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Accrual Mispricing: Evidence from European Sovereign Debt Crisis

Accrual Mispricing-Evidence from European Sovereign Debt Crisis

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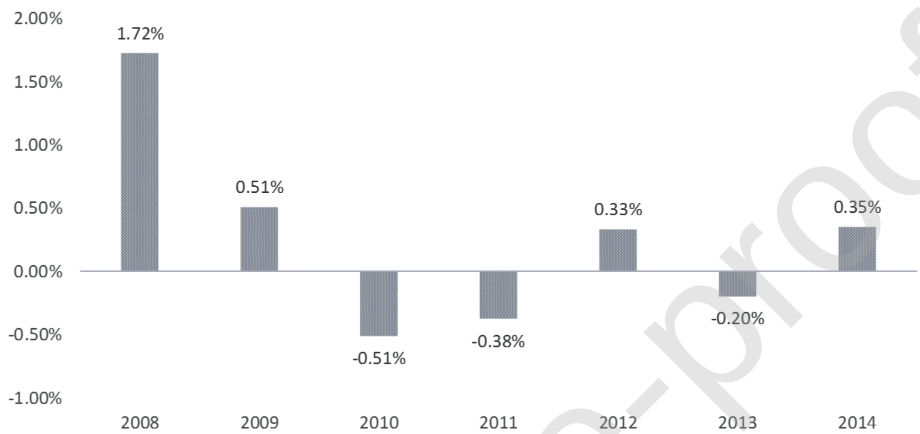
GRAPHICAL ABSTRACT

Returns by calendar year to a hedge portfolio long on the lowest accrual decile and short on the highest accrual decile



1. Introduction

In the financial literature, the efficiency of the capital market shows that prices reflect, in an almost instantaneous manner, all publicly available information (Fama, 1970). Contrary to this belief, Sloan (1996) in his seminal work shows that investors fail to fully recognize the impact of accounting accruals[1] when forming expectations on

[1] Under the accrual accounting, the receipt and the payment of cash are not the focus of reporting revenues and expenses. Indeed, revenues are recognized when earned and expenses when incurred. Therefore, earnings are the sum of accruals and cash flows. In other words, accruals represent liabilities and non-cash assets. Accruals are estimates of cash flows and its quality is an inverse function of the precision of estimates which depends on environmental uncertainty; business model; and managerial intent and expertise. Accrual based earnings management has earned extensive focus on literature regarding its implications for investment decisions and under different settings (e.g.

earnings.

Years later, Mashruwala et al. (2006) tried to respond to very pertinent questions: Why does this accrual anomaly still exist? Why has it not been arbitraged away? Their research indicates that there were constraints that made exploiting it cost ineffective. They argue that high idiosyncratic risk and trading costs chased away risk-averse arbitrageurs that highlighted the anomaly.

This paper follows the same line of investigation but uses the European market instead of the US market. Other authors (Pincus et al., 2007, Papanastasopoulos, 2014) have also found the presence of the anomaly in Europe. However, as the global financial markets have experienced turbulent times recently, how the impact of the recent crisis affects the accruals anomaly is of interest.

In a recent strand of literature (Konstantinidi, Kraft and Pope, 2016; Patatoukas, 2016) there has been debate on whether the accrual anomaly shows asymmetric differential persistence for accruals and cash flows in years of economic losses or economic gains. Although there is mixed evidence, the accrual anomaly appears to subsist only in periods of economic gains, which contradicts the earnings fixation argument. In fact, negative earnings reflect more transitory components and thus, would matter less for forecasting and valuing future expectations. Konstantinidi et al. (2016) argue that investors fully incorporate the asymmetric timely loss and provide evidence that the accrual anomaly is not verified in such loss years. Their findings do not rule out accrual mispricing but rather exclude earnings fixation as a possible explanation. An existing risk premium related to accruals would only be significant for years with economic gains.

Huang, Goodell and Zhang (2019); Magnis and Iatridis (2017); da Silva and Nardi (2017); Halaoua, Hamdi and Mejri (2017)).

We contribute to that debate by providing evidence from an endogenous setting in which the market undergoes aggregate bad news. Focusing on the European sovereign debt crisis, we test the accrual anomaly under a generalized scenario of asymmetric timely loss recognition. Consistently, we provide evidence of investors who incorporate the differential persistence of accruals and cash flows and then price those components differently.

We also answer a call for additional evidence relating to macroeconomic conditions that play a role in enhancing or mitigating the accrual anomaly (Papanastasopoulos, 2014). Country-level factors relate to the magnitude of the accrual effects, but capital markets tend to increase global correlations under crisis settings. Consequently, we argue for a need to understand international evidence under our sampling period.

We find no evidence that the accrual anomaly persists in European markets. The study shows that contrary to previous research, investors do not underweight the accruals component of earnings. We also fail to find any predictive power for accruals with regard to future stock returns.

Our results point toward a possible new type of behaviour in investors during a crisis. Economically, given the lower returns that they can obtain in today's markets, investors may reduce their risk aversion levels to get more returns.

Our findings matter for academics and practitioners alike. We shed new light on a possible explanation for the accrual anomaly by contributing to the literature with international evidence under a special macroeconomic scenario, and point to the importance of economic conditions on the exploitation and explanation of the phenomenon. Investors and regulators need to consider this setting when putting in place investment strategies or regulation.

The reminder of the paper is organized as follows: In Section 2, we review the literature and develop the hypotheses. We describe the method and data in Section 3, and we present the empirical analysis in Section 4. Section 5 concludes.

2. Literature review

Sloan (1996) demonstrates that firms with a high accrual component in earnings fall short on their expected returns. The reverse also prevails, firms with a low accrual component in earnings also experience higher expected returns.

Empirically, Sloan (1996) exploits this negative relation between accruals and stock returns by creating a strategy for hedge trading. Every year, firms are ranked on deciles based on the magnitude of their accruals. By going long (short) in a portfolio consisting of the lowest (highest) decile of firms with low (high) accruals, Sloan generates abnormal returns. Over a period of 30 years, the hedge portfolio had positive returns one year after formation 90% of the time. Abnormal returns, adjusted for size, registered on average 10.4% (same value when computing Jensen's alpha). Lev and Nissim (2004) prove that the strategy also holds for more recent times.

Sloan attributed this market anomaly to investor´s naïve fixation on earnings. Investors, by failing to realize the low persistence of the accrual component in earnings, inflate their earnings expectations. To their surprise, stock returns do not meet their expectations.

2.1. Investor sophistication

Following Sloan (1996), Bradshaw et al. (2001) tries to assess whether this naïve fixation can be generalized to sophisticated investors. In their sample, they choose financial intermediaries with published opinions, sell-side stock analysts, and independent auditors.

Bradshaw et al.'s (2001) research design for this hypothesis is unequivocal. Regarding analysts, they predict that the difference between realized earnings and forecast earnings should be negatively correlated with accruals. If the error approaches zero, then there is evidence that analysts incorporate the accrual effect in their forecasts and are not publishing overconfident (or pessimistic) opinions.

With respect to auditors, Bradshaw et al. (2001) build on the evidence of Dechow et al. *(*1995) that high accrual firms are more likely to be penalized by the SEC over GAAP infringements. The author's underlying assumption is that auditors should be in line with GAAP rules and so there should be a positive association between modified opinions published by auditors and firms with high accruals. If high accrual firms do not have more modified audit opinions, then auditors are not consolidating the information content of the accruals.

Evidence shows that analyst´s forecasts do not fully incorporate the information from accruals in the reported earnings by almost 20% that results in forecast errors (Bradshaw et al., 2001). Furthermore, tests show that auditors also do not issue more modified audit opinions for high accrual firms. The evidence in this paper supports the naïve fixation hypothesis that sophisticated investors appear not to foresee the accrual issue.

2.2. Accrual anomaly globally

In a novel work, Pincus et al. (2007) expand on Sloan´s work on a global scale. They show that the accrual anomaly does not exist only in the US equity markets, but also in Australia, Canada, Denmark, France, Germany, Hong Kong, India, Indonesia, Italy, Japan, Malaysia, The Netherlands, Singapore, Spain, Sweden, Switzerland, Taiwan, Thailand, and the United Kingdom, although to different degrees.

Pincus et al. (2007) propose a new explanation for the anomaly. The authors argue that several country-level factors might be responsible for the mispricing. In this case, countries with a Common Law tradition, more extensive accrual accounting, and lower concentration in share ownership report a higher magnitude of the anomaly. Papanastasopoulos (2014) also finds evidence that cross-country differences in culture, equity markets, analysts' research output, investor protection, and ownership structure explain the variation in magnitude of the accrual anomaly.

2.3. Reasons for the existence of the anomaly

Another stream of literature associates the accrual anomaly with managerial manipulation. A higher degree of subjectivity in accruals makes net income less reliable as a measure of performance than cash flows from operations (Sloan, 1996) and can be manipulated by management to mislead investors.

Accruals can be divided into two components, a normal and a discretionary (abnormal) one. Xie (2001) uses Mishkin (1983)'s test, previously introduced in the finance literature by Sloan (1996), to show that the market underestimates the persistence of accruals, overprices abnormal accruals to a higher degree than normal accruals, and that the mispricing, reported on Sloan (1996), is mainly attributed to them. Considering that normal accruals are associated with economic fundamentals (changes in sales revenues, capex, etc.), then abnormal accruals are associated with unusual business circumstances and earnings management. After controlling for unusual business operations (M&A, IPO etc.) the author finds evidence of managerial manipulation.

Khan (2008) presents a possible new explanation for the accrual anomaly. The author argues that capital markets do not actually misprice accruals. Instead, the risk difference between high and low accrual portfolios is the main determinant of return discrepancy. This argument has not been considered in the models previously used to test the anomaly.

Khan (2008) uses a more recent model of asset pricing to control for risk. Based on Campbell and Vuolteenaho (2004), the four-factor model (ICAPM) considers news about future expected dividends and news about expected returns as risk factors in addition to the traditional SMB and HML. The pricing error tests reject the CAPM, the two-factor model by Campbell and Vuolteenaho (2004), and the Fama and French (1993) three-factor model, while approving the ICAPM. The results also show that the expected returns on high and low accrual portfolios are, on average, equal to the realized returns when risk is adjusted with the four-factor model. In addition, evidence that returns are negatively correlated with the risk of bankruptcy indicates that the difference in risk is not caused by the accruals. Instead, accruals act as a proxy for documented financial and economic distress that is caused due to their correlation.

Zhang (2007) proposes an alternative explanation. The author argues that it is not the low persistence of the accruals that creates the anomaly, but the information on a firm's corporate growth that they contain. The rationale is that accruals measure changes in investments in working capital that co-varies with the growth attributes of the firm such as in employees, capital expenditures, and sales. Therefore, the accrual anomaly should be more pronounced for firms whose accruals co-vary more strongly with their growth attributes (the author uses employee growth as a proxy for this attributes). In the end, under the investment assumption of Zhang (2007), the results show that accruals predict future stock returns due to their information content. The firms for which accruals are more (less) correlated with growth information have a stronger (weaker) power to forecast expected returns. Nevertheless, the question of why investment or growth is negatively related to future stock returns remains open.

Similarly, Wu et al. (2010) also interpret accruals as working capital investments in order to apply the optimal investment theory. This theory argues that firms fine tune their investments to counter changes in the costs of capital. The reasoning behind this argument is the inverse relation between net present value (NPV) and cost of capital (discount rates). If cost of capital decreases, then the NPV of a project will be more profitable that results in more investment, thus driving up the level of accruals. On the other hand, higher costs of capital generate lower NPV and, consequently, reduce the levels of investment and accruals. Higher costs of capital also result in higher current returns (since stock prices increase). However, they also mean lower expected returns in the future. Therefore, the predictive power of accruals for stock returns increases with the covariation between the accruals and past and current returns. As a result, the accruals are negatively correlated with future returns.

Richardson et al. (2005) go further and argue that there are other categories of accruals not included in Sloan's definition that not only contribute to the anomaly but may provide more powerful tests. These are the accruals related to non-current operating assets, non-current operating liabilities, and financial assets and liabilities.

2.3. Barriers to arbitrage

Mashruwala et al. (2006) discuss a very relevant question: if this accrual anomaly is well documented, why has it not been arbitraged away? They argue that arbitrage barriers such as risk and transaction costs (Wurgler and Zhuravskaya, 2002; Pontiff, 1996) prevent the market from correcting the anomaly.

Idiosyncratic risk can only be reduced through diversification (Markowitz, 1952). By definition, the most diversified portfolio (market) has zero idiosyncratic risk and zero abnormal returns. Furthermore, for an investor to gain abnormal returns, she cannot be fully diversified and so an arbitrageur can only achieve abnormal returns if she is exposed to idiosyncratic risk. The literature also defines arbitrage as a risk-free strategy that makes an arbitrageur risk averse (Pontiff, 1996). Quoting Pontiff (1996, pp. 1139), "If the arbitrageur cannot perfectly hedge the fundamental value of the arbitrage position, then arbitrage involves risk." This unchangeable portion of idiosyncratic risk is, according to Mashruwala et al. (2006), what prevents arbitrageurs from taking positions in the hedge portfolio strategy. The results show that the accrual anomaly is concentrated in firms with high arbitrage risk (due to lack of close substitutes) that makes a hedge strategy of long (short) positions in low (high) accruals risky for risk-averse arbitrageurs. The results also show that the accrual anomaly is centered on stocks with low prices and low volumes (proxy for high transaction costs) that prevents further exploitation of the mispricing.

2.4. European sovereign debt crisis

The beginning of the European sovereign debt crisis is difficult to pinpoint. Given the necessity to select a period, for comparison reasons, we mark the start of the crisis circa October 2009. This date is selected considering the occurrence of an important market event, Greece revised their forecast of the 2009 budget deficit that was more than double the previous estimate (from 6% to 12.7% of GDP) (Lane, 2012). We consider the announcement in September 2012 that the ECB would provide free unlimited support for all Eurozone countries involved (Lane, 2012) as the end of the crisis's peak. This period matches the spread expansion, and then contraction, of long-term yields from all European sovereign bonds (Lane, 2012; Arghyrou and Kontonikas, 2012).

According to Shambaugh (2012), the European crisis can be split into three “smaller” crises that are interconnected. It first started with a banking crisis. Since 2007–2009, banks were undercapitalized and faced liquidity issues. To avoid financial contagion, there were mass bailouts of weaker banks. Consequently, the bailouts led to more indebted countries, especially on the European periphery, that caused a sharp increase in their debt to GDP ratio. This is where it starts the “pure” sovereign debt crisis. Weaker banks led to a reduction in lending and therefore, a lack of growth unequally distributed across countries. A growth problem made indebted countries insolvent and thus resulted in a growth crisis.

Ben-David et al. (2011) provide evidence that, on average, there was a retreat of 30% in equity holdings by hedge funds in Q3 and Q4 of 2008. Shleifer and Vishny (1997) attribute this exodus to theories that ascribe that limits-to-arbitrage can emerge at times of market distress. This is a crucial point in our analysis since it makes a bridge for the reoccurring theme of this paper in which barriers to arbitrage can be an explanation of the presence of the accrual anomaly in the markets (Mashruwala *et al.*, 2006). In line with the former, Konstantinidi et al. (2016) argue that investors fully incorporate the asymmetric timely loss recognition that provides evidence that the accrual anomaly is not verified in such loss years. Their findings do not rule out accrual mispricing, but rather exclude earnings fixation as a possible explanation. An existing risk premium related to accruals would only be significant for years of economic gains.

2.5. Research hypotheses

Based on the literature review, we formulate the following hypothesis for the European market:

H1(i): Investors tend to underestimate the accruals in earnings and overweight cash flows.

Following this premise, then there should be a way to explore this market gap. Next, we create a hedged position that exposes only the anomaly to market fluctuation, hence:

H1(ii*):* Positive abnormal returns are possible to generate by simultaneously taking long(short) positions in a portfolio composed of the firms with a relatively low(high) level of accruals.

Furthermore, this hypothesis argues that accruals may have explanatory power for future stock returns. Then, our third component of hypothesis 1 is:

H1(iii): A negative relation exists between accruals and future stock returns.

The possibility of acquiring positive abnormal returns creates a hole in the efficient market rationality. According to Mashruwala et al. (2006), there must be some barriers to arbitrage that justify the anomaly. We study the same barriers proposed by their research on our next hypothesis:

H2: Idiosyncratic risk and transaction costs are barriers to arbitrage.

To the best of our knowledge, this paper provides an original contribution to the literature by framing the accrual anomaly during the European debt crisis.

Konstantinidi et al. (2016) show the persistence of the asymmetric differential for accruals and cash flows in years of economic losses and gains. The accrual anomaly appears to subsist only in periods of economic gains, which contradicts the earnings fixation argument. In fact, negative earnings reflect more transitory components and, thus, matter less for forecasting and valuing future expectations.

The purpose is to expand the premise behind Mashruwala et al.'s (2006) thesis. It follows that if arbitrageurs cannot exploit the mispricing due to transaction costs and idiosyncratic risk, then during a period of finance distress in which the market has higher transaction costs and is more volatile (Chordia et al., 2005), the accrual anomaly should be more severe. Quoting Ben-David et al. (2011, p. 1), "Hedge funds are the investor class that most closely resemble textbook arbitrageurs," so their potential to arbitrage is likely to be more limited during market crises. Hence:

H3: The accrual anomaly is possibly bigger in magnitude during a crisis period given higher idiosyncratic risk and higher transaction costs.

This final test focuses on the previous three hypotheses for the specific period of the European debt crisis. Consequently, we predict that our variables, that is the magnitude of the accruals, the proxy for idiosyncratic risk, the transaction costs, and the alpha generated by the strategy to be higher than the average results derived from the extended period. If verified, then the role of transaction costs and idiosyncratic risk can be further solidified as a major reason for the existence of the anomaly.

3. Data and methodology

Data come from the Amadeus Database. We consider all financial statements and market data from publicly listed firms in the European Union 15 (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and the United Kingdom) for the 11-year period from 2005 to 2016. We exclude the following NACE Rev 2 codes from our sample: K – Financial and Insurance activities, O – Public Administration and defence, and U – Activities of Extra Territorial Organizations and Bodies. We also eliminate any firm-year without enough data to compute the financial variables required by the analysis. To avoid skewed results due to outliers, every year we exclude 1% of the firms on each extreme of the sample based on the level of the accruals.[2] The final sample comprises 15,319 firm-years.

Following Sloan (1996) and Dechow et al. (1995), we measure accruals and cash flows in earnings as:

$$Accruals_{i,t} = (\Delta CA_{i,t} - \Delta Cash_{i,t}) - (\Delta CL_{i,t} + \Delta STD_{i,t} - \Delta TP_{i,t}) - Dep_{i,t} \quad (1)$$

in which ΔCA_{it} is the annual change in current assets of firm i in year t; $\Delta Cash_{it}$ is the annual change in cash and cash equivalents of firm i in year t; ΔCL_{it} is the annual change in current liabilities of firm i in year t; ΔSTD_{it} is the annual change in debt included in current liabilities of firm i in year t; ΔTP_{it} is the annual change in income taxes payable by firm i in year t; and Dep_{it} is the depreciations and amortizations of firm i in year t. All the variables are standardized by the firm size (the average at the beginning and end of the year as reflected by the book value of total assets).

$$Cash\ Flow_{it} = EBIT_{it} - Accruals_{it} \quad (2)$$

in which $EBIT_{it}$ is earnings before interest and tax of firm i in year t. $EBIT_{it}$ and $Accruals_{it}$ are both divided by the average total assets.

[2] In untabulated results, we removed all firms with an average stock price inferior to EUR 1. The reason behind this action was to avoid having huge return swings coming from penny stocks. Nevertheless, this action has residual impact our results and since it reduced our sample by more than one third, we was decided to keep the penny stocks in our research.

Then, for each year end, we rank the firms based on accruals and assign them to equally weighted[3] portfolio deciles. To access if the decile portfolios generate abnormal returns, we use the standard CAPM time series regressions for each portfolio to estimate Jensen's alpha.

$$(R_{pt} - R_{ft}) = \alpha_p + \beta_p(R_{mt} - R_{ft}) + \epsilon_{pt} \tag{3}$$

in which R_{pt} is the equally weighted cumulative monthly return on portfolio p in year t; R_{mt} is the cumulative monthly market return in year t; and R_{ft} is the risk-free rate in year t.

Pooled sample estimates of Jensen's alpha were computed for the post ranking years 2010–2015. To ensure complete dissemination of the accounting information in financial statements, we consider our return computation period as April 1 of the post ranking year instead of December 31. The portfolio beta coefficient is determined through a time series regression on the excess returns of the portfolio and the excess return on the market over the 10-year period. We use German 1-year government bonds[4] as a proxy for our risk-free rate and quotations on the STOXX 600 index[5] for our market return.

Finally, we follow Mashruwala et al. (2006) to determine the proxies for idiosyncratic risks and transactions costs. The idiosyncratic risk of a portfolio is estimated as the residual variance from the CAPM regression on the portfolio's returns and the STOXX 600 index returns over 36 months prior to the ranking year (evaluation period). Given the

[3] Similar to the literature, when forming deciles and portfolios alike, we do not take into account the market capitalization of each firm. Thus, ranking and portfolio construction is based on an equal number of securities for each firm.
[4] Data compiled from Tullett Prebon.
[5] Data extracted from Reuters.

period of our sample, the constraint of 36 months means that the first ranking year is 2009. We used the average trading volume (in shares) as a proxy for transaction costs.

4. Empirical results

Table I presents the statistics for each decile of the equally weighted portfolios. Compatible with Sloan's results, Panel A shows a negative relation between Accruals and Cashflows. The Accruals ranges from the lowest accrual ranked portfolio at -0.2405 to its highest at 0.1228 while the Cashflow falls from 0.1828 to -0.0998 for the highest accrual portfolio. The mean value of Earnings grows from -0.0577 to 0.0230.

Insert Table I

Panel B shows the Accruals as defined on Section 3. While Sloan (1996) attributes the accrual variation to changes in Current Assets, in our data the relation is not that obvious. The accrual variation can be attributed to changes in both Current Assets and Current Liabilities since those variables have a steady growth across the portfolio deciles. On the other hand, the steady fall of Depreciations is consistent with Sloan (1996).

Panel C presents the variables used to adjust for risk. Portfolio Beta has a "U-shaped" relation with the extreme portfolios that shows these portfolios have more risk. This is not as apparent as in Sloan (1996). Even though our highest accrual portfolio has increased risk when compared with the portfolios coming immediately before, it never raises to the level of the lowest accrual portfolio. The other variable used is Size, which is measured as the natural log the market value of common equity (in millions of euros). This variable has an "Inverted U-shaped" figure that indicates the riskier stocks are concentrated in the smaller firms.

Panel D presents the two variables recommended in Mashruwala et al. (2006). Following our hypothesis, transaction costs and idiosyncratic risk are possible justifications for the existence of the accrual anomaly. Volume is our proxy for transaction costs and is defined as the number of shares traded. It is averaged over one year that ends one month prior to April 1 of the post ranking year. For idiosyncratic risk, we consider the variable ARBRISK that is computed as the standard deviation of the residuals from a market model. ARBRISK uses 36 monthly returns ending one month prior to April 1 of the post ranking year.

The results are consistent with the study's prior findings. Idiosyncratic risk is higher in the extreme portfolios with 0.13 for the lowest accrual portfolio and 0.12 for the highest one. The same is observed for Volume. There is a lower volume of shares traded in these extreme portfolios, 2.31 (1.91) for the lowest (highest) accrual decile, that indicates higher transaction costs.

Our first hypothesis is based on the investor´s naïveté of placing less weight on the accruals in earnings and therefore, overweighting the cash flows. If this is true, then there is a negative relation between accruals and future stock returns. Hence, we can design a trading strategy that exploits this anomaly. Since earnings properties can differ according to industry attributes, we start first by assigning our sample to the first two digits of the NACE rev. 2 codes. The result is 17 assignee groups, corresponding to the designations from A to S. This method controls for year and industry fixed effects. The majority of the investigation related to market efficiency using the Mishkin Test uses a standard OLS variance estimator. A few studies control for the cross-sectional correlation in the residuals but ignore time-series variation. We adopt such concerns by using an industry indexed year-by-year, cross-sectional pooled test.[6]

Panel A of Table II shows the average level of the persistence in earnings. The estimate of alpha is 0.5983 (with a p-value of zero) and is consistent with Sloan's (1996) result, which indicates that the earnings are mean reverting.

Insert Table II

Panel B presents the results for Accruals and Cashflows. The definition of the anomaly indicates that the coefficient for Accruals should be lower than the coefficient for Cashflows. We do not find evidence of that. Instead we find that the coefficient for Accruals is 0.8661 (p-value of zero), which is much higher than the coefficient for Cashflows of 0.5197 (p-value of zero). Our data indicate that the posterior returns are not highly associated with past cash flows but instead relate more to the accruals in past earnings.

Our second test for hypothesis 1 consists on creating a trading strategy that exploits the anomaly while keeping the risk exposure reduced to zero to avoid any contamination of the abnormal returns. We compose the strategy by taking a long position on the portfolio with the lowest accruals and a short position on the portfolio with the higher accruals. On the one hand, lower accrual firms, in an economic sense, should produce higher future returns. On the other hand, a firm with too much accruals should not be able to generate enough cash flows to meet its cash needs during the business cycle.

[6] In untabulated results, we test for residuals heteroscedasticity and find no such evidence (across all regressions and using Breusch-Pagan test). We also test for industry groups heteroscedasticity and rejected across all three variables (Earnings, Accruals and Cash Flows). We thank a reviewer for pointing us to that.

Table III shows the average Jensen's Alpha (abnormal monthly return) that is obtained from a portfolio that is based on accruals at year-end. The cumulative period starts on April 1 of the post ranking year and finishes in March of the year after. We predicted that the lowest (highest) accrual portfolio should generate the highest (lowest) alpha. Even though the highest portfolio has the lowest alpha, 0.0019 (p-value 0.5467), this alpha should be negative to be in line with the research. The lowest portfolio has an alpha of 0.0049 (p-value 0.1883) that shows there is no relevant excess return compared to the others. We find no statistical evidence that the returns from the extreme deciles are not purely sporadic. In fact, we find several statistically significant decile portfolios with higher returns than the ones with the lowest accruals.

Insert Table III

Our strategy produces a Jensen alpha of 0.0031 (p-value 0.1183) with a Beta very close to nil (0.02) that reflects the hedged position taken in the market.

Figure 1 more closely displays the performance of the strategy in the years it was implemented. The year 2008 was the only year to report a significant return on the strategy. It was also the only year in our data to show a higher return on the lowest accrual portfolio and a negative return on the highest accrual portfolio. The mean return of the strategy from 2009 to 2014 is very close to zero. Therefore, our results reflect that the accrual anomaly is not present on the period of analysis.

The third test for hypothesis 1 serves to check the theory of the negative relation between future stock returns and accruals. As our results point in a different direction, these tests also serve as a tighter analysis of the contrary view our data indicate.

Figure 1 - Returns by calendar year to a hedge portfolio long on the lowest accrual decile and short on the highest accrual decile

Panel A of Table IV presents the results from the regression of future stock returns. These returns are accumulated starting four months after the post ranking year until one year later, over the industry level mean of the accrual component for the six years in analysis. We also perform the same regression but add the variables that constitute the accruals to capture their variations (Panel B). We find a negative coefficient for the independent variable. However, we cannot find any statistical significance for the coefficients.

Insert Table IV

Since we cannot reject the null hypothesis, our data indicate that the accruals have no explanatory power with respect to future stock returns for the period in analysis.

The second hypothesis introduces two new explanatory variables, as recommended by Mashruwala et al. (2006) for the accrual anomaly. We expect ARBRISK to be high in the extreme portfolios since this value would increase the inability of risk-averse arbitrageurs to perform the accrual strategy developed above. On the other hand, a low Volume means higher transaction costs, hence more constraints to the proper execution of the strategy execution. According to Mashruwala et al. (2006), we should find explanatory power for these variables when regressed against future stock returns. The results in Table V show that, excluding Size and Volume, Accruals and ARBRISK have no statistical significance in explaining the model for future stock returns (null hypothesis cannot be rejected). This finding means that the accruals do not predict future stock prices, and ARBRISK does not decrease the ability to perform the accrual strategy. On the other hand, it may also indicate that investors arbitrage away the accrual anomaly and that they accept the constraints to arbitrage risk.

Insert Table V

Our final hypothesis consists in studying the previous hypothesis, this time in light of the financial crisis. We started by splitting our sample into two periods. The first period is the year 2008 and the second is 2009–2014, which covers the subsequent beginning and end of the peak of the crisis.

Panel A of Table VI shows that Earnings are mean reverting with an alpha of 0.4541 (p-value 0.0393) for 2008 and an alpha of 0.6397 (p-value 0.000) for 2009–2014. However, the results in Panel B are revealing. In 2008 the weight given to the accruals is almost the same as the weight for Cashflows (statistically significant at 10% for N=17). Furthermore, this weight increases drastically for 2009–2014 by almost doubling with a coefficient for Accruals of 0.9186 and a coefficient for Cashflows of 0.5130 and both have a powerful t-statistic. Thus, starting in 2008, investors increased the weight on Accruals and with the beginning of the crisis, their weight surpassed the one given to Cashflows. Nevertheless, Table VII for the year 2008 and Table VIII for 2009–2014 show that Accruals have no predictable power on future stock returns.

Insert Table VI

Insert Table VII

Insert Table VIII

The results of the future return model for the variables Accruals, ARBRISK, Size and Volume are presented in Panels A and B of Table IX.

Insert Table IX

While Panel B shows no statistical significance for any of the variables, Panel A shows that ARBRISK, Size, and Volume explain the model at a 1% significance level. We should note that 2008 is an ambiguous year between the subprime crisis in the US and the beginning of the sovereign debt crisis in Europe. Consequently, since 2008 the accruals could no longer predict future stock prices. Further, the returns in 2009 can be attributed to idiosyncratic risk. Paired with our analysis that investors no longer overweight Cashflows but instead overweight Accruals, there may be evidence that investors who are faced with a more uncertain market with lower returns accept the idiosyncratic risk associated with extreme accrual firms and arbitrage away the accrual anomaly. Further, this conclusion can be extended by conducting the same research in future periods.

5. Conclusions

In this paper, we investigate the presence of the accrual anomaly in European markets for the period between 2008–2014. It follows Mashruwala et al.'s (2006) suggestion of idiosyncratic risk and transaction costs as the barriers to investors of arbitraging away the anomaly.

We find no sufficient statistical evidence that by isolating portfolios of stocks based on the magnitude of accruals, we can exploit the negative relation between accounting accruals and future stock returns to generate positive alpha investments. We also observe that from 2009 to 2014 this strategy returns, on average, an alpha very close to nil.

Our results relate to those of Papanastasopoulos (2014) and Pincus et al. (2007). We conduct a survey of multi-country evidence of the accrual anomaly, but we extend the previous evidence to a macroeconomic setting of crisis. Papanastasopoulos (2014) points to the importance of analyzing the impact of macroeconomic cycles, following his evidence at the country level. Pincus et al. (2007) call for additional evidence on the international level in order to provide further potential explanation of the phenomenon. To the best of our knowledge, we are the first to undertake that analysis on a pan-European sample for the period of the latest crisis.

We also contribute to the findings of Konstantinidi at al. (2016). Our research focuses on a generalized negative economic condition that allows a natural setting to test the asymmetric persistence of accruals and cash flows under negative and positive economic conditions. By doing so, we also rule out investors' earnings fixation as a potential explanation and contribute to the ongoing debate about those results (Patatoukas, 2016). In addition, we test for a differential risk premium that is associated with accruals under negative economic conditions.

The main limitation of the study is the lack of data. Because of gaps in our database, we had to exclude a large number of firms from our study. This exclusion reduced our final sample to roughly one-third of our original data extract. We also cannot disregard the fact that our period of study may be simply an outlier case attributed to the crisis. Research in future years may unveil a conclusion on this case.

Nevertheless, our results also point toward a possible new behavior for investors during a crisis. Economically, given the lower returns that can be obtained from today's markets, it makes sense that investors may reduce their risk aversion levels to get more returns. This reduction could explain that even though we find higher values for ARBRISK and

Volume (transaction costs proxy), the anomaly no longer exists, especially after we find that these proxies had a very high explanatory power for 2008 and this effect disappeared completely afterwards.

It would be of great interest to perform the same tests on the US market. An analysis on the change in risk aversion and behavior of investors pre, during and post crisis (especially hedge funds) could derive important conclusions for the explanation of the anomaly.

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Appendix

Variables	Definition
ARBRISK	Residual variance from a standard market model regression of its excess returns on the excess returns of the market index used over the 36 months ending one month prior to April 1 of the post-ranking year.
Accruals	Change in non-cash current assets, less the change in current liabilities (short-term debt and taxes payable excluded), less depreciation expense, all divided by the average total assets.
Beta	Beta coefficient from a 12-month time-series regression of the monthly excess return on the portfolio over the risk-free rate on the excess return on the market over the risk-free rate beginning four months after the ranking year
Cashflows	Earnings less accruals
CurrAssets	The change in non-cash current assets divided by average total assets.
CurrLiab	The change in current liabilities (short-term debt and taxes payable excluded) divided by average total assets.
Dep	Depreciation expenses divided by average total assets.
Earnings	EBIT (Income from continuing operations) divided by average total assets.
Returns	Monthly returns starting on April of the post-valuation year and finishing one year later in March.
Size	Natural log of the market value of common equity (in millions of euros) measured at fiscal year-end.
Volume	Daily closing price times the daily shared closing price times the daily shared.

Table I

Mean values for ten portfolios formed annually by assigning firms to deciles by their magnitude of accruals

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
Panel A:										
Accruals	-0,2405	-0,1277	-0,0895	-0,0658	-0,0479	-0,0316	-0,0155	0,0044	0,0344	0,1228
Cashflows	0,1828	0,1327	0,1078	0,0988	0,0814	0,0645	0,0562	0,0289	0,0146	-0,0998
Earnings	-0,0577	0,0050	0,0183	0,0330	0,0335	0,0329	0,0407	0,0333	0,0490	0,0230
Panel B:										
Curr Assets	-0,0159	-0,0173	-0,0065	-0,0002	0,0147	0,0146	-0,0093	0,0229	0,0408	0,1016
Curr Liab	-0,1030	-0,0374	-0,0246	-0,0141	-0,0183	-0,0066	0,0268	0,0120	0,0220	0,0429
Dep	-0,0936	-0,0705	-0,0570	-0,0518	-0,0453	-0,0395	-0,0328	-0,0309	-0,0306	-0,0281
Panel C:										
Beta	0,98	0,93	0,91	0,87	0,88	0,85	0,89	0,85	0,91	0,91
p-value	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
Size	13,93	14,51	14,59	15,20	15,08	14,75	14,59	14,72	14,28	13,85
Panel D:										
ARBRISK	0,13	0,11	0,11	0,10	0,10	0,10	0,10	0,10	0,10	0,12
Volume	2,31	2,64	9,10	5,23	4,79	3,85	3,09	2,59	2,96	1,91

See Appendix for detailed definitions of variables.
Sample consists of 13,602 firm-years between 2007 and 2014.

Table II

OLS tests of future earnings performance on current earnings

Panel A: $Earnings_{t+1} = \alpha_0 + \alpha_1 * Earnings_t + \varepsilon_{t+1}$

	Industry Level	Std Dev	T-test	p-value
α_0	0,0065	0,0031	2,1106**	0,0373
α_1	0,5983	0,0827	7,2349*	0,0000
R^2	0,34			
N	102			

Panel B: $Earnings_{t+1} = \beta_0 + \beta_1 * Accruals_t + \beta_2 * Cashflows_t + \varepsilon_{t+1}$

	Industry Level	Std Dev	T-test	p-value
β_0	0,0253	0,0047	5,3931*	0,000
β_1	0,8661	0,0919	9,4235*	0,000
β_2	0,5197	0,0760	6,8344*	0,000
R^2	0,47			
F-test	52,3435*			
p-value	0,0000			
N	102			

Sample consists of 11,172 firm-years assigned to 17 portfolios by industry level classification (using the first two digits of the NACE Rev 2 codes) from 2008 to 2014.
*, ** and *** indicate significance at the 0,01, 0,05 and 0,10 levels, respectively.

Table III

Time-series means of equally weighted portfolios' abnormal stock returns (measured by Jensen's Alpha) sorted by magnitude of accruals

Portfolio Accrual Ranking	Jensen's Alpha				
	Year + 1	Std Dev	T-test	p-value	R^2
Lowest	0,0049	0,0037	1,3270	0,1883	0,59
2	0,0072	0,0031	2.3067**	0,0236	0,64
3	0,0045	0,0030	1,5305	0,1298	0,66
4	0,0040	0,0025	1,6279	0,1074	0,72
5	0,0057	0,0026	2.1914**	0,0313	0,70
6	0,0057	0,0025	2.2788**	0,0253	0,71
7	0,0048	0,0024	2.0184**	0,0468	0,74
8	0,0042	0,0026	1,6023	0,1129	0,69
9	0,0056	0,0028	1.9864**	0,0500	0,68
Highest	0,0019	0,0031	0,6053	0,5467	0,64
Hedge	0,0031	0,0023	1,3268	0,1883	0,02

The Jensen's alpha is the estimated value of the α from (Rpt-Rft)= αp+ βp(Rmt-Rft)+ ∈pt , where Rpt denotes the return of portfolio p in year t, and Rft is the risk free rate that is measured using the contemporaneous 1-year German government bonds. Rmt is the market return that is estimated with the monthly returns of the STOXX 600 index. The return accumulated period begins four months after the fiscal year-end. The hedge portfolio consists of a long position in the lowest accrual portfolio and an offsetting short position in the highest accrual portfolio.
*, ** and *** indicate significance at the 0,01, 0,05 and 0,10 levels, respectively.

Table IV

OLS tests of explanatory power of accruals with respect to future annual stock returns

Panel A: $Returns_{t+1} = \alpha_0 + \alpha_1 * Accruals_t + \varepsilon_{t+1}$

	Industry Level	Std Dev	T-test	p-value
α_0	0,0763	0,0334	2,2850**	0,0241
α_1	-0,2952	0,5421	-0,5446	0,5871
R^2	0,00			
N	119			

Panel B: $Returns_{t+1} = \beta_0 + \beta_1 * CurrAssets_t + \beta_2 * CurrLiab_t + \beta_3 * Dep_t + \varepsilon_{t+1}$

	Industry Level	Std Dev	T-test	p-value
β_0	0,0880	0,0201	4,3751*	0,0000
β_1	0,0013	0,0105	0,1280	0,8983
β_2	-0,0035	0,0090	-0,3857	0,7004
β_3	-0,0056	0,0145	-0,3847	0,7011
R^2	0,00			
F-test	0,1809			
p-value	0,9092			
N	119			

Sample consists of 11.172 firm-years assigned to 17 portfolios by industry level classification (using the first two digits of the NACE Rev 2 codes) from 2008 to 2014.
*, ** and *** indicate significance at the 0,01, 0,05 and 0,10 levels, respectively.

Table V

OLS test of explanatory power of accruals and proxies for barriers to arbitrage with respect to future annual stock returns

$Returns_{t+1} = \beta_0 + \beta_1 * Accruals_t + \beta_2 * ARBRISK_t + \beta_3 * Size_t + \beta_4 * Volume_t + \varepsilon_{t+1}$

	Industry Level	Std Dev	T-test	p-value
β_0	0,5947	0,2394	2,4847**	0,0144
β_1	0,0421	0,5417	0,0777	0,9382
β_2	-0,5046	0,8683	-0.5812	0,5623
β_3	-0,0338	0,0163	-2,075**	0,0402
β_4	0,0052	0,0013	3,9668*	0,0001
R^2	0,14			
F-test	4,4670*			
p-value	0,0022			
N	119			

Sample consists of 11.172 firm-years assigned to 17 portfolios by industry level classification (using the first two digits of the NACE Rev 2 codes) from 2008 to 2014.
*, ** and *** indicate significance at the 0,01, 0,05 and 0,10 levels, respectively.

Table VI

OLS tests of future earnings performance on current earnings comparison of year 2008 with period 2009 to 2014

Panel A : $Earnings_{t+1} = \alpha_0 + \alpha_1 * Earnings_t + \varepsilon_{t+1}$

2008	Industry Level	Std Dev	T-test	p-value
α_0	0,0024	0,0081	0,2953	0,7718
α_1	0,4541	0,2012	2,.2572**	0,0393
R^2	0,25			
N	17			
2009-2014	**Industry Level**	**Std Dev**	**T-test**	**p-value**
α_0	0,0074	0,0033	2,2383**	0,0279
α_1	0,6397	0,0913	7,0084*	0,0000
R^2	0,37			
N	85			

Panel B: $Earnings_{t+1} = \beta_0 + \beta_1 * Accruals_t + \beta_2 * Cashflows_t + \varepsilon_{t+1}$

2008	Industry Level	Std Dev	T-test	p-value
β_0	0,0043	0,0129	0,3340	0,7433
β_1	0,4926	0,2870	1,7167	0,1081
β_2	0,4558	0,2081	2,1898*	0,0460
R^2	0,26			
F-test	2,4032			
p-value	0,1267			
N	17			
2009-2014	**Industry Level**	**Std Dev**	**T-test**	**p-value**
β_0	0,0285	0,0050	5,6943*	0,0000
β_1	0,9186	0,0963	9,5376*	0,0000
β_2	0,5310	0,0825	6,4367*	0,0000
R^2	0,53			
F-test	45,5065*			
p-value	0,0000			
N	85			

Sample consists of 11.172 firm-years assigned to 17 portfolios by industry level classification (using the first two digits of the NACE Rev 2 codes).
*, ** and *** indicate significance at the 0,01, 0,05 and 0,10 levels, respectively.

Table VII

OLS tests of explanatory power of accruals with respect to future annual stock returns: year 2008

Panel A: $Returns_{t+1} = \alpha_0 + \alpha_1 * Accruals_t + \varepsilon_{t+1}$

2008	Industry Level	Std Dev	T-test	p-value
α_0	0,2572	0,0725	3,5458*	0,0029
α_1	-1,0875	1,1806	-0,9212	0,3715
R^2	0,06			
N	17			

Panel B: $Returns_{t+1} = \beta_0 + \beta_1 * CurrAssets_t + \beta_2 * CurrLiab_t + \beta_3 * Dep_t + \varepsilon_{t+1}$

2008	Industry Level	Std Dev	T-test	p-value
β_0	0,2446	0,0976	2,5057**	0,0263
β_1	-1,4359	2,3760	-0,6043	0,5560
β_2	-1,0592	1,6485	-0,6425	0,5317
β_3	-1,3444	1,8789	-0,7155	0,4869
R^2	0,06			
F-test	0,2766			
p-value	0,8413			
N	17			

Sample consists of 2.089 firm-years assigned to 17 portfolios by industry level classification (using the first two digits of the NACE Rev 2 codes) for year 2008.
*, ** and *** indicate significance at the 0,01, 0,05 and 0,10 levels, respectively.

Table VIII

OLS tests of explanatory power of accruals with respect to future annual stock returns: period 2009-2014

Panel A: $Returns_{t+1} = \alpha_0 + \alpha_1 * Accruals_t + \varepsilon_{t+1}$

2009-2014	Industry Level	Std Dev	T-test	p-value
α_0	0,0485	0,0330	1,4701	0,1447
α_1	-0,1057	0,5359	-0,1973	0,8440
R^2	0,00			
N	102			

Panel B: $Returns_{t+1} = \beta_0 + \beta_1 * CurrAssets_t + \beta_2 * CurrLiab_t + \beta_3 * Dep_t + \varepsilon_{t+1}$

2009-2014	Industry Level	Std Dev	T-test	p-value
β_0	0,0482	0,0202	2,3780**	0,0193
β_1	0,0030	0,0097	0,3120	0,7557
β_2	-0,0062	0,0083	-0,7384	0,4620
β_3	-0,0099	0,0135	-0,7360	0,4635
R^2	0,01			
F-test	0,4812			
p-value	0,6961			
N	102			

Sample consists of 9.083 firm-years assigned to 17 portfolios by industry level classification (using the first two digits of the NACE Rev 2 codes).
*, ** and *** indicate significance at the 0,01, 0,05 and 0,10 levels, respectively.

Table IX

OLS tests of explanatory power of accruals and proxies for barriers to arbitrage with respect to future annual stock returns. Comparison on year 2008 to period 2009-2014

Panel A: $Returns_{t+1} = \beta_0 + \beta_1*Accruals_t + \beta_2*ARBRISK_t + \beta_3*Size_t + \beta_4*Volume_t + \varepsilon_{t+1}$

2008	Industry Level	Std Dev	T-test	p-value
β_0	-1,8929	0,3826	-4,9474*	0,0003
β_1	0,7431	0,7619	0,9753	0,3487
β_2	8,1443	1,5091	5,3968*	0,0002
β_3	0,1102	0,0241	4,5762*	0,0006
β_4	-0,0032	0,0011	-2,8091**	0,0158
R^2	0,78			
F-test	10,5286*			
p-value	0,0007			
N	17			

Panel B: $Returns_{t+1} = \beta_0 + \beta_1*Accruals_t + \beta_2*ARBRISK_t + \beta_3*Size_t + \beta_4*Volume_t + \varepsilon_{t+1}$

2009-2014	Industry Level	Std Dev	T-test	p-value
β_0	0,3762	0,3842	0,9790	0,3300
β_1	-0,0907	0,5771	-0,1571	0,8755
β_2	-0,6486	0,9363	-0,6927	0,4901
β_3	-0,0179	0,0266	-0,6754	0,5010
β_4	-0,0102	0,0397	-0,2579	0,7971
R^2	0,03			
F-test	0,6757			
p-value	0,6104			
N	102			

Sample consists of 11.172 firm-years assigned to 17 portfolios by industry level classification (using the first two digits of the NACE Rev 2 codes).
*, ** and *** indicate significance at the 0,01, 0,05 and 0,10 levels, respectively.