiment

**Paper type** Research paper

## 1. Introduction

The traditional finance theory postulates that market prices fully and perfectly reflect all available information. Behaviorists challenge this assumption by addressing the implications of investors' cognitive biases on the price formation process. Libby *et al.* (2002) and Barber and Odean (2008), for instance, establish that investors and financial professionals focus on a few salient stimuli and consequently are more likely to neglect part of the relevant information. Investors' selective evaluation of information potentially explains why they value firms based on their earnings performance rather than on all the financial variables available.

Hirshleifer *et al.* (2004) argue that when investors are subject to limited attention, they do not make full use of the balance sheet information but rather focus on accounting profitability. Hirshleifer *et al.* (2011) report that investors with limited attention attend to earnings announcements, ignore information about earnings components (i.e. cash flows from operations and accruals), and disregard the fact that cash flows from operations are



better at forecasting future profitability than accruals are. To neglect the difference between these variables might result in over-optimistic evaluations of firms with high accruals and pessimistic evaluations for those with low accruals. Consequently, firms with high accruals might end up overvalued relative to those with low accruals. This potentially erroneous valuation, known as the accruals anomaly, was originally documented by Sloan (1996).

The accruals anomaly is a serious challenge to rational asset pricing theory. For Fama and French (2008), this anomaly is one of the most pervasive return anomalies identified in the financial literature. A variety of explanations, both risk-based and behavioral, have been proposed to explain this anomaly. For some researchers, behavioral finance (i.e. investors' naivety) explains the anomaly while for others the anomaly is best explained by rational investors demanding a risk premium to be compensated for the risk induced by the anomaly. The question is thus whether the anomaly reflects market mispricing or whether it can be captured by structural risk factors. Previous studies lead to inconclusive results. Hirshleifer *et al.* (2012, p. 10) state: "While such tests are informative, they do not fully answer the general question of whether or not the accrual anomaly represents a form of market inefficiency, or can be better explained by a rational factor pricing model."

Our research examines whether the accruals anomaly can be explained by limited investors' attention in the European setting. Similar to Ali and Gurun (2009), we investigate whether individual investors' sentiment – as a proxy for limited investors' attention – affects accruals mispricing across the 15 European countries in the period from 1994 to 2014. The academic community agrees to define investors' sentiment as excessive optimistic or excessive pessimistic investors' behaviors that cannot be explained by objective economic reason. Research in social psychology provides evidence that investors' attention decreases (increases) in period characterized by high (low) sentiment. Thus, it seems that optimism decreases investors' attentiveness and that pessimism increases attentiveness. Although we cannot completely rule out the role of rational pricing framework, our results show the ability of the investor sentiment to provide a behavioral explanation for the accruals anomaly and cast doubt on the risk rational explanation.

Our study is in line with the work of Ali and Gurun (2009) but can be differentiated by three essential elements. First, we use a direct indicator of sentiment (confidence index), while Ali and Gurun's study is based on indirect proxies (similarly to Baker and Wurgler's (2006) Composite Index). Our measure better apprehends investor sentiment by avoiding the use of indirect measures that are highly endogenous to the market. Second, our study extends our understanding of the cross-sectional relationship between investor sentiment and the accruals anomaly. Ali and Gurun (2009) focus on small cap stocks in the US market because they are primarily held by individual investors. Since shareholders' ownership is different in Europe, we focus on firms difficult to value and to arbitrate. The sentiment-driven accruals mispricing in stocks is expended by integrating several characteristics other than firm size such as dividend policy, profitability, tangibility and arbitrage costs. Third, our study provides empirical evidence on the role of sentiment in affecting the existence and the magnitude of the accruals anomaly in different countries, and in identifying certain country-level factors that are associated with this role.

This paper contributes to the existing literature in several ways. First, our research enriches the study of Ali and Gurun (2009), who show how investors' sentiment leads to a measure of limited investors' attention and how this measure of limited attention impacts the US market. Second, our research supplements previous studies by showing the significance of the level of sentiment in understanding the accruals anomaly in Europe. The heterogeneity and diversity of European countries is particularly propitious to an extension of the previous analyses since it allows for investigation of the influence of European countries' institutional factors and national culture on the relationship

between accruals anomaly and investor sentiment. To our knowledge, no study in the financial literature has explored this moderating effect of cultural and institutional factors on the relationship between the accruals anomaly and investor sentiment. Third, a new geographical area allows also for the assessment of the robustness of the investors' sentiment as a behavioral explanation for the accruals anomaly. As suggested by Bossaerts and Hillion (1999), reaching similar conclusions when using a new data set and another geographic area reinforce the fact that previous results are not incidental. Moreover, to motivate our analysis in a non-US setting, we refer to the evidences of Green *et al.* (2011), which indicates the demise of the accruals anomaly in the US market, while other studies show that not only does the accruals anomaly still persists but that its magnitude has not declined over time in Europe (Papanastasopoulos and Tsiritakis, 2015).

This paper proceeds as follows. In Section 2, we review the literature on the relationship between investors' sentiment and the accruals anomaly and present our research hypotheses. In Section 3, we present our data and define our variables. Section 4 explains the methodology. Section 5 describes the findings, and Section 6 presents the results of the robustness tests. The last section concludes this research.

## 2. Literature review and hypothesis development

Research in social psychology provides evidence that human behavior is different in times of anxiety and fear than in periods of prosperity and tranquility (Tiedens and Linton, 2001). Investors' decisions to buy, sell or hold assets are thus impacted by their psychological state of mind when the decision is made. Schwarz (2002), for example, notes that investors in an optimistic emotional state are likely to proceed as usual, while those experiencing a pessimistic emotional state have the tendency to proceed in a more drastic and detail-oriented manner.

Results of some studies in accounting research corroborate those reported in social psychology. Ali and Gurun (2009) confirm that accruals mispricing is stronger in high sentiment periods than in low sentiment periods. They show that in high sentiment periods, enthusiastic retail investors pay less attention to the impact of earnings components (i.e. cash flows from operations and accruals) on stock prices than in low sentiment periods. Livnat and Petrovits (2009) show that in pessimistic sentiment periods, companies with low accruals produce considerably higher excess returns than during optimistic sentiment periods. Stambaugh *et al.* (2012), who examine 11 well-documented anomalies in finance literature (including the accruals anomaly), find that long-short strategies exploiting anomalies exhibit more profit in high sentiment than low sentiment periods.

There is also substantial evidence that firms with more subjective valuations and greater limits to arbitrage are more affected by investors' behavioral biases (Baker and Wurgler, 2006; Lemmon and Portniaguina, 2006). Ali and Gurun (2009) report that accruals mispricing is stronger in high sentiment periods than in low sentiment periods, for small stocks which tend to be held by a greater proportion of individual investors. Hribar and McNis (2012) show that when sentiment is high, analysts' forecasts of earnings tend to be more optimistic for the difficult-to-value stock. In a recent study, Cornell *et al.* (2017) find that the quality accounting information (i.e. accruals quality) of firms mitigates sentiment-related mispricing, particularly for firms that are difficult to value.

Drawing from the above studies, we also aim at understanding the relationship between investors' cognitive biases and accruals valuation. Our analysis is predicated on the assumption that investors are less vigilant during optimistic periods than during pessimistic ones. Investors with optimistic views about stocks have the tendency to be excessively optimistic in high sentiment periods, leading to a larger overvaluation of accruals as compared with low sentiment periods. Moreover, the shares of certain firms –

those that are difficult to value and arbitrage – are more affected by investor sentiment. We address this view by testing the following hypothesis:

*H1.* The effect of sentiment on accruals mispricing is stronger for firms that are hard to value and difficult to arbitrage.

The evidence on the international differences in accruals mispricing is sparse and controversial. LaFond (2005) reports that differences in countries' accounting standards and legal systems do not explain the accruals anomaly. Pincus *et al.* (2007) reach another conclusion; the accruals anomaly is more likely to occur in countries with weaker outside shareholder rights, lower legal enforcement, well-functioning equity markets, dispersed ownership and higher allowance of accrual accounting. In our study, we use a cross-section of countries to determine if there is evidence that the pervasiveness of the accruals anomaly in high sentiment periods is related to the level of development of their financial institutions and to the level of sophistication of their equity market. Our market integrity indicators obtained from Leuz *et al.* (2003) include: outside investor rights; legal enforcement; importance of the stock market; and ownership concentration. Our last market integrity indicator is Hung's (2001) index measuring the extent of accruals accounting permitted in a country.

Outside investors' rights are proxied by the anti-director rights index created by La Porta *et al.* (1998)[1], which captures how strongly the legal system favors minority shareholders over dominant shareholders. Legal enforcement is measured as the mean score across three legal variables: the efficiency of the judicial system, the assessment of the rule of law and the corruption index[2]. Several papers (e.g. Pincus *et al.*, 2007) show that a stronger shareholder protection attenuates the negative impact of accruals on the value relevance of earnings. We expect that the occurrence of the accruals anomaly will be negatively related to the anti-director rights index and to the strength of the shareholder's protection, since these variables reduce incentives to manipulate accruals by decreasing the opportunities to benefit from these manipulations.

The third and fourth market integrity variables are used to represent the characteristics of equity markets, including their importance as a source of capital and the concentration of shares ownership. The importance of the stock market in the local economy is measured by the mean rank across three variables, namely, the ratio of the aggregate stock market capitalization held by minorities to gross national product, the number of listed domestic firms relative to the population and the number of IPOs relative to the population. In countries where investors focus heavily on earnings to value firms, managers could have more incentives to manipulate accruals. In developed equity markets, earnings are more value relevant than in less developed markets (Ali and Hwang, 2000). Consequently, investors in developed markets confer more importance to earnings for security pricing. This market characteristic is insidious because it has the potential to motivate managers to manipulate accruals to ensure the satisfaction of the investors, which results in a positive relationship between the occurrence of the accruals anomaly and the importance of the equity markets in a country.

The ownership concentration variable is measured as the median percentage of common shares owned by the largest three shareholders in the ten largest privately owned non-financial firms. High dispersion of ownership is likely to increase the information asymmetry between managers and stock market participants. Information asymmetry induces investors to rely upon reported and forecasted earnings to value firms. As a greater focus on earnings increases the probability of accruals mispricing, the occurrence of the accruals anomaly should be negatively correlated to the degree of concentration of share ownership in a country.

The last market integrity indicator is similar to Hung's (2001) index. It assesses the extent of accruals accounting in various countries by evaluating the extent to which the accounting systems depart from a cash method. A high index value in a particular country

indicates that higher use of accruals accounting is permitted in that country. Since more accruals accounting gives managers more opportunities to manage earnings, we expect more accruals mispricing in countries with more allowance of accruals accounting. From the above, we formulate the following hypothesis:

*H2.* The impact of investor sentiment on accruals mispricing is stronger for countries with weaker outside shareholder rights, lower legal enforcement, well-functioning equity markets, dispersed ownership and higher allowance of accrual accounting.

Even though a number of empirical studies have investigated the accruals anomaly in an international context (LaFond, 2005; Pincus *et al.*, 2007, etc.), very few of these studies have strengthened the link between the accruals anomaly and cultural factors. A notable exception is the paper of Papanastasiopoulos (2014), which shows that accruals mispricing varies according to a country's level of individualism. Using the pivotal study of Hofstede (1980), we evaluate the relationship between sentiment-related accruals mispricing and culture. The task is challenging since culture is difficult to define and sentiment difficult to capture. As far as culture is concerned, we rely on Hofstede (2001) who defines culture as "the collective programming of the mind" separating the members of one group from another. In Hofstede (2001)'s study, culture, a by-product of our environment, can be captured by five dimensions: power distance, uncertainty avoidance, individualism, masculinity and long-term orientation.

The behavioral explanation of the sentiment-return relation says that individuals herd and overreact. Individualism refers to the extent to which people emphasize their own abilities to differentiate themselves from others. Collectivism, on the other hand, pertains to people's (stakeholders') motivations to be assimilated into and sheltered by their organizations. Further, since people in collectivistic countries belong to strong groups, consensus opinions tend to prevail. Collectivism leads to herd-like behavior, similar to noise traders' behavior when they mimic each other's actions based on their similar expectations, whether overly optimistic or pessimistic. This tendency to invest with the herd is exactly what is assumed to drive the relationship between investors' sentiment and stock returns in financial markets.

Uncertainty avoidance deals with a society's tolerance for uncertainty and ambiguity. According to Hofstede (2001), the fundamental issue pertaining to uncertainty avoidance is whether a society tries to control the future. The uncertainty avoidance index measures the degree to which a culture programs its members to react to unusual and novel situation, and explains why people believe they are content regardless of uncertainty. In countries with a higher uncertainty avoidance index value, people prefer predictable outcomes, are reluctant to accept risks and are more emotional than those in countries with lower uncertainty avoidance index values. People in the latter countries can handle more uncertainties, tolerate more risks and are described as contemplative and thoughtful.

In this context, several studies find the strong influence of investor sentiment on stock returns in countries that are more likely to demonstrate herding behavior or overreaction (Schmeling, 2009; Zouaoui *et al.*, 2011; Corredor *et al.*, 2013). Similar to these studies, we use the individualism and the uncertainty avoidance as proxies for herding behavior and for tendency of investors to overreact across countries. These findings lead to our third hypothesis:

*H3.* The impact of investor sentiment on accruals mispricing is stronger for countries with a low level of individualism and high uncertainty avoidance.

### 3. Data sources and variable definitions

Our study covers all common stocks listed on the major stock exchanges of 15 European countries for the period 1994–2014. The countries included in the study are Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, Slovenia, Spain, Sweden and the UK. We extract stock return data and company

financial data from the Datastream/Worldscope database. To clean the return data, we apply the same screens advocated by Ince and Porter (2006) by removing penny stocks, stocks with extremely low market capitalization and stocks with unrealistic returns behavior.

Similar to previous research examining accruals, we exclude financial firms (SIC codes 6000-6999) and utilities (SIC codes 4900-4999) from our sample. We exclude firms with book-to-market values within the top and bottom 1 percent. We also exclude firm-year observations with non-positive total assets and book value of equity, as these variables are used to standardize other variables and thus cannot be zero or negative. A complete set of desired data are required for a firm-year observation to be included in our sample. Finally, all firms with fiscal-year end other than December 31 are excluded from the sample to avoid confounding economic effects in the empirical analysis. Our data requirements produce a final sample comprised of 54,572 firm-year observations for 4,787 European firms.

We obtain our market integrity indicators from Leuz *et al.* (2003) and data for the accruals index from Hung (2001)[3]. Cultural variables about individualism and uncertainty avoidance are borrowed from Hofstede[4]. Data related to institutional factors and national cultures are constant over the study period.

### 3.1 Accruals measure

Along the lines of prior research, we measure the accrual component of earnings as change in non-cash working capital minus depreciation expense. Specifically, we estimate the accrual component of earnings for firm  $i$  in year  $t'$  as follows[5]:

$$Accruals_{it'} = (\Delta CA_{it'} - \Delta CASH_{it'}) - (\Delta CL_{it'} - \Delta STD_{it'} - \Delta TP_{it'}) - DEP_{it'}, \quad (1)$$

where  $\Delta CA_{it'}$  represents the annual change in total current assets;  $\Delta CASH_{it'}$  is the change in cash and cash equivalents;  $\Delta CL_{it'}$  is the change in total current liabilities;  $\Delta STD_{it'}$  is the change in short-term debts;  $\Delta TP_{it'}$  is the change in income taxes payable; and  $DEP_{it'}$  is the depreciation and amortization expense. The accruals component is scaled by lagged assets for meaningful cross-sectional and cross-country analyses. Note that because accruals are mechanically related to ending total assets, average total assets cannot be used as a deflator (Ali and Gurun, 2009).

### 3.2 Investors' sentiment

As of today, there is no uncontroversial and universally accepted sentiment measure. For our international analysis, we favor the consumer confidence index for the following reasons[6]. First, as evidenced by numerous studies (e.g. Lemmon and Portniaguina, 2006; Antoniou *et al.*, 2013), the index is an accurate measure of individual investor sentiment because it is based on a monthly survey of a large number of households about their current and expected financial situations and their beliefs about the economy. Moreover, the consumer confidence index constructed by the European Commission is available for several European countries for long and regular periods of time. Second, the relationship between the consumer confidence index and international stock markets is well documented. Prior studies show that the consumer confidence index, as a proxy for investors' sentiment, has a significant impact on stock returns across countries, even after controlling for other standard risk factors and expected business conditions (Schmeling, 2009). Third, and most importantly, as these surveys are harmonized since the mid-1980s, comparisons across countries are achievable.

The raw sentiment indicator encompasses a psychological component related to sentiment and a rational component related to economic fundamentals. The bullishness or bearishness of an investor can reflect rational or irrational future expectations, or both. To mitigate this possibility, we decompose the raw sentiment indicator into two components: a rational component, reflecting the economic fundamentals, and a psychological component, reflecting investor sentiment. Specifically, we treat the residuals from the following equation

as our measure of sentiment unwarranted by fundamentals:

$$Sent_{jt} = \alpha_j + \sum_{k=1}^K \beta_k^j Fund_{k,t}^j + \varepsilon_{j,t}, \quad (2)$$

where  $Sent_j$  is the raw sentiment variable of every country,  $\alpha_j$  is the constant and  $\beta_k^j$  are the parameters to be estimated;  $Fund$  is the set of fundamental variables representing rational expectations based on risk factors of every country. Similar to previous studies, we use data on growth of industrial production, inflation, term spread and growth in durable, non-durable and services consumption. The fitted values of Equation (2) capture the rational component, and the residual captures the psychological component. Finally, we construct an annual measure of sentiment,  $Sent_t^+$ , by averaging the consumer confidence index orthogonalized by fundamental variables across 12 months in every year.

### 3.3 Firm characteristics

Baker and Wurgler (2006) show that the effect of investor sentiment on stock returns is more pronounced for certain categories of stock, particularly those that are hard to value and to arbitrage. They classify small firms, young firms, unprofitable firms, intangible firms, high volatility firms and firms that do not pay dividends as firms that are difficult to value and costly to arbitrage. Following this study, we utilized the following firm characteristics: size, age, profitability, tangibility, dividend policy and volatility. Size is the market capitalization measured as price per share time number of shares outstanding. Age is the number of months since the firm first appeared in our database. Profitability is captured by the return on assets before taxes, defined as income before tax for a specific fiscal year divided by the average total assets for the same period. Tangibility is quantified by total amount invested in properties, plants and/or equipment over total assets. Dividend policy is approximated by the ex-date dividends per share multiplied by shares outstanding divided by book equity.

Our study uses volatility as a proxy for the difficulty to value and arbitrage of a specific company. Wurgler and Zhuravskaya (2002) report that the higher a company's specific risk, measured as total risk less systematic risk, the riskier arbitrage becomes for that company. The costs associated with arbitrage, i.e. the idiosyncratic risk of a security ( $V(\varepsilon)$ ), are estimated by the variance of the residuals from the regression of returns on individual securities on Fama and French (1993) risk factors. Concretely, the arbitrage cost for a security  $i$  at time  $t$  is calculated by the variance of the residual returns estimated over the last 60 months. Data on Fama and French (1993) risk factors for each country are collected from the EUROFIDAI database[7]. In order to make results easier to interpret, we have rescaled the volatility factor so that smaller values depict hard to value and difficult to arbitrage stocks.

## 4. Research design

As stated previously,  $H1$  asserts that accruals mispricing for hard to value and difficult to arbitrage stocks is greater in periods of high sentiment than in periods of low sentiment. This hypothesis is tested using the modified model of Ali and Gurun (2009). The general model to evaluate the impact of the variable sentiment on the accruals anomaly is written as follows:

$$Eret_{it+1} = \beta_{0t} + \beta_{1t}Char_{it} + \beta_{2t}Accruals_{it} + \beta_{3t}PriorRet_{it} + \beta_{4t}BM_{it} + \beta_{5t}Char \times Accruals_{it} + \mu_{it+1}, \quad (3)$$

$$\beta_{5t} = \gamma_0 + \gamma_1 Sent_t^+ + v_{t+1}. \quad (4)$$

Model (3) is estimated using Fama–MacBeth regressions. The reported estimates are the time-series averages of the monthly estimated coefficients. The  $p$ -values are based on the

standard deviation of coefficient estimates.  $Eret_{it+1}$  is stock return in excess of market return for month  $t+1$ .  $Char_{it}$  is a dummy variable that takes the value of one when a firm characteristic (i.e. size, age, profitability, tangibility, dividend policy or volatility) is below the median for the month  $t$ , and is 0 otherwise. At the beginning of each month  $t$ , all stocks are ranked as difficult to value and hard to arbitrage relative to easier to value and easier to arbitrage, using the median of each firm characteristic as the cutoff point. Fama and French (1992) show that a delay of six months is needed to insure that accounting data are published and available to investors. To relate future returns to the most recently reported accounting information, the independent variable  $Accruals_{it}$  is the accrual component of earnings for the fiscal year that ended at least six months before but less than eighteen months before the return measurement month. BM is the book-to-market ratio measured as the book value of equity divided by the market value of equity. Book value of equity is for the fiscal year that ended at least 6 months before, but less than 18 months before the return measurement month. Market value of equity is for the most recent calendar year end.  $PriorRet_{it}$  is prior returns measured by six months cumulative stock returns preceding the future return measurement period.

Since we investigate the relationship between investor sentiment and accruals mispricing, our independent sentiment variable must capture investors' state of mind at the time they value the firm reported accruals. The dependent variable of Model (4) ( $\beta_{5t}$ ) represents the value of average accruals mispricing of firms difficult to value and hard to arbitrage relative to those easier to value and easier to arbitrage for a month  $t$ . This dependent variable is estimated using cross-sectional regressions, one for each month in our sample stocks that includes accruals from firms with the same fiscal year end of December 31.  $Sent^L$  is the explanatory variable of Model (4) and represents our sentiment measure defined previously. Thus, the sentiment measure that corresponds to the accruals mispricing may be either for the most recent calendar year before the return month (period between July and December) or for the previous calendar year (period between January and June).

Since investors' attention is lower in high sentiment periods than in low sentiment periods, high sentiment should accentuate the negative impact of accruals on future returns. We predict a negative coefficient for the variable  $Sent^L$  in Equation (4). For firms hard to value and difficult to arbitrage, a negative coefficient is coherent with significant overvaluation per unit of accruals when investors are bullish.

## 5. Results

### 5.1 Overall analysis

Table I depicts some descriptive statistics for the variables accruals, sentiment and control variables used in the study for all countries. The mean firm size in our sample is €855.97m, with the median at €44.5m. The mean book-to-market ratio is 0.852, while mean ROA is 0.5 percent. Similar to previous studies, the average total accruals are negative due to depreciation expenses.

Table II presents the results of the Fama–MacBeth regressions of Model (3). The results in the table are comparable for all characteristics studied. Results from the Fisher tests show that the models are generally significant. Similar to prior researches, we find that the coefficients for the book-to-market and prior returns variables are positive and significant. Findings are consistent with the explanation that risk factors explain at least a portion of accruals anomaly. We also find that the coefficient  $\beta_{2t}$  for the accruals variable is negative and significant. This finding, which is also consistent with previous studies, shows the presence of accruals mispricing in our international sample (LaFond, 2005; Pincus *et al.*, 2007). However, we observe that the coefficient  $\beta_{5t}$  for the interactive variable between accruals and the dummy variable is negative but insignificant. These results confirm that when investor sentiment is not taken into account there is not much difference in accruals mispricing between firms difficult to value and to arbitrage relative to those easier to value



Variables	Mean	Median	SD	Min.	Max.
Accruals	-0.037	-0.040	1.022	-0.298	0.213
PriorRet	0.070	0.046	0.346	-0.324	0.794
Eret	0.015	0.013	0.009	-0.010	0.036
Market value (in M€)	855.97	44.05	2,388.66	4.853	1,845.98
BM ratio	0.852	0.549	0.488	0.442	1.541
Age (in months)	68.303	71	39.85	1.292	133.198
Profitability	0.005	0.048	0.252	-4.261	1.231
Tangibility	0.311	0.165	0.553	0.226	0.883
Dividend policy	0.389	0.376	0.391	0.000	0.123
Volatility	0.052	0.049	0.008	0.009	0.112
Sent <sup>L</sup>	86.12	66.76	12.23	21.09	111.26

**Notes:** Accruals are calculated as: ( $\Delta$ current assets –  $\Delta$ cash) – ( $\Delta$ current liabilities –  $\Delta$ short-term debt –  $\Delta$ taxes payable) – depreciation expense, scaled by lagged assets. Prior Returns (PriorRet) are measured by six-month cumulative stock returns preceding the future return measurement period. Future return (Eret) is stock return in excess of market return. Market value is measured as year-end stock price times the number of shares outstanding. Book-to-market ratio (BM) is calculated as the book value of common equity divided by the market value of equity. Age is the number of months since the firm's first appearance in our database. Profitability is captured by the return on assets defined as earnings divided by total assets. Tangibility is captured by property, plant and equipment over total assets. Dividend policy is approximated by the ex-date dividends per share multiplied by shares outstanding divided by book equity. Volatility for a security  $i$  at time  $t$  is calculated by the variance of the residuals from the regression of returns on individual securities on Fama and French (1993) risk factors. Sent<sup>L</sup> is the component of consumer confidence index that is orthogonal to economic fundamentals

**Table I.**  
Descriptive statistics

and to arbitrage. We also find that the coefficient for the dummy variable is positive and significant. This finding indicates that firms that are difficult to value and hard to arbitrage are mispriced by markets because these firms face important information asymmetries and have higher transaction costs.

Panel A of Table III presents the results of the estimation of Equation (4), over the whole sample, without taking into account the impact of institutional factors and national culture. In that equation, the dependent variable represents the time series of coefficients  $\beta_5$  estimated in Equation (3) and the independent variable is our measure of sentiment. We observe that for all characteristics studied, the regression coefficient on Sent<sup>L</sup>, which is the investor sentiment measure, is negative and significant. Regarding the influence of firm characteristics, the results confirm *H1* and indicate that the mispricing per unit of accruals for stocks that are hard to value and difficult to arbitrage is related to our sentiment measure. These results are in line with those obtained by Ali and Gurun (2009), who report a negative relationship between accruals and future returns during high sentiment periods for small stocks which are especially followed by individual investors.

To check for robustness of our results, we replace the time series of coefficients  $\beta_5$  by the time series of coefficients  $\beta_2$  in Equation (4). The model is as follows:

$$\beta_{2t} = \gamma_0 + \gamma_1 \text{Sent}_t^L + v_{it+1} \quad (5)$$

$\beta_{2t}$  represents the value of average accruals mispricing of all firms (the full sample). An insignificant relation between accruals mispricing of all the stocks and our measure of sentiment should further support our hypothesis. The results of the test of model (5) are reproduced in Panel B of Table III. We found a negative but insignificant link between accruals mispricing of all stocks included in our sample and investor sentiment. The results validate the hypothesis that sentiment does not significantly impact the accruals mispricing of stocks easier to value and to arbitrage.

Variables	Signs	Size	Age	Firm characteristics Profitability	Tangibility	Div. policy	1/Volatility
Intercept	?	0.768*** (0.001)	0.827*** (0.001)	1.023*** (0.000)	0.927*** (0.000)	0.751*** (0.005)	0.862*** (0.002)
Char	+	1.628** (0.021)	1.346** (0.042)	1.123** (0.048)	1.987** (0.011)	1.098* (0.072)	1.211* (0.062)
Accruals	-	-2.354** (0.023)	-2.732** (0.012)	-2.232** (0.019)	-2.825** (0.011)	-2.223** (0.029)	-2.921** (0.011)
PriorRet	+	0.721*** (0.000)	0.736*** (0.000)	0.724*** (0.000)	0.742*** (0.000)	0.688*** (0.000)	0.777*** (0.000)
Book-to-market	+	0.245** (0.021)	0.203* (0.051)	0.235** (0.032)	0.282** (0.019)	0.231** (0.041)	0.222** (0.029)
Char × accruals	-	-0.135 (0.234)	-0.123 (0.329)	-0.101 (0.423)	-0.112 (0.345)	-0.099 (0.542)	-0.112 (0.621)
$\beta$ -value (Fisher)		0.018**	0.019**	0.023**	0.012**	0.023**	0.011**
$R^2$ adjusted		0.020	0.018	0.011	0.024	0.012	0.025

**Notes:**  $Eret_{it+1} = \beta_0 + \beta_1 Char_{it} + \beta_2 Accruals_{it} + \beta_3 PriorRet_{it} + \beta_4 BM_{it} + \beta_5 Char \times Accruals_{it} + \mu_{it+1}$ . This table depicts the results of Fama-MacBeth's regressions of Model (3). The statistics tabulated in parentheses correspond to the  $\beta$ -values. The dependent variable, Eret, is stock return in excess of market return. Char is a dummy variable that takes the value of one when a firm characteristic (i.e. size, age, profitability, tangibility, dividend policy and volatility) is below the median for the month  $t$ , and is zero otherwise. Accruals are calculated as:  $(\Delta \text{current assets} - \Delta \text{cash}) - (\Delta \text{current liabilities} - \Delta \text{short-term debt} - \Delta \text{taxes payable}) - \text{depreciation expense}$ . Accruals are scaled by lagged assets. The prior rate of returns (PriorRet) are measured by six-month cumulative stock returns preceding the future return measurement period. The book-to-market ratio, BM, is measured as the book value of equity divided by the market value of equity. The sample consists of 54,572 firm-year observations for the period 1994–2014 across 15 European countries and 4,787 European firms. \*, \*\*, \*\*\*, \*\*\*\*: Significant at the 0.10, 0.05 and 0.01 levels

**Table II.** Stock price reaction to information in the accrual component of earnings

Variables	Size	Age	Profitability	Tangibility	Div. policy	1/Volatility
<i>Panel A: the dependent variable is the incremental mispricing per unit of accruals of stocks hard to value and to arbitrage relative to stocks easy to value, <math>\beta_{5t}</math></i>						
$\beta_{5t} = \gamma_0 + \gamma_1 \text{Sent}_t^\perp + v_{t+1}$ (Model 4)						
Intercept	-0.502 (0.322)	-0.487 (0.287)	-0.498 (0.325)	-0.673 (0.234)	-0.522 (0.294)	-0.567 (0.495)
Sent <sup>⊥</sup>	-1.082** (0.042)	-1.112** (0.036)	-1.091** (0.041)	-1.237** (0.019)	-1.076** (0.049)	-1.138* (0.054)
R <sup>2</sup> adjusted	0.011	0.012	0.010	0.014	0.009	0.008
<i>Panel B: the dependent variable is the incremental mispricing per unit of accruals of all stocks, <math>\beta_{2t}</math></i>						
$\beta_{2t} = \gamma_0 + \gamma_1 \text{Sent}_t^\perp + v_{t+1}$ (Model 5)						
Intercept	-0.723 (0.302)	-0.812 (0.212)	-0.731 (0.298)	-0.693 (0.356)	-0.894 (0.184)	-0.896 (0.183)
Sent <sup>⊥</sup>	-0.541 (0.298)	-0.556 (0.358)	-0.544 (0.242)	-0.612 (0.254)	-0.806 (0.136)	-0.810 (0.132)
R <sup>2</sup> adjusted	0.001	0.001	0.001	0.002	0.003	0.002
<b>Notes:</b> Panel A reports the regression estimates of Model (4), where the dependent variable, $\beta_{5t}$ , is the incremental mispricing per unit of accruals of stocks hard to value and to arbitrage relative to stocks easy to value and to arbitrage, obtained from Fama–MacBeth regressions of Model (3). Sent <sup>⊥</sup> is the component of consumer confidence index that is orthogonal to economic fundamentals; Panel B reports the regression estimates of Model (5), where the dependent variable, $\beta_{2t}$ , obtained from Fama–MacBeth regressions of Model (3). The sample consists of 54,572 firm-year observations for the period 1994–2014 across 15 European countries and 4,787 European firms. *, **, *** Significant at the 0.10, 0.05 and 0.01 levels						

**Table III.**  
Investor  
sentiment and  
accruals mispricing

### 5.2 Per-country analysis

Table IV presents the results of the estimation of Equation (4) for each country. In this equation, the dependent variable represents the time series of coefficients  $\beta_5$  estimated in Equation (3) and the independent variable is our measure of sentiment. *HI* is not validated for all countries. For example, for the small cap stocks, coefficients are negative and significant at the usual threshold of 5 percent for 10 countries out of the 15 analyzed. The countries most affected by the sentiment are, in descending order, Italy, Portugal, Greece, Germany and France. Since these countries do not have uniform characteristics in terms of size and geographical location, it is likely that the national culture and institutional factors play a role in the relationship between investor sentiment and accruals anomaly in Europe. This result is consistent with the presence of fixed effects in our model as corroborated by the tests of Fischer and Hausman.

### 5.3 The impact of institutional factors and national culture

To evaluate *H2* and *H3*, we introduce in Model (4) interactive terms between the variables identifying institutional and cultural factors and investor sentiment (Sent<sup>⊥</sup> × factor). The model is as follows:

$$\beta_{5jt} = \gamma_0 + \gamma_1 \text{Sent}_{jt}^\perp + \sum \delta \text{factor}_j + \sum \beta \text{Sent}_{jt}^\perp \times \text{factor}_j + v_{jt+1}. \quad (6)$$

Factor is a dummy variable that takes the value of one when an institutional or a cultural factor is below the median of the full sample of countries, and is zero otherwise. The results of the estimation of Equation (6) after the inclusion of the cultural and institutional factors for all the countries in our sample are shown in Table V. In this equation, the dependent variable represents the time series of coefficients  $\beta_5$  (accruals mispricing) estimated in Equation (3) and the independent variables are our measure of investor sentiment and interactive terms between the variables identifying institutional factors, herd-like and overreaction behavior, and sentiment. Regarding the influence of institutional factors, with the exception of the variables' concentration of ownership and importance of the stock market, the results confirm *H2*. Thus, regression results of Model (6) show a negative and significant relation between sentiment and accruals mispricing in countries characterized by weaker anti-director rights, weaker legal enforcement

	BEL	CZ	DEN	FIN	FRA	GER	GRE	IRE	ITA	NET	POR	SLO	SPA	SWE	UK
Num. of obs.	1,482	205	1,334	1,357	8,894	8,963	3,387	775	2,714	1,802	718	297	1,174	3,866	17,604
<i>Size</i>															
Intercept	-1.023	-1.001	-1.109	-0.099	-1.111	-1.066	-1.020	-1.033	-1.042	-1.019	-1.002	-1.115	-1.021	-0.098	-1.011
Sent <sub>t-1</sub>	-1.033**	-0.091	-0.077	-0.071	-1.087**	-1.096**	-1.099**	-0.088	-1.114**	-1.011**	-1.111**	-1.077**	-1.015**	-0.066	-1.022**
R <sup>2</sup> Adjusted	0.005	0.002	0.001	0.001	0.006	0.006	0.008	0.001	0.009	0.005	0.008	0.004	0.004	0.000	0.005
<i>Age</i>															
Intercept	-1.026	-1.004	-1.105	-0.099	-1.109	-1.061	-1.020	-1.035	-1.055	-1.021	-1.011	-1.110	-1.001	-0.091	-1.013
Sent <sub>t-1</sub>	-1.037**	-0.090	-0.071	-0.073	-1.091**	-1.099**	-1.101**	-0.081	-1.201**	-1.012**	-1.109**	-1.089**	-1.013**	-0.061	-1.023**
R <sup>2</sup> Adjusted	0.005	0.002	0.001	0.002	0.006	0.006	0.008	0.002	0.009	0.004	0.007	0.004	0.004	0.001	0.005
<i>Profitability</i>															
Intercept	-1.019	-1.000	-1.101	-0.102	-1.109	-1.059	-1.019	-1.032	-1.055	-1.062	-1.109	-1.108	-1.029	-0.091	-1.011
Sent <sub>t-1</sub>	-1.030**	-0.106**	-0.081	-0.070	-1.085**	-1.093**	-1.083**	-0.089	-1.111**	-1.023**	-1.099**	-1.091**	-1.018**	-0.065	-1.022**
R <sup>2</sup> adjusted	0.005	0.005	0.002	0.001	0.006	0.005	0.007	0.001	0.008	0.007	0.007	0.004	0.004	0.000	0.005
<i>Tangibility</i>															
Intercept	-1.055	-1.016	-1.110	-0.089	-1.108	-1.051	-1.022	-1.028	-1.089	-1.021	-1.082	-1.109	-1.009	-0.108	-1.088
Sent <sub>t-1</sub>	-1.041**	-0.093	-0.080	-0.074	-1.091**	-1.099**	-1.103**	-0.081	-1.119**	-1.019**	-1.118**	-1.091**	-1.019**	-0.071	-1.029**
R <sup>2</sup>	0.006	0.002	0.001	0.001	0.006	0.006	0.007	0.002	0.009	0.006	0.007	0.004	0.005	0.001	0.006
<i>Dividend policy</i>															
Intercept	-1.027	-1.000	-1.002	-0.099	-1.118	-1.081	-1.021	-1.099	-1.072	-1.017	-1.008	-1.108	-1.019	-0.101	-1.010
Sent <sub>t-1</sub>	-1.052**	-0.093	-0.078	-0.071	-1.091**	-1.099**	-1.106**	-0.081	-1.118**	-1.015**	-1.113**	-1.104**	-1.024**	-0.069	-1.026**
R <sup>2</sup>	0.006	0.002	0.001	0.002	0.007	0.006	0.008	0.002	0.008	0.006	0.008	0.005	0.005	0.001	0.006
<i>I/Volatility</i>															
Intercept	-1.014	-1.022	-1.008	-0.116	-1.118	-1.092	-1.041	-1.021	-1.039	-1.007	-1.109	-1.112	-1.026	-0.101	-0.098
Sent <sub>t-1</sub>	-1.034**	-0.090	-0.075	-1.098**	-1.099**	-1.106**	-1.102**	-0.081	-1.118**	-1.016**	-1.109**	-1.104**	-1.017**	-0.071	-1.019**
R <sup>2</sup>	0.005	0.002	0.002	0.006	0.005	0.007	0.007	0.001	0.008	0.005	0.007	0.006	0.005	0.001	0.005

Notes:  $\beta_{5t} = \gamma_0 + \gamma_1 \text{Sent}_{t-1} + \gamma_{it+1}$  This table reports the regression estimates of Model (4) for each country, where the dependent variable,  $\beta_{5t}$ , is the incremental mispricing per unit of accruals of stocks hard to value and to arbitrage relative to stocks easy to value and to arbitrage, obtained from Fama-MacBeth's regressions of Model (3). Sent<sub>t-1</sub> is the component of consumer confidence index that is orthogonal to economic fundamentals. The  $\beta$ -values are based on Newey-West standard errors that are robust to heteroskedasticity. \*, \*\*, \*\*\*Significant at the 0.10, 0.05 and 0.01 levels

**Table IV.**  
An analysis by country of the sentiment-accruals mispricing relation for stocks that are hard to value and difficult to arbitrage

**Table V.**  
Cross-country analysis  
of the sentiment-  
accruals mispricing  
relation for stocks that  
are hard to value and  
difficult to arbitrage

Variables	Signs	Size	Age	Firm characteristics Profitability	Tangibility	Div. policy	1/Volatility
Intercept	?	-0.412 (0.317)	-0.591 (0.429)	-0.463 (0.386)	-0.508 (0.311)	-0.522 (0.317)	-0.567 (0.538)
Sent <sub>t-1</sub>	-	-1.011** (0.038)	-1.018** (0.035)	-1.102** (0.043)	-1.010** (0.045)	-1.028** (0.035)	-1.088** (0.039)
Individualism	-	-0.003 (0.762)	-0.002 (0.754)	-0.003 (0.749)	-0.002 (0.821)	-0.005 (0.762)	-0.003 (0.871)
Uncertainty avoidance	+	0.007 (0.462)	0.006 (0.460)	0.004 (0.462)	0.005 (0.398)	0.006 (0.401)	0.005 (0.621)
Anti-director rights	-	-0.001 (0.823)	0.000 (0.923)	0.001 (0.933)	0.004 (0.988)	0.003 (0.878)	0.004 (0.921)
Legal enforcement	-	-0.001 (0.654)	-0.002 (0.664)	-0.003 (0.554)	-0.006 (0.587)	-0.003 (0.554)	-0.004 (0.567)
Imp. of stock market	+	-0.004 (0.523)	-0.003 (0.545)	-0.004 (0.567)	-0.005 (0.546)	-0.004 (0.567)	-0.005 (0.632)
Own. concentration	+	-0.004 (0.623)	-0.003 (0.644)	-0.004 (0.638)	-0.005 (0.555)	-0.007 (0.732)	-0.005 (0.821)
Accrual index	+	0.001 (0.823)	0.002 (0.833)	0.001 (0.836)	0.002 (0.767)	0.003 (0.823)	0.002 (0.845)
Sent <sub>t-1</sub> × individualism	-	-1.204** (0.041)	-1.197** (0.045)	-1.202** (0.043)	-1.199** (0.044)	-1.127** (0.023)	-1.128** (0.024)
Sent <sub>t-1</sub> × uncertainty avoidance	+	0.097** (0.043)	0.092** (0.045)	0.093** (0.044)	0.091** (0.047)	0.092** (0.046)	0.093** (0.044)
Sent <sub>t-1</sub> × anti-director rights	-	-1.192** (0.025)	-1.201** (0.025)	-1.177** (0.040)	-1.196** (0.031)	-1.179** (0.032)	-1.199** (0.029)
Sent <sub>t-1</sub> × legal enf.	-	-1.195** (0.022)	-1.193** (0.032)	-1.181** (0.039)	-1.176** (0.041)	-1.169** (0.031)	-1.176** (0.044)
Sent <sub>t-1</sub> × imp. of stock market	+	-1.201** (0.029)	-1.190** (0.041)	-1.195** (0.033)	-1.192** (0.037)	-1.190** (0.034)	-1.199** (0.031)
Sent <sub>t-1</sub> × own. concentration	-	-0.055 (0.102)	-0.047 (0.110)	-0.045 (0.109)	-0.041 (0.119)	-0.042 (0.105)	-0.039 (0.109)
Sent <sub>t-1</sub> × accrual index	+	0.099** (0.047)	0.092** (0.043)	0.087** (0.046)	0.087** (0.047)	0.091** (0.044)	0.089** (0.049)
R <sup>2</sup> adjusted		0.029	0.031	0.028	0.029	0.033	0.032

**Notes:**  $\beta_{5it} = \gamma_0 + \gamma_1 \text{Sent}_{it} + \sum \delta \text{factor}_j + \sum \beta \text{Sent}_{it} \times \text{factor}_j + \nu_{it}$ . This table reports the regression estimates of Model (6), where the dependent variable,  $\beta_{5it}$ , is the incremental mispricing per unit of accruals of stocks hard to value and to arbitrage relative to stocks easy to value and to arbitrage, obtained from Fama-MacBeth's regressions of Model (3). The  $\beta$ -values are calculated using standard errors clustered by both time and firm. Sent<sub>t-1</sub> is the component of consumer confidence index that is orthogonal to economic fundamentals. Factor is a dummy variable that takes the value of 1 when an institutional or a cultural factor is below the median of the full sample of countries, and is 0 otherwise. \*, \*\*, \*\*\*: Significant at the 0.10, 0.05 and 0.01 levels

and lower equity market development. The relationship between sentiment and accruals mispricing is positive and significant in countries with allowance for accrual accounting[8].

In accordance with the classic literature on accruals mispricing[9], the anomaly is expected to be more prevalent when earnings are more value relevant in security pricing, an attribute of developed equity markets. Our results, however, can be reconciled by the idea that large equity markets should benefit from a better flow of information and therefore be more efficient. In an efficient market, the effectiveness of the accrual strategy is thus questionable. Our results indicate also that in the countries with lower ownership concentration, the accruals anomaly is not significantly related to investor sentiment. This finding is consistent with LaFond (2005), who shows that ownership structure does not appear to consistently affect the accruals anomaly internationally.

Table V also shows that accruals mispricing in high sentiment periods is higher than low sentiment periods in countries scoring low on individualism and high on uncertainty avoidance, which supports the idea that investors in different cultures have different biases. Our results confirm *H3* and reveal how the investor sentiment explains accruals mispricing in countries where herd-like behavior and overreaction behavior are strong.

## 6. Robustness tests

In this section, we conduct an analysis of the robustness of our results. First, we evaluate the adequacy of our sentiment measure by studying the impact of other alternative sentiment indicators on the sentiment-accruals mispricing relationship. Second, we investigate the relevance of our empirical model used to analyze the impact of investor sentiment on accruals anomaly.

### 6.1 Relevance of the sentiment indicator

In the financial literature, different indicators (direct, indirect and exogenous) have been used to capture investors' sentiment. This section evaluates the adequacy of our sentiment measure, i.e. the consumer confidence index developed by the European Commission. One way to determine the adequacy of our sentiment measure is to compare the results presented above with other measures of sentiment. Since most studies focus on the US data, very few indicators are available for European countries. One notable exception is the sentiment indicator of Baker *et al.* (2012), who develop an indicator for six major stock markets: Canada, France, Germany, Japan, UK and the USA.

We find that the consumer confidence index is strongly correlated with Baker *et al.*'s (2012) sentiment indicator for the three European countries of our sample (France, Germany and the UK) over the period 1994–2005 for which the indicator is available[10]. The Pearson correlation coefficients amount to 0.38, 0.42 and 0.49, respectively, for the UK, Germany and France. The magnitude of these correlations explain why the consumer confidence index has acquired a solid reputation as a measure of sentiment (Lemmon and Portniaguina, 2006; Schmeling, 2009; Antoniou *et al.*, 2013).

The results of the regressions of Model (4) (not reported), obtained after replacing our sentiment indicator with the indicator of Baker *et al.* (2012), confirm the significant impact of investors' sentiment on accruals mispricing for the UK, Germany and France. Similarly to what was reported in Section 5, the estimated coefficients using this alternative sentiment indicator are all negative and significant at the 5 percent threshold regardless of the characteristic studied (i.e. size, age, profitability, tangibility, dividend policy and volatility). Results are thus similar for both sentiment indicators.

### 6.2 Relevance of the empirical model

In a recent study, Cornell *et al.* (2017) investigate whether accounting information mitigates the relationship between investor sentiment and stock market mispricing. An alternative way to

examine *HI* is to introduce sentiment measure directly in our regression model (Model 3) and to perform a sub-sample analysis for difficult to value stocks and not so difficult to value stocks [11]. We use the Cornell, Landsman and Stubben model (2017) to test the robustness of our previous results. Thus, we use the following equation, which we estimate using the full panel of observations, with standard errors clustered by time and firm:

$$Eret_{it+1} = \beta_0 + \beta_1 Sent_t^\perp + \beta_2 Accruals_{it} + \beta_3 PriorRet_{it} + \beta_4 BM_{it} + \beta_5 Sent_t^\perp \times Accruals_{it} + \mu_{it+1}. \quad (7)$$

To do this, we estimate Equation (7) for all firms of our sample and for the sub-samples of observations for difficult to value stocks and not so difficult to value stocks. Like Cornell *et al.* (2017), we use principal components analysis to isolate a common factor representing the valuation difficulty. This composite factor represents the first principal component of the six characteristics studied. The first principal component captures much of the common variation between the six continuous variables. A firm is categorized as difficult (easy) to value and arbitrage if its first principal component score is below (above) the median of the first principal component score calculated across all firms. The first column of Table VI presents findings from estimation of Equation (7) for all sample firms. The findings support the presence of accruals mispricing in our European sample. The coefficient on Accruals variable is significantly negative ( $p$ -value = 0.019), indicating that firms with high (low) total accruals earn lower (higher) future returns. The coefficient on the interaction of total accruals and investor sentiment ( $Sent_t^\perp \times Accruals_{it}$ ) is negative but not significant. This result implies that investor sentiment does not mitigate the negative relationship between total accruals and future returns. This finding is similar to our results presented in Table III.

The second set of findings in Table VI presents results from firms easy to value and to arbitrage, and the third set of analogous results relates to the sample of firms hard to value and to arbitrage. Consistent with our predictions, sentiment-related accruals mispricing is higher only when valuation difficulty is high. The coefficient on the interaction of total accruals and investor sentiment ( $Sent_t^\perp \times Accruals_{it}$ ) is negatively significant only for firms hard to value and difficult to arbitrage. Taken together, the findings in Table VI suggest

	All firms	Stocks easy to value and to arbitrage	Stocks hard to value and to arbitrage
Intercept	0.623*** (0.002)	0.526*** (0.001)	0.829*** (0.001)
Sent <sup>⊥</sup>	-0.012** (0.034)	-0.010** (0.037)	-0.015** (0.029)
Accruals	-2.245** (0.019)	-2.099** (0.024)	-2.376** (0.015)
PriorRet	0.624*** (0.000)	0.592*** (0.000)	0.666*** (0.000)
Book-to-market	0.278** (0.025)	0.255** (0.025)	0.267** (0.025)
Sent <sup>⊥</sup> × accruals	-0.101 (0.115)	-0.009 (0.249)	-0.135** (0.044)
R <sup>2</sup> adjusted Fisher	0.012 (0.000)	0.009 (0.000)	0.014 (0.000)

**Notes:**  $Eret_{it+1} = \beta_0 + \beta_1 Sent_t^\perp + \beta_2 Accruals_{it} + \beta_3 PriorRet_{it} + \beta_4 BM_{it} + \beta_5 Sent_t^\perp \times Accruals_{it} + \mu_{it+1}$ . This table depicts the results of regressions of Model (7). The statistics tabulated in parentheses correspond to the  $p$ -values. The dependent variable, *Eret*, is stock return in excess of market return.  $Sent^\perp$  is the component of consumer confidence index that is orthogonal to economic fundamentals. Accruals are calculated as:  $(\Delta \text{current assets} - \Delta \text{cash}) - (\Delta \text{current liabilities} - \Delta \text{short-term debt} - \Delta \text{taxes payable}) - \text{depreciation expense}$ . Accruals are scaled by lagged assets. The prior rate of returns (*PriorRet*) are measured by six-month cumulative stock returns preceding the future return measurement period. The book-to-market ratio, *BM*, is measured as the book value of equity divided by the market value of equity. The sample consists of 54,572 firm-year observations for the period 1994–2014 across 15 European countries and 4,787 European firms. \*, \*\*, \*\*\*Significant at the 0.10, 0.05 and 0.01 levels

**Table VI.**  
Robustness test:  
investor sentiment  
and accruals  
mispricing

that the valuation difficulty mitigates the accruals mispricing when investor sentiment is high. This finding corroborates *H1*.

Our results, validated by several robustness tests, provide convincing support to the thesis of the behavioral finance. We conclude that investor sentiment should be considered as a factor influencing accruals mispricing, particularly for hard to arbitrage and difficult to value firms.

## 7. Conclusion

In this study, we analyze a sample of 54,572 firm-year observations from 15 European countries for the period between 1994 and 2014. In line with recent evidence from the USA, we show that investor sentiment explains accruals mispricing across European countries. The effect is pronounced for stocks whose valuations are highly subjective and difficult to arbitrage. Specifically, we find that mispricing per unit of accruals for stocks that are hard to value and difficult to arbitrage is greater in periods when investor sentiment is high than in periods when investor sentiment is low. This is due to naive individual investors' fixation in high sentiment periods on the total amount of reported earnings without regard to the persistent differential between accruals and cash flow. Hence, it is important for future studies to consider investor sentiment as an important time-series determinant of the accruals anomaly, particularly for stocks that are hard to value and difficult to arbitrage.

In subsequent empirical analyses, we test whether the differences in market integrity and culture across countries explain the magnitude of accruals mispricing. Our results indicate that both institutional factors and cultural factors have explanatory power for the accruals anomaly in the European countries sampled. In particular, we find that investor sentiment explains accruals mispricing in countries characterized by weaker outside shareholder rights, lower legal enforcement, lower equity market development and higher allowance of accrual accounting, as well as in countries where herd-like behavior and overreaction behavior are strong.

## Notes

1. We performed a robustness test, replacing the anti-director rights index from La Porta *et al.* (1998) with the revised anti-director rights index suggested by Spamann (2010). Using the updated Spamann (2010) index does not modify the results.
2. We also tested the robustness of our results with the proxy for legal enforcement, i.e. the variable "rule of law" proposed by Kaufmann *et al.* (2007). This variable is widely used in international accounting studies as a proxy for the strength of the legal enforcement (e.g. Li, 2010). Results (available upon request) are qualitatively unchanged from those reported in the paper.
3. Data were not available for Czech Republic, Greece, Portugal or Slovenia.
4. The data are freely downloadable on the website of Hofstede: <http://geert-hofstede.com/index.php>
5. To compare our results with those published by Ali and Gurun (2009) using the US data, we rely on the same measure of accruals. Note, however, that other measure of accruals computed directly from the cash flows statements were also used (Collins and Hribar, 2002). Findings, available upon request, are similar to those reported in this paper.
6. Our sentiment index is provided by the European Commission. This index is available for several European countries for extended and regular periods of time. The data are freely downloadable on the website: [http://ec.europa.eu/economy\\_finance/db\\_indicators/surveys/index\\_en.htm](http://ec.europa.eu/economy_finance/db_indicators/surveys/index_en.htm)
7. The data are downloadable on the website: <https://www.eurofidai.org>
8. In order to take into consideration the application of IFRS standards in Europe since 2005, we divided our study period into two periods: 1994–2004 and 2005–2014. We have re-estimated our econometric models on the two sub-periods. The results (not tabulated) show that the impact of sentiment on the accruals anomaly decreases significantly in the second period, a period characterized by the convergence to the same IFRS accounting standards in the different



European countries. This finding supports our result that the accrual index of a country explains the cross-section of the sentiment-accruals anomaly relationship.

9. See, for example, Pincus *et al.* (2007) and Papanastasopoulos (2014).
10. The annual time series of Yuan, Baker and Wurgler's sentiment data are available for the period 1980–2005.
11. We were largely inspired for this robustness test by a judicious comment by one of the anonymous reviewers for which we are most grateful.

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