Behavioral Tax and Psychological Biases: Theories and Implications for Regional Real Estate Policies

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Abstract

From the viewpoint of behavioral economics, this paper examines the theories and empiricism of behavioral tax and psychological biases. In particular, with respect to real estate, whose asset value and market transactions are indispensable to regional economies, theoretical and policy implications for regional real estate issues are discussed. Toward formulating such implications, the basic tenets of behavioral taxation and psychological biases, including the applied versions of the prospect theory by Kahneman and Tversky, and their empirical testing are reviewed and criticized. This review may serve as a basic guidance for any future research that values the behavior and psychology of agents in the real estate market transactions where biases and tax or loss aversion are apt to be made in investment and against taxation.

JEL Classification: D91, G41, H26, R30

Contents

1. INTRODUCTION

Until recently, it has rarely been known that Adam Smith, who is the pioneer of economics, already commented on the relationship between human behavior and economy in *The Wealth of Nations* and in *The Theory of Moral Sentiments*. In particular, the meaning of loss aversion is explicitly mentioned in the first page of Part VI, Section I of the latter as follows: "We suffer more… when we fall from a better to a worse situation, than we ever enjoy when we rise from a worse to a better" (Camerer and Loewenstein, 2004: 4)

From this propensity to avert loss, the origin of the theoretical background of behavioral tax within the study of behavioral economics could be found. Essentially, such study in behavioral economics and, more specifically, behavioral tax is interdisciplinary as Mullainathan and Thaler (2000) showed that behavioral economics is the study combining psychology and economics. With these origins and interdisciplinarity in mind, the purpose of this study is to review basic theories of behavioral tax and psychological biases and their implications for regional real estate policies, where human complexity and restriction are to be reflected with respect to varied spatially-tangible or spatially-fixed assets.

In line with Herbert Simon's (1947) *Administrative Behavior*, Mullainathan and Thaler (2000) criticized human rationality, a major premise of economics, and argued that humans have bounded rationality. Bounded rationality means that he or she would have limited cognitive ability when someone *tries to* solve problems. In this definition, people can make "reasonable" decision-making on what they have considered rational. As the research area of behavioral economics was extended to the anomalies of markets and decision-making based on this academic idea of bounded rationality, the matters of judgment and choice in real estate markets and policies has recently begun to be studied.

One of the typical experiments of behavioral economics is the Asian Disease Problem designed by Tversky and Kahneman (1981). Before conducting the experiment in the U.S., it was assumed that the participants are decision makers who should choose between two solutions to help 600 people who are exposed to plagues. If participants choose Solution A, it will save 200 citizens. On the other hand, if the participants would select Solution B, then the proportion of saved people will be 1/3 and the proportion of others will be 2/3. It is a general belief that most people would choose Solution A in this case, ceteris paribus. Probabilistically, however, both alternatives can save the same number of people. Thus, in terms of behavioral economics, it can be said that the above situation has the positive framing.

In addition to these alternatives, another solutions C and D were also suggested. If participants would choose Solution C, 400 citizens would be dead, which is also an indifferent

alternative to solutions A and B. Meanwhile, if they choose Solution D, the probability that "nobody" would die is 1/3 and the probability that "everybody" would be dead is 2/3. In this case, where participants have to choose between solutions 'C' and 'D,' most people select Solution D, although, both solutions can save the same number of people. Researchers named this phenomenon as the negative framing. Although there are four alternatives, which would show the same result, most people choose solutions 'A' and 'D'. From this example, it can be easily known that people have bounded rationality and make a cognitive error when they make decisions.

After this study, researchers became more interested in the field of behavioral finance. Behavioral finance was originally developed since Burrell's experimental research, which was published in *Journal of Finance* in 1951. He studied humans' market behavior. His study proposed a new perspective of finance research, which introduced a new method combined with psychology and finance. Then Slovic's studies (1969, 1972) made behavioral finance begin to expand as being researched more in earnest. This tradition leads to the following general definition of behavioral finance within the discipline of economics. Recently, this study has consistently been defined as the study of finance combined with psychology for analyzing the cause of anomalies and investor's mind (Olsen, 1998; Ritter, 2003).

Unlike classical finance, behavioral finance, as a new perspective that examines the causes of cognitive errors of investors and anomalies of the markets, are centering on the factors of cognitive psychology. Its researchers are particularly interested in cognitive psychological factors such as overconfidence, cognitive dissonance, anchoring, loss aversion, and framing. In addition, there are numerous studies concerning the disposition effect, which are focused on psychological factors with a variety of viewpoints in behavioral finance. Most of these psychological factors are begun to be studied since the above pioneering studies of behavioral economics, which is in line with the argument that people have bounded rationalities.

This paper examines the recent advances and implications of behavioral finance in the theme of behavioral taxation, with respect to real estates as spatially-tangible assets. Those studies, which are more or less based on the prospect theory that was built by Tversky and Kahneman, proposed a new perspective, and which are currently called behavioral tax (research). This field of research has recently focused on psychological or environmental factors and regulations. It is both academically and practically meaningful that its researchers continue to find out the cognitive, the behavioral bias of tax professionals and taxpayers with regard to real estate.

2. THEORIES OF BEHAVIORAL TAX AND PSYCHOLOGICAL BIASES

2.1. Behavioral Tax Research

The field of behavioral tax has recently appeared in the same vein as the above tradition of behavioral economics and finance. This line of research began to be widely known since Roberts (1998) examined the decision-making of tax accountants considering their psychological factors. His study has been seen as a meaningful study particularly because tax experts are relatively limited despite their increasing importance in the research of taxation (Choi and Shim, 2011). In this study, the decision-making process of tax experts was analyzed using a five-factor-model, which is applied from economic psychology-processing models. These five factors are composed of individual psychological factors (e.g., age, solving ability, knowledge level, and risk preference), environmental factors, income task factors (e.g., complexity, ambiguity), outcome task factors, and process factors (e.g., structure of profit and loss). It was concluded that outcome factors were made by combining all the other factors.

Before Roberts (1998), there had, of course, been many more studies concerning the target taxpayers in behavioral tax such as Roth et al. (1989), Alm et al. (1992), Elffers (1992), and Scholz and Lubell (1998). In particular, Alm et al.'s (1992) study shed light on the tax compliance of taxpayers. From the results of the study, he found that the capability of reducing the tax rate and appreciation rate of income increase the compliance of taxpayers effectively.

In the paper of Kinsey et al. (1991), one famous bias in cognitive behavioral science was researched regarding the matter of income tax burden. Based on the research findings, it was concluded that taxpayers should use one of the two processes (to evaluate for tax fairness), namely, outcome-processing and norm-processing. It is also found that framing is affected by implemented tax policy and personal tax situation.

Since the dissemination of the representative studies as above in the early 1990s, the specific field of behavioral tax (research) has developed rapidly. The main focus of this line of research has been to figure out the psychological factors that would influence when taxpayers pay taxes. Practically, many of these studies are propelled by an inquiry into how to find the conditions for taxpayers to pay adequately. In particular, many scholars have recently developed or designed varied mechanisms concerning the human preference between discounting and reducing taxes. Most distinguished and widely applied one of such theoretical mechanisms is the prospect theory in behavioral economics. The prospect theory was studied a lot as a theoretical mechanism of behavioral finance and behavioral economics. Many concepts and ideas to be examined in the following sections within the tradition of behavioral finance and economics were developed in line with the prospect theory, which became academically well-known over diverse disciplines after Kahneman won the Novel Prize in 2002.

2.2. Confirmation Bias

In general, a confirmation bias means a tendency to commit errors in confirmation (Shefrin, 2005). The author divided the psychological factors affecting the financial decisions of the company into three factors: convenience, structure, and heuristic. In the case of convenience, it consists of confirmatory convenience, and optimism. One of the main research areas in behavioral tax theory is confirmatory convenience.

In theory, a confirmation bias refers to an act accepting favorable or agreeable signals only. In behavioral tax theory, a signal of one's preference is regarded as "a signal that makes agents act in favor of a behavior to verify confirmation biases depending on the tax expert's choice on the favorable decision of the customers" (Choi and Shim, 2011). Regarding confirmation biases, Kahle and White (2004) found that these biases often intervene in the decision-making of tax experts. They studied the decision-making under the confliction with the customer's interest. They selected participants from the BIG-4 accounting firms in the southeastern U.S. for the experiment. The participants were then asked to answer the questions, which have two independent answers per question. In the study, they measured their belief based on dictionary definitions and examined its relevant evidence. For the experiment, they classified participants into four types: CP (Confirming and Positive), DN (Disconfirming and Negative), CN (Confirming and Negative), and DP (Disconfirming and Positive). Experimental results showed that the taxpayers react more responsively to the evidence that appears good to the customer, which means that the tax professionals tend to select a favorable alternative to the customer. They interpreted it as a bias.

Cloyd and Spilker (2000) had also verified the cause of tax professionals' confirmation bias, which is often based on the attitude of customer-oriented optimism. They had argued that subsequent studies should address the potential problem, which might include the cognitive behavioral factor in the decision making of the tax professionals. Since these studies, it has been continuously researched so that relevant training may also reduce the confirmation convenience. Based on these academic endeavors, researchers have recently found that tax professionals could reduce the possibility of inaccurate decision making potentially causable by confirmation biases if they are well trained.

Unlike many other typical experiments in social sciences, lots of experiments in behavioral taxation are directly related to the act of actual experts. Thus, it cannot help but consider more diverse psychological and environmental factors regarding the decision making of tax professionals, not only of customers.

2.3. Hindsight Bias

The hindsight bias is a bias that occurs when someone pretends to know that an accident will occur even though they do not know that the accident will occur. This phenomenon has been studied commonly in the cognitive psychology and behavioral economics. Recently, Hölzl and Kirchler (2005) have investigated hindsight biases considering the effects of causal attribution. They examined the hindsight bias predicting the (exchange rate of) euro and European economic development after six months. In their research, the hindsight bias was severer when euro advocates predict positive results than when they predict negative results. On the other hand, anti-euro predictions showed contrary results. This implies that casual attribution (Heider, 1958) may affect hindsight biases and these biases are apt to occur in many circumstances regarding finance and regional economies.

2.4. The Framing of Behavioral Tax

The framing is often understood as one of the famous cognitive errors in the prospect theory, which was pioneered by Kahneman and Tversky. A representative example of framing is the contingency where a risk-aversive propensity is revealed when people are likely to make a profit and a risk-taking tendency came out when people are likely to make a loss. This error shows the result of ill-made decision (Choi and Shim, 2011).

Regarding the framing of behavioral tax, the research made by Levin et al. (1998) is representative and often quoted. In their paper, the authors distinguished and formalized three trigger factors of framing: 1) the risk-preference framing effect proposed by Kahneman and Tversky, 2) the attribution framing effect affecting the character or objective of the event, and 3) the objective framing effect influencing persuasiveness. The risk-preference framing effect is explained within the context of the Asian Disease Problem. The attribution framing effect refers to the error when agents feel more favorable to an alternative when positive or euphuistic terms are used in the explanation of that alternative than negative terms. Meanwhile, the objective framing effect refers to a phenomenon that the negative framing effect toward loss is stronger than the positive framing effect toward gain.

Vines and Wartick (2003) also investigated the framing effect of government subsidies and tax credits on the taxpayers' tax returns. In this study, it was expected that both types of grant (government subsidies and tax credits) would show the same reduction effect. However, the experiment showed a different result. Especially, for the group that did not get a subsidy, stronger reaction came out regarding the tax return, which can be interpreted in accordance with the mechanism of the prospect theory. Not receiving the subsidy can be recognized as a loss to tax payers, and this structure implies the greater probability that risk-taking actions are made during the period of loss.

Until recently, studies of the framing effect were often carried out with an emphasis on general taxpayers. Most of them were based on the prospect theory, and tended to confirm the validity of the prospect theory through verifying the framing. These studies emphasized the applicability and importance of prospect theory in behavioral tax.

2.5. The Heuristics of Behavioral Tax

Heuristics is defined as "a skill of rough guess used due to the complexity and lack of time or in order to reduce the effort when they make a decision" in general. Blaufus et al. (2013) conducted an experiment and analyzed the cognitive ability of taxpayers with the tax burden which was associated with a change in tax rates. The results of the experiment showed that most individuals did not reasonably determine their tax payment taking account their tax burden. It was more irrational than simply heuristic. For example, when taxpayers select one between the higher tax rate of net income and the lower tax rate of total revenue, they prefer the lower tax rate. Actually, however, the higher tax rate of net income was the better choice than the other. It showed that tax rates are often overestimated by taxpayers, whose perceived structure that prejudices taxes is often observed in research.

2.6. Tax Aversion

Taxpayers often make a tax-aversive behavior. It is the behavior to avoid tax, because tax is recognized as a loss to taxpayers. To study tax aversion, there are two alternative ways: to study tax aversion directly or to study the compliance of taxpayers.

Walsh (2012) studied tax compliance indirectly in lieu of the aversion of taxpayers. In this recent study, it was particularly noted that an understanding of the behavior and motivation of taxpayers and their attitude will improve the efficiency of tax itself as well as tax compliance. In light of the literature, Walsh (2012, p. 451) presented the five factors to determine tax compliance: deterrence; personal and social norms; fairness and trust (in the tax administration); complexity of the tax system; and the role of government and the broader economic environment. Through a comprehensive and detailed survey of theoretical and experimental research on tax compliance, it was concluded that the most important determinant of tax compliance is "personal" norms, since social norms influence eventually less than personal norms.

Meanwhile, Blaufus and Möhlmann (2012) directly examined tax aversion through the lab experiment where they analyzed the types of trade behavior imposing different taxes to securities. The model used in this study was developed as an optimal capital structure by Miller (1977).

The model of the study is as follows:

$$(1) \qquad R_D = \frac{R_E}{1-(1+\alpha_i)\tau_i},$$

where
R_D: Return on debt
R_E: Return on equity
α_i: Tax aversion parameter
τ_i: Tax rate.

This formula is made by utility function and Lagrange's equation in Balfus and Möhlmann (2012). In light of the above optimal capital structure as in equation (1), he derived three hypotheses. The first hypothesis is that "the avoidance of tax increases the rate of return on debt." In this hypothesis, when negative tax cash flows occur, a reduction in the loss (of financing) occurs. On the other hand, when positive cash flows occur, a reduction in the (investment) profit follows. The second hypothesis is that "the effect of tax avoidance is higher than the effect of profit exemption." The last hypothesis is that "given learning opportunity is sufficient, tax avoidance becomes less likely as taxpayers become more experienced."

An experiment was designed for testing these hypotheses. For this testing, two laboratories were set up. In the first lab, a virtual market was created for taxpayers to trade stocks with different tax rates. In addition, the above three hypotheses were examined. The other lab used an adjusted plan so that it cans constantly feedback the training effect on the tax avoidance in competitive markets.

From this experiment, they found out that the result relies on the reference point. In addition, the effect of tax aversion shows higher possibility of a tax deduction than the possibility of the investment income deduction in the cost efficiency. However, this experiment has a limit because it is not an empirical analysis.

2.7. Loss Aversion

Prospect theory attracted academic attention soon after the pioneering research by Kahneman and Tversky. Before their research investment psychology and abnormal phenomena were not described in traditional financial theory and economics, but it became possible to analyze them through this new point of view. Prospect theory made a theoretical

foundation for analyzing the anomalies and investment psychology using the (S-shaped) utility function. As a result, the field of economics and finance became broader, and it has recently become very common for financial and economic studies to use their theory in researching anomalies. The representative theme of such abnormal phenomena is the phenomenon of loss aversion, which was first studied by Kahneman and Tversky (1984). Loss aversion is defined as "a tendency that the avoiding incentive of losing $X is greater than attracting incentive of gaining $X" (Kahneman, D. and A. Tversky, 1984, p.342). This tendency is an abnormal phenomenon that cannot be explained based on the classical assumption of rational egoist in financial markets. The validity of loss aversion has been academically and practically verified through a lot of experimental work and analysis based of cognitive psychology. One example is the Asian Disease Problem, which is mentioned above. The most representative studies are the research on endowment effect. This effect means the tendency that people overweight something when they hold it than they do not. This effect become known since Kahneman, Knetsch, and Thaler (1991) and Kahneman, Tversky, and Slovic (1991) had researched loss aversion in light of the concept of reference point.

2.8. Mental Accounting

Thaler (1980) introduced the concept of individual's psychic accounting when he sets a systematic model regarding sunk costs. Thaler (1980) named this personal psychological accounting system as a psychic equivalent to debits and credits. In this model, it was assumed that the consumer's net pleasure is calculated by the sum of the cost value and satisfaction with consumption. Net satisfaction was evaluated by the following formula (2), which is based on the prospect theory as the theoretical base of these theories.

$$P = \mathrm{v(g)} + \bar{v}(c), \tag{2}$$

where
P: Net pleasure
$v(g)$: The satisfaction when people consume goods
$\bar{v}(c)$: The pain when people consume goods.

Thaler (1985) also studied consumer behavior and explained mental accounting through the fusion of cognitive psychology and microeconomics. Here, the mental accounting was classified into one of the framings, and this paper concluded that people tends to make a mental accounting about both expected and gained utilities when people trade. In other words, it can be generalizable that each individual experiences his or her own psychological accounting process. His and subsequent microscopic studies focused on the efficiency of individual mental accounting. In particular, Thaler (1999) demonstrated that consumers can obtain a transaction utility and an acquisition utility through a purchase. Acquisition utility is a utility in general, and it can be measured as the value of the amounts to be paid to acquire goods. On the other hand, transaction utility is defined as the difference between the reference price and total payment value. This difference helps measure the relative value with respect to the reference. These two types of utility have been researched in many fields of economics and expanded to relevant disciplines such as management and marketing, which often focuses on the consumer's point of view (Godek and Murray 2012; Kalwani and Yim 1992).

3. EMPIRICAL FINDINGS ON BEHAVIORAL TAX IN REGIONAL PROPERTY MARKETS

3.1. Analysis of Investment Psychology in Regional Real Estate Markets

Regarding the regional real estate markets, many studies of investment psychology have focused on avoidance loss and the barometer. No and Yu in 2011 researched that the lower selling price would influence the selling price in real estate auction markets, especially in apartment auction in Seoul. It was also investigated that the reference effect had occurred in real estate auction markets. There are two representatives or relevant types of reference effect: reference effect and anchoring effect. In the case of No and Yu (2011), the meaning of reference effect included both of them. In this case, the reference point is that something is to be standardized like pricing and became the criterion to buy and auction behavior. They checked whether the lowest selling price would affect the (average) selling price in the relation among the typical observable factors influencing the selling price. It was concluded that the (average) selling price also gets higher, and its effect becomes stronger if the lowest selling price gets higher. In addition, it was also found that the lower selling price significantly affects the selling price depending on its setting point and market circumstances. However, their study has a limitation because the sample of the study was restricted to the apartments in Seoul.

The study of Kim and Lewis (2013) has a similar limitation that the study area is limited to Seoul. However, their study is still significant since the study thoroughly examined the phenomenon of house sellers' loss aversion. The main purpose of their study was to figure out the criterion for loss aversion in real estate markets. In the study, they defined loss aversion as a tendency that the price of the house with a chance of loss in housing markets is set higher than current markets price for avoiding disadvantage. With respect to loss aversion, the standard point is determined by three variables: the highest price over the period, the recent transaction price of other houses, and the first purchase price. Then they verified which variable the house seller preferred to use to determine the loss. They concluded that the recent price has the greatest influence on house sellers. However, this research has a limitation because it was based on the survey in Seoul, whose result may not be sufficient to generalize.

On the other hand, Yu (2012) investigated loss aversion using judicial auction data in regional real estate markets. In general, the traded volume of goods decreases when price increases. This is natural according to the rule of supply and demand. However, in regional real estate markets, it is often for the traded volume of houses to increase with decreasing prices, which is against the rule of supply and demand. Considering the characteristics of regional real estate markets, Yu (2012) examined the applicability of prospect theory to explaining investment behavior. It was found that the traded amounts increased when the price of the seller's houses goes up. It was particularly because houses used to be sold for profit rather than for residential purpose. Based on this finding, Yu (2012) verified prospect theory in regional real estate markets by testing the statistical significance and degree of correlation between non-apartment housing (or apartments) in the judicial auction markets and their traded amount. A positive correlation between the bid price and trade rate was found in the auction markets. In particular, in apartment auctions, all the other regions in the study except downtown Seoul showed strong correlations. In light of those results and survey of the relevant data and literature, Yu (2012) explained that this was due to the loss aversion occurred in the real estate auction markets.

Jung et al. (2012) also investigated the relation between house price and trade route of Seoul apartments with a focus on owners' loss aversion. They found the coupling of actual traded volume turnover ratio with actual trading price index changes the ratio itself. It was concluded that such coupling occurred because of the macroeconomic variable which is the exogenous variable affecting the endogenous variable. The regression analysis results verified that loss aversion exists in apartment trading in Seoul.

3.2. International Property Tax Research

Many behavioral tax studies have recently focused on anchoring effect and loss aversion and this research trend has become expanded over the world. Most of all, Bucchianeri and Minson (2013) analyzed over 14,000 observations in the property sales data through multiple listing service (MLS), which records the different geographic locations and timings of trade made in America. Through their comprehensive analysis testing the relation between the higher price for registering property and the higher selling price, Bucchianeri and Minson (2013) showed that there is an 'anchoring effect' between the higher price for registering real estate and the higher selling price. In addition, the strong anchoring effect was also found in not only the mortgage bonds with but also the regions of higher rate default.

In particular, a stronger anchoring effect was found in the regions where the effect itself is estimated negatively. They concluded that the stronger anchoring effect on the region would be related to negative framing. However, it is hard to find recent research about this issue.

Another representative study of loss aversion is the research by Genesove and Mayer (2001). They analyzed 13,983 observations in the LINK's property data from 1990 to 1997 (available at: http://www.linkrealestate.net). In this study, it was concluded that a positive correlation exists between the price and traded volume in the regional real estate markets. Their analysis showed that loss aversion in Boston during the 1990s determined the selling price in the housing markets. The condominium ownership affected nominal loss, and it can be understood that its sellers showed such loss aversion as well explained by prospect theory.

With respect to prospect theory, Anenberg (2010) examined the loan-to-value (LTV) ratio. The study area was the regions in the Bay of San Francisco. Anenberg (2010) figured out the controlling effect of loss aversion and selling price using the real estate trading data through long-panel analysis. The analysis result showed that the loss aversion effect is bigger than was expected by the real estate owners who faced the nominal loss and who had a higher LTV than average. In addition, it was found that the limit of deposit and the systemic variable of mortgage markets make the correlation between LTV and price.

With a focus on the period of transactions, Bokhari and Geltner (2011) researched the relation between the loss aversion of participants in the markets and the period of market participation. The study period is 2001 to 2009. The result showed that the strongest loss aversion appeared in 2007. After this period, the anchoring effect began to influence the trading price. The study of Bokhari and Geltner (2011) is unique because it investigated the loss aversion in the regional real estate markets using the market period, which had rarely been considered.

With an emphasis on the area of transactions, Engelhardt (2003) studied nominal loss aversion in urban regions. To investigate this, the data from a national longitudinal survey of youth (NLSY79) was used. The mobility by house owners was observed in the data. This study suggested that it is possible to verify loss aversion if a researcher is able to identify the change of mobility tendency using the data. In the result, it was shown that household mobility decreases when nominal loss happens. This result is meaningful particularly because actual mobility data were used to show difference according to the spatial dimension. It is especially notable that it showed and emphasized the investment psychology of residents or investors in the housing market, where they make a search, movement, negotiation, or exchange with either perfect or imperfect information psychologically. In this regard, real estate market and its participants' behavior cannot help but be deeply related to the spatial dimension, which still needs to be more scientifically researched through geographical information systems (GIS) and spatial econometrics as well.

4. CONCLUSION

In many countries, real estate policies such as taxation on real estate transfer and property tax have been continuously changed. Especially, in Korea, after the rapid growth of its economy, real estate policy became increasingly important along with the increase in the academic and

social interest in distribution and equality. For example, the comprehensive real estate holding tax was introduced to control the constant speculation in regional real estate markets. Such regions as the city of Seoul and its metropolitan area used to be seen as an area with much higher speculative demand.

However, it is not guaranteed that for a regional economy to properly control the real estate market, let alone its policy, through its self-adjusting function. This lack of guarantee may be particularly due to the recent recession or depression although such self-adjusting economy sometimes has lost its control over real estate economies, which are more or less local, even under prosperity as well. Then, why can real estate policy be ineffective or sometimes even irrelevant to regional real estate markets? This question will be continued to be solved by examining the specificity and nature of regional real estate markets, which are both temporal and spatial.

When these two aspects are fully considered, the efficiency of real estate markets will be improved, given more accessible information and adequate practices or policies. At least in terms of financial economics, it is notable that, according to Fama's (1970) efficient market hypothesis, an efficient market decides a price to use available information. This implies that the efficient market hypothesis explains why the intrinsic value may exist though there are a lot of changes about the value of real estate due to excessive investment and trade even in a short period. Investors tend to make a decision referring to the intrinsic value, and the government uses it for analyzing economic conditions to make real estate policies.

Then, is the regional real estate market efficient? Different from the stock market (Fama, 1998) supporting the efficient market hypothesis in the long run, there are some studies that the market price does not have an effect on deciding the intrinsic value in regional real estate markets (Clayton, 1998; Brzezicka, Wiśniewski 2013). These studies consistently showed that the market often showed anomalies as the (statistical) phenomena that happens constantly and cannot be understood or measured as an intrinsic value. The most interested themes of these phenomena would be the PER effect, weekend effect in stock markets, and calendar effect in real estate markets. Regarding policies, the anomalies can also cause the error on real estate policies to control real estate economies when an intrinsic value is analyzed. The cause of anomalies is known to come from diverse psychological errors. Their existence does not match with the self-adjustment of economies in line with the basic assumption of human rationality. It does not necessarily mean people estimate values inefficiently. Rather, it means that people have a Simonian 'bounded rationality' (Mullainathan, 2000). Recently, many studies of anomalies have been developed in the field of behavioral finance, and it has been proven that anomalies affect the trade behavior and earnings ratio (Jeong, 2005).

However, the response of investors still seems to much more depend on the change in real estate policies. This behavioral response has been limitedly understood with a limited academic emphasis on behavioral finance on the trade behavior and the change in financial markets. If the relation between investors' reaction and psychology about the government's real estate policy are verified, it will become able to contribute to the mechanism design to regulate regional real estate markets and formulate adequate real estate policies considering behavioral taxation. From this point of view, this study has investigated the significance and implications of the behavior and psychology of real estate investors, concerning psychological biases amidst changing real estate and tax policies. As the aggregate consequences of such behaviors are really significant to regional real estate markets and economies, theories and policies about the behavior and psychology of real estate investors still need to be corroborated and improved continuously together with the scientific analysis of temporal and spatial phenomena of regional real estate markets.

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