Bibliometric Analysis Of Herding Behavior In Times Of Crisis
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Abstract
The social and psychological concept of herding behavior provides a suitable solution to give an understanding of the behavioral biases that often occur in the capital market, especially the herding behavior of investors in times of crisis. The aim of this paper is to provide an overview of the broader bibliometric literature on the term and concept of “herding behavior”. Articles are collected through the help of software consisting of Publish or Perish (PoP), Google Scholar, Mendeley and VOSViewer through a systematic approach, explicit and reproductive methods. In addition, the articles were scanned by Scimagojr.com (Q1, Q2, Q3 and Q4), analyzing 83 articles of 261 related articles from reputable and non-reputable journals from 1996 to 2021. Mendeley software is used to manage and resume references. To review this database, a classification was performed using the VOSviewer software. Four clusters were reviewed; The words that appear most often in each group are the type of stock market, the type of crisis and the factors that cause herding. Thus these four clusters became the main research themes on the topic of herding in times of crisis. Meanwhile, methodology and strategy are the themes for future research in the future.

Keywords: herding behavior, bibliometric analysis, publish or perish, Scopus, VOSviewer.

Introduction
Some research that discusses the herding behavior of investors has discussed that herding behavior occurs in some markets. Economou, Kostakis and Philippas (2011) found during the crisis of 1998 to 2008 in Greece there had been herding behavior, as well as the stock market in Italy. Similarly, Dang and Lin's research (2016) obtained evidence that herding behavior occurs in the capital market, where herding behavior will tend to increase in the period of increase in the share price compared to the decrease in the share price. Espinosa, Crishtian and Arias research also found the presence of vulture behaviour in the Australian stock market. Li, Hu and Tang (2019) conducted research on Chinese stocks during three periods of crisis and found that herding behavior in China occurred for type A stocks only. Vulture behavior in Europe caused by the financial crisis in 2007-2008 has been proven to occur (Ouarda, El Bouri and Bernard, 2013). In addition, some researchers also say that herding behavior occurs in the stock markets of Japan, Indonesia, Hongkong, Vietnam, and the Balkans(Nakagawa, Oiwa and Takeda, 2012; Bui, Nguyen and Nguyen, 2015; Teng and Liu, 2014; Vo and Phan, 2017, Economou, 2019). From some of these studies it can be said that herding behavior can be found in advanced stock markets, developing and borders.
Herding behavior occurs a lot in countries that are experiencing pressures and crises. Like the global financial crisis in 1997-1998, the financial crisis of 2007-2008, 2015. When the stock market moves strongly and investors will tend to ignore personal confidence and follow other investors. Herding behavior will occur when stock market movements are sent with a positive or negative return. (Dang and Lin, 2016; Economou, Kostakis and Philippas, 2011; Emekter, 2020; Blasco, Navidet et al., 2017; Huang, Lin and Yang, 2015; and Ouarda, El Bouri and Bernard, 2013). During Europe's crisis, this herding behavior was also discovered by some peolitiks. Some countries in Europe are proven to experience dispersion returns on its stock market and cause herding behavior. Research discussing herding behavior during the crisis of disease outbreaks was also found by several researchers such as, Chang, Mc Aleer and Wang (2020) and Espinosa, Christian and Arias (2020) and Luu and Luong (2020) who found that during the covid 19 pandemic that caused pressure on the market, causing herding behavior in the stock market. Based on some previous research, it can be concluded that herding behavior occurred during the global financial crisis, financial crisis in certain regions and pandemic disease outbreaks that can affect investor psychology in making investment decisions.

Previous research also presents some facts that there are several things that are the determining factors of the occurrence of herding behavior. Those factors include (i) extreme stock returns (Bohl, Klein and Siklos, 2014; Dang and Lin, 2016; Economou, Karsikas, and Vickers, 2016; Bharti, et al., 2020), (ii) investor sentiment (Zouaoui, 2011; Philippas, Economou, Babalos and Kostakis, 2013; Abbes, 2013; Teng and Liu, 2014; Mokni, 2020), (iii) market sentiment (Blascoa, Curredorb, and Ferreruela, 2011), (iv) financial analyst recommendations (Lin, 2018), (v) forecasters (Pierdzioch, Rulke, and Stadtmann, 2012; Tsuchiya, 2020), (vi) presence of foreign investors (Park (1995) and Sachs (1998) Frankel and Schmukler (1996, 1998) Bowe, Domuta (2004); Chen, Yang and Lin (2012), (vii) institutional investors (Nakagawa,Oiwa and Takeda (2012), (viii) cascade information (Chari and Kehoe (2004), (ix) macro and micro news released by the government (Galariotis, Rong and Spyrou (2015); Hwang and Salmon (2004); Luo and Schinckus (2015); Mesis and Zapranis (2014), (x) fears felt by investors (Huang and Wang (2017), (xi) market pressures (Stavroyiannis and Babalos (2017) Demirer and Zhang (2018), Stavroyiannis and Babalos (2019) Junior and Palazzi (2020).

So far there has been no bibliometric analysis that discusses herding behavior that occurs in times of crisis. The purpose of this research is to provide a broader literature review of the terms and concepts of herding behavior in times of crisis, in order to answer the following questions:

1. How are articles of herding behavior in times of crisis classified?
2. What is the growing trend of research on herding behavior for this time of crisis? Which topics are more widely published subjects?
3. What are the topics regarding herding in times of crisis for future research that provide opportunities for more research?
This paper is prepared as follows: (1) provides an overview of the literature on herding behavior based on previous research in part 1. In part 2, the definition of herding behavior and the review of the term herding behavior exist. The methodology used to perform bibliometric analysis, including method steps related to the use of publish or perish (PoP) software will be presented in part 3. Part 4 will present the results using VOSviewer. The recommendations, conclusions and limitations of the study will be explained in section 5.

**Literature Review**

**Definition of Herding Behavior**

Some researchers propose different definitions of herding behavior. Vives (2008) said that herding behavior captures the suitability of investor choice. Institutional investors will imitate each other when making an investment decision. Christie and Huang (1995) define vulture behavior as the behavior of investors who do not make investment decisions based on their rational analysis but follow the actions of others. Thus, it can be said that herding behavior is a consequence of social pressure and the general logic that group voices are better than individual voices. Group behavior will be able to destabilize the situation in the market, by pushing the share price away from its fundamental value and causing market inefficiency.

Christie and Huang (1995) said that vulture behavior is an environment where investors follow the group's decisions even if it is different from the information it has itself. This herding behavior by investors can destabilize the market and investors will act based on judgments made by others. Another definition was expressed by Bikchandani and Sharma (2001) which defines herding behavior as rational as a form of behavior imitating other investors that can cause stock price volatility. Furthermore, Bikchandani and Sharma say that herding behavior is also false or (spurious) which refers to the act of following a group of investors who have important information and earn maximum profit. There are three reasons why investors engage in herding behavior, namely incomplete information, investor reputation and compensation.

Lakonishok et al (1992) defines vultures as the average tendency of money management groups to buy or sell shares. Nofsinger and Sias (1999) say that vulture behavior is a collective behavior that arises from uncoordinated individual choices. Herding behavior will refer to a group of investors who trade in the same direction over several periods.
From some of the above definitions it can be said that there are two main streams of empirical studies that investigate vulture behavior in financial markets. Vultures can be detected from market returns and vultures are focused on institutional investor behavior.

| Researchers          | Mimic Behavior | Rational Action | Irrational Action | Institutional Investors | Stock Volatility | Price |
|----------------------|----------------|-----------------|-------------------|-------------------------|------------------|-------|
| Vives (2008)         | V              | V               |                   |                         |                  |       |
| Christie & Huang (1995) |                |                  | V                 |                         |                  |       |
| Bikchandani & Sharma (2001) | V              | V               | V                 |                         |                  |       |
| Lakonishok et al. (1992) |                |                  |                   |                         |                  | V     |
| Nofsinger & Sias (1999) | V              | V               |                   |                         |                  |       |

Source: Previous research data

Research Method
A library review should be conducted using systematic, explyptic and reproductive methods (Fink, 2005; Garza-Reyes, 2015), or thought mapping method that emphasizes the limits of knowledge (Tranfield et al., 2003). This bibliometric review is used in disciplines that cover quantitative studies in the form of papers, articles, journals, books or other types of written communication (Heersmink et al., 2010). In this study, bibliometric analysis was conducted with five steps introduced by Fahimnia et al. (2015). The steps of this study are to search for keywords about vulture behavior in times of crisis, initial search results, improvement of search results, preparation of initial data statistics and data analysis that will be described in the following subsections.

1. Defining search keywords
This literature search on herding behavior was conducted in September 2020, using the keyword "vulture behavior in times of crisis". PoP software is used to collect this data. At the beginning of the search, it is done by entering keywords into pop software that is specialized in scopus indexed journal searches only, and setting special conditions for "journal/article", "title only words" and 0-0 years. In search, for newspapers, book reviews and book chapters are excluded in the search. From this database obtained 165 articles from 1996 to 2021.

Initial search results
During the initial search, no year span was set, so it was obtained that the oldest journals were discussing the behavior of vultures in times of crisis. So it was obtained that research that discusses the behavior of vultures in times of crisis there began in 1996. The following is data based on identification of PoP.
Table 2. Top Ten Articles Identified From POP (search unfiltered)

| Researchers                  | Title                                                                 | Year |
|------------------------------|----------------------------------------------------------------------|------|
| S Bikhchandani, S Sharma     | On crises, contagion, and confusion                                   | 2000 |
| G. Kaminsky                  | An empirical analysis of herd behavior in global stock markets       | 2010 |
| S. Hwang                     | Market stress and herding                                            | 2004 |
| G. Kaminsky                  | What triggers market jitters?: A chronicle of the Asian crisis       | 1999 |
| G. Calvo                     | Mexico's balance-of-payments crisis: A chronicle of a death foretold | 1996 |
| W. Kim                       | Foreign portfolio investors before and during a crisis                | 2002 |
| F. Economou                  | Cross-country effects in herding behaviour: Evidence from four south European | 2006 |
| E.C. Galariotis              | Herding on fundamental information: A comparative study               | 2015 |
| D. Kenourgios                | Equity market integration in emerging Balkan markets                 | 2011 |
| N. Philippas                 | Herding behavior in REITs: Novel tests and the role of financial crisis | 2013 |

Source: PoP Data

2. Improved search results
The next step is to issue an article that is not suitable for screening criteria. The table below shows the results for references to articles that seem important to meet the requirements.

Table 3 Detailed Search Filtering Criteria

| Search filtered              | Number of Articles |
|------------------------------|--------------------|
| Irrelevant                   | 43 articles        |
| Non-English Languages        | 2 articles         |
| Review /Book/Conference      | 23 articles        |
| Total                        | 68 articles        |

Source: PoP software

Table 4. Comparison Metrics

| Metrics Data | Initial Search                                                                 | Narrow Search                                                                 |
|--------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| Query        | Journals, articles, erratum, reviews and conference, herding behavior in times of crisis | Journals, articles, herding behavior in times of crisis                        |
| Source       | Scopus                                                                         | Scopus                                                                         |
| Paper        | 165                                                                            | 98                                                                             |
| Citations    | 3.242                                                                          | 2.422                                                                         |
| Years        | 1996-2021                                                                      | 1996-2021                                                                     |
| Citations_Years | 130,16                                                                   | 96,88                                                                         |
| Citation_articles | 19,84                                                                  | 24,71                                                                         |
3. Build initial statistics

Searches are generated after repair, stored in Mendeley software, and exported to RIS format to include all important information related to the article, including title, author name, abstract, keywords and journal specifications (journal publications, speeding years, volumes, publications and pages). The data is analyzed so that articles can be classified by year and source of publication and publisher. From table 3 it is known that the articles published are from the journal scopus Q1 through Q4. The figure below shows the number of articles published from year to year. Figure 1 describes journals from years (1996-2021) and distribution of publications per year.

Regarding the publishing group, Elsevier appears most often followed by Emerald insight, Taylor and Francis, and Routledge (Figure 2).

| Researchers_articles | 0,99 | 1 |
|----------------------|------|---|
| h_index              | 25   | 22 |
| g_index              | 54   | 48 |
| hA_index             | 9    | 9  |
| hl_annual            | 1    | 0,88 |
| hl_norm              | 25   | 22 |

Source: PoP software

![Years Publication](image1.png)

**Figure 1 Years of Publication**
A total of 61 journals to date published one article themed on herding behavior in times of crisis, 61 of them are ‘*Academy of Accounting and Financial Studies Journal*’, ‘*Accounting and Finance*’, ‘*Acta Oeconomica*’, ‘*Applied Economics*’, ‘*Applied Economics Letters*’, ‘*B.E. Journal of Theoretical Economics*’, ‘*Contaduria y Administracion*’, ‘*Economic Annals-XXI*’, ‘*Economic Modelling*’, ‘*Emerging Markets Review*’, ‘*Finance India*’, ‘*International Journal of Banking, Accounting and...*’ and others.
4. Data Analysis
This study presents a bibliometric problem for the term herding behavior in times of crisis from a database. The bibliometric review in this study used PoP software which was developed and launched in 2006 (Harzing, 2011). For this analysis, PoP version 5.28.1.6296 was used. This software was used on September 1, 2020, obtained 165 initial articles and refined the results leaving only 98 articles. These findings suggest that journals with Scopus ratings of Q1 and Q2 have the most significant impact on citations compared to other journals.
Results And Discussion

This research shows that the journal Q1/Q2 has a substantial impact on the metrics associated with citations. Articles written by Chiang (2010) and Hwang (2004) have been widely cited by 309 and 238 other authors, and become the most frequently cited articles in the study. The article is titled 'An empirical analysis of herd behavior in global stock markets' and 'Market stress and herding'. For data on all articles cited more than 50 times (with complete information) is in table 5.

Figure 4 Mapping of research network visualization

After taking into account the frequency of citations and other metrics, the study also analyzed the output of PoP software into VOSviewer software to determine what keywords appeared most often. Keyword frequencies can be set by 1, 5, 10, 20 or other events. The VOSviewer tool was developed by Van Eck and Waltman in 2010 (see http://www.vosviewer.com) and can be used to visualize bibliometric maps. This device shows bibliometric mapping on three different visualizations namely network visualization, overlay visualization, and density visualization. VOSviewer can classify
keywords into different clusters. Each cluster shows the weight of its occurrence or the appearance of the term and this explanation answers the first research question.

Figure 5 Mapping the research density visualization

Extracting from existing titles and abstract fields, we get 240 terms and 40 items. Seven clusters are identified here. The first cluster in figure 4 consists of 9 items with the most common term being herd (9 repetitions). The second cluster has 7 items with the most common terms appearing are vultures (35 times), liquidity (3 times) and quantil regression (5 times). The third group identified 6 items with the most emerging terms being cross sectional disperse (4 times), global financial crisis (5 times), herding behavior (11 times). The fourth cluster consists of 5 items with the most emerging terms are contagion (3 times), financial markets (3 times), herding behavior (21 times), institutional investors (3 times). For cluster five consisting of 5 items with the most frequent terms are Crisis (4 times), European sovereign debt (3 times), feedback trading (3 times), cluster six consists of 5 items with the most frequent terms / appear is the stock market developing (4 times), basic information (3 times). The last is a cluster of seven with 3 items in it, and the most common term is financial crisis (21 times).
Keywords in each cluster represent a stream of herding behavior research in times of crisis. More detailed information is presented in table 6. Each cluster shows a trend of studies related to herding behavior in times of crisis that can be represented through the emergence of these terms. This data makes it possible to answer the second research question, "what is the trend of herding behavior research in times of crisis". 'herd', 'vulture', 'liquidity', 'cross sectional disperse', 'financial crisis', 'vulture contagion', 'financial markets', 'institutional investors', 'feedback trading', 'emerging stock markets are the most common words; 'asymmetry behavior', 'trade volume', 'Covid 19 pandemic', 'Contrarian', 'momentum' are some of the words that are rarely used and can be researched in future research. A variety of topics can be developed based on these keywords.

Table 5 Articles with more than 50 citations

| No | Citations | Per Year | Author       | Title                                                                 | Year     | Publication                                                                 |
|----|-----------|----------|--------------|----------------------------------------------------------------------|----------|-----------------------------------------------------------------------------|
| 1  | 309       | 28,09    | T. Chiang    | An empirical analysis of herd behavior in global stock markets       | 2010     | Journal of Banking and Finance                                              |
| 2  | 238       | 14       | S. Hwang     | Market stress and herding                                            | 2004     | Journal of Empirical Finance                                               |
| 3  | 193       | 8,77     | G. Kaminsky  | What triggers market jitters?: A chronicle of the Asian crisis        | 1999     | Journal of International Money and Finance                                   |
| 4  | 167       | 6,68     | G. Calvo     | Mexico's balance-of-payments crisis: A chronicle of a death foretold | 1996     | Journal of International Economics                                         |
| 5  | 165       | 8,68     | W. Kim       | Foreign portfolio investors before and during a crisis              | 2002     | Journal of International Economics                                         |
| 6  | 120       | 12       | F. Economou  | Cross-country effects in herding behaviour: Evidence from four south European markets | 2011 | Journal of International Financial Markets, Institutions and Money |
| 7  | 74        | 12,33    | E.C. Galariotis | Herding on fundamental information: A comparative study | 2015 | Journal of Banking and Finance                                            |
| 8  | 72        | 7,20     | D. Kenourgios | Equity market integration in emerging Balkan markets                | 2011     | Research in International Business and Finance                              |
| 9  | 63        | 7,88     | N. Philippas | Herding behavior in REITs: Novel tests and                           | 2013     | International Review of                                                     |
the role of financial crisis
Financial Analysis

| Cluster | The keywords that appear the most | Keywords | Article |
|---------|-----------------------------------|----------|---------|
| 10      | 61                                | A. Mobarek | A cross-country analysis of herd behavior in Europe | 2014 Journal of International Financial Markets, Institutions and Money |
| 11      | 61                                | D. Sornette | A nonlinear super-exponential rational model of speculative financial bubbles | 2002 International Journal of Modern Physics C |
| 12      | 52                                | M. Bowe | Investor herding during financial crisis: A clinical study of the Jakarta Stock Exchange | 2004 Pacific Basin Finance Journal |
| 13      | 52                                | S.Khan | Contagion in the stock markets: The Asian financial crisis revisited | 2009 Journal of Asian Economics |
| 14      | 50                                | M. Cipriani | Herd behavior and contagion in financial markets | 2008 B.E. Journal of Theoretical Economics |

Source: data processed with PoP, 2020

| Table 6 Details of data per cluster |
|-------------------------------------|

| Cluster 1 | Herding (35), Liquidity (3), Quantum regression (5), |
|-----------|-------------------------------------------------|

| Cluster 2 | Herding (35), Liquidity (3), Quantum regression (5), |
|-----------|-------------------------------------------------|

| Article |
|---------|

Herd's behavior (Cipriani, 2008; Khan, 2009; Bharti, 2010 Mobarek, 2014; Huang, 2015; Which, 2015; Galariotis, 2016; Lee, 2017, Litimi, 2017; Vo, 2017; Balcilar, 2017; Shanta, 2019; Vo, 2019; Abdeldayem, 2020; Nakagawa, 2020)
| Cluster 3 | Cross sectional disperse (4), Global Financial Crisis (5), Herding Behavior(11) | Covid-19, the oil market, market efficiency. Cross sectional disperse, global financial crisis, herding behavior | Cross Sectional disperse (Oarda, 2013; Dos Santos, 2017; Lee, 2017; Shanta,2019) Global financial crisis (Bohl, 2014; Bharti, 2020, Chang, 2020; Gabbori, 2021) Herding behavior (Calvo, 1996; Kaminsky, 1999; Chiang, 2010; Klein, 2013; Oarda, 2013; Kulvanich, 2013; Philippas, 2013; Bohl, 2014; Demirer, 2014; Teng, 2014; Javaire, 2015; Lee, 2015; Zheng, 2015; Lugo, 2015; Sharma, 2015; Huang, 2017; Shah, 2017; BenMabrouk, 2018; Yousaf, 2018; Lu, 2018; Bahadar, 2019; Spelta, 2019; Stavroyiannis, 2019; Abeldayem, 2020; Batmunkh, 2020; Tsuchiya, 2020; Yossef, 2020; Duygun, 2021) |
| Cluster 4 | Contagion (3), Financial markets (3), Herding behavior(21), Institutional investors (3). | Commodity markets. Contagion, Financial Markets, Herding Behavior, Institutional Investors. | Transmission (Kaminsky, 1999; Cipriani, 2008; Khan, 2009; Messis, 2014; Teng, 2014; Wahyudi, 2018; Troug, 2020) Financial Markets (Kaminsky, 1999; Cipriani, 2008; Khan, 2009; Economou, 2011; Oarda, 2013; Liu, 2014, Spelta, 2019) Herding behavior (Calvo, 1996; Kaminsky, 1999; Chiang, 2010; Klein, 2013; Oarda, 2013; Kulvanich, 2013; Philippas, 2013; Bohl, 2014; Demirer, 2014; Teng, 2014; Javaire, 2015; Lee, 2015; Zheng, 2015; Lugo, 2015; Sharma, 2015; Huang, 2017; Shah, 2017; BenMabrouk, 2018; Yousaf, 2018; Lu, 2018; Bahadar, 2019; Spelta, 2019; Stavroyiannis, 2019; Abeldayem, 2020; Batmunkh, 2020; Tsuchiya, 2020; Yossef, 2020; Duygun, 2021) Institutional investors (Chen, 2012; Bohl, 2014; Zheng, 2015; Cai, 2019) |
| Cluster 5 | Crisis (4), European sovereign debt (3), Feedback trading (3), Disperse return, stock market. Crisis, European sovereign debt, feedback trading. | Crisis (Bohl, 2014; Bohl, 2014; Mesly, 2018; Stavroyiannis, 2019) European sovereign debt (Dos Santos, 2017; Tsuchiya, 2020). Feedback Trading (Kim, 2002; Bowe, 2004; Hsieh, 2011; Ramli, 2016) |
| --- | --- | --- |
| Cluster 6 | Emerging stock markets (4), Basic information (3), Contrarian, momentum, china, emerging stock market, basic information | Emerging stock markets (Chen, 2012; Demirer, 2014; Bui, 2015; Which, 2015; Shah, 2017; Huang, 2017; Indars, 2019; Vo, 2019) Basic Information (Galariotis, 2015; Indars, 2019; Duygun, 2021) |
| Cluster 7 | Financial crisis (21), Disperse returns on equity, irrational herding, financial crises | Financial Crisis (Khan, 2009; Chiang, 2010; Hsieh, 2011; Chen, 2012; Klein, 2013; Oarda, 2013; Philippas, 2013; Mobarek, 2014; Bowe, 2014; Bohl, 2014; Teng, 2014; Economou, 2011; Galariotis, 2015; Huang, 2015; Sharma, 2015; Which, 2015; Huang, 2017; Stavroyiannis, 2017; Ben Mabrouk, 2018; Kabir, 2018; Yousaf, 2018; Bahadar, 2019; Vo, 2019; Bharti, 2020; Chang, 2020; Jirasakuldech, 2020; Nakagawa, 2020; Tsuchiya, 2020; Fang, 2021; Duygun, 2021; Gabbori, 2021) |

Source: data processed with VOSviewer, 2020

**Conclusion**

The study reviewed a set of 98 articles with themes related to herding behavior in times of crisis. Articles are collected from the database by using PoP software. 98 of these articles are extracted from 165 larger original articles. In this study, researchers concluded that journals with scopus index Q1 /Q2 had a more significant impact in the field of herding behavior in times of crisis than the initial results and processed results. The gaps in this study indicate a direction for future research agendas. As well as summarizing and supporting the important findings of the review. Overall, studying the concept of herding behavior is on an increasing trend, with particular attention requiring to involve more other research collaborations.

The limitations of this research are based on a limited set of keywords and have limited potential by existing databases in PoP software.
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