

CROSS SECTIONAL ABSOLUTE DEVIATION OF SECURITY RETURN: EVIDENCE FROM EUROPEAN EQUITY MARKETS

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ABSTRACT

This paper tries to investigate whether changes in information environment resulting from the changes in the EU financial market regulations mitigates investors' herding practice in the equity market. To achieve this set objective, the paper employs and modifies one of the most reliable and widely used herding detection techniques of Cross-Sectional Absolute Deviation (CSAD) which uses stock return dispersion as a function of aggregate market return as a proxy for herding behavior. The rationale behind these herding measures is that limited deviation of returns around their cross-sectional average implies that investors ignore their prior heterogeneous information and follow the market consensus in their trading patterns. The findings of this study reveal significant evidence of investors' herding practice following the EU financial regulatory changes. These findings tend to defy the notion that strengthening financial regulations has the potential to enhance the informational efficiency of capital markets by encouraging information-based trading and mitigating irrational investment behaviors like intentional herding. The results of this study are expected to be of interest to academics, regulators, and policy-makers, and to the investing public and other market participants who trade based on firm fundamental variables. Moreover, the findings can be used to serve as a reminder to regulators in other jurisdictions to ensure that their countries are maintaining a clean and healthy financial markets regulatory infrastructure.

Key words: Herding; Financial Regulation, Equity Markets.

1. INTRODUCTION

Academics and practitioners have long been interested in understanding the behavior of financial market players. Professional investors, according to Keynes (1936), are similar to contestants in a beauty pageant who make decisions based on what other contestants think rather than the ultimate beauty of the contestants. This analogy

demonstrates how investors tend to imitate one another in their trading behaviors even when their private information signals suggest otherwise. Herding behavior is a term used in behavioral finance to describe this type of investment behavior.

Behavioral finance literature defines herding as the tendency of market participants to mimic the action of others. This collective investment behavior is said to be strongest during extreme market conditions, when market volatility and information flows impede the reliability and accuracy of investment predictions. Studies point out that herding behavior can be both rational and irrational. In addition, these studies classify herding into several types such as information-based herding, reputation-based herding, and compensation-based herding, as well as spurious herding in accordance to its motive. The sequential decision theory suggests that traders reference the decisions of other investors to make their decision. According to each investor, this is rational, because decisions made by other traders might include some important aspects for the trader. Thus, one can claim that herding is rational (Chang, Cheng, & Khorana, 2000; Chang, Wong, & Koh, 2003; Fong, Wong, & Lean, 2005).

While several explanations have been given as to why investors exhibit herding tendencies in the financial market, factors such as an opaque information environment (Fernández et al., 2011; Yao et al., 2014; Zhou & Lai, 2009), a weak regulatory infrastructure (Bikhchandani & Sharma, 2000), lax accounting standards (Guney et al., 2017; Prosad et al., 2012), and high information acquisition costs are said to be the leading causes for this phenomenon. As such, the widely held view among regulators and policymakers is that more regulatory intervention is needed to mitigate the impacts of herding and other forms of irrational exuberance among investors, on the grounds that these behaviors exacerbate financial market fragility (Christensen, Hail, & Leuz, 2016; Grosse, 2017; Hou, McKnight, & Weir, 2013; J. Zhou & Lee, 2013).

In this regard, many countries around the world have continued to respond to this outcry with a variety of regulatory efforts over the last few decades (Christensen et al., 2016; Grosse, 2017; Hou, 2013; Leuz & Wysocki, 2016). For example, the Securities and Exchange Commission (SEC) of the United States enacted Regulation Fair Disclosure (Reg. FD) in August 2000 with the goal of reducing information asymmetry and providing a fair playing field for all market players (Gomes et al., 2007; Li et al., 2015; Yu & Webb, 2017). Since 1999, however, there have been initiatives in Europe to reduce securities market abuses, safeguard investors, and improve quality disclosure. The Financial Services Action Plan (COM 1999, 232, 11.5.1999) lays out the first set of changes to the EU's financial market regulatory structure (Christensen et al., 2013; Christensen et al., 2016). Other attempts in the

jurisdiction include; the Market Abuse Directive (MAD), which was enacted in 2003 with the goal of eliminating market abuses and addressing situations where investors have been unfairly disadvantaged. The Transparency Directive (TPD) was enacted in 2004 to address issues related to corporate disclosure (Cumming et al., 2011).

Another significant regulatory shift in the EU jurisdiction is the adoption of a global reporting benchmark through legislation (Regulation EC1606/2002). As of January 2005, this new regulation requires all EU member states to implement International Financial Reporting Standards (IFRS) (Palea, 2007, 2013). The goal of implementing IFRS, among others, is to help investors make better decisions by offering a more transparent, comparable, and high-quality reporting system in the business information environment (Hope et al., 2006; Kang, 2013; Lambert et al., 2007; Lambertides & Mazouz, 2013; Lee & Fargher, 2010).

However, despite the forgoing efforts to strengthen financial market regulations new evidence has demonstrated that investors' behavioral biases still remain enigmatic and challenge the most exact and predictive classical economic models (Babajide & Adetiloye, 2012; Jang, 2017). Among these biases, herding has been a particular source of concern (Chang & Lin, 2015). This assertion has been reinforced by several EU officials, media outlets, and market participants who stated that investors' herding behavior was significantly responsible for exacerbating the recent EU financial crisis and spreading volatility to nations that receive cross-border financial packages (Galariotis et al., 2015; Galariotis et al., 2016).

Although this apprehension and concerns have further contributed to the growing realization that investors' herding tendency necessitates policy intervention, the situation raises some intriguing questions. What, for instance, are the actual implications of recent EU financial regulatory measures on investor behavioral anomalies? Is there a significant improvement in the information available to investors as a result of the new regulatory regime? Or could these regulatory attempts have some unintended consequences? These, we suggest, are crucial empirical questions that should be answered empirically. This is because, despite recurring regulatory changes, promoting a well-functioning and stable financial system has proven to be an elusive goal for many decades (Nenova, 2006).

Thus, the purpose of this study, is not to highlight why herding behavior exists in the EU financial markets, instead, to address the question of what actually constitutes the effect of recent financial regulatory changes on investors' herding practice in the EU financial markets. The rest of this paper is laid out as follows. Section 2 presents the literature review. The methods and the data employed to attain the research objectives

is discussed in Section 3 and 4 respectively. The empirical results and discussion are summarized in Section 5. Section 6 concludes the paper.

2. LITERATURE REVIEW

Since the advent of behavioral finance paradigm in the 1980s, a plethora of studies on finance have been devoted to the employment of cognitive psychological theory with conventional finance to provide explanations as to why investors make irrational investment decisions (Hachicha, 2010; Musse & Echchabi, 2015). A significant part of these studies has been centred on specific investors' trading bias called herding behavior, a concept that, hitherto, used to be confined typically within the realm of the rational finance paradigm (Chang & Lin, 2015; Hachicha, 2010). Academic interest in herding behavior has been notably intense in the aftermath of several recent financial crises (Mobarek, Mollah, & Keasey, 2014). A number of these crises have largely been attributed to investors' behavioral biases (Galariotis, Rong, & Spyrou, 2015b; Lee & Lee, 2015), particularly herding behavior (Galariotis, Krokida & Spyrou, 2015a).

The empirical literature on market-wide herding focuses on cross-sectional correlations over the whole stock market, which is the subject of our research. Christie and Huang (1995) presented an econometrical method to detect herd behavior that is still in use today, using the cross-sectional standard deviation of returns (CSSD) as a measure of the average proximity of individual asset returns to the realized market average. Chang, Cheng, and Khorana (2000) use a non-linear regression specification to enhance Christie and Huang's (1995) model. Their findings demonstrate no evidence of market participants herding in the United States and Hong Kong, but some evidence of herding in Japan. However, during periods of extreme price movements, equity return dispersions for developed countries tend to increase rather than decrease, providing strong evidence against any market-wide herding, which is consistent with Christie and Huang (1995). In addition, for South Korea and Taiwan, the two emerging markets in their sample, they document significant evidence of herding. An extension of Christie and Huang's (1995) method using the cross-sectional absolute deviation of returns (CSAD) in global markets was created by Chiang and Zheng (2010), who, using a sample of 18 countries for the period 1988-2009, find significant evidence of herding in advanced and emerging markets except the US and Latin America.

Tan, Chiang, Mason, and Nelling (2008) explored herding behavior in Chinese A shares using the Chang et al. (2000) model. They also used the market index, trade

volume, and volatility to test the asymmetric impacts of herding behavior. They looked at herding behavior on the Shanghai A-share market during up-market conditions, when there was a lot of stock activity and volatility. In B shares, however, they found no significant indication of herding. Local investors with a lack of financial awareness are the primary traders on the A-share market. Traders in the B-shares market are generally overseas investors with more experience in investing than those in the A-share market.

Herd behavior is also largely studied in emerging markets. Tan, Chiang, Mason, and Nelling (2008), for example, investigate whether herd behavior exists in dual-listed Chinese A and B shares. The results reveal that herding is present in all four markets examined. Relatedly, Lao and Singh (2011) provide evidence of the presence of herd behavior both in the Chinese stock market during periods of down markets and high trading volumes and in the Indian market during upswings. Furthermore, Economou et al. (2010), who explore the presence of herd behavior in extreme market situations for the markets of the PIGS (Portugal, Italy, Greece, and Spain) from 1998 to 2008, are the most closely comparable study to this paper. Their findings back up Caparelli et al. (2004) and Caporale et al. (2008) findings that market-wide herding exists in the Italian and Greek stock markets (2008).

Using the CH Model and the CCK Model, Javaira and Hassan (2015) and S. U. Khan (2013) investigated herding behavior in the Pakistan stock market and found no evidence of it. However, Shah, Shah, and Khan (2017) observed that when firms are classified by size, large firms demonstrate herding behavior during extreme market fluctuations, despite individual firms not exhibiting herding behavior. This study backs up the findings of Zafar and Hassan (2016), who used both CH and CCK models to discover considerable evidence of herding behavior in extreme market swings. Furthermore, Yousaf, Ali, and Shah (2018) and Javed, Zafar, and Hafeez (2013) observed considerable herding behavior in the Pakistan stock market under various market conditions, particularly during low trading volume days and during the 2007–2008 financial crisis. Finally, Zhaohui, Ali, and Lu-Guang (2019) stated that there is intentional herding on the Pakistan Stock Exchange because they discovered sector-wise herding in 2016.

Furthermore, empirical evidence establishes that investors are more likely to exhibit herding behavior in a market with less publicly available information (Javaira & Hassan, 2015; Yao et al., 2014; Zhou & Lai, 2009). This argument has featured in prominent academic literature over the last two decades. In times of market turbulence, this argument accentuates (Antoniou, Koutmos, & Pericli, 2005; Galariotis, Krokida, et al., 2015; Galariotis, Rong, et al., 2015). The popular view

tends to revolve around calls for more regulatory action to lessen the effects of investors herding and noise trading behaviors on the premise that their actions destabilize prices (Chau et al., 2013). Accordingly, it is widely acknowledged that effective financial regulations play an important role in ensuring efficiency and stability of financial markets (La Porta et al. 2006; Jackson & Roe, 2009). However, determining which regulation safeguards the interest of investors has been both a topical issue in academic finance and an issue for policy-making at global development organizations (Jackson & Roe, 2009).

3. METHODOLOGY

Two studies have proposed methods for detecting herding behavior using cross-sectional data on stock returns: Christie and Huang (1995) and Chang et al. (2000). Christie and Huang suggest that the investment decision-making process used by market participants depends on overall market conditions. During normal periods, rational asset-pricing models predict that the dispersion in cross-sectional returns will increase with the absolute value of the market returns, since individual investors are trading based on their own private information, which is diverse. However, during periods of extreme market movements, individuals tend to suppress their own private information, and their investment decisions are more likely to mimic collective actions in the market. Individual stock returns under these conditions tend to cluster around the overall market return.

To measure the return dispersion, Christie and Huang (1995) propose the cross-sectional standard deviation (CSSD) method, which is expressed as:

$$CSSD = \sqrt{\frac{\sum_{i=1}^N (R_{i,t} - R_{m,t})^2}{(N-1)}} \quad (1)$$

Where, N, is the number of stocks in the market, $R_{i,t}$, is the observed return on stock i at time t , $R_{m,t}$, is the overall market returns at time t .

The second return dispersion methodology employed in this paper is suggested by Chang et al. (2000) and uses the cross-sectional absolute deviation of returns (CSAD) as a measure of return dispersion. CSAD is expressed as:

$$CSAD = \frac{1}{N} \sum_{i=1}^N |R_{i,t} - R_{m,t}| \quad (2)$$

Specifically, for each stock i of the N stocks and each day t , the difference between the individual stock return ($R_{i,t}$) and the overall market return ($R_{m,t}$) is first calculated,

and the CSAD is then estimated. In line with this, the authors suggest the following approach as per equation (3) that allows the detection of herding behavior for the entire market return distribution.

$$CSAD_t = \alpha + \gamma_1 |R_{m,t}| + \gamma_2 R_{m,t}^2 + \varepsilon_t \quad (3)$$

Where; the square market returns ($r_{m,t}^2$) is used to capture the nonlinearity in the relationship, α is constant, γ_1 and γ_2 are coefficients, ε_t is the error term at time t . Herding behavior exists in the market if $\gamma_2 < 0$ (negative and statistically significant), and is absent if $\gamma_1 > 0$ and $\gamma_2 = 0$.

The intuition underlying the CSSD and CSAD herding measures of Christie and Huang (1995) and Chang et al. (2000) respectively, is that low dispersion of returns around their cross-sectional average indicates that market participants ignore their prior heterogeneous beliefs and information to follow correlated trading patterns around the “market consensus”.

Consequently, prior literature argues that herding behavior might be asymmetric under different market conditions. For example, herding is likely to be more prevalent during abnormal information flow; when market volatility and information flows impede the reliability and accuracy of investment predictions (Economou et al., 2011; Galariotis et al., 2015). To capture this effect, Economou et al. (2011) consider days with positive market returns as a period of normal information flows (Upmarket) and days with negative market returns as a period of extreme market movement (down market). In a similar spirit, we estimate the following regression to detect the evidence of herding discretely for days with positive returns (upmarket) and days with negative returns (down market) as per equation (4) and (5) as follows:

$$CSAD_t^{up} = \alpha + \beta_1^{up} |R_{m,t}^{up}| + \beta_2^{up} (R_{m,t}^{up}) + \varepsilon_t \quad (4)$$

$$CSAD_t^{Down} = \alpha + \beta_1^{Down} |R_{m,t}^{Down}| + \beta_2^{Down} (R_{m,t}^{Down}) + \varepsilon_t \quad (5)$$

Consequently, having established that information is a powerful stimulus in controlling investors’ emotions and psychology, we, therefore, argue that having effective regulatory mechanisms would boost investor confidence to trade based on fundamental variables. This is because effective regulatory infrastructure ensures smooth, clean, and efficient information dissemination (Nasarudin et al. 2017). In this regard, following Chan and Karim (2016) our study uses one of the most comprehensive regulatory and governance measure popularly known as World Governance Indicators (WGI) developed by Kaufmann et al. (2009) in order to test whether changes in financial market regulations impact investors’ herding tendency.

Thus, following earlier studies, e.g., Galariotis, et al. (2015), Galariotis et al. (2016), and Blasco et al. (2017), we modify the benchmark model in order to achieve the set research objectives as follows:

$$CSAD_t = \alpha + \beta_1 R_{m,t} + \beta_2 R_{m,t}^2 + \beta_3 FINREG(R_{m,t}^2) + \delta Macroinfo_t + \omega LogGDP_t + \varepsilon_t \quad (6)$$

In equation (6) FINREG denotes financial regulatory variable designed to measure the effect of financial market regulations on investors herding propensity. A negative and statistically significant coefficient of (β_3) in equation (6) will suggest that the new regulatory changes have promoted investors' herding practice, while a positive and statistically significant coefficient of the (β_3) will suggest otherwise.

We use WGI in this study because these regulatory proxies are publicly available and are calculated by international trusted institutions. This avoids subjective data mining issues and improves the accountability of the paper. Also, given that most of the recent EU financial market regulatory changes are principally geared towards tightening enforcement by way of improving supervisory regimes, the use of WGI would, therefore, allow us to gauge both the effectiveness of the new EU regulations as well as their enforcement. Furthermore, given that investors' herding practice is likely to be affected by some factors, such as important macroeconomic information (Galarioti et al., 2016), and the level of capital market development (Blasco et al., 2017). Thus, the macroeconomic variables that have proven to affect the intensity of investors' herding practice in the prior literature are included as control variables. Namely, changes in interest rate, money supply, and consumer confidence (Galariotis et al., 2015; Javaira & Hassan, 2015).

The sample of this study consists of three major European markets that are commonly assumed to serve as sufficient representative of the EU member states in terms of their legal origin; France (Continental-French group), Germany (Continental-German group) and the United Kingdom (Common Law- British group) (see Platikanova & Perramon, 2012). This method of country classification seems to provide a better and more refined categorization in comparison to the commonly used approach where the countries are grouped into two legal origin groups: Code-law (Continental) and Common-law group.

3.1 Data

The dataset of this study consists of monthly closing prices of the major constituents; France-CAC40 (37 stocks), Germany-DAX 30 (27 stocks) and the UK-FTSE 100 (76 stocks). We limit the sample to stocks that are constituents and trade continuously since January 2000. The sample period stretches from 1-11-2000 to 31-12-2018.

Monthly returns for the constituent stocks are calculated as follows: $R_{i,t} = (\ln(P_t) - \ln(P_{t-1})) * 100$. Where $R_{i,t}$ is the observed stock return of firm i at time t , and P_t and P_{t-1} are the closing price of the individual stock at time t and $t-1$. The market returns ($R_{m,t}$), which is needed to calculate the CSAD measure is equally calculated. All data are obtained from Thomson Reuters DataStream.

Table 1: Summary Statistics of Country-wise Monthly CSAD of Returns and Rm

Country	Variable	Std.				
		Mean	Median	Dev.	Skewness	Kurtosis
France	CSAD	0.1638	0.4203	3.2359	1.3345	5.4385
	Rm	0.4037	0.4258	4.0203	2.4726	13.3342
Germany	CSAD	0.1364	0.6322	3.4394	2.3334	9.3424
	Rm	0.6876	0.7237	4.1632	2.4432	12.7684
UK	CSAD	0.3232	0.6250	5.3266	1.5432	6.4937
	Rm	0.4431	0.5392	3.5638	3.3376	13.7891

Notes: This table reports descriptive statistics for the measure of monthly cross-sectional absolute deviation (CSAD) of individual stock returns concerning the market portfolio return and the market return (Rm); French, German, Swedish, and British market for the period 1-11-2000 till 31-12-2018. The CSAD measure is defined in Eq (2).

4. RESULTS AND DISCUSSION

We begin our empirical analyses with estimation of the benchmark model as per equation (3), for the whole sample period in order to find whether herding practice exists in the sample markets. We applied Newey-West’s (1987) consistent estimator to correct for autocorrelation and heteroscedasticity. Table 2 presents CSAD

estimates for the whole sample period (1/11/2000- 31/12/2018) and for the whole sample markets; France, Germany, and the UK. The coefficients reported in the table are those of linear and non-linear terms. Remember, when herding bias exists, the coefficient on the non-linear term (β_2) should be negative and statistically significant. Otherwise, there exists no herding tendency in the market. The results reveal that the estimated values of the coefficient on the linear term (β_1) in all the sample markets turn out to be consistently positive and statistically significant at a conventional level¹. Specifically, the value of (β_1), for example, is **0.2243** with a *t-statistics* = **2.14** for France, **0.0689** with a *t-statistics* = **4.33** for Germany and **0.0432** with a *t-statistics* = **2.04** for the UK. These results strongly support the theoretical assumption that CSAD increases with the magnitude of absolute market return $|R_{m,t}|$. As the absolute market return increases, so should the deviation in the individual asset returns (see, Chang et al., 2000; Guney et al., 2017).

Table 2: Testing the Evidence of Market-Wide Herding

Market	α	β_1	β_2	Adj. R ²
France				
Full sample	0.0341 (6.11)***	0.2243 (2.14)**	-0.3405 (-0.45)	0.4225
Up market ($R_m > 0$)	0.0434 (4.2)***	0.3460 (2.67)***	-0.2251 (-4.29)***	0.4163
Down market ($R_m < 0$)	0.0736 (3.24)***	0.3504 (3.26)***	0.0137 (1.24)	0.3952
Germany				
Full sample	0.3238(2.46)* *	0.0689 (4.33)***	0.4549 (2.08)**	0.3358
Up market ($R_m > 0$)	0.0229 (2.38)**	0.2048 (4.22)***	0.0566 (3.17)***	0.3081
Down market ($R_m < 0$)	0.1438 (2.46)**	0.0357 (3.44)***	-0.6060 (-0.54)	0.4532
UK				

¹ By conventional level, we mean statistical significance at 1%, 5%, or 10%.

Full Sample	0.0353 (3.16)***	0.0432 (2.04)**	-0.0457 3.35)***	(- 0.3256
Up market ($R_m > 0$)	0.0643 (2.49)**	0.0358 (2.41)**	-0.0111 2.04)**	(- 0.3432
Down market ($R_m < 0$)	0.0225 (3.92)***	0.0244 (0.95)	-0.0439 3.21)***	(- 0.5322

Note: This table shows the regression estimates for equation (3): $CSAD_t = \alpha + \gamma_1 |R_{m,t}| + \gamma_2 R_{m,t}^2 + \varepsilon_t$. Where $CSAD = \frac{1}{N} \sum_{i=1}^N |R_{i,t} - R_{m,t}|$, $|R_{m,t}|$ is absolute market returns, $R_{m,t}^2$ is squared market return. The sample period stretches between 2000 and 2017. Values in parentheses are t-statistics. ***, **, and * symbolize statistical significance at the 1%, 5%, and 10% levels respectively.

However, the coefficient of the non-linear term (β_2), which is the coefficient of interest in this case, disregarding market asymmetry provides no evidence of herd behavior in France (representing Continental-French group), Germany (representing Continental-German group) and the United Kingdom (representing Common Law-British group). More specifically, except for the UK, the coefficient on the square market returns (β_2) is either significantly positive or negative but not statistically significant at conventional level across the sample markets. These findings seem consistent with those reported in Chang and Lin (2015). Their empirical results show that among 50 global stock markets only 18 demonstrate evidence of herding practice based on the market-wide estimates. On the contrary, Blasco et al. (2017) find that among 35 global stock markets, 30-exhibit evidence of herding practice.

Furthermore, taking a deeper look at the sample markets, as shown in different market conditions, i.e., upmarket ($R_m > 0$) and downmarket ($R_m < 0$), we notice that investors' herding practice exists, but the phenomenon is asymmetric under different market situations. As shown in Table 2 when evidence of herding is estimated during normal market condition, i.e. upmarket ($R_m > 0$), the results indicate that markets such as France and the UK, which at first exhibit no evidence of herding based on the market-wide analysis, demonstrate evidence of investors' herding tendency in days with positive market returns (see equation 4). In other words, the herding coefficient (β_2), after splitting the sample period into rising and falling market phases reveals that herding practice exists during a rising market for the above-identified markets. While these results tend to defy the most commonly held expectations², they appear

² That herding is likely to be more pronounced during extreme market movement or abnormal information flow.

consistent with those reported in Tan et al. (2008), who report that herding tendency in the Shanghai A-share market looks stronger when the market is rising. Moreover, Guney et al. (2017) also document significant evidence of herding during rising markets when examining African frontier equity markets.

Regarding herding formation during abnormal information flows ($R_m < 0$), the analysis reveals that UK exhibits a significant non-linear relationship between return dispersion and overall market return when the market is falling (see, equation 5), hence indicating evidence of herding practice during the down market. This evidence validates the findings of CCK (2000) that suggest that assets return dispersions appear to be on average slimmer on days with negative market returns. By and large, the none-evidence of herding observed in the full sample period, and only intermittent presence of herding in the subsamples is consistent with the findings in Galariotis et al., (2015).

Taken together, therefore, we infer that investors' herding practice exists in all the markets under consideration in this study, but the phenomenon mainly occurs during different market phases. What these findings further suggest is that the tendency of investors to herd is not only limited to less efficient markets, but the phenomenon is also likely to occur in highly matured markets, like France and the UK. Although the evidence of herding observed in the European equity markets in this study is consistent with that of Economou, Katsikas, and Vickers (2016), Economou et al. (2011), and Chiang and Zheng (2010), our study differs from these studies in two ways. Firstly, we consider only markets assumed to represent the EU member states in terms of their legal origin, namely; France (Continental-French group), Germany (Continental-German group) and the United Kingdom (Common Law- British group). By contrast, Economou et al. (2016) consider only single European (Greece) market, Economou et al. (2011) cover only four Southern European (the PIGS) markets, and Chiang and Zheng (2010) consider only three European markets (France, Germany and the UK). In addition, while our study uses sample period covering years between 2000 to 2018, Economou et al. (2016) cover between 2007 to 2015, Economou et al. (2011) has 1998 to 2008, and Chiang and Zheng (2010) used 1988 to 2009. Nonetheless, despite the differences in the sample sizes and sample periods, one common feature between these prior studies and the present study is the establishment of the fact that herding behavior exists in the European financial markets.

By implication, the co-movement in the cross-sectional returns dispersion among European markets will hinder the prospect of portfolio diversification benefits. This is because investors' convergence of trading strategies would have significant implications for equity market efficiency and might systematically misprice financial

assets and lead to the creation of asset bubbles (Mobarek and Mollah, 2014). It is for

Country	β_1	β_2	β_3	Adj. R ²
France				
Full sample	0.0284 (6.16)***	0.5654 (3.29)***	-0.0322 3.28)***	(- 0.5533
Up market ($R_m > 0$)	0.4525 (9.28)***	0.4630 (2.36)**	-0.0283 4.67)***	(- 0.4123
Down market ($R_m < 0$)	0.5353 (3.65)***	0.5435 (3.45)***	-0.5646	(-1.59) 0.4352
Germany				
Full sample	0.7507 (5.83)***	0.0128 (1.35)	0.4582 (1.57)	0.5453
Up market ($R_m > 0$)	0.3943 (2.82)***	0.2353 (1.42)	-0.3453 (-1.81)	0.3243
Down market ($R_m < 0$)	0.3260 (4.34)***	0.0642 (1.35)***	-0.05276 (-1.54)	0.6543
UK				
Full sample	0.0657 (3.52)***	0.3242 (2.42)**	-0.4356 2.14)**	(- 0.6469
Up market ($R_m > 0$)	0.8892 (3.99)***	0.3232 (4.12)***	-0.4353 2.36)**	(- 0.3322
Down market ($R_m < 0$)	0.4593 (4.11)***	0.0423 (0.63)	0.0342 (1 .23)	0.3240

this reason, regulators and policymakers are consistently urged to pay considerable attention to this type of collective investment behavior, for it spurs unnecessary volatility, destabilizes markets, and increases the fragility of financial systems (Mobarek et al., 2014). Against this backdrop, our study attempts to test whether the recent efforts

by the EU policymakers to strengthen financial market regulatory infrastructure have an impact on this particular behavioral bias. The question is whether the new regulatory changes promote or inhibit the observed herding propensity.

Table 3: Herding around Financial Regulatory Changes

Note: This table reports regression estimates for equation 6): $CSAD_t = \alpha + \beta_1 |R_{m,t}| + \beta_2 R_{m,t}^2 + \beta_3 FINREGR_{m,t}^2 + \delta_1 MacroV_{Control} + \omega LogGDP_{Control} + \varepsilon_t$. Where FINREG denotes financial market regulation designed to capture the effect of financial market regulatory directives on investors’ herding practice. A negative and statistically significant coefficient of (β_3) will suggest the financial market regulation has significantly contributed towards the observed herding practice, while a positive and statistically significant coefficient of the (β_3) will suggest otherwise.

Table 3 report the regression estimates that test the propensity of investors’ to herd around EU financial regulatory changes. The coefficient of interest here is that of (β_3). The results from this analysis indicate that the herding indicator (β_3) is significantly negative in two of the major sample markets (France and the UK) and positive in the case of Germany. The results for the full sample period, for example, reports that France has $\beta_3 = -0.0322$ and the t-stat = -3.28, Germany $\beta_3 = 0.4582$ and t-stat = 1.57, and UK $\beta_3 = -0.4356$ and the t-stat = -2.14.

While we cannot rule out that fact that changes in financial regulations may have unintended consequences of increasing certain market anomalies, we however, become curious as to why improvement in financial market regulations designed to reduce information asymmetry would instigate investors’ herding behavior. Besides, we realize that despite the mixed findings documented in the extant literature regarding the economic effect of financial regulatory changes, a substantial part of this literature points to the direction of positive economic benefit on the capital market, with some positive real economic consequences. Further, given the settings of the sample markets in this study and considering the explanations put forth by most of the behavioral finance scholars as to why herding exists in the financial market³, we do not expect herding activity to be prevalent in developed markets where information asymmetry is likely to be weaker due to quality institutional infrastructures.

³ Lack of corporate transparency, less publicly available information, lax regulatory infrastructure, and weak accounting standards (Bikhchandani & Sharma, 2000; Duasa & Kassim, 2009; Guney et al., 2017; Yao et al., 2014).

5. CONCLUSION AND RECOMMENDATIONS

This study examines the effect of EU financial regulatory changes on investors' herding propensity using a sample of three European equity markets that are presumably believed to serve as sufficient representation of the EU member states in terms of their legal origin, namely; France (Continental-French group), Germany (Continental-German group), and the United Kingdom (Common Law- British group). The new regulatory environment, according to the findings, appears to rather promote investors' herding behavior in the markets under consideration. These findings appear to be in line with that of (Arya et al., 2005), who investigate the impact of Regulation Fair Disclosure (RFD) on investors' herding behavior in the U.S. financial market. Despite the fact that RFD is meant to level the playing field among security investors in the U.S., their empirical evidence reveals that the regulation may have an unintended consequence of intensifying investors' herding behavior. Thus, to the extent that the presence of herding behavior may suggest relative market inefficiencies, the findings in this paper are qualified by the following caveats; this study adopts a herd detection approach which searches for evidence of herding toward a market consensus. As a result, the findings do not, in any way, rule out the possibility that other types of herding behavior exists in European equity markets. Furthermore, it is quite plausible that investors in our sample markets trade in similar manner without necessarily imitating the actions of others, but identical reaction to common fundamental information. This form of clustering, according to Galariotis, Rong, et al. (2015), is called "spurious herding. Spurious herding often leads to an efficient outcome and lends support to Efficient Market Hypothesis.

REFERENCES

- Ahmed, A. S., & Schneible, R. A. (2007). The impact of regulation fair disclosure on investors' prior information quality—evidence from an analysis of changes in trading volume and stock price reactions to earnings announcements. *Journal of Corporate Finance*, 13(2), 282-299.
- Ananzeh, I. E. N. (2014). Testing the weak form of efficient market hypothesis: Empirical evidence from Jordan. *International Business and Management*, 9(2), 119-123.
- Armstrong, C. S., Barth, M. E., Jagolinzer, A. D., & Riedl, E. J. (2010). Market reaction to the adoption of IFRS in Europe. *The Accounting Review*, 85(1), 31-61.

- Arya, A., Glover, J., Mittendorf, B., & Narayanamoorthy, G. (2005). Unintended consequences of regulating disclosures: The case of Regulation Fair Disclosure. *Journal of Accounting and Public Policy*, 24(3), 243-252.
- Babajide, A. A., & Adetiloye, K. A. (2012). Investors' behavioral biases and the security market: An empirical study of the Nigerian security market. *Accounting and Finance Research*, 1(1), 219-229.
- Barth, J. R., Caprio, G., & Levine, R. (2004). Bank regulation and supervision: what works best? *Journal of Financial Intermediation*, 13(2), 205-248.
- Belhoula, M., & Naoui, K. (2011). Herding and Positive Feedback Trading in American Stock Market: A Two Co-directional Behavior of Investors. *International Journal of Business and Management*, 6(9), 244-252.
- Beneish, M. D., & Yohn, T. L. (2008). Information friction and investor home bias: A perspective on the effect of global IFRS adoption on the extent of equity home bias. *Journal of Accounting and Public Policy*, 27(6), 433-443.
- BenMabrouk, H., & Litimi, H. (2018). Cross herding between American industries and the oil market. *The North American Journal of Economics and Finance*.
- Bikhchandani, S., & Sharma, S. (2000). Herd behavior in financial markets. *IMF Economic Review*, 47(3), 279-310.
- Blasco, N., Corredor, P., & Ferreruela, S. (2017). Can agents sensitive to cultural, organizational and environmental issues avoid herding? *Finance Research Letters*.
- Bowe, M., & Domuta, D. (2004). Investor herding during financial crisis: A clinical study of the Jakarta Stock Exchange. *Pacific-Basin Finance Journal*, 12(4), 387-418.
- Branch, B. (2014). Institutional economics and behavioral finance. *Journal of Behavioral and Experimental Finance*, 1, 13-16.
- Bushee, B. J., & Leuz, C. (2005). Economic consequences of SEC disclosure regulation: evidence from the OTC bulletin board. *Journal of Accounting and Economics*, 39(2), 233-264.
- Carhart, M. M. (1997). On persistence in mutual fund performance. *The Journal of Finance*, 52(1), 57-82.
- Chan, S.-G., & Karim, M. Z. A. (2016). Financial market regulation, country governance, and bank efficiency: Evidence from East Asian countries. *Contemporary Economics*, 10(1), 39-54.
- Chang, C. H., & Lin, S. (2015). The effects of national culture and behavioral pitfalls on investors' decision-making: Herding behavior in international stock markets. *International Review of Economics & Finance*, 37, 380-392.

- Chang, Cheng, J. W., & Khorana, A. (2000). An examination of herd behavior in equity markets: An international perspective. *Journal of Banking & Finance*, 24(10), 1651-1679.
- Chau, F., Dosmukhambetova, G. B., & Kallinterakis, V. (2013). International Financial Reporting Standards and noise trading. *Journal of Applied Accounting Research*, 14(1), 37-53.
- Chiang, T. C., & Zheng, D. (2010). An empirical analysis of herd behavior in global stock markets. *Journal of Banking & Finance*, 34(8), 1911-1921.
- Christensen, H. B., Hail, L., & Leuz, C. (2013). Mandatory IFRS reporting and changes in enforcement. *Journal of Accounting and Economics*, 56(2–3, Supplement 1), 147-177.
- Christensen, H. B., Hail, L., & Leuz, C. (2016). Capital-market effects of securities regulation: Prior conditions, implementation, and enforcement. *The Review of Financial Studies*, 29(11), 2885-2924.
- Christie, W. G., & Huang, R. D. (1995). Following the pied piper: Do individual returns herd around the market? *Financial Analysts Journal*, 31-37.
- Cumming, D., Dannhauser, R., & Johan, S. (2015). Financial market misconduct and agency conflicts: A synthesis and future directions. *Journal of Corporate Finance*, 34, 150-168.
- Cumming, D., Johan, S., & Li, D. (2011). Exchange trading rules and stock market liquidity. *Journal of Financial Economics*, 99(3), 651-671.
- Dang, H. V., & Lin, M. (2016). Herd mentality in the stock market: On the role of idiosyncratic participants with heterogeneous information. *International Review of Financial Analysis*, 48, 247-260.
- Daniel, S. J., Cieslewicz, A. P. J. K., & Pourjalali, H. (2012). The impact of national economic culture and country-level institutional environment on corporate governance practices. *Management International Review*, 52(3), 365-394.
- Demirer, R., Kutan, A. M., & Chen, C.-D. (2010). Do investors herd in emerging stock markets?: Evidence from the Taiwanese market. *Journal of Economic Behavior & Organization*, 76(2), 283-295.
- Duasa, J., & Kassim, S. (2009). Herd behavior in Malaysian capital market: An empirical analysis. *Journal of Applied Economic Sciences*, 4(1), 7.
- Economou, F., Katsikas, E., & Vickers, G. (2016). Testing for herding in the Athens Stock Exchange during the crisis period. *Finance Research Letters*, 18, 334-341.

- behaviour: Evidence from four south European markets. *Journal of International Financial Markets, Institutions and Money*, 21(3), 443-460.
- Fama, E. F., & French, K. R. (1995). Size and book-to-market factors in earnings and returns. *The journal of finance*, 50(1), 131-155.
- Fernández, B., Garcia-Merino, T., Mayoral, R., Santos, V., & Vallelado, E. (2011). Herding, information uncertainty and investors' cognitive profile. *Qualitative Research in Financial Markets*, 3(1), 7-33.
- Galariotis, E. C., Krokida, S.-I., & Spyrou, S. I. (2016). Herd behavior and equity market liquidity: Evidence from major markets. *International Review of Financial Analysis*, 48, 140-149.
- Galariotis, E. C., Rong, W., & Spyrou, S. I. (2015). Herding on fundamental information: A comparative study. *Journal of Banking & Finance*, 50(0), 589-598.
- Gavriilidis, K., Kallinterakis, V., & Ferreira, M. P. L. (2013). Institutional industry herding: Intentional or spurious? *Journal of International Financial Markets, Institutions and Money*, 26, 192-214.
- Gomes, A., Gorton, G., & Madureira, L. (2007). SEC Regulation Fair Disclosure, information, and the cost of capital. *Journal of Corporate Finance*, 13(2), 300-334.
- Gordy, M. B., & Howells, B. (2006). Procyclicality in Basel II: Can we treat the disease without killing the patient? *Journal of Financial Intermediation*, 15(3), 395-417.
- Goshen, Z., & Parchomovsky, G. (2005). The essential role of securities regulation. *Duke LJ*, 55, 711.
- Grosse, R. (2017). The global financial crisis—Market misconduct and regulation from a behavioral view. *Research in International Business and Finance*, 41, 387-398.
- Guney, Y., Kallinterakis, V., & Komba, G. (2017). Herding in frontier markets: Evidence from African stock exchanges. *Journal of International Financial Markets, Institutions and Money*, 47, 152-175.
- Hachicha, N. (2010). New sight of herding behavioural through trading volume (No. 2010-11). Economics Discussion Papers
- Hail, L., & Leuz, C. (2006). International differences in the cost of equity capital: Do legal institutions and securities regulation matter? *Journal of Accounting Research*, 44(3), 485-531.

- Hamberg, M., Mavruk, T., & Sjögren, S. (2013). Investment allocation decisions, home bias and the mandatory IFRS adoption. *Journal of International Money and Finance*, 36, 107-130.
- Healy, P. M., & Palepu, K. G. (2001). Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature. *Journal of Accounting and Economics*, 31(1), 405-440.
- Hirshleifer, D. (2001). Investor psychology and asset pricing. *The Journal of Finance*, 56(4), 1533-1597.
- Hope, O.-K., Jin, J., & Kang, T. (2006). Empirical evidence on jurisdictions that adopt IFRS. *Journal of International Accounting Research*, 5(2), 1-20.
- Hou, A. J. (2013). Asymmetry effects of shocks in Chinese stock markets volatility: A generalized additive nonparametric approach. *Journal of International Financial Markets, Institutions and Money*, 23(0), 12-32.
- Huang, T., & Zhao, Y. (2017). Revolution of securities law in the Internet Age: A review on equity crowd-funding. *Computer Law & Security Review*.
- Huang, T.-C., Wu, C.-C., & Lin, B.-H. (2016). Institutional herding and risk–return relationship. *Journal of Business Research*, 69(6), 2073-2080.
- Hwang, Soonsung & Salmon, Mark (2004). Market stress and herding. *Journal of Empirical Finance*, 11(4) 585-616.
- Jackson, H. E., & Roe, M. J. (2009). Public and private enforcement of securities laws: Resource-based evidence. *Journal of Financial Economics*, 93(2), 207-238.
- Jain, P. K., & Rezaee, Z. (2006). The Sarbanes-Oxley Act of 2002 and Capital-Market Behavior: Early Evidence. *Contemporary Accounting Research*, 23(3), 629-654.
- Jang, J. (2017). Stock return anomalies and individual investors in the Korean stock market. *Pacific-Basin Finance Journal*, 46, 141-157.
- Javaira, Z., & Hassan, A. (2015). An examination of herding behavior in Pakistani stock market. *International Journal of Emerging Markets*, 10(3), 474-490.
- Jiang, H., & Verardo, M. (2018). Does herding behavior reveal skill? An analysis of mutual fund performance. *The Journal of Finance*, 73(5), 2229-2269.
- Kabir, M. H., & Shakur, S. (2018). Regime-dependent herding behavior in Asian and Latin American stock markets. *Pacific-Basin Finance Journal*, 47, 60-78.
- Kang, W. (2013). The impact of mandatory IFRS adoption on the earnings–returns relation. *Applied Financial Economics*, 23(13), 1137-1143.

- Kaufmann, D., Kraay, A., & Mastruzzi, M. (2009). Governance matters VIII: aggregate and individual governance indicators, 1996-2008. *World bank policy research working paper*(4978).
- Kim, T., Koo, B., & Park, M. (2013). Role of financial regulation and innovation in the financial crisis. *Journal of Financial Stability*, 9(4), 662-672.
- Klein, A. C. (2013). Time-variations in herding behavior: Evidence from a Markov switching SUR model. *Journal of International Financial Markets, Institutions and Money*, 26(0), 291-304.
- Kremer, S., & Nautz, D. (2013). Causes and consequences of short-term institutional herding. *Journal of Banking & Finance*, 37(5), 1676-1686.
- Kross, W. J., & Suk, I. (2012). Does Regulation FD work? Evidence from analysts' reliance on public disclosure. *Journal of Accounting and Economics*, 53(1), 225-248.
- La Porta, R., Lopez-de-Silanes, F., & Shleifer, A.(2006). What Works in Securities Laws? *The Journal of Finance*, Vol. LXI, No. 1, 1-32
- Lakonishok, J., Shleifer, A., & Vishny, R. W. (1992). The impact of institutional trading on stock prices. *Journal of Financial Economics*, 32(1), 23-43.
- Lambert, R., Leuz, C., & Verrecchia, R. E. (2007). Accounting information, disclosure, and the cost of capital. *Journal of Accounting Research*, 45(2), 385-420.
- Lambertides, N., & Mazouz, K. (2013). Stock price volatility and informational efficiency following the mandatory adoption of IFRS in Europe. *Journal of Applied Accounting Research*, 14(1), 4-17.
- Lao, P., & Singh, H. (2011). Herding behaviour in the Chinese and Indian stock markets. *Journal of Asian Economics*, 22(6), 495-506.
- Leftwich, R. (1980). Market failure fallacies and accounting information. *Journal of Accounting and Economics*, 2(3), 193-211.
- Leuz, C., & Wysocki, P. D. (2016). The economics of disclosure and financial reporting regulation: Evidence and suggestions for future research. *Journal of accounting research*, 54(2), 525-622.
- Li, Y., Saunders, A., & Shao, P. (2015). Did Regulation Fair Disclosure affect credit markets? *Journal of Banking & Finance*, 54, 46-59.
- Litimi, H., BenSaïda, A., & Bouraoui, O. (2016). Herding and excessive risk in the American stock market: A sectoral analysis. *Research in International Business and Finance*, 38, 6-21.

- Mensah, Y. M., & Yang, R. (2008). An empirical evaluation of analysts' herding behavior following Regulation Fair Disclosure. *Journal of Accounting and Public Policy*, 27(4), 317-338.
- Mobarek, A., Mollah, S., & Keasey, K. (2014). A cross-country analysis of herd behavior in Europe. *Journal of International Financial Markets, Institutions and Money*, 32, 107-127.
- Nasarudin, A. M., Noordin, B. A.A., Law, S. H., Yahaya, M.H, (2017). Investigation of Herding Behaviour in Developed and Developing Countries: Does Country Governance Factor Matters? *Capital Markets Review* 25 (2) pp. 1-14.
- Nenova, T. (2006). *Takeover laws and financial development* (Vol. 4029): World Bank Publications.
- Palea, V. (2013). IAS/IFRS and financial reporting quality: Lessons from the European experience. *China Journal of Accounting Research*, 6(4), 247-263.
- Panta, S. B., Phuyal, N., Sharma, R., & Vora, G. (2016). The Cross-Section of Stock Returns: An Application of Fama-French Approach to Nepal. *Modern Economy*, 7(02), 223.
- Peltzman, S., Levine, M. E., & Noll, R. G. (1989). The economic theory of regulation after a decade of deregulation. *Brookings papers on economic activity. Microeconomics*, 1989, 1-59.
- Prosad, J. M., Kapoor, S., & Sengupta, J. (2012). An Examination of Herd Behavior: An Empirical Evidence from Indian Equity Market. *International Journal of Trade, Economics and Finance*, 3(2), 154.
- Shiller, R. J. (2003). From efficient markets theory to behavioral finance. *The Journal of Economic Perspectives*, 17(1), 83-104.
- Sias, R. W. (2004). Institutional herding. *Review of Financial Studies*, 17(1), 165-206.
- Simões Vieira, E. F., & Valente Pereira, M. S. (2015). Herding behaviour and sentiment: Evidence in a small European market. *Revista de Contabilidade* 18(1)78-86.
- Singleton-Green, B. (2015). The effects of mandatory IFRS adoption in the EU: A review of empirical research (April 20, 2015). Information for Better Markets, Forthcoming, Available at SSRN: <https://ssrn.com/abstract=2515391>.
- Skott, P. (1995). Financial innovation, deregulation and Minsky cycles. *Macroeconomic Policy after the Conservative Era*, Cambridge University Press, Cambridge, Massachussets, 255-273.
- Solaiman, S. M. (2009). Investor protection by securities regulators in the primary

- share markets in Australia and Bangladesh: A comparison and contrast. *Journal of Financial Crime*, 16(4), 305-333.
- Spyrou, S. (2013). Herding in financial markets: a review of the literature. *Review of Behavioural Finance*, 5(2), 175-194.
- Truong, N. H., & Le, M. U. (2014). An Exploratory Study of Herd Behaviour in Vietnamese Stock Market: A New Method. *Asian Journal of Finance & Accounting*, 6(1), 464-475.
- Verrecchia, R. E. (2001). Essays on disclosure. *Journal of Accounting and Economics*, 32(1), 97-180.
- Vidal-Tomás, D., Ibáñez, A. M., & Farinós, J. E. (2019). Herding in the cryptocurrency market: CSSD and CSAD approaches. *Finance Research Letters*, 30, 181-186
- Watts, R. L., & Zimmerman, J. L. (1983). Agency problems, auditing, and the theory of the firm: Some evidence. *The Journal of Law and Economics*, 26(3), 613-633.
- Yao, J., Ma, C., & He, W. P. (2014). Investor herding behaviour of Chinese stock market. *International Review of Economics & Finance*, 29, 12-29.
- Yu, S., & Webb, G. (2017). Market adaptation to Regulation Fair Disclosure: The use of industry information to enhance the informational environment. *Journal of Economics and Business*, 89, 1-12.
- Zhou, R. T., & Lai, R. N. (2009). Herding and information based trading. *Journal of Empirical Finance*, 16(3), 388-393.