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Bibliometric Analysis of Herding Behavior in Capital Market

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ABSTRACT
Herding behavior in financial market as a theoretical concept get going to be popular since 1990s. There are many articles that discuss and investigate herding behavior in capital market, but our understanding about antecedents and outcomes of herding behavior is still very limited. The majority of empirical research are investigated whether herding behavior really occur in capital market or not. In this paper, we conduct a bibliometric analysis to map the development of research on herding behavior in the capital market. We analyze quantitatively the distribution patterns of publications, dimensions related to herding behavior and the most influential research. Based on 279 articles which were taken from Scopus database, we mapped the level of co-occurrence and network of researchers through keywords analysis. This bibliometric analysis provides insight into the research profile and opportunities that can be carried out regarding herding behavior in the capital market.
Keywords: *bibliometric analysis, capital market, herding behavior, informational cascade*

1. INTRODUCTION

Herding behavior is a phenomenon that arises in many financial markets [1], and was popular in the 1990s led by Banerjee [2] and Bikhchandani, Hirshleifer, & Welch [3]. However, the empirical evidence supporting this assumption is inconclusive.

Bikhchandani et al. [3] specifically explained this mechanism using an informational cascade model. According to Bikhchandani et al. [3], this takes place just as an individual's actions or decisions do not depend on their private information, but on action of others. However, the discussion of herding behavior in these articles fails to specifically explain the context of financial markets.

In contrast to Doherty [4], this paper reviews the literature associated with herding behavior, and not informational cascade which is a term often used interchangeably in numerous financial literatures. Devenow & Welch [5] defined herding behavior as a pattern of behavior which correlates with individuals. However, assuming there many investors buy hot shares, it is categorized a uniform behavior due to the uniformly analyzed information and the fact that each investor acts independently.

Devenow & Welch [5] stated that one of the conditions for herding behavior is the existence of a coordinated mechanism among investors, which is usually in the form of a widespread convention based on several signals (for example, a price change), or an investor's ability to directly observe other decision makers such as colleagues.

In contrast to Devenow & Welch [5], Avery & Zemsky [6] defined herding behavior as a trade carried out by investors that traded trends in the past despite the contrary pattern to the initial information regarding the assets. The definition proposed by Avery & Zemsky [6] seems more appropriate for the informational cascade.

Informational cascade is a condition associated with individuals making decisions by observing the actions of others and ignoring their private information. Bikhchandani et al. [3] defined it as a situation used by individuals to obtain optimal results by observing the actions of their predecessor's without regarding their personal information. This is an application of conformity and social learning theories.

Hirshleifer & Hong Teoh [7] defined herd as a behavioral convergence, while informational cascade is the result of neglecting private information. Individuals choose to carry out identical actions in a different manner using a private signal, during herd activities. Furthermore, an individual feels optimal by observing the actions of others beforehand, and following their predecessors' behavior with no regard to personal information. Therefore, the existence of an informational cascade implies a herd, which does not necessarily reflect the informational cascade.

Çelen & Kariv [8] explained that the distinction between herd and cascade consists of a practical significance. During an informational cascade, individual behavior is purely imitative, therefore the process of social learning stops, with uninformative actions which fail to consist of private information. In contrast, herding behavior reflects individuals that imitate other people's actions. It is fragile because the strong signals which are different from group actions, causes changes in patterns. In contrast, the informational cascade phenomenon is more stable, meaning that there are no signals capable of causing changes to the individual's behavior patterns.

Çelen & Kariv [8] summarized the results of analytical research from Smith & Sørensen [9] research and concluded that the informational cascade occurs just as unlimited number of individuals ignores their private information during decision making. Conversely, herding behavior occurs when an unlimited number of individuals make identical decisions without ignoring their private information. Although herding behavior has been extensively researched in the financial sector, in 2018, it became an empirical study discussed in tier 1, 2 and 3 journals. Cipriani & Guarino [10] reported that the theory does not completely explain herding behavior because prices and market conditions are controlled in experiments, with participants following the crowds in some instances. Cipriani & Guarino [11] stated that empirical research which uses secondary data is atheistic because it utilizes proxies derived from statistical formulas and not based on strong theories. This article furthermore aims to simple literature review and conduct profiling based on bibliometric analysis.

2. THEORETICAL UNDERPINNING

Based on the various perspectives on herding behavior, it is possible to analyze several main theories, with its root by investors explained using the conformity theory. Aronson [12] defined conformity as a change in a person's behavior or opinion due to pressure or imagination from a group. It allows people to voluntarily follow certain group norms, and expect to obtain rewards or punishment. Furthermore, it is different from obedience which is a method used to avoid various possible penalties and in order to obtain rewards by carrying out orders from legitimate authorities [13].

The theory of herding behavior is also explained from the field of social psychology also known as crowd or mass psychology. Gustave Le Bon, a famous psychologist, discusses the Theory of Crowd Psychology. In 1895, Le Bon explained that crowds occur through three stages, namely submergence, transmission, and suggestion. During the submergences period, individuals lose their sense of personal responsibility and identity due to the anonymity of the crowd. The transmission period shows the tendency of to follow the most dominant ideas and emotions in the crowd without questioning the reasons and thinking rationality. The last stage refers to the condition of the ideas and emotions that are driven by something which is not shared. In other words, the crowd is influenced by the idea or emotion which drives others to follow without thinking. A crowd or individual psychology is under a "collective mentality," capable of radically transforming individual behavior. Le Bon [14] also indicated that members of the crowd tend to feel 'safe' from the demands associated with error due to the difficulty of prosecuting or blaming the masses.

Based on Le Bon [14] thinking framework, the phenomenon of herding behavior arises during the period of transmission and suggestion. The idea of collective hypnosis which forms social transmission helps to explain herding behavior as irrational and unconscious.

It is also viewed from the agency theory which is based on the contractual relationship between investment managers and investors and capable of triggering the emergence of the phenomenon of herding behavior. Investment managers possess incentives to maintain reputation and compensation which is dependent on the performance of the investments they manage [15]. Career reputation or concentration arises due to uncertainty on the ability or expertise of managers. Herding behavior arises when low-ability investment managers deliberately imitate the decisions of senior investors, and ignore their private information because they believe that decisions made their superiors are based on better information. Although investment managers' compensations are based on comparing its performance with others, they tend to further change their portfolio to be inefficient [16] which fails to decrease.

The phenomenon of herding behavior in the context of financial markets often adopts social influences and learning theories in forming herding behavior. The theory of social learning proposed by Bandura [17] stated that humans learn from others through observation, imitation and modeling and the information serves as a guidance for carrying out an action. This social learning theory explains human behavior in the form of continuous reciprocal interactions between cognitive, behavioral, and environmental influences.

Gale [18] stated that social learning takes place when a person learns by observing the behavior of others. This definition implies that the process materializes in asymmetry information and it is also a mechanism that encourages herding behavior.

3. METHODOLOGICAL ASPECT OF THE RESEARCH

This research analyzed the online databases such as Ebsco Host, Jstor, Proquest, Sage Journal, Science Direct, Springer Link, Taylor and Francis, Emerald and Wiley to identify all publications related to herding behavior in the capital market. It consists of three categories namely theoretical, conceptual and empirical research.

The empirical research category is screened as follows:

1) Articles published from 1988-2018.
2) The article is included in the Scopus database starting Q1-Q4.

This article filtering utilizes Publish or Perish software with the keywords "herding", "herding behavior", "herding behavior", "herd", "information cascade" and "informational cascades". In order to obtain relevant articles, the study also limited the context by entering the keyword "capital market".

The method used to filter the theoretical/conceptual research is the snowball method without limiting years or restricting the publishers of these theoretical articles with the screening based on sensitivity. Assuming the article is frequently cited by other researchers, a citation cutoff of

more than 50 is utilized with the literature review included but excluded in the Scopus database.

Based on the initial screening results, 389 articles were obtained from 1942 to 2018, with the second stage carried out by reading the article and selecting researches which discussed herding and relevant behavior in the capital market context. The filtering results of this relevance produced a total of 279 articles consisting of 44 theoretical articles, 14 conceptual articles, and 221 empirical researches. Approximately 293 articles were read, tabulated, and sorted according to the context of the problem, the field of research, and the methodology adopted with easily understand different aspects of herding behavior.

This paper uses a bibliometric analysis approach to quantitatively analyze the performance of publications. Furthermore, the bibliometric analysis consists of three questions as follows: Which journals are these papers published? What keywords are often used in herding behavior research? Who are the most productive and influential researchers? In order to answer these questions, the analysis is only applied to empirical research.

4. RESULTS AND DISCUSSION

4.1 Journal Distribution Analysis

Herding behavior in the capital market has been widely discussed in journals covering the fields of business and management. A total of 279 articles analyzed in this study were spread into 128 academic journals and 3 articles in working papers. The following is the distribution of journals which published the research in more than 4 papers.

Table 1. Distribution of Journal

No.	Nama Jurnal	Number of Papers			
		Theoretical	Conceptual	Empirical	Total
1	Journal of Behavioral Finance			12	12
2	Journal of Banking and Finance	2		9	11
3	International Review of Economics and Finance	1		9	10
4	American Economic Review	1	1	7	9
5	Journal of International Financial Markets, Institutions and Money			9	9
6	International Review of Financial Analysis			8	8
7	Applied Economics Letters			7	7
8	Emerging Markets Finance and Trade			7	7
9	Journal of Finance	3		4	7
10	Journal of Economic Behavior and Organization	1		5	6
11	Pacific-Basin Finance Journal			6	6
12	Pacific Basin Finance Journal			5	5
13	Physica A: Statistical Mechanics and its Applications	4		1	5
14	Quantitative Finance	1		4	5

Table 1 shows that empirical research on herding behavior is widely published in the Journal of Behavioral Finance which occupies quarter 2 (Q2) according to the database of the SCImago Journal & Country Rank portal. The second rank is occupied by the Journal of Banking and Finance which has a rating of Q1. The International Review of Economics and Finance, the American Economic Review, the Journal of International Financial Markets, Institutions and Money and the International Review of Financial Analysis also have a Q1 ranking according to the SCImago Journal & Country Rank portal.

Also, by type the theoretical articles which examine herding behavior mathematically are widely published in Physica A: Statistical Mechanics and its Applications which occupy the 2nd quarter of the SCImago Journal & Country Rank portal. The Journal of Finance publishes 3 theoretical articles on herding behavior.

4.2 Keyword Analysis

Keyword analysis is used to map words most often associated with herding behavior, with a good number indicating that the dimension has been frequently studied. This study limits the frequency of the emergence of these keywords by 2 times. The following is a graphic illustration of keywords which are quoted in many empirical articles on herding behavior and the quotation timeframe.

Figure 1 Keywords Analysis of Empirical Research

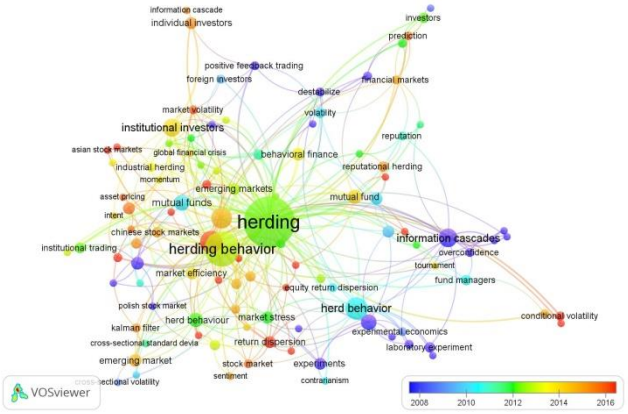

Figure 1 shows the different ways in which researchers write herding behavior in keywords. The picture shows that some researchers used the terms "herding", "herding behavior", "herd behavior", "herding behavior", and "informational cascade". The five terms in empirical research are used interchangeably with keywords such as "herding" which shows that majority of researchers examine the phenomenon which occurs in the capital market.

Subsequent analysis is carried out to determine the keywords that are most often associated with herding behavior. Based on VOSViewer, the most often appear at the level of strength of the relationships between words and these are "financial crisis", "institutional investors", "mutual funds", and "feedback trading". Similarly, the keywords "emerging market" and "individual investor" are relatively rare, which means that the empirical research studied t discusses the herding behavior carried out.

The emergence of the keyword "financial crisis" indicated that the herding behavior is closely related to market

conditions, which means that the market condition correlates or influences it in the capital market. The keyword "institutional investors" refers to its perpetrators, while "institutional investors" shows the numerous empirical studies that examined the herding behavior carried out by institutional investors in emerging financial markets.

Figure 1 also shows that research on herding has been rampant before 2008 with a lot of researches discussing the informational cascade, experiments, and feedback trading. In the early days of the booming herding behavior in the capital market, the term informational cascade was frequently used in laboratory experimental methods (for example; Anderson & Holt [19]; Huck & Oechssler [20]; Hung & Plott [21]; Çelen & Kariv, [8]; and Alevy, Haigh, & List [22]). The keyword use of the term was actually found in 2011-2013, and from 2015 to 2018 it became widely associated with the construct of market volatility, return dispersion, and contrarian strategy. Further analysis, proved that the construct is often tested as an impact of herding behavior, with research on the outcome relatively small.

The level of theme density in a more clustered manner is seen in Figure 2, with the red and yellow clusters used to indicate a high level of density, which means that the theme has been widely studied. The more blurred colors in figure 2 indicate that the theme is still very rarely investigated empirically.

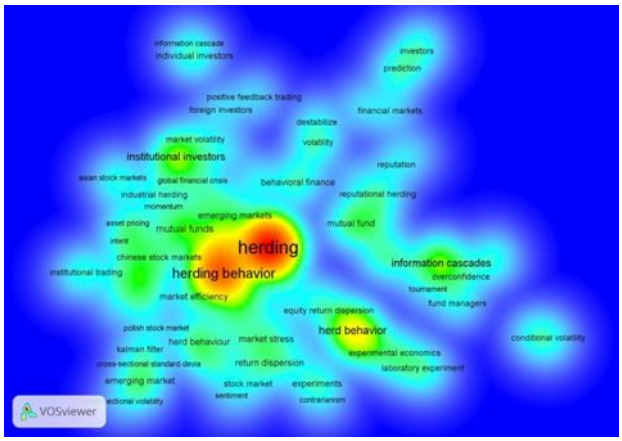

Figure 2. Density Rate of Empirical Research's Theme

Basically Figure 2 corroborates the results of the analysis in Figure 1 which shows that the theme of herding behavior is most often cited as a keyword, followed by an informational cascade, institutional investors, and mutual funds. Figure 2 shows an indication of research opportunities which is conducted by researchers related to the theme.

4.3 Productivity and Influence of Researchers

Researcher productivity shows the amount of research with a productive and highly specialized test phenomenon in the capital market. Figure 3 shows the productivity of researchers and their relationship.

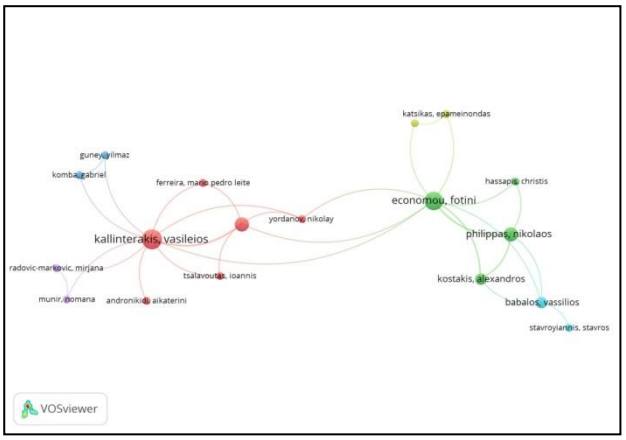

Figure 3. Co-authorship network of the most productive authors

Figure 3 show that Vasileios Kallinterakis and Fotini Economou frequently studied the herding behavior although their productivity does not automatically have a large influence on others. The magnitude of the influence on other researchers is indicated by the level of citation of each published paper.

The following is the highest citation level for each type of paper with the number of citations calculated based on Google Schoolar due to its ability to provide up-to-date information included in the Scopus and Non-scopus databases.

Table 2. Top Cited Empirical Papers

Author	Journal	Cited Count	Title
Grinblatt, Titman, & Wermers [23]	American Economic Review	2375	Momentum Investment Strategies, Portfolio Performance, and Herding: A Study of Mutual Fund Behavior
Lakonishok, Shleifer, & Vishny [24]	Journal of Financial Economics	2245	The Impact of Institutional Trading on Stock Price
Wermers [25]	Journal of Finance	1933	Mutual Fund Herding and the Impact on Stock Prices
Nofsinger & Sias [26]	Journal of Finance	1620	Herding and Feedback Trading by Institutional and Individual Investors
Choe, Kho, & Stulz [27]	Journal of Financial Economics	1311	Do foreign investors destabilize stock markets? The Korean experience in 1997
Anderson & Holt [19]	American Economic Review	979	Information Cascades in the Laboratory
Sias [28]	Review of Financial Studies	970	Institutional Herding

Table 2 shows that Grinblatt et al. (1995) was the most quoted researcher followed by Lakonishok et al. (1992). In figure 3 it is concluded that this most influential researchers did not include those that focus on examining herding behavior empirically. Meanwhile, the highest citation rate obtained by Vasileios Kallinterakis was 54 for most articles published in the Journal of International Financial Markets, Institutions and Money.

Table 3. Top Cited Conceptual Papers

Author	Journal	Cited Count	Title
Bikhchandani, Hirshleifer, & Welch [29]	Journal of Economic Perspectives	1993	Learning from the Behavior of Others: Conformity, Fads, and Informational Cascades
Bikhchandani & Sharma [30]	IMF Staff Papers	1444	Herd Behavior in Financial Markets
Devenow & Welch [5]	European Economic Review	1210	Rational herding in financial economics
Hirshleifer & Hong Teoh [7]	European Financial Management	948	Herd behaviour and cascading in capital markets: A review and synthesis
Shiller [31]	American Economic Review	566	Conversation, Information, and Herd Behavior

The number of citations for conceptual articles as a whole is lower than the empirical articles (see Table 3). An interesting finding in this analysis is there is a paper that not included in Scopus database but it has high citation level, namely Bikhchandani & Sharma [25]. This shows that the content in the paper titled Herd Behavior in Financial Markets is quite interesting and provides new insights for other academics.

Table 4. Top Cited Theoretical Papers

Author	Journal	Cited Count	Title
Bikhchandani et al. [3]	Journal of Political Economy	7328	A theory of fads, fashion, custom, and cultural change as informational cascades
Banerjee [2]	Quarterly Journal of Economics	7005	A Simple Model of Herd Behavior
Welch [32]	Journal of Finance	1632	Sequential Sales, Learning, and Cascades
Froot, Scharfstein, & Stein [33]	Journal of Finance	1317	Herd on the Street: Informational Inefficiencies in a Market with Short-Term Speculation
Lux [34]	Economic Journal	1197	Herd Behaviour, Bubbles and Crashes
Avery & Zemsky [6]	American Economic Review	1030	Multidimensional Uncertainty and Herd Behavior in Financial Markets

The name Sushil Bikhchandani seems to be very influential in finance especially in discussing the theme of herding and informational cascade behavior as shown in Tables 3 and 4. Sushil Bikhchandani occupies the top position as the most quoted researcher of herding behavior both conceptually and theoretically. Banerjee [2] was the first researcher to popularize the term "herding behavior" as a result his citation rate was high. However, Banerjee's [2] contribution to the development of the concept of herding behavior stopped in an article entitled "A Simple Model of Herd Behavior" because afterwards there was no track record of research on the theme of herding behavior again conducted. Tables 2, 3, and 4 shows the most cited papers by other researchers which ranked high according to the SCImago Journal & Country Rank portal. These results differ from Table 1 which shows the ranking of the most productive journals in publishing herding behavior themes. However, the amount of productivity does not guarantee the high citation or influence of researchers in the journal.

5. CONCLUSION

This study uses a simple bibliometric approach to analyze current conditions and the development trends of academic research in accordance to herding behavior. Important information on research developments, influential researchers, and reference were obtained using the ranking analysis and visualization of keywords to examine the construct of herding behavior in the capital market.

Based on a keyword analysis of 221 words on herding behavior in the capital market, this study found it is often associated with institutional and financial crisis investors. In addition, research on herding behavior mostly tests the

occurrence of the phenomenon in the capital market. Bibliometric analysis showed that the most productive writer is not always the most influential researcher. The most cited researchers are the authors who publish in Q1 journals and have a high impact factor.

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