

Theoretical Overview of Sentiment Analysis in the Real Estate Market

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Abstract: *With the assertion that most empirical studies are underpinned by a theory, this study aims to presents the theoretical underpinnings of sentiment analysis in the housing market. It discussed four main theories namely: the behavioral finance theory, the bubbles theory, the theory of irrational exuberance and the theory of noise traders. To the best of the authors knowledge, this overview is the first in recent past to discuss the theoretical foundations of sentiment analysis in relation to housing prices. The study contributes to the extant literature in the field through the development of theoretical framework and the identification of new research gaps for future research. It has theoretical relevance to researchers and students in the finance fraternity who are beset with or struggling to identify the most appropriate finance theories that underpins their study in real estate sentiment analysis.*

Key words: *Sentiment, real estate market, housing prices and stock market.*

I. INTRODUCTION

For about a jubilee, housing only served as a prestige and an achievement to many households regarding its ownership. But for the few past decades, it is seen more as a safe deposit box rather than a mere castle or place for human habitat (Fernandez & Aalbers, 2016). Recent studies have further shown that it performs dual functions of serving as both a consumption and an investment goods (see Korkmaz, 2019; Yang, Fan, & Zhao, 2018; Zhang & Guo, 2018 and Uluc, (2018). Iacoviello, (2011) posited that one of the most treasured assets by household representing significant part of their portfolio is housing. Hence, changes in housing prices could cause volatilities in the market cycle, since significant part of their income is swept by housing and its related activities. According to Ernst & Saliba, (2018) both theoretical and empirical studies have established that housing prices are affected as households feel richer. In spite of the enormous contribution of housing to households and many economies at large its theoretical and empirical studies have been undermined in economics and finance literature.

However, the turbulence of the global financial crises in 2008 is gradually center-staging housing research in economics and finance studies, since the said crises was believed to be knotted to the pitfalls in the real estate market particularly subprime mortgages which brought about so much uncertainties in in the market (see Jorda`, Schularick, & Taylor, 2016; Agnello, Castro, & Sousa, 2019; Cerutti, Dagher, & Dell’Ariccia, 2017 and Shukor, Said & Majid, 2016).

As a result, Martínez-García & Grossman, 2020 and Cesa-Bianchi, Cespedes, & Rebucci, (2015) were of the opinion that real estate research studies have now been hyped in economics and finance studies but yet can still not be count on compared to main stream finance. Nonetheless, while empirical studies are on the rise, elucidations on the theories underpinning the empirical studies on sentiment analysis in the real estate market have not been amply emphasized by scholars. In the real estate market, the study of sentiment analysis is tied to behavioral finance studies. According to Baker & Wurgler, (2007 pg. 129) Investor sentiment is broadly defined as “a belief about future cash flows and investment risks that is not justified by the facts at hand”. Similarly, Saydometov et al., (2020) defines sentiment as the future projections of the capital markets that mirrors the attitude of individual beliefs in the aggregate economy. Soo, (2018) on the other hand explained it as the determination of asset prices that reflect phycological beliefs of investors. In the real estate market, Ling et al., (2015 pg. 88) also define sentiment as “a misguided belief about the growth in housing prices, the risk of house price appreciation, or both, that cannot be justified by the current economic information set available to housing market participants”. Putting the definitions into perspective, it can be deduced that the phycological beliefs of market participants play significant role in the housing market especially through prices. Depending on how and where the lens is placed on sentiment in the housing market, for example from news and noise, detection of mere bubbles or emphasis on extreme irrationality of investors, it is imperative to accurately identify the most appropriate and relevant finance theory that could underpin a particular empirical study. In main stream finance studies where assets are liquid with arbitrage transactions, finance theories are well situated and justified but same cannot be said in the real estate market. More importantly, where the market is perceived as illiquid, without definite location and difficult to arbitrage. Even though, sentiment is often spotted to have a short term effect, evidences are being brought to bear that it has a long term effect on house prices and the housing market at large (Gazzani, 2019 and Hui & Wang, 2014).

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Amidst, the agreements and disagreements on finance theories in literature in the real estate market, it is important to situate and synthesize the theories in empirical studies. It is against this background that the study seeks to give the theoretical overview of sentiment analysis in the real estate market, by elaborating on the progenitors, origins, applications, context of real estate with empirical support and criticisms.

The rest of the overview will capture the theoretical framework, theories such the behavioral finance theory, the bubbles theory, the theory of irrational exuberance and the theory of noise traders, summary and gaps for future studies and conclusion. The novelty of this overview comes from the identification of gaps for future studies and the development of the theoretical framework.

1.1. Overview

“If one considers that the prices paid for houses, as for any other speculative investments, surely reflect people’s willingness to pay, then the change in attitudes must have had an impact on prices. Just because we cannot precisely quantify and prove such an effect does not mean we should revert back to a null hypothesis that the changing psychology has no effect on home prices” (Shiller, 2008 pg. 13).

I. THEORETICAL FRAMEWORK

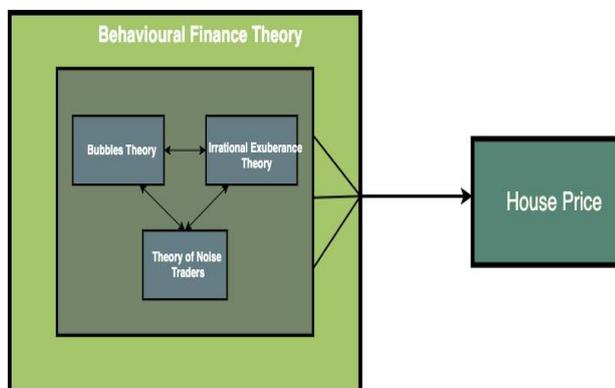


Figure 1: Theoretical framework

Source: Authors construct

From figure 1: It can be seen that all the four theories can be synthesized. And the behavioral finance theory has the ability to stomach the other three theories (the bubbles theory, the theory of irrational exuberance and the theory of noise traders). In the housing market, the three theories can be said to be inter-linked, with the behavioral finance theory being the mother of all the theories related to sentiment analysis in the real estate market with several and joint effect on house prices.

A. From classical to the behavioral finance theory

Fama, (1970) indicated that the efficient market is a market where the available information in the market fully reflects prices. Hammond, (2015) also emphasized that the efficient market hypothesis is a traditional finance theory that encompasses the law of price, meaning that at any given time there is only one price. According to the theory, the attitude of investors regarding the determination of asset prices in the market is evaluated through the demand and supply equilibrium point and equilibrium stability. As an assumption, the classical theory of finance posits that

investors behave in another in order to maintain an efficient market with rational expectation. As time goes by, the theory's credibility started to be questioned, because asset prices became unpredictable even to the point of causing boom and burst. This shows that investors activities in the market extends beyond rationality in the market. Hammond, (2015) postulated that as a result of the instability in asset prices various theories were formulated to explain it, but it became a challenge to unify the idea that asset prices were the present value of all future dividends. Shiller, (2003) also posited that the market may be inefficient at the macro level while at the micro level it may be efficient. It then presupposes that finance was either entirely incorrect on what makes a stock price or that investors in the market were not truly rational. Hence, the need for a more comprehensive theory to fully explain the behavior of investors in the market became necessary. The behavioral finance theory is generally believed to be propounded by Amos Tversky, Daniel Kahneman, and Richard Thaler. Behavioral economics which in many cases includes behavioral finance emerged as a result of the prospect theory developed by Daniel Kahneman and Amos Tversky. Fascinatingly, both Kahneman and Tversky were psychologists with little or no knowledge in classical finance but the theory was valuable to economics since it advocates that individuals make decisions based on the perceived value of gains and losses rather than the utility derived from their decision. Richard Thaler, who was already a finance theorist then, applied the economic and financial insight required to apply the prospect theory to the financial market which gave birth to the theory of behavioral finance (Heukelom, 2014 as cited in Hammond 2015).

Shiller, (2003 pg. 83) in his paper titled “From Efficient Markets Theory to Behavioral Finance” explained that “Behavioral finance—that is, finance from a broader social science perspective including psychology and sociology—is now one of the most vital research programs, and it stands in sharp contradiction to the efficient markets theory”. According to Shiller, (2014: 2003) in spite of the existence of the theory in the early 1980’s it received little or no academic attention then until the early 1990’s where it became blossom and more consolidated and till date has flourished in economics and finance studies. The theory postulates that investors behavior in the market is affected by phycological beliefs that induce asset price fluctuations and thus act as a source of market intelligence. Aggarwal, (2014) was also of the view that individuals in the market do not rely on all the available information in making financial decisions and predictions. Analogously, Suciu, (2015 pg. 85) articulated that “prices tend to move in trends and trend following has a valid theoretical basis” and investors are sentimental creatures. In making financial decisions, it is argued through the behavioral finance theories that human emotional elements and perceptions play a key role in the financial market (Baker & Wurgler, 2006: 2007) and Suciu, (2015).

The applicability and testability of the behavioral finance theory is expressed in the housing sector through sentiment analysis. Das et al., (2020) and Aggarwal, (2014) confirms that the property market is prone to sentiment its imperfections such as noise traders, asymmetric information and illiquidity, transaction cost and high cost of capital. In making financial decisions either to invest, purchase, sell or rent a property, market participant considers myriad of existent and non-existent information in the market coupled with their psychological beliefs for gains or losses.

From the stands of the behavioral finance theory, Case & Shiller (2003) expressed that house prices in the US are somehow elevated owing to the gradual and universal rise in public perceptions of future rise in house prices, in an effort to identify a bubble in the housing sector.

Empirically, Ling, Ooi, & Le, (2015) in the U.S. from behavioral finance perspective focused on quarterly evidence from 1990Q2 to 2010Q3 and reported that changes in investor sentiment has incremental effect on house prices above the lag effect demand. Relatedly, Wang & Hui, (2017) also established a relationship between sentiment and house prices and concluded that sentiment is an important indicator of house prices. According to Jin, Soydemir, Tidwell, & Tidwell, (2014) the variations in housing prices arise as a result of the irrational psychological beliefs of market participants. Lama & Hui, (2018) on the other hand, recorded a negative relationship between sentiment and house prices of residential properties as well as future returns. Irrespective of the general application and the acceptability of the behavioral finance theory, it is often questioned by academics in economics and finance studies. Hammond (2015) stated that behavioral finance scholars are actively reviewing simple finance rules when they attempt to examine how arbitrage restrictions and investors biases affect the performance of the stock market. Fama, (1998) is one of the leading critiques of the behavioral finance theory arguing that “If a reasonable change in the method of estimating abnormal returns causes an anomaly to disappear, the anomaly is on shaky footing, and it is reasonable to suggest that it is an illusion” pg. 303 and the apparent overreaction to information is virtually as common as underreaction, concluding that it is subject to scrutiny and the purported fact is without merit to abandon the efficient market. Shiller, (2003) however, refuted his claim and accentuated that his scope of writing was far from fully researched at the time of writing for the mere fact that the irregularities occasionally vanishes or switch signs from time to time does not show that the market is fully rational. Nonetheless, he acknowledges that “It is the nature of scholarly research, at the frontier, in all disciplines, that initial claims of important discoveries are often knocked down by later research” Pg.102. “In classical finance models of asset pricing, there is no role for investor sentiment due to the rational actions of informed arbitrageurs. However, in behavioral finance models, investor sentiment can play a role in the determination of asset prices—independent of market fundamentals” (Ling et al., 2015 pg. 88).

B. The bubbles theory

The term “bubble” is rooted in history for over centuries dating from the Dutch tulip mania (1643-1637), the

Mississippi Bubble (1719–1720) and the South Sea Bubble in (1720). Academics from time-to-time have ascribed these bubbles to the irrational behaviors in the market and perhaps may be as a result of frenzied speculative crowds which materializes in Paris and London in 1719 and 1720 respectively (Garber, 1990). After the passage of the Bubbles Act in June 1720, bubbles was more recognized as an official term in economics given concerted attention (Shiller, 2014). Even though, in spite of the wide acceptance of the Mississippi Bubbles, controversies still surrounds it whether indeed it arose as a result irrational behavior (see Garber, 2001 and Goetzmann, Labio, Geert, & Young, 2012). Garber, (2001) further posited that the use of the economic jargon “bubble” means that an event inexplicably was crowd-driven.

Ding, (2014) in his book titled “The Bubble Theory Towards a Framework of Enlightened Needs and Fair Development” constructed the bubbles theory and named it as such because he believes “desires can be visualized as tiny bubbles”. It is claimed that investors keep bubble assets because they anticipate the asset 's price will rise on the expectation that every investor would always anticipate asset price rises in the future, even though the bubble would burst with a certain likelihood. The rise in price then become self-fulfilling prophecies which mean an exponential increase in asset valuations (Blanchard and Watson, 1982 as cited in Kholodilin et al., 2018). Brunnermeier & Oehmke, (2013) indicated that in speculative bubbles period asset values rise explosively.

According to Shiller, (2014 pg. 1487) bubble is “a situation in which news of price increases spurs investor enthusiasm which spreads by psychological contagion from person to person, in the process amplifying stories that might justify the price increases and bringing in a larger and larger class of investors, who, despite doubts about the real value of an investment, are drawn to it partly through envy of others’ successes and partly through a gambler’s excitement”. Miao, (2014) argue that speculative bubbles have two effects in the market thus relaxing credit constraints and encouraging investments effect and the capital reallocation effect. Classically, bubbles mimic an asymmetric shape by having a slow start long boom with a sharp burst. The sharp burst is often attributed to forced liquidations of unsound positions, turning disillusionment in panic which ultimately results in financial crises (Hebron, 2010). In studying speculative asset prices in the financial markets (Shiller, 2014) stated that the real estate market is one of the asset markets with high speculative bubbles, with similar views shared by (Leamer, 2015: Fernández-Kranz & Hon, 2006 :Hebron, 2010: Case & Shiller, 2003 and Brunnermeier & Oehmke, 2013). In the housing market, the misconceptions usually serving as a catalyst for bubbles spike is often attributed to the availability of credit supply with loose credit requirements and or repayment conditions. As a result of the cheap credit, housing supply increases at the initial stages with low default rate but later freezing the market with property price appreciation reaching the height boom.

The outstanding credit amount then attains its maximum with stagnation in property value leading to a fall in prices. The underlying phenomenon surrounding the whole process bubbles formation and its brouhaha in the real estate market is precipitated by the speculative rise in the value of real estate assets. Aizenman, Jinjark, & Zheng, (2019 pg. 1) however, posited that “house price bubbles are typically unsustainable and once a housing bubble bursts, credit conditions will tighten due to falling collateral value”.

Fabozzi, Kynigakis, Panopoulou, & Tunaru, (2019) in an attempt to detect bubbles in the US and UK housing market, detected bubbles in both markets and as well documented significant periods of overvaluation and undervaluation in the real estate market.

Analogously, the empirical analysis of bubbles and house price dispersions in the US postulated that there is the presence of bubbles but prices grow at different rates across the metropolitan and statistical areas (Tang et al., 2020). Analyzing speculative price bubbles in urban housing market in Germany, Kholodilin et al., (2018) found no evidence of speculative price movements at the national level. But, in many cities’ speculations were observed to cause volatilities in house prices. The findings of Kibunyi, Wagura Ndiritu, Carcel, & Gil-Alana, (2017) and Glindro, Subhanij, Szeto, & Zhu, (2011) can therefore be aligned. Shi, (2017) also found a massive reduction in speculative bubbles in the US but recorded shorter episodes of bubbles. From empirical evidences, one can infer that the theory of bubbles can be supported in the housing market, even though there could be contradictory finding. This confirms the assertion that the term “bubble” is carelessly used, because for there to be bubble it must be epidemic as stated by (Robert J. Shiller, 2014) with akin positions justified by Garber, (2001) and Goetzmann, Labio, Geert, & Young, (2012) regarding the Mississippi Bubble (1719–1720) believing that controversies still surrounds it. According to Barlevy, (2015) regardless, of the contentions and the contradictory evidences the theories of bubbles are fairly understood and straightforward.

C. The theory of irrational exuberance

The word “irrational” in the asset markets had existed in economics and finance literature for several decades but the phrase “irrational exuberance” was first coined by Alan Greenspan, the then board chairman of the Federal Reserve Board in December, 1996 to describe the attitude of investors in the stock market. After making the pronouncement in his speech, the world fixated on those words and the stock market went into serious pitfalls precipitously in many countries including the U.S, Japan, Hong Kong and many more. Realistically, the behavior of investors in the market portrayed that the words were not merely coined but followed an action of speculative market instability and the latter part of the millennium boom between 1982 – 2000 made the phrase “irrational exuberance” more famous in the assets market (Shiller, 2015). From the happenings from Greepan, (Shiller, 2000) described him as a modern prophet who spoke in riddles but stated that he likes to pose questions rather than making declarations.

Bracha & Brown, (2013) stated that “(Ir)rational exuberance is an intrinsic property of asset markets where bulls and bears are endowed with Keynesian utilities” but according to (Shiller, 2015, 2000) it reflects investors’ enthusiasm in relation to asset prices in the market by considering factors drawn from sociology, psychology and economics. And the causes of these exuberance can be exacerbated by a feedback loop and a speculative bubble. In the real estate market, as the level of exuberance increases, prices rise with an enhanced asset value. Though, Greepans phrase was more attributed to the stock market, empirical and theoretical analysis suggest that same can be exhibited in the real market.

For instance, Hui, Dong, Jia, & Lam, (2017) from both empirical and theoretical perspective investigated the dynamic effect of sentiment on housing returns and concluded that in the short run buyer-seller sentiment has positive effect on housing returns while in the long run buyer-seller sentiment was observed to have a negative effect on housing returns. Nonetheless, a high level of buyer-seller sentiment is usually proceeded by an immediate fall in housing returns as experienced after the 2009 crises. Presupposing that investors becomes more vigilant after crises. In his theoretical analysis he asserted that “A higher buyer-seller sentiment in real estate market reflects investor optimistic (or pessimistic) expectation to the future housing returns, which may imply a temporary irrational exuberance in the market some extent”. Following the events from irrational exuberance in both the stock and the real estate market, it can be posited that speculative bubbles are often triggered by irrational exuberance. Hence, investors irrational exuberance in the market leads to speculative asset bubbles. This confirms Shiller’s position that “speculative bubbles—periods of exaggerated but temporary investor enthusiasm, often associated with “new era” theories—are in fact commonplace” (Shiller, 2000 pg 118).

D. The theory of noise traders

According to Black, (1986) trading in the capital market is made possible through noise, and noise causes variations in asset prices and to some extent makes the financial markets inefficient but disallows for taking undue advantages in the market, with similar assertion by (Admati, 1985). Noise in the form of expectations which do not need to follow rational rules makes inflation what it is, at least in the absence of a gold standard or fixed exchange rates. Noise in the form of uncertainty about what relative prices would be with other exchange rates makes us mistakenly think that changes in exchange rates or inflation rates cause changes in the flows of trade or investment or economic activities. Generally speaking, as a result of noise, it becomes laborious to test how economic or financial market work, using either practical or academic theories, making investors to trade in the dark (Black, 1986). Black, (1986) argued that in the financial markets’ investors may be right by trading the ordinary information in the market as they expect to make profit. Conversely, they also trade on noise as if they were information but may be mistaken to make valuable returns.

Hence, in the financial market noise is contrasted with information but necessary for the survival of the capital markets. As posited by Aizenman, (1984) without noise trading, there will be no or little exchange of individual financial assets. Because of noise, market participants would still be willing to trade their financial assets for better returns with the view that they are trading on information while in actual sense they would be better off not transacting (Bernanke, 1983).

However, according to Grossman & Stiglitz, (1980) and Milgrom & Stokey, (1982) as cited Dow & Gorton, (2006) the presence of noise traders was hypothetically seen as a remedy to the “no trade” or “no speculation” syndrome. They only serve as economic agents who trade in the financial market based on personal reasons other than the available information. “The unpredictability of noise traders’ beliefs creates a risk in the price of the asset that deters rational arbitrageurs from aggressively betting against them. As a result, prices can diverge significantly from fundamental values even in the absence of fundamental risk” (Long et al., 1990 p. 703). They concluded that, noise traders may perhaps be rewarded for the risk they make by getting higher returns even more than the so-called sophisticated investors. Meanwhile, they thwart asset price in the financial markets but will not sustain as speculations destabilizes and assets are unprofitable.

In the past decade literature has confirmed that, noise trading activities does not only impact on stock prices but also on housing prices, an asset perceived to be difficult to arbitrated. As posited by Baker & Wurgler, (2006) assets difficult to arbitrage are prone to market sentiments. In an attempt to investigate news and noise bubbles in the US real estate market, Gazzani, (2019) concluded that the volatility in the US housing prices are largely explained by noise trading activities. However, in the long run, they identified news shocks are the principal driver of housing prices. Analogous evidences were unearthed by Hausler et al., (2018) and Das et al., (2020) in their study on news-based sentiment analysis and the cross-over impact of irrational sentiment in the real estate and the stock markets.

II. SUMMARY AND FUTURE RESEARCH OPPORTUNITIES

This overview, has established that indeed the rational and irrational behavior, beliefs and or the psychology of the participants in the housing market is reflected and analyzed through sentiment analysis. Unlike stock prices, housing prices are more associated with illiquidity, high transaction cost and arbitrage difficulties (Hui et al., 2017 and Baker & Wurgler, 2006: 2007). This difficulty presents a challenge to eliminating mispricing swiftly in the housing but with ease in the stock market. Nonetheless, there is a confirmation of long-term impact of sentiment on housing prices (see Hui et al., 2017; Hui & Wang, 2014 and Shiller, 2014).

Amid the myriad theories in the housing market with regards to sentiment analysis, the classical and behavioral finance theory, the bubbles theory, the theory of irrational exuberance and the theory of noise traders were identified as the main theoretical underpinnings of sentiment analysis in the housing market. However, the branch of finance known as “behavioral finance” back-boned by the behavioral

finance theory was noted to be the main set for most finance theories while other related theories become as sub-set (see fig. 1). However, it must be emphasized that, the focus and/or the type of sentiment study determines the theory to be used. For example, the study of housing bubbles warrants the need to utilize the bubbles theory or the theory of irrational exuberance which is often used interchangeably. Since an extreme irrational investors behavior often leads to bubbles. Investigating how news and noise impact on the housing market is usually underpinned by the theory of noise traders. Usually, in most empirical studies the behavioral finance theory is commonly referred. Regardless, of the contestability of the of the expatiated theories, it has been empirically proven to be useful and largely applied by renown scholars in the contemporarily.

Using mathematical or econometric models, finance theorist could justify if there is any relationship between the behavioral finance theory, the bubbles theory and the theory of noise traders. As accentuated by Shiller, (2014), even though bubbles exist in the real estate market, there is still wide spread speculation of illiquidity in the housing market. An empirical analysis could be carried out both locally and internationally to assess if indeed in recent times the real estate market, is still difficult to arbitrage or illiquid in nature.

III. CONCLUSION

This study tried to give an overview of the major theories underpinning sentiment analysis in the housing market. It brought to light the behavioral finance theory, the bubbles theory, the theory of irrational exuberance and the theory of noise traders. From arguments raised by the scholars, the researcher is of the view that, the behavioral finance theory is the mother of all related theories attempting to explain the irrationality of investors in the real estate market. The study has also identified new research opportunities for further studies. It has theoretical relevance to researchers and students in the finance fraternity who are beset with or struggling to identify the most appropriate finance theories that underpins their study in real estate sentiment analysis.

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