INDUSTRY HERDING BEHAVIOR IN BULL AND BEAR MARKETS: EVIDENCE FROM MOROCCO

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Abstract

This paper investigate sherding behavior on the Moroccan Stock Exchange using daily data of listed firms. We follow the methodology of *(Chang et al., 2000)* to test for the presence of herding behaviour in the context of market level and industry level during rising and falling market. At the market level, the empirical evidence indicates that herding is more pronounced in down market and no evidence of herding is reported during rising market. However, when testing industry herding behavior, we find that industry herding is more pronounced in down markets (11 of 24 industries) and only (3 of 24 industries) during up markets. Overall, the empirical results suggest that investors tend to herd more during bearish market due to the behavior of "flight to safety".

Keywords: Herding Behavior, Moroccan Stock Exchange, CSAD, Industry.

Résumé

Cette étude examine l'effet de troupeau dans la Bourse marocaine en utilisant les données journalières des entreprises cotées. Nous adoptons la méthodologie de *(Chang et al., 2000)* pour tester la présence de l'effet de troupeau, au niveau du marché et au niveau de l'industrie, en période de hausse et de baisse du marché. Les preuves empiriques indiquent qu'au niveau du marché, l'effet de troupeau est plus prononcé en période de baisse, mais aucune preuve n'est observée en période de hausse. Cependant, lorsque nous testons l'effet de troupeau au niveau de l'industrie, on constate que celui-ci est plus prononcé dans les marchés en baisse (11 parmi 24 industries) et seulement (3 parmi 24 industries) dans les marchés en hausse. En général, les résultats empiriques reflètent que les investisseurs ont tendance à suivre le troupeau en période de marché baissier en raison de la "fuite vers la sécurité".

Mots clés : Effet de troupeau, Bourse Marocaine, CSAD, Industrie.

Introduction

The traditional finance theory, which has remained the central paradigm for several decades, presumes that investors make rational decisions, in which the highest possible expected utility is optimally achieved. Moreover, the classical decision theory assumes that individual investors are risk-averse, and require high compensation of bearing higher risk.

Besides, under the efficient market hypothesis *(E.M.H),* the classical finance framework supposes that information is available, similar, and accessible for all the market participants, thus collecting and processing information doesn't incur costs, which allows investors to be able to price correctly financial assets on the basis of rational expectations. As a result, the price of the financial assets will reflect all available information, in the sense that no investor can repeatedly earn abnormal returns *(Fama, 1991).*

For several decades, the traditional finance framework attempted to understand financial markets mechanism, and has provided relevant models of financial decision making, such as asset pricing and portfolio management.

Although the traditional finance framework has provided many useful intuitions, the normative view is still apparently too simple to be in most cases confirmed in the data. For instance, the normative view that presumes investors can identify the optimum decision even in the presence of several constraints or in the face of complex situations, fails to understand the trading behavior of investors.

In addition, in the real world, uncertainty strongly complicates financial decision making, in such a way that, individual investors are simply constrained by their ability and resources. *(Simon, 1955)'s* theory of bounded rationality suggests that investors' decision making is bounded by numerous factors such as information asymmetry, information unavailability, cognitive ability, wealth constraint, and uncertainty. Hence, investors tend to make trading decisions under the context of irrational thinking and exhibit several behavior biases such as the herding behavior.

The reasons for herding are various. For example, money managers may imitate the actions of their peers in order to preserve and build reputation and/or compensation *(Scharfstein & Stein, 1990); (Trueman, 1994).* When money managers are characterized by a high reputation, there will be stronger incentives to hide in the herd, to protect their reputation.

As also, argued by*(Rajan, 2006),* herding may be perceived as insurance against poor relative performance. Moreover, herding may occur when institutional investors undergo similar private information, therefore, analyzing the same indicators *(Bikhchandani et al., 1992)*; *(Banerjee, 1992).*

Moreover, individual investors may herd when they are subject to information asymmetry *(Bikhchandani & Sharma, 2001),* as a result, some investors might exhibit a preference for conformity by disregarding their private information and basing their trade decisions on the actions of the others. And also, when undiversified investors face information asymmetry, then the idiosyncratic volatility of their stocks increases and the herding behavior emerges. *(Bikhchandani et al., 1992)* state that obscureness and unclearness is one of the driving factors of herding.

It is also widely assumed in the behavioral finance literature that when herding behavior is prevailing among the investors, it is often regarded as one of pillar key drivers behind periods of utmost volatility and market instability (*Spyrou, 2013).* In another word, herding is a real issue and concern to market participants, as it might cause the financial assets to deviate from their fundamentals, thus affecting the risk and return characteristics and accelerating financial market uncertainty and volatility *(Bikhchandani & Sharma, 2001),* and also increasing complications for individual investors to opt for strategies of diversification*(Venezia et al., 2011).* As another major consequence, herding is also viewed as a typical behavior of bubbles and crashes *(Avery & Zemsky, 1998); (Litimi et al., 2016).*

Herding behavior was first mentioned by *(Keynes, 1936)* where he described in his famous "Beauty Contest and Delicious Apple" example, that an investor ignores his personal information and beliefs and falls into a collective and correlated behavior*"it is better to fail conventionally than succeed unconventionally"*. In this case, investors imitate their informed peers, either because they don't have information, or because they think that others, they follow have superior and relevant information than they do.

(Scharfstein & Stein, 1990) and *(Banerjee, 1992)*argue that herding is when investors simply follow the actions of others by imitating the same investment decisions of others and suppressing their private information. In the same line, *(Chang et al., 2000)* suggest that this type of behavior arises when investors ignore their personal beliefs and base their own investment and trade decisions on other investors' actions. *(Hirshleifer et al.,1994)* suggest

that when individuals have access to the same information and interpret it equivalently, similar actions may occur. *(Christie & Huang, 1995),* defines the herding behavior as a tendency of the market participants to converge towards the market consensus.

Broadly speaking, in our study, we define the herding behavior as the process whereby individual investors exhibit a mimicking behavior and show apreference for conformity with the market consensus.

Generally, there exist two main distinct strands in the empirical literature. On the one hand, there are empirical studies that investigate institutional investor's herding behavior*(Lakonishok et al., 1992); (Nofsinger & Sias ,1999*); (*Grinblatt et al., 1995)*and *(Sias, 2004).* While on the other hand, there are empirical studies that accent on the aggregate market data and consider herding behavior towards the market consensus*(Christie & Huang, 1995); (Chang et al., 2000)* and *(Huang & Salmon 2004).* This study falls within the second strand and investigates herding towards the market consensus for the case of the Moroccan stock market.

Particularly, this study will investigate the herding behavior under rising and falling markets, and not only in the market level but also in the context of the industry level *(Choi & Sias, 2009).* As argued by *(Huberman, 2001)* investors' herding behavior occurs not only within the overall market, but is also observed within industries. More specifically, investors who are familiar with certain industries tend to exhibit herding behavior mainly within those industries. *(Bikhchandani & Sharma, 2001)* state that herd might emerge at the level of investments in a group of stocks, such as stocks of firms in an industry or in a country where investors might face similar information.

The institutional characteristic of the Moroccan stock market, in which we shall examine the herding behavior, plays a crucial role for our first pillar motivation for this paper. The Moroccan stock market's unique macro/micro-structure features yield an important background for the investigation of investor herding behavior. In recent years, the Moroccan government has enacted various courses of action to reform the stock market, but it is still criticized for its lack of transparency, unsophisticated retail investors, and substantial regulations. Hence, in comprehending of how investors act in the Moroccan stock market is important and worthwhile.

Our second motivation is manifested by the characteristic of information asymmetry in the framework of emerging markets. *(Gelos & Wei, 2005*) argue to the fact that emerging markets are characterized by lower transparency and higher information asymmetries, provide sufficient motivation to investors to recourse to herding.

The remainder of this study has the following structure. Section 2 summarizes the review of the literature on herd behavior. Section 3, describes data and methodology that will be used, while Section 4 presents and discusses the empirical results. Finally, conclusion.

Review of literature

Several papers have been devoted to the study of herding towards the market. However, the empirical evidence of herding is conflicted and mixed.

Using U.S data, *(Christie & Huang, 1995)* found no sign of herding in the U.S equity market, specifically during the utmost market fluctuations. *(Chang et al., 2000)* inspect the herding behavior of investors towards the market consensus within, Hong Kong, Japan, U.S Taiwan, and South Korea financial markets. Their empirical results display the absence of behavior of herd within the U.S financial market, which confirms the results of *(Christie & Huang, 1995)* and no evidence of herding in Hong Kong and limited evidence of herding in Japan. However, the findings document substantial evidence of herding within two emerging markets, South Korea and Taiwan. *(Jlassi & Bensaïda, 2014)* examine the presence of herding in the U.S market. Their results show that herding behavior exists in the U.S financial market and it is a long-lived phenomenon. More specifically, their findings report that herding is more intense in the S&P 100 index than in the DJIA index.

(Economou et al., 2011) provide comprehensive evidence that tests for the presence of herding behavior within the Italian, Portuguese, Greek, Spanish financial markets. The results report that herding behavior is present mostly in the Italian and the Greek markets and no evidence of herding behavior for the Spanish market but mixed evidence for Portugal. By using the Athens Stock Exchange data, *(Caporale et al., 2008)* explore the herd behavior formation in the extreme market conditions, their results indicate the presence of herding behavior over the period 1998 to 2007. More specifically, their results display that herd is more prevalent in daily frequency, which reveals that herd behavior in the Athens Stock Exchange is a short-lived phenomenon.

(Chiang et al., 2010) inspected this behavior in 18 countries. They evidenced that herding is existing in Asian markets and advanced stock markets (except the U.S) and the absence of herding behavior in Latin American markets.

For the case of Europe, *(Filip et al., 2015)* examine investors' herding behavior for the CEE (Central and Eastern Europe) countries. The empirical results endorse the occurrence of herding behavior for all of the CEE stock markets, apart from Poland. *(Mobarek et al., 2014)* investigate herd behavior among European markets (Continental, Nordic, and the PIIGS). The empirical results suggest that herd behavior is not significant in Europe during ordinary times, but is significant during periods of crises and different extreme market conditions.

For the case of the Indian stock market, *(Poshakwale et al., 2014)* report the presence of herding behavior over the period 1997 to 2012. However, *(Prosad et al., 2012)* and *(Garg & Jindhal, 2014)* find no evidence in the Indian Stock market for the period of 2006 to 2011 and the period of 2000 to 2012, respectively.

For the case of the Chinese stock market, *(Demirer & Kutan, 2006)* use the Chinese data of both firm- and sector-level over the period from January 1999 to December 2002 and report no evidence of herd formation. More specifically, the findings state that in Chinese stock markets, investors make rational investment decision which matches with the rational asset pricing models. In contrast, by using data for all dual-listed firms listed on the Shanghai (S.H.S.E) and Shenzhen (S.Z.S.E) Stock Exchange over the period from 1994 to 2003, *(Tan et al., 2008)'s* findings endorse the evidence of herding behavior within the Chinese A-share markets. The study of *(Singh & Lao, 2011)* uses data of the top 300 firms in terms of market capitalization in the Shanghai A-Share index, over the period from 1 July 1999 to 30 June 2009. The empirical results support the presence of herding behavior, especially when the Chinese market is falling and the trading volume is high. In the same line, *(Lee et al., 2013)* show strong evidence of industry herding in the A-shares markets using data from May 17, 2001, through May 16, 2011. Furthermore, the empirical results show that the technology sector plays a significant role in elucidating the other sectors' herding activity. Using data over the period from January 1, 1996 to April 30, 2007, and under least squares method, *(Chiang et al., 2010)* report evidence of herding behavior within Chinese A-shares markets and no evidence of herding within both Chinese B-shares markets, however by applying quantile regression analysis method, they find supporting evidence of the presence of herding behavior in both A-shares and B-shares markets in the lower quantile region.

Moreover, previous studies also argue that herding can exhibit asymmetric patterns related to rising market and falling markets. Several arguments state that herd behavior will be more pronounced in falling markets than in rising markets. In falling markets, investors may herd due to the tendency of "flight to safety" *(Vo & Phan, 2017).*

(Huang & Salmon, 2004) propose a new approach to estimate the herding intensity in the U.S and South Korean stock markets. They find the evidence of herding behavior towards the market portfolio in both rising and falling markets periods.

The empirical evidence of *(Tzewei, 2010)*reports the presence of asymmetric herding with higher significance during the market downstream in the Chinese stock market from 2004 to 2009. However, *(Chiang et al., 2010)* report that herding behavior is taking place during both rising and falling markets periods, even though herding behavior asymmetry is more pronounced within the Asian markets during up markets. *(Filip et al., 2015)* endorse that investors herd in the CEE markets, especially during down periods. In the same line, (*Lao, & Singh, 2011*) find that herding behavior is greater when the market is falling in the Chinese market, and*(Vo & Phan, 2017)* find that herd behavior in Vietnam stock market is more pronounced in down market than in up market. *(Indārs et al., 2019)* report no evidence of herding asymmetry within the Moscow stock market, however, when splitting the herd to fundamental and non-fundamental factors, herding is found only in down market and driven with non-fundamentals factors.

However, some studies report herding behavior during up markets. Among others, *(Prosad et al., 2012)* endorse that herding behavior is observed in greater magnitude during rising market in the Indian stock market. *(Chiang et al., 2010)* find the presence of herding in both rising and falling markets. However, no evidence of herding for B-shares investors when the market is rising. *(Tan et al., 2008*) find that herding behavior by investors from A-shares in the Shanghai market is more noticeable during up markets. *(Economou et al., 2011*) provide evidence of herding behavior in the Greek stock market, especially during the rising market**.**

A growing body of literature argues that in the context of emerging markets where information asymmetry and unsophisticated investors are higher and tremendous regulations that give few alternatives for investors, the effect of herd behavior will be more intense.

Therefore,motivating by the above literature***, we shall hypothesize that herding will be more noticeable during falling markets than rising markets due to the behavior of flight to safety***

Methodology &Data collection

Data Collection

The dataset used in this study is obtained from the Thomson DataStream database and comprises of both firm-specific and market-level data listed on the Moroccan stock market over the period from September 1, 2017 to July 1, 2019.

Daily updated constituent lists of the *Masi index (Moroccan All Shares Shares Index)* are used when retrieving the firm-specific data. To calculate individual stock returns, daily data on stock prices for firms listed on the *Masi index (Moroccan All shares Shares Index)* over the period from September 1, 2017 to July 1, 2019, are collected. Log returns are calculated as follows: $\boldsymbol{R_{it} = 100 \times \left(\log\left(P_t\right) - \log\left(P_{t-1}\right)\right)}$, and Log Market returns are calculated as follows: $\boldsymbol{R_{mt} = 100 \times \left(log\left(PMasi_t\right) - log\left(PMasi_{t-1}\right)\right)}$.

For the examination of herding across industries, this study will follow industry classification based on the Casablanca Stock exchange classification.

Methodology

The behavior finance literature provides measures of herdingbehavior. When the herd occurs in the stock market, investors tend to converge to the market consensus engendering a decrease of return dispersion from market return. In order to capture the return dispersion, *(Christie & Huang, 1995)* propose the cross-sectional standard deviation *(CSSD)* method. They argue that the return dispersions tend to decrease, when individual investors herd and cluster towards the market consensus. Contrary, when investors do not choose to herd, the return dispersion is expected to increase as it is supposed under rational asset pricing. The method of *(Christie & Huang, 1995)*uses the value of 1%, 5% and 10% as a criterion to define the extreme market conditions, however, a branch of literature argues that the definition of extreme return is arbitrary and recognizes herding only during periods of market stress. However, herd behavior may be present in the whole return distribution and turn out to be more prevalent during periods of market stress *(Chiang et al., 2010). (Chiang et al., 2010)*

argue that if the herd appears, then the linear relationship between the return dispersion and market return will no longer hold and will turn to a non-linear relationship.

Following the spirit of *(Christie & Huang, 1995)'s* model. *(Chang et al., 2000)* propose an alternative measure of return dispersion. That is, the cross-sectional absolute deviation *(CSAD)*, which is in the following form:

$$\boldsymbol{CSAD_{i,t} = \frac{1}{N}\sum_{i=1}^{N}\left|R_{i,t} - R_{m,t}\right|}$$

Where *N* is the number of firms in the portfolio, $R_{m,t}$ is the market return at day *t*, and $R_{i,t}$ is the stock return of firm *i* at day *t*.

Under the rational asset pricing models, the classical financial theory assumes that the relationship between return dispersions and market returns is linear. However, during periods of large price swings, the linear relationship converts to a non-linear relationship. Hence, the particularity of this model in capturing the return dispersions and market returns is the non-linear relationship.

(Chang et al., 2000) add the quadratic term of $R_{m,t}$ to the regression model to measure the nonlinearity as follows:

$$\boldsymbol{CSAD_{i,t} = \beta_0 + \beta_1\left|R_{m,t}\right| + \beta_2 R_{m,t}^2 + \varepsilon_t}$$

Thus, a negative and statistically significant coefficient β_2 implies the decrease of return dispersion from market returns, which indicates the presence of herding.

We modify *(Chang et al., 2000)*'s model by adding a 1-day lag of the dependent variable $CSAD_{i,t}$, as a control variable to improve the power and the fit of our model.

$$\boldsymbol{CSAD_{i,t} = \beta_0 + \beta_1\left|R_{m,t}\right| + \beta_2 R_{m,t}^2 + \beta_3 CSAD_{i,t-1} + \varepsilon_t}$$

To inspect the asymmetric effect of herding under up and down markets, we specify the following model:

$$\boldsymbol{CSAD_{i,t}^{UP} = \beta_0 + \beta_1{}^{UP}\left|R_{m,t}^{UP}\right| + \beta_2{}^{UP}\left(R_{m,t}^{UP}\right)^2 + \beta_3{}^{UP} CSAD_{i,t-1}^{UP} + \varepsilon_t}$$, where $\boldsymbol{R_{m,t} > 0}$

$$\boldsymbol{CSAD_{i,t}^{DOWN} = \beta_0 + \beta_1{}^{DOWN}\left|R_{m,t}^{DOWN}\right| + \beta_2{}^{DOWN}\left(R_{m,t}^{DOWN}\right)^2 + \beta_3{}^{DOWN} CSAD_{i,t-1}^{DOWN} + \varepsilon_t}$$,

where $\boldsymbol{R_{m,t} < 0}$

Where,$\left|R_{m,t}^{UP}\right|$ and $\left|R_{m,t}^{DOWN}\right|$ are the absolute values of average market returns in up and down markets, respectively $\left(R_{m,t}^{UP}\right)^2$ and $\left(R_{m,t}^{DOWN}\right)^2$are the corresponding quadratic terms.

To estimate the industry herding intensity, we follow the same model:

$$\boldsymbol{CSAD_{Ind,t} = \beta_0 + \beta_1\left|R_{m,t}\right| + \beta_2 R_{m,t}^2 + \beta_3 CSAD_{Ind,t-1} + \varepsilon_t}$$

Where CSAD is the cross-sectional absolute deviation of industry *ind* and day *t*.

To inspect the asymmetric effect of industry herding under up and down markets, we follow the same model:

$$\boldsymbol{CSAD_{\text{Ind,t}}^{UP} = \beta_0 + \beta_1{}^{UP}\left|R_{m,t}^{UP}\right| + \beta_2{}^{UP}\left(R_{m,t}^{UP}\right)^2 + \beta_3{}^{UP} CSAD_{\text{ind,t}-1}^{UP} + \varepsilon_t}$$, where $\boldsymbol{R_{m,t} > 0}$

$$\boldsymbol{CSAD_{\text{Ind,t}}^{DOWN} = \beta_0 + \beta_1{}^{DOWN}\left|R_{m,t}^{DOWN}\right| + \beta_2{}^{DOWN}\left(R_{m,t}^{DOWN}\right)^2 + \beta_3{}^{DOWN} CSAD_{\text{ind,t}-1}^{DOWN} + \varepsilon_t}$$, where$\boldsymbol{R_{m,t} < 0}$

Empirical results

Summary statistics

Table 1, reports the summary statistics of cross-section absolute deviation. The summary statistics show that the daily average *CSAD* is 0,0164, while the maximum value is 0.5059 and the minimum value is 0.0. Hence, there is a huge difference between the minimum and maximum value of *CSAD* indicating higher volatility in *CSAD*.

Descriptive Statistics	**CSAD**

Table 1. Descriptive Statistics.

#Obs	46656
Mean	0,0164
Std	0,0237
Min	0,0
25%	0,0025
50%	0,0069
75%	0,0195
Max	0,5059
Kurtosis	11,3231
Skewness	2,7098
Jarque-Bera (Jb)	306280,2
P-Value (JB)	0.0
ADF-Test	-18,66***

Notes: Thistable presents thedescriptive statisticson the cross-sectional absolute deviation of returns(CSAD)forthefullsample.TheMeanistheaverageevalueduringthesample. The Stdisthe standard deviation; The Minand Maxare the minimu mand maximum return dispersions, respectively. Inaddition, the 25%, 50% and 75% of CSAD present the 25% 50% and 75% percentiles. Kurtosis, Skewness, Jarque-Bera (Jb) for testing the normality of distribution. ADF-Test for testing the stationarity. #Obs indicatesthenumberoftradingobservationsinthe sample.The sample consists of daily data from January 1, 2017 toJuly 1, 2019, in the Moroccan Stock Market. CSAD is obtained by this equation: $\boldsymbol{CSAD_t = \frac{1}{N}\sum_{i=1}^{N}\left|R_{i,t} - R_{m,t}\right|}$, where N is the number of firms in the portfolio, $R_{m,t}$ is the market return at day t, and $R_{i,t}$ is the stock return of firm i at day t.

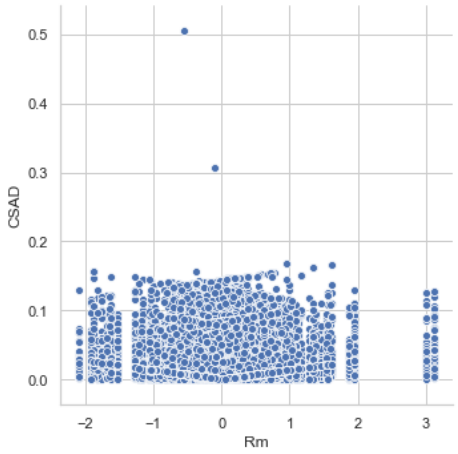


Figure 1: Relationship between daily cross-sectional absolute deviation (CSAD) and the market return (Rm)

Panel A in Table 2, provides descriptive statistics of the CSAD for all 24 industries in the Casablanca Stock Exchange. The values of the CSAD are different across different industries. On average, Forestry and Paper, Engineering and Equipment Industrial Goods; Leisures and Hotels industries have relatively higher average CSAD values, indicating that there is more volatility in trading these stocks.

Panel B reports descriptive statistics of the average returns for all 24 industries. The values of the average returns are different across different industries. On average, the Chemical industry has a higher average returns value, while, Engineering and Equipment industrial goods industry has a lower average returns value.

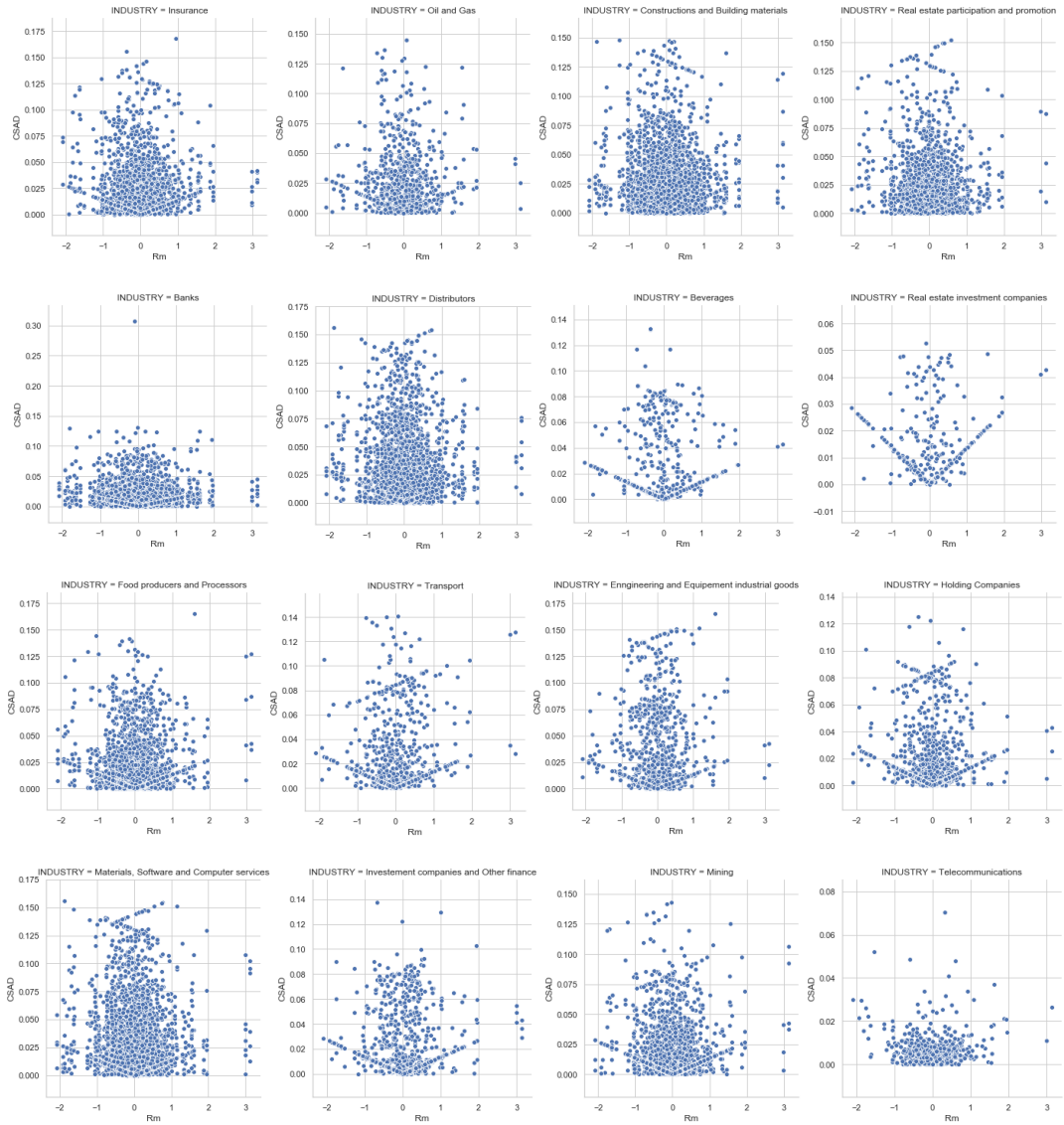
Table 2. Descriptive Statistics of CSAD and Average returns at industry level

Panel A: CSAD								
INDUSTRY	**#Firms**	**#Obs**	**mean**	**std**	**min**	**max**	**Skew**	**kurtos**
Banks	6	3906	0,0126	0,0177	0,00	0,3069	3,7153	27,734
Beverages	2	1302	0,0124	0,0202	0,00	0,1330	2,6271	6,771
Chemicals	2	1302	0,0208	0,0276	0,00	0,1625	2,0835	4,536
Constructions and Building Materials	7	4557	0,0175	0,0228	0,00	0,1478	2,4181	7,142
Distributors	7	4557	0,0181	0,0263	0,00	0,1558	2,3719	5,864
Electrical and Electronic Equipments	1	651	0,0137	0,0230	0,00	0,1444	2,7366	7,490
Electricity	1	651	0,0141	0,0150	0,00	0,0963	1,927	5,107
Engineering and Equipment Industrial Goods	2	1302	0,0265	0,0356	0,00	0,1655	1,6663	1,992
Food Producers and Processors	7	4045	0,0135	0,0203	0,00	0,1655	2,8294	9,225
Forestry and Paper	1	651	0,0310	0,0391	0,00	0,5059	3,7136	33,376
Holding Companies	2	1302	0,0166	0,0230	0,00	0,1255	2,0672	3,610
Insurance	5	3255	0,0162	0,0228	0,00	0,1678	2,6381	8,158
Investment Companies and Other Finance	4	2604	0,0111	0,0178	0,00	0,1372	2,8291	8,271
Leisures And Hotels	1	651	0,0223	0,0252	0,00	0,1415	1,8615	4,147
Materials, Software and Computer Services	7	4557	0,0204	0,0277	0,00	0,1556	2,1629	4,792
Mining	4	2604	0,0145	0,0206	0,00	0,1432	2,5915	7,848
Oil and Gas	2	1302	0,0174	0,0233	0,00	0,1445	2,3366	6,190
Pharmaceutical Industry	2	1302	0,0120	0,0204	0,00	0,1465	2,8277	7,781
Real Estate Investment Companies	2	947	0,0075	0,0091	0,00	0,0526	2,4209	6,443
Real Estate Participation and Promotion	3	1953	0,0221	0,0255	0,00	0,1522	2,1552	5,431
Telecommunications	1	651	0,0061	0,0072	0,00	0,0705	3,3565	17,920
Transport	2	1302	0,0167	0,0256	0,00	0,1408	2,3347	5,178
Transportation Services	1	651	0,0110	0,0131	0,00	0,1356	3,9456	25,333
Utilities	1	651	0,0175	0,0237	0,00	0,1322	1,8956	3,249
Total Firms	73							

Panel B: Average returns				
INDUSTRY	**mean**	**std**	**min**	**max**
Banks	-0,0025	1,6255	-22,5037	9,5191
Beverages	0,0098	1,7128	-10,0193	9,3526
Chemicals	0,1030	2,5585	-10,5340	9,5272
Constructions and Building materials	0,0057	2,1205	-10,6890	9,5270
Distributors	-0,0360	2,3000	-10,7398	9,5245
Electrical and Electronic Equipments	-0,0199	1,8304	-10,4981	9,4583
Electricity	0,0177	1,5306	-6,7881	5,2149
Engineering and Equipment industrial goods	-0,1590	3,2023	-10,5303	9,5273
Food producers and Processors	0,0285	1,7447	-10,5076	9,5026
Forestry and Paper	0,0003	3,6712	-37,4823	9,5279
Holding Companies	0,0288	2,0568	-9,5310	8,9052
Insurance	0,0088	2,0381	-11,7474	9,5145
Investment companies and Other finance	0,0173	1,4634	-8,9612	9,3434
Leisures and Hotels	0,0545	2,4809	-10,5171	9,4951
Materials, Software and Computer services	0,0442	2,4943	-10,5328	9,5283
Mining	-0,0336	1,8407	-10,5285	9,1541
Oil and Gas	0,0185	2,1700	-10,5029	9,5129
Pharmaceutical industry	0,0009	1,6353	-10,6078	6,4022
Real estate investment companies	-0,0106	0,6903	-3,9221	5,1193
Real estate participation and promotion	-0,1403	2,5666	-10,5328	9,5280
Telecommunications	-0,0032	0,8350	-5,3299	4,3213
Transport	-0,0369	2,1579	-10,5207	9,5289
Transportation services	0,0737	1,3834	-	8,8831

			10,6179	
Utilities	-0,0213	2,1591	-9,2373	9,0972

Notes: This table presents the descriptive statistics on the cross-sectional absolute deviation of returns $\boldsymbol{CSAD}$ and average returns for each industry. The Mean is the average value during the sample. The Std is the standard deviation. The Min and Max are the minimum and maximum for return dispersions and average returns, respectively. In addition. Kurtosis, Skewness, #Obs indicates the number of trading observations in the sample.#Firms indicates the number of firms in a particular industry. The sample consists of daily data from January 1, 2017 toJuly 1, 2019, in the Moroccan Stock Market. $\boldsymbol{CSAD}$of each industry is obtained by this equation: $\boldsymbol{CSAD_{ind,t}} = \frac{\mathbf{1}}{\boldsymbol{N}}\sum_{\boldsymbol{i=1}}^{\boldsymbol{N}}\left|\boldsymbol{R_{i,ind,t}} - \boldsymbol{R_{m,t}}\right|$, where $\boldsymbol{N}$ is the number of firms in the industry portfolio, $\boldsymbol{R_{m,t}}$ is the market return at day t, and $\boldsymbol{R_{ind,t}}$ is the stock return of firm i within a particular industry ind at day t.



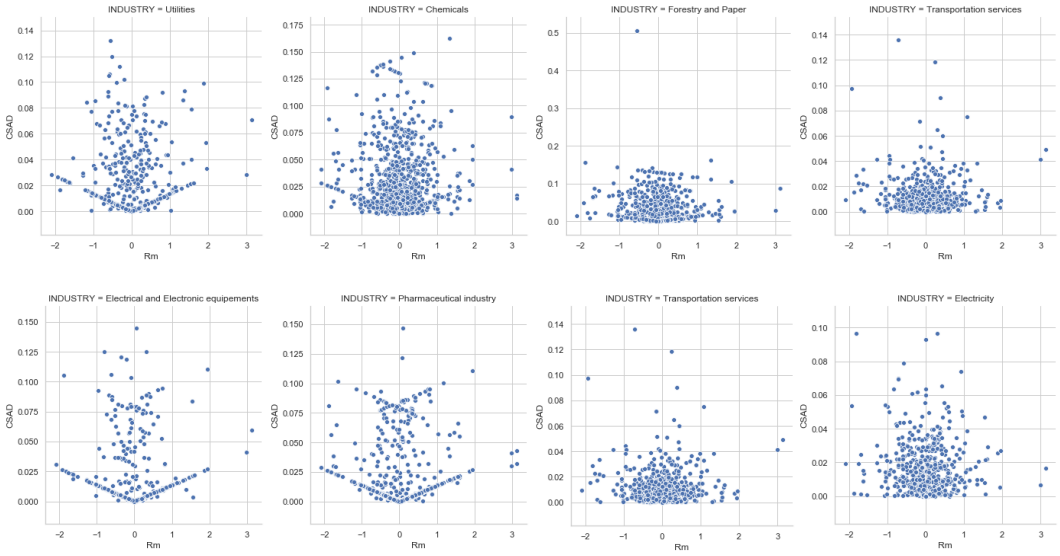


Figure2: Relationship between daily cross-sectional absolute deviation (CSAD) of each industry and the market return (Rm).

Regression Results

This study uses the regression model of *(Chang et al. 2000)* to investigate the presence of herding in the stock market of Morocco. Table 3, reports the regression results for $\boldsymbol{CSAD}$during three specific market conditions. First, this study uses $\boldsymbol{CSAD}$of the whole sample to detect herding in the stock market. Second, this study uses the$\boldsymbol{CSAD^{UP}}$ to investigate herding during the bull (rising) market. Third, this study uses the$\boldsymbol{CSAD^{DOWN}}$to investigate the herding during the bear (falling) market condition.

The regression results of the whole market sample show that coefficient$\boldsymbol{\beta_2}$ of$\boldsymbol{R_{m,t}^2}$ is negative and highly significant at a significance level of 1%. According *(Chang et al. 2000),*a negative and statistically significant coefficient of $\boldsymbol{R_{m,t}^2}$, indicates the occurrence of herding in the market, and vice versa. In our empirical evidence, $\boldsymbol{\beta_2}$ is negative in the whole market sample, suggesting a presence of herding behaviorin the stock market of Morocco.

During down market, $\boldsymbol{\beta_2}$ is also negative and statistically significant at 1% significance level, which indicates that investors herd due to the tendency of "flight to safety". However, during rising market, $\boldsymbol{\beta_2}$remains positive, suggesting that investors do not exhibit a tendency towards market consensus.

Overall, we conclude that herding behavior is observed during the whole market sample, and is more pronounced in falling markets, however, no evidence of herding in rising markets.

Table 3. Regression results of the CSAD approach for full sample period and during up and down markets.

Variables	Whole Market		Down Market		Up Market	
	Coefficient	T-statistics	Coefficient	T-statistics	Coefficient	T-statistics
β_0	0.3750***	57.139	0.3798***	38.985	0.3847***	40.215
β_1	0.3660***	23.984	0.5325***	22.530	0.2356***	11.156
β_2	**-0.0345*****	-5.912	**-0.0938*****	-8.848	-0.0017	-0.232
β_3	0.2252***	29.865	0.2265***	21.196	0.2226***	21.653
Adjusted R-squared	0.09		0.099		0.083	
F Statistics	955.5		616.6		387.2	

Notes: This table provides the estimated coefficients of(Chang et al., 2000) 's model during whole sample , up and down of market: Whole market sample:$\boldsymbol{CSAD_{i,t} = \beta_0 + \beta_1|R_{m,t}| + \beta_2 R_{m,t}^2 + \beta_3 CSAD_{i,t-1} + \varepsilon_t}$,during up market $\boldsymbol{CSAD_{i,t}^{UP} = \beta_0 + \beta_1{}^{UP}|R_{m,t}^{UP}| + \beta_2{}^{UP}(R_{m,t}^{UP})^2 + \beta_3{}^{UP} CSAD_{i,t-1}^{UP} + \varepsilon_t}$,where $\boldsymbol{R_{m,t} > 0}$ and during $\boldsymbol{CSAD_{i,t}^{DOWN} = \beta_0 + \beta_1{}^{DOWN}|R_{m,t}^{DOWN}| + \beta_2{}^{DOWN}(R_{m,t}^{DOWN})^2 + \beta_3{}^{DOWN} CSAD_{i,t-1}^{DOWN} + \varepsilon_t}$, where $\boldsymbol{R_{m,t} < 0}$.$\boldsymbol{CSAD_{i,t}}$ is the cross-sectional absolute deviation of the individual stock returns, $\boldsymbol{R_{m,t}}$is the market return. The sample consists of daily data from January1, 2017 to July 1,2019. t-statistics are also given using Newey–West (1987) heteroscedasticity- and autocorrelation-consistent standard errors. ***, **, and * represent statistical significance at the 1, 5, and 10% levels, respectively.

In table 5 (see appendix 1),we replicate the regression model of *(Chang et al. 2000)* to investigate the presence of herding behavior within industries in the stock market of Morocco. The results show that during the whole market sample, herding behavioris observed in 12 among 24 industries in the Moroccan stock market, (Banks, Chemicals, Constructions and Building Materials, Distributors, Electricity, Engineering and Equipment Industrial Goods, Holding Companies, Insurance, Investment Companies and Other Finance, Materials Software and Computer Services, Oil and Gas, Utilities).

The empirical evidence shows also that in the Moroccan stock market, herding behavior is more dominant during down markets. This is the case for 11 of 24 industries

namely (Beverages, Constructions and Building Materials, Distributors, Engineering and Equipment Industrial Goods, Holding Companies, Investment Companies and Other Finance, Materials, Software and Computer Services, Mining,Oil and Gas,Transport, Utilities), and only 3 of 24 industries namely(Banks, Electricity ,Insurance) that exhibit herding during Up market.

Table 4. Summary resultsof industry herding behavior for full sample period and during up and down markets.

INDUSTRY	Whole Market	Up Market	Down Market
Banks	YES	YES	NO
Beverages	NO	NO	YES
Chemicals	YES	NO	NO
Constructions and Building Materials	YES (little evidence)	NO	YES
Distributors	YES	NO	YES
Electrical and Electronic Equipments	NO	NO	NO
Electricity	YES	YES	NO
Engineering and Equipment Industrial Goods	YES	NO	YES
Food Producers and Processors	NO	NO	NO
Forestry and Paper	NO	NO	NO
Holding Companies	YES	NO	YES (little evidence)
Insurance	YES	YES	NO
Investment Companies and Other Finance	YES	NO	YES
Leisures And Hotels	NO	NO	NO
Materials, Software and Computer Services	YES (little evidence)	NO	YES
Mining	NO	NO	YES
Oil and Gas	YES	NO	YES
Pharmaceutical Industry	NO	NO	NO
Real Estate Investment Companies	NO	NO	NO
Real Estate Participation and Promotion	NO	NO	NO
Telecommunications	NO	NO	NO
Transport	NO	NO	YES
Transportation Services	NO	NO	NO
Utilities	YES	NO	YES
Total	12	3	11

Overall, results show that herding behavior is more likely to be observed during falling markets, because, investors regard this market phase as a turbulent period, therefore they tend to exhibit behavioral biases such as the sentiment of fear, like hiding in the herd to feel safer.

Conclusion

Using daily data of listed firmsover the period from September 1, 2017 to July 1, 2019, this paper examines herding behavior on the Moroccan stock Exchange. We adopt the methodology of *(Chang et al., 2000)* to test for the occurrence of herding behavior on the market level and on the context of industry-level during rising and falling market. The empirical vidence indicates that under market level, herding is dominant in down market and no evidence of herding during rising market. When testing industry herding behavior under different market conditions, we find that industry herding is more pronounced in down markets (11 of 24 industries) and only (3 of 24 industries) during up market. The overall findings are consistent with the behavioral finance literature which, suggest that investors are more prone to herd towards market consensus during periods of market stress.

One of the possible reasons behind this scenario, is manifested by the information asymmetry in the framework of emerging markets. By the fact that emerging markets are characterized by lower transparency and higher information asymmetries, it provides sufficient motivation for investors to recourse to herding. Another explanation is related to the unique macro/micro-structure features of the Moroccan stock market. The Moroccan government has enacted various courses of action to reform the stock market, nevertheless, it is still criticized for its lack of transparency, low trading volume, and unsophisticated retail investors who intentionally herd towards the market consensus to be in the safety zone.

As for industry herding, *(Bikhchandani & Sharma, 2001)* state that herd might arise at the level of investments in a group of stocks, such as stocks of firms in an industry or in a country where investors might face similar information. Another reason is the degree of familiarity of sophisticated investors with certain industries, that allow un sophisticated investors to mimic their trading and investment strategies within these specific industries, thus, the occurrence of the herd.

APPENDIX

Table 4. Regressionresultsof Industry CSAD approach for full sample period and during up and down markets

INDUSTRY	Whole sample					UP market	
	β_0	β_1	β_2	β_3	adj-R-Squared	β_0	β_1
Banks	0.2281***	0.3198***	**-0.0338*** **	0.1796***	0.081	0.2446***	0.3020***
	14.550	8.599	-2.635	6.330		10.749	6.080
Beverages	0.2462***	0.3836***	-0.0243	0.0349	0.063	0.2214***	0.2240**
	7.233	6.130	-1.462	1.044		4.644	2.308
Chemicals	0.5161***	0.4612***	**-0.0804** **	0.3191***	0.136	0.5279***	0.4157***
	11.452	4.591	-2.278	7.853		8.184	2.883
Constructions and Building Materials	0.4258***	0.3664***	**-0.0395 ***	0.2327***	0.09	0.4533***	0.1505**
	20.063	7.053	-1.850	9.184		13.813	2.222
Distributors	0.4794***	0.4023***	**-0.0431*** **	0.1853***	0.069	0.4494***	0.2900***
	20.093	8.512	-2.864	8.942		13.188	4.285
Electrical and Electronic Equipments	0.2746***	0.3484***	-0.0030	0.1244**	0.067	0.2316***	0.2387*
	5.094	3.512	-0.095	2.196		2.785	1.679
Electricity	0.3280***	0.3648***	**-0.0725*** **	0.1557***	0.073	0.3486***	0.2566**
	9.790	4.700	-3.053	3.620		6.890	2.477
Engineering and Equipment Industrial Goods	0.8159***	0.5335***	**-0.1072*** **	0.2639***	0.087	0.8971***	0.3969**
	13.490	4.476	-3.066	7.459		9.246	2.260
Food Producers and Processors	0.2356***	0.2890***	0.0098	0.1997***	0.106	0.2385***	0.2288***
	12.322	5.470	0.427	8.132		8.850	3.284
Forestry and Paper	0.9559***	0.3442*	-0.0126	0.2801***	0.093	0.9631***	-0.0980
	8.667	1.858	-0.217	6.250		7.934	-0.419
Holding Companies	0.3775***	0.3567***	**-0.0536** **	0.2685***	0.097	0.4165***	0.1730
	10.007	4.613	-2.170	6.079		7.226	1.626
Insurance	0.3784***	0.4204***	**-0.0481*** **	0.1979***	0.085	0.3730***	0.3452***
	16.003	8.905	-3.274	7.008		10.846	5.113
Investment Companies and Other Finance	0.1549***	0.4141***	**-0.0341*** **	0.0972***	0.094	0.2013***	0.3038***
	7.541	10.683	-2.841	3.923		6.222	5.444
Leisures And Hotels	0.6238***	0.2699**	-0.0293	0.2683***	0.090	0.6566***	0.0640

	9.805	2.356	-0.719	4.904		7.045	0.416
Materials, Software and Computer Services	0.6059***	0.3627***	**-0.0418***	0.1759***	0.055	0.6218***	0.1598**
	23.068	6.220	-1.887	7.659		6.644	1.957
Mining	0.3069***	0.3907***	-0.0293	0.1695***	0.092	0.2647***	0.2598***
	12.727	6.243	-1.145	5.942		8.404	3.279
Oil and Gas	0.4937***	0.4023***	**-0.0636*** **	0.1343***	0.047	0.4831***	0.1947
	11.683	5.016	-2.593	2.824		8.248	1.642
Pharmaceutical Industry	0.1958***	0.4360***	-0.0285	0.0870**	0,088	0.2509***	0.3503***
	5.799	6.639	-1.339	2.526		4.592	3.317
Real Estate Investment Companies	-0.0340***	0.3169***	-0.0069	0.1957***	0.307	-0.0241	0.3062***
	-2.194	10.756	-0.771	4.285		-1.044	8.026
Real Estate Participation and Promotion	0.5907***	0.2033 **	0.0020	0.2862***	0.104	0.6423***	-0.0704
	15.929	2.484	0.061	8.258		11.296	-0.642
Telecommunications	-0.0836***	0.1660***	0.0032	0.1238***	0.165	-0.0612**	0.1759***
	-5.279	4.690	0.218	2.794		-2.340	4.290
Transport	0.3922***	0.3962***	0.0032	0.1547***	0.085	0.4561***	0.2731
	8.806	3.045	0.052	4.406		6.779	1.523
Transportation Services	0.1460***	0.0947	0.0283	0.2109***	0.088	0.1842***	0.0019
	5.672	1.549	1.299	3.928		4.722	0.023
Utilities	0.5110***	0.6323***	**-0.0866****	0.0642	0,083	0.4230***	0.4475***
	8.881	5.342	-2.048	1.551		5.564	2.817

Notes: This table provides the estimated coefficients of(Chang et al., 2000) 's model during whole sample , up and down of market: Whole market sample:$\boldsymbol{CSAD_{ind,t} = \beta_0 + \beta_1|R_{m,t}| + \beta_2 R_{m,t}^2 + \beta_3 CSAD_{ind,t-1} + \varepsilon_t}$,during up market $\boldsymbol{CSAD_{\text{ind,t}}^{UP} = \beta_0 + \beta_1{}^{UP}|R_{m,t}^{UP}| + \beta_2{}^{UP}(R_{m,t}^{UP})^2 + \beta_3{}^{UP} CSAD_{\text{ind,t-1}}^{UP} + \varepsilon_t}$,where $\boldsymbol{R_{m,t} > 0}$ and during $\boldsymbol{CSAD_{\text{ind,t}}^{DOWN} = \beta_0 + \beta_1{}^{DOWN}|R_{m,t}^{DOWN}| + \beta_2{}^{DOWN}(R_{m,t}^{DOWN})^2 + \beta_3{}^{DOWN} CSAD_{\text{ind,t-1}}^{DOWN} + \varepsilon_t}$, where $\boldsymbol{R_{m,t} < 0}$, where $\boldsymbol{CSAD_{ind,t}}$ is the cross-sectional absolute deviation of the individual stock returns within industries, $\boldsymbol{R_{m,t}}$is the market return. The sample consists of daily data from January1, 2017 to July 1,2019. t-statistics are also given using Newey–West (1987) heteroscedasticity- and autocorrelation-consistent standard errors. ***, **, and * represent statistical significance at the 1, 5, and 10% levels, respectively.

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