A Bibliometric Analysis of Behavioral Finance and Behavioral Accounting

Bharati Singh
Indian Institute of Management Ahmedabad, India

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ABSTRACT

This paper presents a bibliometric analysis of relevant publications in the field of behavioral finance and behavioral accounting. The analysis shows that the emerging themes of research in recent years in behavioral finance is on investors' sentiment, social media, investors' attention, and financial literacy. In the field of behavioral accounting, biases such as — *overconfidence, framing effects or cognitive constraints on information processing,* have been explored in greater detail. Other than cognitive biases, this field includes studies such as behavioral tax, organizational ecology, and performance evaluative style of organization, among others. Interestingly, our analysis suggests that research in behavioral accounting is comparatively underdeveloped than research in behavioral finance. This bibliometric analysis has been extended by network analysis using, "Visualization of similarities, (VOS) viewer" software. Using the themes generated here the direction for future scope of research work has been discussed.

KEYWORDS

INTRODUCTION

Richard Thaler, a Nobel Prize-winning economist, once said that in future an investor's behavior would become such an integral part of finance that any financial modeling without it would make the model incorrect (Thaler, 1999). Initially, perceived as a controversial field of study as it suggested that investors do not always act rationally (Barberis & Thaler, 2005), the research in behavioral finance picked up nearly after a decade. Today this field is an active area of research (Costa et al., 2017; Paule-Vianez et al., 2020). During the COVID-19 pandemic, two of the prominent events in the financial world — a huge jump in investors' participation in the financial market through Robinhood platform and an abnormal increase in price of GameStop Corp have been tried to be explained from the perspective of behavioral finance. For example, Barber et al. (2020) show that inexperienced traders at Robinhood's platform are more engaged with attention-induced trading than other traders. In a similar context, Pagano et al. (2021) show that Robinhood investors pursued both momentum and contrarian trading strategies depending upon the uncertainty loomed in the financial market during various phases of COVID-19 pandemic. At a firm level, the pandemic has also brought various operational challenges on a day-to-day basis. It has led virtually every organization to reinvent its processes to deal with this

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[a] Indian Institute of Management Ahmedabad, India

Corresponding Author:
Singh (phd17bhartis@iima.ac.in)

crisis.[1] The field of behavioral accounting tries to answer questions such as how management should control processes to ensure the productivity of the firm. There is existing literature that suggests managerial actions in response to irrationality exhibited by investors (Stein, 1996; Degeorge, Patel, & Zeckhauser, 2005) but behavioral accounting is more concerned with the behavior of a manager itself which in turn affects the performance of a firm. The research around behavioral issues has witnessed a growing interest and diversity of methods which has led to a flurry of definitions of behavioral research in general and behavioral accounting research in particular (Birnberg, 2011). Both these scientific fields are related to biases that affect the decision-making of individuals. Thus, to get a comprehensive view of both these fields, and to understand how both these fields have evolved individually as well as collectively, a bibliometric analysis is needed.

Behavioral finance is considered to be an applied branch of behavioral economics (Tomer, 2007). It questions the "rationality" aspect in the traditional financial paradigm which suggests the agents are rational and hence maximize their expected utility and all agents update their beliefs in the manner as per the Bayes' law (Barberis & Thaler, 2005). Initially, the research in this field was more oriented towards explaining that financial markets may not be always efficient. Over the years, behavioral finance gained credibility in explaining various market phenomena which couldn't be explained by rational models. For example, the stock market crash on October 19, 1987, popularly known as Black Monday (Barberis & Thaler, 2005), the Equity Premium Puzzle (THALER, 1995), and Internet Carve-Outs (Lamont & Thaler, 2005). On the other hand, the field of behavioral accounting covers a broader theme — internal data structures (closely related to managerial accounting), sociology of accounting, the interaction of accounting with the environment (like intergroup conflict) and miscellaneous themes (like methodology in accounting, income taxation and others) (Birnberg, 1973). Thus, to understand which areas and which groups like individuals, groups, organizations, or society have been explored, a detailed analysis is required.

The bibliometric analysis of behavioral finance has been done in the past as well. The current study differs from previous ones on various grounds, thus justifying the objective of the present work. For example, Costa et al. (2017) have conducted a bibliometric analysis of behavioral finance along with behavioral biases — overconfidence, anchoring and confirmation bias. The insights from the study were broadly limited to biases and hence the discussion around the limits of arbitrage which is considered to be one of the building blocks of behavioral finance have not been adequately captured. Costa et al. (2019) conduct a bibliometric analysis of behavioral finance with behavioral economics where the findings of a more developed field of behavioral economics dominate the former. Paule-Vianez et al. (2020), on other hand, consider the period of analysis from 1987-2017 for bibliometric analysis. It is to be noted that in the current study the field of behavioral accounting has also been included where the early and major development in behavioral accounting was made in 1960s. The analysis done in the current study has been done for a wider period. Paule-Vianez et al. (2020) come up with four broad themes and categorize them into four different categories depending upon the level of research. Though the authors suggest that some of the themes are least developed, the argument appears to be subjective. The study by Vitor Jordão da Gama Silva et al. (2019) tries to provide a comprehensive view of behavioral finance but the scope of study gets limited as only Brazilian journals have been examined. Thus, most of them have approached the field of behavioral finance in association with the field of behavioral economics, where relatively developed research in behavioral economics have overshadowed the field of behavioral finance. In this study, though it has been tried to incorporate views of other dimensions of behavioral accounting like personality traits or role of emotions, management control systems and ethics, a complete discussion in these areas is beyond the current scope of this study.

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[1] https://review.chicagobooth.edu/strategy/2020/article/how-leaders-can-rise-challenge-covid-19

This study has mainly four contributions. First, to the best of the knowledge of the author, this is the first study that has explicitly done a bibliometric study of behavioral finance in combination with behavioral accounting[2]. The decision to combine them has felt important as one strand of literature in behavioral finance particularly talks about the motivational aspect of a manager which drives him or her to engage in earnings management (Degeorge, Patel, & Zeckhauser, 2005). Second, the literature review of Top-20 publications in behavioral accounting highlights the trends of the ongoing research works — for example, how the presentation of financial data influence investors' decisions-making or the debate over using MBA students as a good proxy for unsophisticated investors. These suggest an ample scope for future research work like exploring managerial behavior (personality traits, self-control or the role of emotions) which can influence the dynamics inside the organization and hence affect the financial performance of a firm. Third, this study provides a network analysis using VOSviewer which gives important insights while identifying themes. Previously, in the study, Costa et al., (2019), the authors use the Citespace software which helps in visualizing emerging trends, the network analysis using VOSviewer provides a different set of analyses like co-occurrence of keywords, bibliographic coupling of authors and sources (journals). And lastly, this study makes an incremental contribution to the literature of both behavioral finance and behavioral accounting.

The rest of the paper is organized as follows. Section 2 provides a review of literature of both fields. In Section 3 the research methodology and data have been discussed. The results have been analyzed in Section 4. Section 5 focuses on network analysis using VOSviewer software. Section 6 provides an overall discussion covering the analysis both from the bibliometric study and network visualization using VOSviewer software. Finally, in the last section, the conclusion and future scope of research work have been provided.

LITERATURE REVIEW OF BEHAVIORAL FINANCE AND BEHAVIORAL ACCOUNTING

Behavioral research aims to understand the process involved in making decisions and how individuals influence and interact with other participants which include organizations, society, and the market (Birnberg & Ganguly, 2012). Statman & Caldwell (1987) stated that behavioral finance is a descriptive theory of choice under uncertainty. Similarly, behavioral accounting links behavioral aspects besides accounting principles and knowledge (Kutluk, 2017). Both scientific fields have witnessed a surge in publications in the recent decade (Birnberg, 2011; Costa et al., 2019; Paule-Vianez et al., 2020). Some of the authors have done extensive literature reviews in the area of Behavioral Finance and Behavioral Accounting (Barberis & Thaler 2005; Kumar & Goyal, 2015; Arnold 2007). A literature review of each field is being provided to give an overall view of research works in these areas.

BEHAVIORAL FINANCE

Though the field of behavioural finance saw its origin in the early 1980s (Barberis & Thaler, 2005), the early studies mostly tried to show that markets can be inefficient[3] as mispricing could exist. The efficient market hypothesis suggests that a stock price reflects all available information (Fama, 1970). If there is mispricing, then arbitrageurs will quickly take positions in the market and hence the stock's price will ultimately come to its equilibrium price. Behavioral finance argues that sometimes strategies designed to correct mispricing are so costly and risky that arbitrageurs are not able to exploit them

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[2] In the study, (Costa et al., 2019), the authors do mention "behavioral accounting". However, this discussion is quite small. The discussion is dominated by the field of behavioral economics followed by behavioral finance.

[3] In one of the discussions related to "Are markets efficient?", Eugene Fama said " I'm probably the most important behavioral-finance person because, without me and the efficient-markets model, there is no behavioral finance. " https://review.chicagobooth.edu/economics/2016/video/are-markets-efficient

and hence mispricing exists (Barberis & Thaler, 2005). This is called limits to arbitrage. Shleifer & Vishny (1997) explore the limits to arbitrage in detail where the authors suggest that for slow-moving market mispricing arbitrageurs need long horizons. The arbitrageurs can affect prices when they would have sufficient capital which could be other investors' money. As a result, these investors should have long horizons. Abreu & Brunnermeier (2003) propose a similar idea where they discuss that bubbles will exist due to limits of arbitrage.

A market can also be inefficient because of investors' irrationality (Barberis & Thaler, 2005). The underlying principle of the traditional financial paradigm which is based on assumptions of the rationality of investors or "representative agent" has been criticized in the literature due to the existence of several types of biases exhibited by investors' behaviours (Paule-Vianez et al., 2020). The prospect theory proposed by Kahneman & Tversky (1979) suggests that investors tend to treat gains or losses differently and many follow up studies provide evidence that the actual behaviour of people is affected by cognitive biases (Tversky & Kahneman, 1992; Tversky & Kahneman,1973). These studies have been considered as some of the most influential studies in the field of behavioural finance as they have paved the way to understand the role of cognitive biases while decision-making.

The overconfidence bias is one of the most studied biases in behavioral finance (Costa et al., 2017). Overconfidence of managers can destroy a company's value (Ahmed & Duellman, 2013) or overconfidence can make people blind about the risk they are taking (Kumar & Goyal, 2015). Barber & Odean (2000) is among the widely cited studies in this area. Another study by Barber & Odean (2001) shows that men in general trade more than women but earn a lower average rate of return. Barber & Odean (2008) show that individual investors come out to be the net buyer of the attention-grabbing stock. The other biases which have been explored in this field are confirmation bias where investors try to process or interpret information in a manner that supports their existing beliefs (Pompian, 2011), availability bias which refers to the tendency of investors to be strongly influenced by an event which is relevant to them and recent in nature (Tversky & Kahneman, 1973), anchoring bias where investors rely too much on pre-existing information while making decisions (Andersen, 2010).

Whether behavioral finance explains market inefficiency or if the market is efficient is still a debate. The Nobel Prize 2013 in Economics was shared by Eugene Fama, Lars Peter Hansen and Robert Shiller. It is worthwhile to note that both Eugene Fama and Robert Shiller held contrary ideas where the ideas of Robert Shiller were more oriented towards advocating behavioral finance.[4] The debate continues but the research works in behavioral finance has witnessed an increasing interest over the years (Costa et al., 2019). The research today is now related to explaining several phenomena in the financial market from a behavioral finance perspective, for example, how the selling propensity of traders are influenced by previous "realized-return" and "peak-return" of the stock (Bansal et al., 2021) or the positive association of disposition effect with increased volatility in stocks (Vasudevan, 2019). The field of behavioral finance offers a set of behavioral concepts which help to understand what makes an investor deviate from making a rational decision and not update his beliefs in accordance with the Bayes' rules. In recent times, the research works are on how investors' biases can be reduced. Some of the studies proposed in these directions are introducing a gamification approach (Dhawan et al., 2020) or usage of artificial intelligence (Chartier et al., 2021) or using agent-based modelling (LeBaron, 2006).

BEHAVIORAL ACCOUNTING

The term "behavioral accounting" has been mentioned in literature as early as 1967 (Becker 1967; Birnberg & Shields, 1989). In the study, Becker (1967) argues that accounting is a piece of information that an accountant codes and sends to the receiver (readers of the financial information). The term

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[4] https://www.nobelprize.org/prizes/economic-sciences/2013/press-release/

"behavioral sciences of accounting" explain regularities and irregularities in differential coding and differential reception of the same information by people (Becker, 1967). Dyckman (1998) tries to trace the growth of the behavioral paradigm in accounting. The author suggests that the count of research works in behavioral accounting might be an understatement as the faculties don't identify their works as behavioral but an area of research application in finance, management, auditing etc. The author also suggests that in future the research work in behavioral accounting may witness a declining trend as many universities are resource-constrained and funding is limited. Birnberg (2011) proposes a framework that divides the accounting research into four behavioral units — individual, group, organizations, and society. Not much attention has been given to the human aspect such as perceptions, attitudes, and motivation in accounting (Huseynov et al., 2020). Some of the studies discuss the type of participants, M.B.A graduate as a proxy for accounting practitioners (Brandon et al., 2014; Liyanarachchi & Milne, 2005). Brandon et al. (2014) discuss the external validity of such experiments and hence recommend increasing the number of participants whereas the study by Liyanarachchi & Milne (2005) shows that there is no significant difference between the investment decisions taken by professional and M.B.A students. Macintosh & Daft (2019) explore another dimension of the field of behavioral accounting, the management control systems. In this study, the authors discuss the level of interdependence between departments and the control systems used in the company. The authors put that when task uncertainty increases managers need control systems along with face-to-face interaction. Similarly, Vagneur & Peiperl (2000) talks about control systems related to performance measurement and introduces an alternative measure. In another study, Collins, Holzmann, Lowensohn, & Shaub (2007), the authors try to answer what pushes or restrains managers to engage in unethical practices.

An emerging line of research in behavioral accounting is neuroaccounting (Birnberg & Ganguly, 2012) where the authors suggest that observing the brain's activity will provide more insights than observing behavior of an individual while making decisions. The authors discuss various physiological measures like eye pupil dilation, facial expressions, and other non-invasive neuroscience technologies to be used in behavioral accounting research. Another area of research is putting the gender dimension into perspective. Gender-related differences in areas such as risk-taking, negotiation behavior and competition are some of the topics which haven't been explored in much detail.

Like other scientific fields, behavioral accounting has its own set of challenges. In experimental psychology, the internal mental states are considered to be an object of scientific inquiry (Daniel et al., 2002). This develops a challenge in the field of behavioral accounting where a researcher needs to associate a psychological bias with an economic variable. Thus, the challenge comes on two fronts: identifying an appropriate construct for a psychological bias and finding an appropriate economic variable. Secondly, the focus on BAR studies has been around individuals mostly because of the simplicity of the model involved. But studies involving two individuals related to strategic choice have been less explored. In addition to the above, sub-fields like management control systems or ethics have been explored but there are no sufficient studies that simultaneously address these sub-fields.

RESEARCH METHODOLOGY AND DATA

This study uses Scopus database for analysis. Scopus and Web of Science (WoS) have recently become the most used and reliable databases for scientific publications. Though WoS is considered as an authenticated data source, Scopus has recently progressed to become the popular database for analysis. Additionally, it complements WoS (Merig et al., 2020). There are bibliometric studies that have espoused the use of the WoS database over Scopus as the former has a list of publications since 1900 while the Scopus has since 1966 (Paule-Vianez et al., 2020). In this study, the decision to use Scopus does not result in the loss of any articles or data points as the history of both the scientific

fields of studies are not old. The field of behavioral finance gained attention in the 1980s (Barberis & Thaler, 2005; Thaler, 1999) while the field of behavioral accounting was first introduced by Becker in 1967 (Birnberg & Shields, 1989).

In this study, first, bibliometric analysis has been conducted which is extended by network analysis using VOSviewer. The bibliometric analysis mainly uses three knowledge structures — the conceptual structure to identify main themes and trends; the social structure which explains the interaction among authors, institutions and countries; and the intellectual structure such as how an author's work influences others (Aria & Cuccurullo, 2017). The bibliometric approach uses an objective process based on a statistical technique that is easy to use and replicate (Aria et al., 2020). As earlier said, the network analysis has been conducted by using VOSviewer. Using VOSviewer, large bibliometric maps can be interpreted easily (van Eck & Waltman, 2010). The analysis has been carried out at three levels— co-occurrence of keywords, bibliographic coupling of authors and sources (journals).

DATA

The dataset has been extracted from Scopus. In search criteria the keywords — "behavioral accounting", "behavioral research in accounting", "behavioral accounting research" or "behavioral finance" occurring at any of the places—Article Title, Abstract or Keywords have been applied. The Scopus database returned 2,164 matches as a result of this search (*shown in Table 1*). But when the search was restricted to document type only as "Article" or "Review" and language as "English", the search result returned 1,739 documents[5]. This resulted in the dataset for doing studies in the field of "behavioral accounting" or "behavioral finance".

Table 1. Number of Articles Considered for Analysis

Terms which have been searched are "Behavioral Finance" or "Behavioral Accounting" or "Behavioral Accounting Research" or "Behavioral Research in Accounting" in the Title, Abstract or Keyword			Limit to Document Type as "Article" or "Review" and Language as "English"	
Article	1711			
Conference Paper	181			
Book Chapter	104			
Review	92			
Book	45			
Editorial	11			
Erratum	7			
Conference Review	4		Article	1654
Retracted	3		Review	85
Undefined	3		Total	1739
Short Survey	2			
Note	1			
Total	2164			

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[5] This dataset has been extracted from SCOPUS on 13th July 2020.

RESULTS

The results have been discussed in the following three subsections: publication and citation structure, literature review of most influential publications and analysis of publications of leading authors, institutions, and countries.

PUBLICATION AND CITATION STRUCTURE

In *figure 1*, the total number of publications (both behavioral finance and behavioral accounting) has been shown.
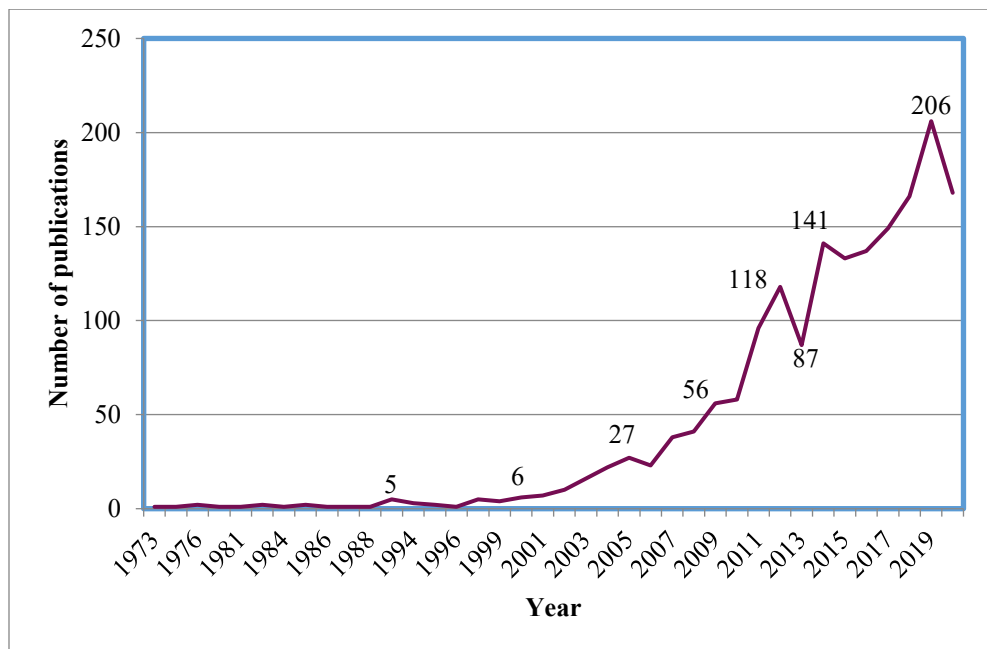

Figure 1. Annual Number of Publications in the Field of Behavioral Finance and Behavioral Accounting.

In figure 1, it can be easily seen that the number of publications is quite static till the year 1988 (at most 2 publications a year). The trend has remained the same for the next decade. From the year 2001 onwards, there is an increasing trend. It is worthwhile to note that till the year 2000, the research in behavioral accounting dominated. Out of 40 publications, 28 publications are in behavioral accounting[6]. There is a leap in publications in the field of behavioral finance from the year 2005 (out of a total of 27 publications just 5 publications are in the field of behavioral accounting). During this period, the research in behavioral finance is more on experimenting with different methodologies to understand the beliefs of market participants. The number of publications in behavioral finance continued to be greater than that in behavioral accounting. In the year 2012, out of 118 publications,

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[6] This was obtained by using a separate dataset from SCOPUS. Here, in the search criteria, the keywords were "behavioral accounting" or "behavioral research in accounting" or "behavioral accounting research". Some additional restrictions related to document type and language as described previously were also applied. The final search results returned 94 documents.

only 4 is in behavioral accounting[7]. From 2009 to 2012, though the research linking global financial crisis with behavioral finance gained attention, the research works, however, are more on herding, prospect theory and examining related fields like neuroeconomics. Then again, the number of publications has gained momentum in the year 2014. The research in this period has been marked by examining investors' sentiment from social media. One can see a drop in the year 2020 with respect to 2019 but then it is to be noted only the first half of the year 2020 has been considered.

LITERATURE REVIEW OF TOP-20 PUBLICATIONS

A list of Top-20 highly cited journal articles combining both fields of behavioral finance and behavioral accounting has been shown in Table 2. A separate literature review of Top-20 highly cited journal articles in the field of behavioral accounting only has also been done. This has been shown in Table 3. This could have been possible as another set of data extraction from the Scopus database has been made. Only three keywords "behavioral accounting" or "behavioral research in accounting" or "behavioral accounting research" have been used. The additional search criteria related to document Type and language has been kept the same as mentioned previously in the Data section (refer footnote 6). In Table 2, for all those articles which have also been included in Table 3, an identifier "**(BA)**" has been put in the last column.

Table 2. Literature Review of Top-20 Publications

Sr. No.	Authors	Title of the Paper, Reference	Journal Name (Year of Publication)	Total Citations	Contribution to Behavioral Finance or Behavioral Accounting (BA)
1	*Fama E.F.*	*Market efficiency, long-term returns, and behavioral finance, (Fama, 1998)*	*Journal of Financial Economics (1998)*	1845	*This study can be considered as a critic to the field of behavioral finance. The author argues that existence of irrationality of investors in financial markets as claimed by various models will be non-existent if a better model is used. Hence, the efficient market hypothesis remains valid amidst the growing concern of observed behavioral biases of investors.*
2	*Hirshleifer D., Teoh S.H.*	*Limited attention, information disclosure, and financial reporting, (Hirshleifer & Teoh, 2003)*	*Journal of Accounting and Economics (2003)*	563	*Investors' decisions get biased by the form of presentation of financial reporting— Pro-Forma and GAAP disclosure. Investors tend to underweight certain information if the form of presentation is abstract or is in statistical terms without considering the economic importance. This is due to the limited attention of investors. (BA)*

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[7] Though the articles in the journal, Behavioral Research in Accounting (BRIA) are available from 2001, all articles from this journal didn't automatically qualify for analysis. A separate search from SCOPUS Database focusing on behavioral accounting has been made. This has been mentioned in the Data section.

3	Barberis N., Thaler R.	A survey of behavioral finance, (Barberis & Thaler, 2005)	Handbook of the Economics of Finance (2003)	513	The study first talks of two building-blocks of behavioral finance: limits of arbitrage and psychology. Then a comprehensive review of literature of the field of behavioral finance is provided. Some applications of behavioral finance in understanding aggregate markets or in pricing of closed-end mutual fund or cross-section of average return have also been discussed.
4	Abreu D., Brunnermeir M.K.	Bubbles and Crashes, (D. Abreu & Brunnermeier, 2003)	Econometrica (2003)	401	The study primarily talks about limits of arbitrage. The author suggests that even if rational arbitrageurs are aware of a bubble, the bubble will continue to exist as long as rational arbitrageurs fail to coordinate among themselves.
5	LeBaron B.	Agent-based Computational Finance,(LeBaron, 2006)	Handbook of Computational Economics (2006)	346	Provides a survey of literature which have used agent-based modeling (ABM) tool to understand financial markets. ABM is necessary when an analytical solution can't be provided and when there is a need to process the dynamics of financial markets where agents have several types of beliefs and biases and hence a computational model is necessary. For building the computational model, the author discusses its various components such as preferences, price-determination, evolution and learning, information representation and social learning.
6	Hirshleifer D., Hong Teoh S.	Herd Behavior and cascading in Capital Markets, (Hirshleifer & Hong Teoh, 2003)	European Financial Management (2003)	326	Provides a synthesis of literature addressing herd behavior, social learning, and behavioral convergence of market participants like investors, analysts, or firms in the financial markets.

7	*Daniel K., Hirshleifer D., Teoh S.H.*	*Investor Psychology in Capital Markets, (Daniel et al., 2002)*	*Journal of Monetary Economics (2002)*	252	*The study makes a significant point that having an efficient market is largely an exception and not the norm. They talk of limits of arbitrage which is driven by internal psychological biases like heuristics simplification and different beliefs of investors. The study argues that how systematic mispricing and investor credulity make government intervention necessary to protect investors and improve risk sharing. Other biases have been viewed as outgrowths of heuristics simplifications, emotion-based judgments, and self-deception. For example, heuristics simplifications can help explain other biases like salience and availability effects, framing effects, money illusion and mental accounting. The authors provide evidence for systematic cognitive errors made by investors and analysts.*
8	*De Bondt W.F.M., Thaler R.H.*	*Financial Decision Making in Capital Market, (De Bondt & Thaler, 1995)*	*Handbooks in Operations Research and Management Science (1995)*	251	*The authors put that the usual axioms of finance theory (expected utility; risk aversion; Bayesian updating and rational expectations) are descriptively false. The authors explain a list of behavioral concepts like overconfidence, loss aversion and mental accounting.*
9	*Campbell J.Y.*	*Asset pricing at the millennium, (Campbell, 2000)*	*Journal of Finance (2000)*	251	*Provides a theory of asset pricing which has evolved from consumption-based modeling, a brief description about puzzles which can't be adequately explained by the theory.*
10	*Hirshleifer D., Hou K., Teoh S.H., Zhang Y.*	*Do investors overvalue firms with bloated balance sheets?, (Hirshleifer et al., 2004)*	*Journal of Accounting and Economics (2004)*	230	*The authors suggest that the limited attentions of the investors disregard the fact that how much accrual income is being generated more than cash income. Such type of earnings doesn't hold promising results for future earnings growth. Investors in such cases disregard the quality of the balance sheet.*

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11	*Glaser M., Weber M.*	*Overconfidence and trading volume, (Glaser & Weber, 2007)*	*GENEVA Risk and Insurance Review (2007)*	*225*	*The authors try to find out if investors' overconfidence holds the answer for why investors trade more. The authors take a survey-based approach to measure overconfidence and measure the number of trades (trades over a 51-month period) of those survey's participants. The authors calculate the correlation between miscalibration score (the difference between estimated and actual value of information) and trading volume and found out a positive association between them. The overconfident investors overestimate the precision of the information and hence trade more.*
12	*Malmendier U., Shanthikumar D.*	*Are small investors naive about incentives?, (Malmendier & Shanthikumar, 2007)*	*Journal of Financial Economics (2007)*	*211*	*The authors perform a controlled experiment where they analyze trading responses of large and small investors who have been given analysts' recommendations for a stock. The authors find out that though large traders don't follow analyst's recommendations blindly and exercise their judgments, small traders follow analysts' recommendations literally.*
13	*Boswijk H.P., Hommes C.H., Manzan S.*	*Behavioral heterogeneity in stock prices, (Boswijk et al., 2007)*	*Journal of Economic Dynamics and Control (2007)*	*205*	*The author talks of heterogeneity of prices among investors. The authors discuss about various routes with which the heterogeneity among the stock prices exist. For example, expectations about the stocks' price for a short-term horizon and long-term horizon is not uniform among investors.*
14	*Vissing-Jorgensen A.*	*Perspectives on Behavioral Finance: Does "Irrationality" Disappear with Wealth? Evidence from Expectations and Actions, (Vissing-Jorgensen, 2003)*	*NBER Macroeconomics Annual (2003)*	*201*	*The study summarizes both the arguments in favor of and against behavioral finance. It suggests that wealthy investors and large institutions don't show behavioral biases as they have information advantage and don't face trouble with transaction costs as in the case of wealthy investors.*

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15	*Oechssler J., Roider A., Schmitz P.W.*	*Cognitive abilities and behavioral biases, (Oechssler et al., 2009)*	*Journal of Economic Behavior and Organization (2009)*	195	*The study examines the relationship between cognitive abilities and three behavioral biases: conjunction fallacy, conservatism, and anchoring.*
16	*Alfarano S., Lux T., Wagner F.*	*Estimation of Agent-Based Models: The Case of an Asymmetric Herding Model, (Alfarano et al., 2005)*	*Computational Economics (2005)*	180	*The authors here introduce an agent-based model to model fat-tail of distribution of securities' return where ABM takes as an input the herding propensity and autonomous switching tendency to strategies.*
17	*Gebauer H., Friedli T.*	*Behavioral implications of the transition process from products to services, (Gebauer & Friedli, 2005)*	*Journal of Business and Industrial Marketing (2005)*	172	*The emphasis is on the behavioral processes of managers as well as employees who facilitate the transition of their company from products manufacturers to service providers. The authors explain seven behavioral dimensions (risk aversion, attribution error, employee perceptions of transitions and others) which can result in a successful transition. (BA)*
18	*Graham J.R., Harvey C.R., Huang H.*	*Investor Competence, Trading Frequency, and Home Bias, (Graham et al., 2009)*	*Management Science (2009)*	171	*The authors discuss if 'competence effect' is the reason behind the people trading more. This is similar to the idea of examining if overconfident people trade more. The authors suggest that if an investor feel more competent in terms of education, diversified portfolio, and gender then the investor will trade more.*
19	*Ofek E., Richardson M., Whitelaw R.F.*	*Limited arbitrage and short sales restrictions: evidence from the options markets, (Ofek et al., 2004)*	*Journal of Financial Economics (2004)*	159	*The authors try to find out if the irrationality of the market participants leads to mispricing which holds the reasons for violations of put-call parity. This parity holds when there exists a no-arbitrage relationship between stock and options. The authors provide empirical evidence that the irrationality of investors exist and there exists a limit to arbitrage.*

| 20 | *De Bondt W.F.M.* | *A portrait of the individual investor, (De Bondt, 1998)* | *European Economic Review (1998)* | *156* | *The author argues that how the idea of an investor being rational and updating beliefs according to the Bayesian model is not true in reality. The author provides valuable insights like extrapolation bias of investors which is their beliefs about the expected continuation of past prices' changes or the contrarian view of experts which talks of trend-reversal, or the 'under diversified portfolio' of households even when they are aware that diversification pays. The author conducts a survey that shows investors are overoptimistic about the performance of their respective equity holdings.* |

LITERATURE REVIEW OF TOP-20 PUBLICATIONS IN BEHAVIORAL ACCOUNTING

The analysis of Top-20 journals' articles based on the number of citations belonging to the field of behavioral accounting has been shown. The number of review studies in this scientific field is less. The list of such publications in this field has been shown in Table 3.

Table 3. Literature Review of Top-20 Publications in Behavioral Accounting

Sr. No.	Authors	Title of the paper, Reference	Journal Name	Total Citations	Contribution to Behavioral Accounting
1	*Hirshleifer D., Teoh S.H.*	*Limited attention, information disclosure, and financial reporting, (Hirshleifer & Teoh, 2003)*	*Journal of Accounting and Economics*	560	*Investors' decisions get biased by the form of presentation of financial reporting— Pro-Forma and GAAP disclosure. Investors tend to underweight certain information if the form of presentation is abstract or in statistical terms without considering the economic importance. This is due to the limited attention of investors.*
2	*Gebauer H., Friedli T.*	*Behavioral implications of the transition process from products to services,(Gebauer & Friedli, 2005)*	*Journal of Business and Industrial Marketing*	*171*	*The emphasis is on the behavioral processes of managers as well as employees who facilitate the transition of their company from products manufacturers to service providers. The authors explain seven behavioral dimensions (risk aversion, attribution error, employee perceptions of transitions and others) which can result in a successful transition.*

3	*Williams P.F., Jenkins J.G., Ingraham L.*	*The winnowing away of behavioral accounting research in the US: The process for anointing academic elites, (Williams et al., 2006)*	*Accounting, Organizations and Society*	*102*	*This paper provides a systematic literature review where it draws the attention of the reader to some findings like academic affiliations of top publishers in the field of three most prominent journals accounting-JAR, JAE and TAR[8] and highlights that the publications have been dominated by certain elite schools. The authors reason out that the lack of studies in the field of behavioral accounting is that academicians in the editorial boards of these journals espouse the idea of neo-classical economics and thus the research in behavioral accounting has been sidelined.*
4	*Brandon D.M., Long J.H., Loraas T.M., Mueller-Phillips J., Vansant B.*	*Online Instrument Delivery and Participant Recruitment Services: Emerging Opportunities for Behavioral Accounting Research, (Brandon et al., 2014)*	*Behavioral Research in Accounting*	*99*	*The authors first talk about how the external validity of the instrument gets compromised as participants in various experimental behavioral research are drawn out of a convenience sampling. They also talk about three online tools SurveyMonkey, Qualtrics and Amazon's Mechanical Turk which recently have been used in experimental research. These tools not only ensure the external validity of the instruments but also, do not require programming expertise and thus, are very cost-effective mechanisms to reach out to populations of interest. The authors suggest that though online instruments may overcome the problem of external validity they may generate problem related to internal validity as a researcher may need to relinquish some of the experimental control which he or she has in a traditional lab setup.*

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[8] JAR, JAE and TAR are the acronyms for the Journal of Accounting Research, Journal of Accounting and Economics and The Accounting Review.

5	*Macintosh N.B., Daft R.L.*	*Management Control Systems And Departmental Interdependencies: An Empirical Study, (Macintosh & Daft, 1987)*	*Accounting, Organizations and Society*	*84*

The authors examine the relationship between the level of interdependence among departments and the usage of control systems. The control systems have been captured by three elements: the operating budget, statistical reports and standard operating procedures and policies whereas the interdependence has been classified in three categories varying by the degree of interdependence. The authors find the usage of control systems are not uniform across all levels of interdependence and as the task uncertainty increases managers need face-to-face interaction in addition to the available control systems.

6	*Colville I.*	*Reconstructing "BEHAVIOURAL ACCOUNTING", (Colville, 1981)*	*Accounting, Organizations and Society*	*63*

The author argues that the natural scientific approach for examining the field of behavioral accounting is not appropriate. The positivistic approach which advocates replicability cannot be extended and an alternative need to be found. The author suggests that a field like behavioral accounting which borrows theories from other fields like psychology should have a framework for testing competing theories. Otherwise, behavioral accounting runs the risk of defining concepts in psychology in an arbitrary manner. The author suggests a set of alternatives like Symbolic Interaction, Attribution Theory, Construct Theory and approaches like Ethnographic, Dramaturgical and Phenomenology which have been picked up from various studies.

7	*Magner N., Welker R.B., Campbell T.L.*	*Testing a Model of Cognitive Budgetary Participation Processes in a Latent Variable Structural Equations Framework, (Magner et al., 1996)*	*Accounting and Business Research*	*54*

This paper is special in its usage of structural equation modelling (SEM)[9] for measuring the effect of latent variables. The authors use SEM to provide empirical evidence on the effect of subordinates' budgetary participation resulting in an improved budget quality which in turn positively impact budget utility. Such participation also enhances access to job-relevant information to the subordinates. The authors also introduce a scale for measuring the construct "budget utility".

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[9] Structural Equation Modeling provides a graphical approach to understand various links or associations among latent variables in an easy manner.

8	*Liyanarachchi G.A., Milne M.J.*	*Comparing the investment decisions of accounting practitioners and students: an empirical study on the adequacy of student surrogates, (Liyanarachchi & Milne, 2005)*	*Accounting Forum*	*48*

The context of this paper is similar to the paper (Brandon et al., 2014) to the extent that both discuss participants in the experimental research. Though the (Brandon et al., 2014) paper was more on including a greater number of participants to ensure the external validity of the experiment, this paper discusses the type of participants. The authors conduct an experimental study to examine if students are a good proxy (surrogates) for non-students (accounting practitioners) while making investment decisions in a specific environment. In the experimental setting, the authors don't find any significant difference in the decisions of professionals and surrogates (students).

9	*Birnberg J.G.*	*A Proposed Framework for Behavioral Accounting Research, (Birnberg, 2011)*	*Behavioral Research in Accounting*	*41*

The author provides an extensive literature review of studies that have been categorized into four parts depending upon the behavioral units (individual, group, organizations, or the society (environment)) on which the research question is centered upon. For each of the behavioral units, a sub-categorization has also been made. The author covers various research designs that have been adopted in each type of study.

10	*Liyanarachchi G.A.*	*Feasibility of using student subjects in accounting experiments: a review, (Liyanarachchi, 2007)*	*Pacific Accounting Review*	*36*

The author provides a literature review of studies where accounting students have been used as a proxy for practitioners while conducting experimental research. The argument provided here is similar to (Liyanarachchi & Milne, 2005) mentioned previously. The author also tries to address the question that such experiments face the problem of poor generalizability. The author argues that if experimental realism and replicability of experiments are ensured then the concern about the participants is of lesser importance.

11	*Vagneur K., Peiperl M.*	*Reconsidering performance evaluative style, (Vagneur & Peiperl, 2000)*	*Accounting, Organizations and Society*	*32*	*The authors talk about how performance measurement control systems for example budget-constrained evaluative style of an organization have an unintended effect on employees' behavior and their relationships with other employees. The authors propose alternative performance evaluative styles after drawing insights from the different measures of performance outcomes with a special emphasis on performance outcomes proposed by authors (Hopwood, 1972; Otley, 1978).*
12	*Raffournier B., Schatt A.*	*Is European Accounting Research Fairly Reflected in Academic Journals? An Investigation of Possible Non-mainstream and Language Barrier Biases, (Raffournier & Schatt, 2010)*	*European Accounting Review*	*26*	*This study aims to examine if diversity of themes as well as diversity in terms of number of non-English speaking scholars have been fairly represented in 18 major accounting academic journals. The authors introduce two metrics to calculate contributions of a scholar from a European country. The authors find out that US scholars are a major contributor to the management accounting journal but in the field of accounting history and interpretive/critical periodicals European's scholars dominate.*
13	*Birnberg J.G., Ganguly A.R.*	*Is neuroaccounting waiting in the wings? An essay, (Birnberg & Ganguly, 2012)*	*Accounting, Organizations and Society*	*23*	*The authors talk about the relevance of neuropsychology and neuroscience to the field of behavioral accounting research (BAR) which imply that instead of measuring observed behaviors of decision-makers, a brain's activity needs to be observed. The authors mostly discuss the content of the book "Neuroeconomics: Decision making and the brain" authored by Paul W. Glimcher, and Ernst Fehr and talk about its relevance to BAR. The authors discuss how different external physiological measurements like eye pupil dilation, facial expression, and medical technologies which are used in neuroscience research could also be useful to BAR. The authors suggest that this emerging field of "neuroaccounting" has its own practical limitations which could be addressed with the development of more non-invasive neuroscience technologies.*

14	*Mason J.D., Levy L.G.*	*The use of the latent constructs method in behavioral accounting research: The measurement of Client Advocacy, (Mason & Levy, 2001)*	Advances in Taxation	23	*This study introduces a measure for the construct called client advocacy which is an important parameter while studying judgements and decisions of tax professionals. This study is more about behavioral tax research.*
15	*Sisaye S.*	*Ecological systems approaches to sustainability and organizational development, (Sisaye, 2011)*	*Leadership and Organization Development Journal*	22	*This provides a perspective of the organization as a living system and applies an organizational ecological approach to examine the relationship among sustainability, ecology, and triple bottom line (TBL) reporting. The findings from the paper suggest that how the adoption of triple bottom line reporting (economic, social, and environmental) leads to sustainable profit and growth for a firm as it provides a competitive advantage.*
16	*Hirshleifer D., Teoh S.H.*	*The Psychological Attraction Approach to Accounting and Disclosure Policy, (Hirshleifer & Teoh, 2009)*	*Contemporary Accounting Research*	22	*The authors put how psychological biases affect the designing of accounting rules and policy. The authors talk of two cases. In the first case, when biases and cognitive constraints of investors are considered, the attempt is to make a good policy. In the second case, the authors say if the designers (managers, auditors, officials, voters) of policies themselves have psychological biases then this may result in a bad policy. The authors talk about the merit and demerit of both types of policies.*
17	*SALTERIO S.*	*Researching for Accounting Precedents: Learning, Efficiency, and Effectiveness, (Salterio, 1994)*	*Contemporary Accounting Research*	21	*This study is focused on how auditors' learning happens as in a professional environment learning comes through experience or performing repetitive tasks. In the case of auditors, this experience-based learning or repetitive learning is truly not the case as auditors perform relatively a few audit tasks and the tasks are different from each other and hence repetition hardly occur.*

18	Kihn L.-A.	Performance outcomes in empirical management accounting research Recent developments and implications for future research,(Kihn, 2010)	International Journal of Productivity and Performance Management	18	The authors try to identify gaps in the assessment of performance outcomes of an organization by reviewing studies from three areas: behavioral research; organizational accounting research and strategic management accounting research.
19	Wilken R., Cornelißen M., Backhaus K., Schmitz C.	Steering sales reps through cost information: An investigation into the black box of cognitive references and negotiation behavior, (Wilken et al., 2010)	International Journal of Research in Marketing	17	This study suggests that a profitable deal for a company is associated with the level of product's cost information which is made available to a sales representative. This information is provided by sales managers. The information shared affects the seller's cognition, negotiation outcomes and negotiation behavior. The study tries to understand the negotiation process itself that takes place between the sales representative and the customer.
20	Cannon N.H., Herda D.N.	Auditors' Organizational Commitment, Burnout, and Turnover Intention: A Replication, (Cannon & Herda, 2016)	Behavioral Research in Accounting	16	This study introduces a new methodology to measure commitment called KUT. The KUT is a relatively shorter and an effective way to measure commitment (just four items) in contrast to the commitment measure which involves on an average nine items.

LEADING AUTHORS, INSTITUTIONS, AND COUNTRIES

An analysis of leading authors, institutions and countries and the result has been summarized in *Table 4.*

Table 4. Top 22 Authors, Journals Countries, and Institutions

Author	TP	Journal	TP	Country	TP	Institutions	TP
Durand, R.B.	10	Journal Of Behavioral Finance	294	United States	538	University of Zurich	16
Hirshleifer, D.	10	Journal Of Banking and Finance	39	United Kingdom	160	Universidad Pública de Navarra	16
Kudryavtsev, A.	10	Quantitative Finance	39	China	132	University of Sfax	15
Teoh, S.H.	10	Journal Of Behavioral and Experimental Finance	36	Germany	128	The Ohio State University	14
Yang, C.	10	Review Of Behavioral Finance	30	India	112	National Bureau of Economic Research	14
Statman, M.	9	Journal Of Financial Economics	27	Australia	102	Monash University	13
Hens, T.	8	Journal Of Economic Behavior and Organization	26	Taiwan	62	New York University	13
Muga, L.	8	Pacific Basin Finance Journal	23	Spain	58	San Francisco State University	13
Santamaria, R.	8	European Journal of Finance	19	Canada	56	University of Haifa	12
Seiler, M.J.	8	Managerial Finance	19	France	55	Santa Clara University	12
Oehler, A.	7	Qualitative Research in Financial Markets	18	Italy	52	University of Pittsburgh	12
Tauni, M.Z.	7	Finance Research Letters	17	Switzerland	44	South China University of Technology	12
Ahmad, Z.	6	Investment Management and Financial Innovations	17	Israel	42	Curtin University	12
Chang, C.H.	6	Physica A Statistical Mechanics and Its Applications	17	Netherlands	39	Westfälische Wilhelms-Universität Münster	11
Corredor, P.	6	Research In International Business and Finance	17	Hong Kong	37	MIT Sloan School of Management	11
Feldman, T.	6	Applied Economics	15	Malaysia	36	Hebrew University of Jerusalem	10
Hudson, R.	6	Economic Modelling	15	Brazil	34	Hong Kong Polytechnic University	10
Kliger, D.	6	International Review of Financial Analysis	15	Turkey	27	RMIT University	10
Mesly, O.	6	Management Science	15	Poland	26	Texas Tech University	10
Sehgal, S.	6	Journal Of Economic Psychology	14	Tunisia	26	Erasmus Universiteit Rotterdam	10
Tuyon, J.	6	Behavioral Research in Accounting	13	Pakistan	24	University of New South Wales UNSW Australia	10
Zhou, L.	6	Accounting Organizations and Society	12	South Africa	24	Chinese University of Hong Kong	9

Instead of considering Top-10 or Top-15, this study has taken Top-22 authors, Journals, Countries, and Institutions for analysis. The reason for coming up with a number like 22 is to not exclude any author for a given number of publications. As one can see multiple authors for a given number

of publications. For example, for the highest number of publications, there are five authors. The authors are Durand, R.B., Hirshleifer D., Kudryavtsev, A., Teoh, S.H. and C. Yang. Each of them has 10 publications. The Journal of Behavioral Finance, (JBF) comes out to be the most productive journal with the highest number of publications (294). Among the Top-22 journals, the JBF constitutes roughly 40% of publications. The entry of the journal *"Physica A Statistical Mechanics and Its Applications",* in this list was a bit surprising. A closer look at the relevant studies published here reveals these studies emphasized electronic trading, Diffusion, Diffusion mechanisms, Fourier spectrum analysis, Causality, Econophysics and Kinetics. Two of the highest cited studies published in Physica A are (Maldarella & Pareschi, 2012) with 29 citations (Kukacka & Barunik, 2013) with 23 citations. The first study is related to study the interplay between chartists and fundamentalists and its effect on price dynamics of the stock using kinetic models while the second study is related to examining the heterogeneous agent model framework. In the list, one can also see that there are only two journals that are related to publications in the field of Behavioral Accounting. These are Behavioral Research in Accounting (BRIA) and Accounting Organizations and Society (AOS) with total publications of 13 and 12 respectively. The AOS is one of the four prominent journals in the field of accounting apart from TAR, JAR and JAE (Williams et al., 2006). This suggests that the field of behavioral accounting hasn't garnered wide academic attention. The latest publication in AOS is in the year 2018 (Baginski et al., 2018) while in the case of BRIA, it is the year 2019 (Buchheit et al., 2019). Among the countries, the United States of America (USA) leads the list with the highest number of publications (538) followed by the United Kingdom (160). This is consistent with the findings of the paper (Raffournier & Schatt, 2010) where the authors reason that some of the most recognised academic journals are in the USA and other English-speaking countries, as a result of which they accept papers only in English. From the list, when total publications from developed countries across the world are combined, this constitutes roughly 70% of the total of Top-22 publishing countries. The University of Zurich has highest number of publications institution-wise. This is followed by Universidad Pública de Navarra. Both these universities are from Europe. The third place is occupied by the University of Sfax, a Tunisian university.

NETWORK ANALYSIS USING VOSVIEWER

In the following subsections, network analysis of co-occurrence of keywords, bibliographic coupling of sources and authors have been carried out.

ANALYSIS OF CO-OCCURRENCE OF KEYWORDS

Before analysis, some keywords which are similar to other keywords have been combined[10]. The minimum occurrence of a keyword in a publication was first set to the default value of 5. Out of 4557 keywords, 258 met the criteria. But the resulting image is too cluttered to do meaningful analysis. Therefore, the minimum occurrence of keywords was kept on incrementing by 1. However, too much requirement for a minimum occurrence posed the risk of resulting in too few keywords. The best result was found with a minimum occurrence of 14 for each keyword. Thus, 47 keywords, 6 clusters, and 435 links with total link strength of 1925 were finally obtained. The resulting image has been shown in *figure 2.*

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[10] The keywords "Behavioural finance" and "behavioral finances" have been replaced by the keyword "behavioral finance". Similarly, the keywords "stock market" and "financial markets" were replaced by the keyword "financial market". The other replacements are "investments" for "investment", "market efficiency" for "efficient market hypothesis" and finally the keywords "investor sentiment" and "investor behavior" were replaced by "investor psychology".
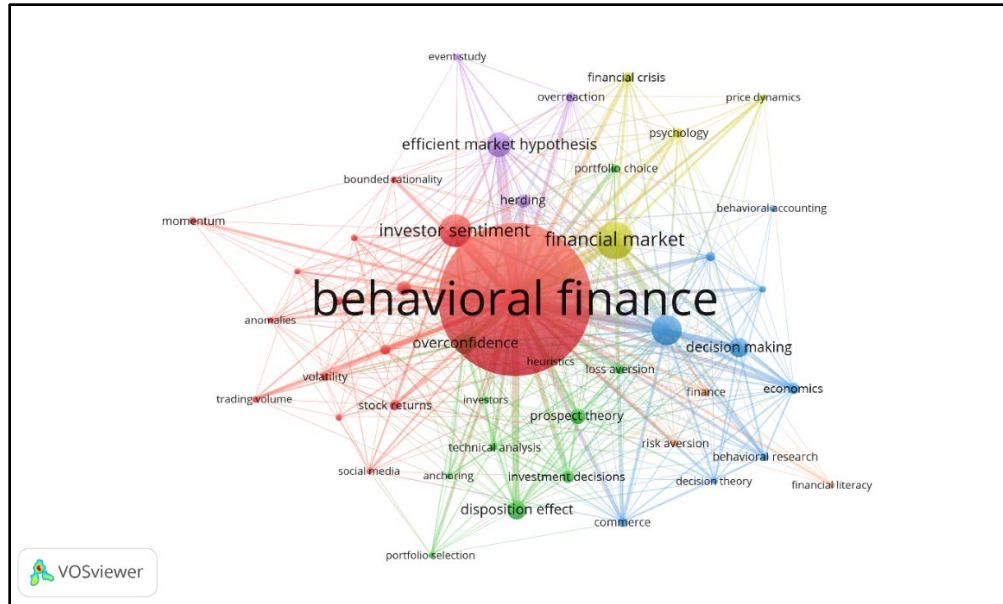
Figure 2. Network Visualization of Co-occurrence of Keywords

Each cluster has been identified by a theme the description of which is given below:

CLUSTER 1: INVESTORS' SENTIMENT AND ASSET PRICING

This cluster has been marked with red color. The most significant keyword of this cluster after the keyword "behavioral finance" is "investor sentiment" with 130 occurrences. In the second place, it is the keyword "asset pricing" with 43 occurrences. The other significant keywords of this cluster are "anomalies", "bounded rationality", "momentum", "risk", "social media", "stock returns", "trading volume", "volatility", and "emerging markets". One of the important ideas from this cluster is how investors' sentiment can drive an asset's price away from its fundamental value. Another idea from this cluster is how investor sentiment can result in momentum chasing or volatility in the financial market. In recent studies, investors' sentiments are being captured using social media through textual analysis (Bukovina, 2016; Li et al., 2014). Some of the most cited studies related to investor sentiment are (Białkowski et al., 2012; Mujtaba Mian & Sankaraguruswamy, 2012; Vissing-Jorgensen, 2003).

CLUSTER 2: TYPES OF COGNITIVE BIASES INFLUENCING INVESTORS' DECISION

This cluster has been shown with green color lines. The keyword "overconfidence" has the highest occurrence (72) and a total link strength of 134. This has been followed by the keyword "disposition effect" (62 occurrences). Other significant keywords are "prospect theory", "investment decisions", "loss aversion", "portfolio choice" and "anchoring". One of the most cited studies discussing overconfidence is (Daniel et al., 2002) with 252 citations and (Glaser & Weber, 2007) with 225 citations while the most cited literature in disposition effect is of (Barberis & Xiong, 2012) with 120 citations and (Locke & Mann, 2005) with 146 citations.

CLUSTER 3: EVOLUTION OF BEHAVIORAL STUDIES FROM BEHAVIORAL ECONOMICS

This cluster has been marked with dark blue color lines. The keyword "investment" has the highest occurrence (118) and is followed by the keyword "decision-making" (65). The keywords "behavioral

economics" and "behavioral research" have 25 and 22 occurrences, respectively. Other significant keywords in this cluster are "experimental economics", and "behavioral accounting". The psychological biases impacting decision-making and hence influence investment decision is the most explored area. The studies coming under this cluster have adopted various methodologies including literature review, Cognitive-Reflection Test, Experiment-based research, and Agent-Based Modeling, among others. Some of the most widely cited studies in behavioral research are (Graham et al., 2009; Kothari et al., 2006) and in experimental economics are (Hirshleifer et al., 2009; Seasholes & Wu, 2007).

CLUSTER 4: BEHAVIORAL STUDIES PRE-AND POST-FINANCIAL CRISIS

This cluster has been marked with yellow color lines. There are only four keywords in the cluster with the keyword "Financial Market" with the highest occurrences (156) and "Financial Crisis" with the second-highest occurrence (29). This has been closely followed by the keyword "Psychology" with 25 occurrences. The studies in this cluster can be broadly categorized into two: behavioral biases that can lead to a financial crisis in general (Kleinnijenhuis et al., 2013; Markiewicz & Weber, 2013) and second behavioral changes which resulted from the post-financial crisis (Bateman et al., 2011; Bucciol & Zarri, 2015; Gendron & Smith-Lacroix, 2015). The research works in this cluster have used varied sample data: household, portfolio or fund-managers, and corporate treasures.

CLUSTER 5: VIOLATION OF EFFICIENT MARKET HYPOTHESIS IN SHORT-TERM AND LONG-TERM

This cluster has marked with violet color lines. The keywords with the highest occurrence and the second-highest occurrence are "Herding" (41) and "Overreaction" (25) respectively. There are two more keywords in this cluster "Efficient Market Hypothesis" and "Event Study". The studies in the cluster can be divided into three themes: (1) Herding and Overreaction challenging the Efficient Market Hypothesis (Caginalp & DeSantis, 2011; Florin et al., 2005; Fung et al., 2010; Hirshleifer & Hong Teoh, 2003). (2) Herding and Overreaction as anomalies in the short-term and not challenging the Efficient-Market Hypothesis in the long-run (Fama, 1998)(Ali et al., 2009). (3) Examining herding as a form of social influence and its role in financial decision-making by an investor (Blasco et al., 2012; Bursztyn et al., 2014; Corzo et al., 2014; Dang & Lin, 2016; Fenzl & Pelzmann, 2012; Venezia et al., 2011).

CLUSTER 6: INFLUENCE OF FINANCIAL LITERACY ON RISK AVERSION

This cluster has shown with orange color. Only three keywords constitute this cluster: "Finance", "Risk Aversion" and "Financial Literacy". After the keyword Finance (22) the keywords, Risk Aversion (20) and Financial Literacy (15) follow. Some of the research findings associated with this cluster are the impact of financial literacy in lowering positive attitude, more portfolio diversification or enrollment in 401(k) plan (M. Abreu & Mendes, 2010; French & McKillop, 2016; Hibbert et al., 2013).

BIBLIOGRAPHIC COUPLING OF SOURCES

Bibliographic coupling between two sources (journals) increases when there is a greater number of common references between their publications. In this case, only those sources have been picked up which has at least ten publications. The count of citations for a publication was however kept to the default value of 0. With such criteria, 25 sources were obtained. For each source, VOSviewer calculates the total link strength of the bibliographic coupling links. The sources in the final graph are selected

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on the basis of total link strength (TLS) (van Eck & Waltman, 2020)[11]. The nodes which are closer to each other have publications that are co-cited together. The result has been shown in *figure 3*.
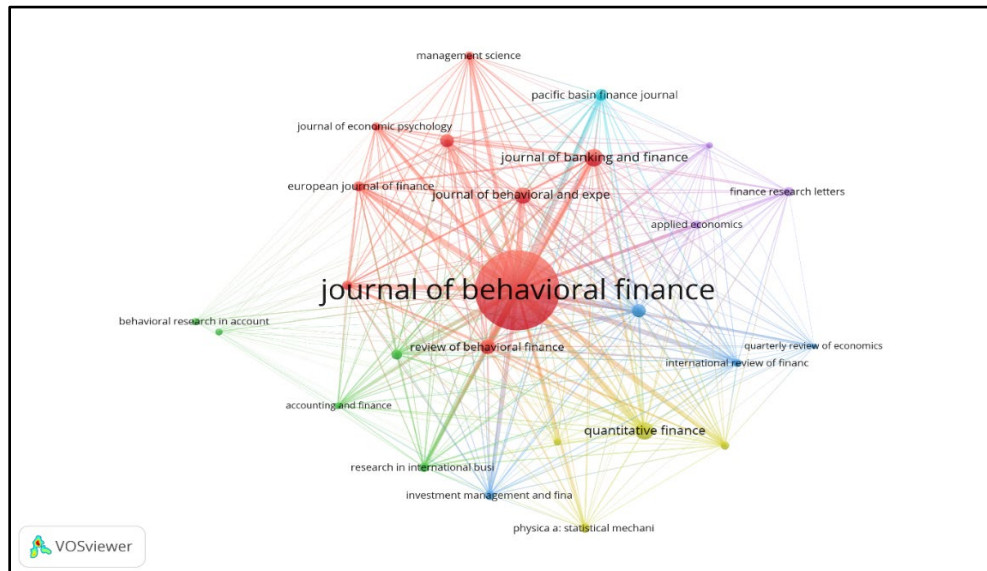

Figure 3. Bibliographic Coupling of Journals or Sources

The Journal of Behavioral Finance has not surprisingly come out as the source or the journal with the highest number of publications (294 documents or articles) and its total link strength is 54512. This is followed by the Review of Behavioral Finance with 30 publications and a total link strength of 13841. The Journal of Banking and Finance has 39 publications, but its total link strength is 993. A total of six clusters has been obtained with red and green colored clusters being the major ones. The first cluster (red) has 9 sources or journals while the second cluster (green) has 5 sources. The green cluster constitutes the sources that are predominantly related to the field of behavioral accounting. For example, journals like Behavioral Research in Accounting, Accounting, Organizations and Society are part of this cluster. The 6th cluster (blue) consists of only one journal, Pacific-Basin Finance Journal.

BIBLIOGRAPHIC COUPLING OF AUTHORS

To carry out the analysis, the minimum number of documents published by an author and the minimum number of citations for a publication were kept to their default values of 5 and 1 respectively. Out of 3118 authors, 41 authors met the criteria. The result has been shown in *figure 4*.

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[11] In the case of a bibliographic coupling analysis of sources (journals), the strength of the link between journals A and B is the total number of common references of all pairs of a publication in journal A and a publication in journal B. The total link strength of journal A is the total strength of the links of journal A with all other journals in the bibliographic coupling network. The author is thankful to Ludo Waltman one of the developers of VOSviewer for this insight.
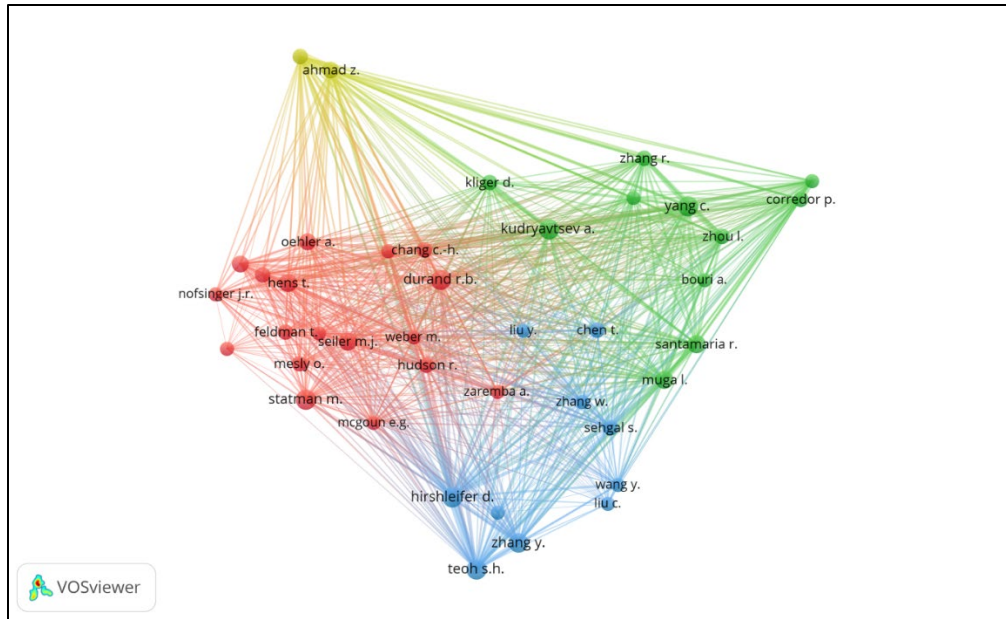
Figure 4. Bibliographic Coupling of Authors

The studies of these authors have been divided into 4 clusters. The red-colored cluster is the biggest one with 18 authors. In the ongoing discussion, the number of citations has been put in brackets. Some of the highly cited authors are Weber M. (462), Statman M. (164), Hoffman (137), Jacob Birnberg (117) and Hens T. (102) where Jacob Birnberg is a well-cited author in the field of behavioral accounting. Among these authors, Statman M. has the highest number of publications (10). The total number of citations[12] from this cluster is 1643. The studies of authors in this cluster are more related to the theoretical development of the field of behavioral finance and behavioral accounting. For example, the studies of Statman M. are more of asserting the "normal" rather than the "rational" behavior of a human in a financial market. Similarly, some of the influential studies of Jacob Birnberg are around providing a comprehensive literature review and proposing new developments in the field of behavioral accounting. The research of other authors is mostly empirical, and they try to provide either a new or alternative measure for biases like Weber M. did for overconfidence. The next cluster is the green-colored cluster consisting of 11 authors. The highly cited authors are Vagenas-Nanos E. (111), Corredor P. (91) and Blasco N. (83). The total number of citations is 562. Their studies are broadly around the impact of investors' sentiment on the stock market's return. Some of the findings from their studies include the role of sentiment on Monday's stock return, the differential impact of sentiments on uninformed traders, the impact of herding on volatility. The blue-colored cluster consisted of 10 authors ▪ David Hirshleifer (1650), Siew Hong Teoh (1348) and Yinglei Zhang (406). The total number of citations from this cluster is 3592. Their studies are about identifying psychological biases like limited attention or social processes and their impact on asset prices, regulations, policies, and accounting rules. Further, their studies examine how firms try to opportunistically report to exploit cognitively constrained investors. The fourth cluster, yellow-colored has just two authors Z. Ahmad (37) and J. Tuyon (35). Their works have been mostly around examining stock market efficiencies of emerging market economies in the light of behavioral biases. From the above discussion, it is quite clear that the blue-colored cluster consists of the most influential author as this cluster has the highest number of citations.

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[12] A sum of all the citations has been taken to arrive at the total figure.

DISCUSSION

Though some of the highly cited studies in the field of behavioral finance were published in the early 1990s, the research in this field accelerated after 2009. From 2009 to 2012, the research works around examining behavioral changes in investors which resulted from the post-financial crisis gained attention. The number of publications saw a jump once again in the year 2014. The Nobel Prize in Economics 2013 which was shared by Eugene Fama, Lars Peter Hansen and Robert Shiller has a pivotal role to play here. It brought more attention to the field of behavioral finance. In the case of behavioral accounting, the first discussion about it was during 1960s, thereafter, the research work here did not witness a clear increasing trend. One of the reasons behind this, as suggested by Williams et al. (2006) is that research in social science contributing to business practices lagged as social science falls behind natural science in terms of developing predictive theory. The authors also put that the editorial board of top-accounting journals has been dominated by academicians who espouse neo- classical economics because of which the research in behavioral accounting in the current study, the bibliometric analysis shows that the Journal of Behavioral Finance is the topmost journal in terms of the number of publications. The bibliometric analysis also shows that the topmost country in terms of publications is the USA. A literature review of Top-20 journals combining both the field of Behavioral Finance and Behavioral Accounting shows that the author, Hirshleifer has the highest number of publications. The most cited author is Eugene Fama with a total number of 1845 citations. A further literature review of Top-20 journals considering studies related to only behavioral accounting provides valuable insights. For example, external validity has been questioned when in behavioral experiments the type of participants were M.B.A students or undergraduate business majors in place of sophisticated investors or professionals. Colville (1981) emphasizes building a framework to test the psychological theories. Otherwise, behavioral accounting runs the risk of defining concepts in psychology in an arbitrary manner. The literature review of Top-20 also shows that out of the five schools of research in Behavioral Accounting: Managerial Control, Accounting Information Processing (AIP), Accounting Information System Design (AISD), Auditing Research and Organizational Sociology, behavioral research has been dominated by only two schools Managerial Control and Auditing Research (Birnberg & Shields, 1989). Also, the research in the area of AIP is similar to how investors' process information provided by various accounting disclosures. Thus, this field of AIP gets overlapped with the topic of investors' attentions which also fall in the domain of behavioral finance. In the case of research in AISD, two broad questions have been pursued: how well the decision support systems are utilized by the people to whom the systems are intended, and secondly, what are the characteristics of decision support systems that inhibit or facilitate their utilization (Birnberg, 2011). In the network analysis using VOSviewer software, the research works have been categorized into various themes such as investors' sentiment and asset pricing or behavioral studies pre-and post-financial crisis and influence of financial literacy on the risk aversion of investors. There are some challenges or limitations associated with behavioral accounting which offers an opportunity to further explore this area. The research in BAR has been centered on analyzing the behavior of an individual leaving research focusing on the behavior of groups, organizations and environmental conditions relatively unexplored (Birnberg, 2011). Apart from this, Colville (1981) suggests that behavioral accounting which borrows theories from the field of psychology should have a proper framework to test the competing theories. If it is not done, then behavioral accounting runs the risk of defining psychology in an arbitrary manner. Additionally, the analysis shows that themes like managerial accounting systems or ethics have not been explored in greater detail in the domain of behavioral accounting.

CONCLUSION AND FUTURE SCOPE OF RESEARCH WORK

This study carries out a bibliometric analysis of behavioral finance and behavioral accounting. The analysis indicates that the field of behavioral finance has been explored using experimental studies and archival data while in the case of behavioral accounting experimental studies dominate. One of the most explored psychological biases which has gained much attention in the field of behavioral finance literature and has also been explored in behavioral accounting is overconfidence. This bias has been captured by measurable variables like the proportion of long-term debt, frequency of repurchase of stocks and component of more performance-linked executive compensation. The other biases which have been explored are anchoring bias, confirmation bias, framing effects or cognitive constraint and ideas such as bounded rationality while information processing. A greater number of biases have been covered in behavioral finance literature than in behavioral accounting. For example, the biases like regret or loss aversion can also be extended to the field of behavioral accounting and hence proper constructs need to be defined. The literature review revealed that a new topic of study in the field of behavioral finance is agent-based modelling which means the usage of computers to model various dynamics of the financial markets. Another evolving concept which is common to both fields is neuroscience, which basically involves how a human brain function. Other than this, not many studies have addressed the personality traits of managers or the role of emotions in taking decisions (Barberis & Thaler, 2005). The absence of three prominent journals in accounting TAR, JAR and JAE from the list of Top-22 journals with the highest number of publications in the field of behavioral accounting suggests that research in this field hasn't made the progress to a great extent. There are some limitations of this current study. As put earlier, in the case of behavioral accounting, a large part of the discussion has been around managerial actions keeping into consideration the cognitive biases of investors. Behavioral accounting has a broad dimension that includes management control systems and ethics, a complete discussion on them has been kept outside the scope of this study. Additionally, the keyword *behavioral economics* hasn't been included for analysis so that the analysis could not be overshadowed by well-developed research in behavioral economics. Thus, some of the well-developed theories like prospect theory and mental accounting didn't get much attention. However, an attempt to incorporate the important insights from behavioral economics have been made wherever it was required.

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