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An Analysis of Objectivity in the Real Estate Appraisal Process

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Most existing studies on the behavior of real estate appraisers focus on the issues around the independence of the appraiser. This study uses a questionnaire to measure the objectivity of real estate appraisers which involves six indicators related to the appraisal process, and divides the factors that affect the objectivity of real estate appraisers in Taiwan into four categories, namely, the opinion of the appraiser regarding the future development of the real estate appraisal industry, current real estate appraisal approaches and behavior of other appraisers, and the characteristics of real estate appraisers and their firms. The empirical results reveal that the income of appraisers relative to other professionals and public opinion in relation to the fairness of real estate appraisers are the two most important factors that affect the objectivity of real estate appraisers. Furthermore, the work experience of the appraiser, total revenue of the real estate appraisal firm, and independence of the final appraisal result all significantly and positively affect the objectivity of the real estate appraisers, and the awareness of a lack of appraisers in the market significantly and negatively affects their objectivity. These findings are helpful to the healthy development of real estate appraisal and its related industries.

Keywords:

Real Estate Appraisal, Behavior of Appraisers, Objectivity, Independence

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1. Introduction

Real estate is both a consumption and investment good, so there is a relatively strong and diverse demand for real estate in both the public and private sectors. However, since real estate is a commodity that is both highly heterogeneous and regionally restricted, the available information on the real estate market is both inadequate and asymmetric, and real estate prices may vary quite drastically with fluctuations in real estate cycles, thereby creating a huge demand for real estate appraisal. If the results of such appraisals deviate from a fair market price, not only would value misjudgment emerge for individual investment cases, but the market may also operate inefficiently. For these reasons, real estate appraisers (hereinafter the appraiser) play a very important role in the sound operation of both the real estate and financial markets.

There are three basic appraisal approaches in real estate, namely, the comparison, income, and cost approaches. In order to select the appropriate approach, a considerable number of transactions, amount of income, or volume of cost data need to be collected during the appraisal process. However, the highly heterogeneous nature of real estate means that even when the appraisers refer to a comparison target that is very similar to the appraised target, or the collected revenue or cost data are highly credible, many elements still require adjustment. The collection and analysis of such data and judgments made using them need to be objective because they each have a considerable impact on the final appraisal results (Tchira, 1979; Vandell, 1991; Lai and Wang, 1996; Epley, 1997; Todora and Whiterell, 2002; Kung et al., 2007). However, the behavior of appraisers is influenced by many factors that might cause the appraisal results to deviate from their fair market value, for example, the influence brought to bear by clients, other appraisers, previous appraisal results, selection bias, and conflicts of interest (Diaz, 1990; Quan and Quigley, 1999; Hung and Chang, 2006; Olufolahan et al., 2016).

In 2019, the United States had about 73,000 certified practicing appraisers,¹ while Taiwan had 431 practicing appraisers.² To engage in the appraisal business, appraisers usually need to pass a professional examination and obtain a business license issued by a competent authority. In addition to the appraisal body and its regulations, the appraisers should also adhere to the required ethics

¹ According to the American Appraisal Institute, the number of real estate appraisers at the end of 2019 was 72,724, which is a reduction of 6.7% compared to 2018. The average annual growth rate of the number of appraisers in the past five years is -2.6%, mainly due to the increase in retirees, decrease in new entrants, economic factors, government regulations, and popularity of data analysis technology.

² According to statistics compiled by the Ministry of Examination, a total of 732 people passed the real estate appraiser exam in Taiwan between 2001 and the end of 2019. However, according to statistics compiled by the Ministry of the Interior, the number of registered real estate appraisers nationwide as of 2019 was 431. Moreover, the number of appraisers was 315 when the questionnaire was conducted in 2004.

and professional guidelines, which largely include no conflicts of interest regarding their clients, and no stake over the appraisal results or the appraised target, in order to maintain their independence, objectivity, and fairness.

The objectivity of real estate appraisers is defined as the collection and use of data and making any adjustments or judgment during the appraisal process based on facts without influence of personal beliefs or feelings. In fact, objectivity is also a basic professional requirement for many other professionals, such as auditors or auditing officers (Magilke et al., 2009; Pennington et al., 2017). Most previous studies related to the behavior of appraisers have focused on the factors that affect their independence, especially in relation to clients (Kinnard et al., 1997; Levy and Schuck, 1999, 2005; Worzala et al., 1998; Wolverson and Gallimore, 1999; Gallimore and Wolverson, 2000; Chen and Yu, 2009; Wolverson, 2000; Chen et al., 2013; Achu, 2013; Crosby et al., 2010, 2015; Liao et al., 2018). However, empirical analysis is rarely carried out on the objectivity of appraisers. This study addresses this research gap by drawing attention to the objectivity of appraisers. The certification of the appraiser system in Taiwan was established in 2000. Compared to other professions in Taiwan or the certified real estate appraiser system in other countries, the history of the system in Taiwan is relatively short. One of the main objectives of this paper is to examine the objectivity of real estate appraisers after 15 years since the establishment of the system in Taiwan, and then to re-examine its changes every five to ten years. This study uses a questionnaire to measure the objectivity of real estate appraisers in Taiwan by means of six indicators that are used during the appraisal process, and group the factors that affect the objectivity of real estate appraisers into four categories, namely, the opinion of the appraisers of the future development of the real estate appraisal industry, the opinion of the appraisers in relation to the current approaches to real estate appraisals, the opinion of the appraisers on the behavior of other appraisers, and the characteristics of real estate appraisers and their firms. Based on the empirical results, we are able to propose some constructive suggestions that will benefit the development of the appraisal industry and real estate market.

In the following section, we present the literature review, followed by the research design in the third section. The fourth section presents the empirical analysis, and the final section contains a conclusion and some suggestions.

2. Literature Review

In previous studies, appraisal bias was attributed to the four following possible reasons: (1) the familiarity of the appraiser with the environment of the appraised target and his/her personal qualifications; (2) selection bias in the targets compared; (3) anchoring bias during appraisal mainly due to the smoothing of the appraisal results, or the appraisal process has been affected by other appraisers or previous appraisal results; and (4) client influence on the

appraiser, which results in adjustments to the appraisal report in response to the request of the client (Diaz, 1990; Quan and Quigley, 1999; McAllister et al. 2004; Hung and Chang, 2006; Olufolahan et al., 2016).

For example, Diaz (1990) believes that appraisers are often influenced by their own experiences and the external environment when making appraisals, which lead to distortions in the appraisal process or price anchoring. Quan and Quigley (1999) believe that the three above appraisal biases are mainly affected by the characteristics of the appraisers and information uncertainty. Due the chaotic nature of market information, appraisers often adopt the conservative strategy of making partial adjustments, which can be regarded as fairly rational behavior. Hung and Chang (2006) find that when appraisers make appraisals by applying the relevant appraisal norms and principles, their pricing decisions are often affected by other information and thus deviate from the normative process. Furthermore, the appraisal experience of appraisers and their familiarity with the regional market will also affect appraisal behavior. Olufolahan et al. (2016) find that the main factors behind appraisal biases in commercial real estate appraisals are the professional skills, experience, judgment and integrity of the appraisers, type of real estate, and lack of a manual of appraisal standards.

As regards the selection of comparison targets, although many studies have discussed the criteria for selecting the most suitable comparison targets, there is still no consensus as to the best method (Tchira, 1979; Vandell, 1991; Lai and Wang, 1996; Epley, 1997; Todora and Whiterell, 2002; Kung et al., 2007). For example, Tchira (1979) suggests that using Mahalanobis distance is a better approach in selecting a comparison target. Vandell (1991) and Lai and Wang (1996) advocate for the principle of “minimum variance” in selecting the most suitable comparison target. Todora and Whiterell (2002) suggest the use of the Minkowski metric as the basis for the selection of the most suitable comparison target. Kung et al. (2007) calculated the Minkowski metric through standardized coefficients in a hedonic price model, since it can reduce the subjective predictions of appraisers. Furthermore, as regards the statistical and computer applications of appraisal, Peng and Yang (2007) evaluate the impact of the development of Automated Valuation Model (AVM) systems on appraisers in Taiwan. In terms of the 22 types of appraisal businesses listed by the Real Estate Appraiser Association, only two of them, namely, those engaged in the appraisal of real estate collateral by financial institutions and the appraisal of real estate auctioned by courts, are businesses that have been replaced by AVMS. It is estimated that AVMS may only result in a maximum reduction of 37.6% of the appraisal business.

Many studies in the literature have also focused on the client influence on appraisers, and it is believed that this type of influence could be the most important cause of bias in the appraisal results (Kinnard et al., 1997; Levy and Schuck, 1999, 2005; Worzala et al., 1998; Wolverton and Gallimore, 1999; Gallimore and Wolverton, 2000; Chen and Yu, 2009; Wolverton, 2000; Chen et al., 2013; Achu, 2013; Crosby et al., 2010, 2015; Liao et al., 2018). For example,

Levy and Schuck (1999) find that most appraisers acknowledge that their clients influence the final appraisal results, whether through direct price intervention or the dominance of the appraisal process. Chen and Yu (2009) find that the influence of clients on appraisers exists in both Taiwan and Singapore. However, appraisers in Taiwan are mostly affected by personal factors. In Singapore, they may be limited by a small market and a powerful appraisal agency. However, long-term clients who are more familiar with the company may have a stronger influence. Liao et al. (2018) find that factors that affect the independent cognition of real estate appraisers include the size of the company, impact of the behavior of other appraisers, and recognition of the industrial system. However, there are some studies in which the influence of clients on the appraisal results is considered to be less obvious (Worzala et al., 1998; Gallimore and Wolverton, 2000; Amidu and Aluko, 2007; Achu et al., 2015).

Among the relevant professional and technical personnel, the role of auditors or auditing officers is very similar to that of real estate appraisers, and they also attach great importance to objectivity. Magilke et al. (2009) examine the objectivity of the members of independent audit committees in stock market-listed companies in an experimental market. They find that when the compensation of auditors is related to stocks, the probability of errors in the related financial statements is higher. Pennington et al. (2017) examine whether the attitude of auditors toward advocacy can lead to biases in collecting audit evidence. Based on a survey of 60 auditors from the Big Four auditing firms, they find that attitude toward advocacy does affect both the initial judgment and related searching strategies of the auditor.

Overall, the objectivity of the appraiser will have a considerable impact on the accuracy of the appraisal result, and so it is very important to the appraiser and the appraisal industry. However, empirical analysis on this issue has been rarely conducted in previous studies in the literature. If an appraiser is unable to make an objective appraisal, this will not only directly affect the accuracy of the appraisal results, but will also give the client more opportunity to influence the appraisal result. Therefore, it is both important and necessary to discuss this topic.

3. Research Design

In this study, an ordered logistic model is used for the analysis. The objectivity of the real estate appraiser is reflected by the following objective cognitive variables and how they vary:

- (1) The appraiser has an objective basis for determining the relevant adjustment rate when using the comparison approach (y_1);
- (2) The decision of the appraiser on the relative weight between comparison targets is very objective (y_2);

- (3) The appraiser is often very objective in determining the cost or expense ratio when using the income approach (y3);
- (4) The appraiser is often very objective in determining the rate of capitalization of income when using the income approach (y4);
- (5) The appraiser is quite objective in determining the profitability of construction development when using the land development analysis method (y5); and
- (6) The appraiser is quite objective in determining the comprehensive interest rate on capital interest when using the land development analysis method (y6).

In the part of the study which focuses on the factors that influence the objectivity of appraisers, reference is made to Levy and Schuck (1999), Achu (2013), and Liao et al. (2018). Four variables are used to explain for the influence: the characteristics of the appraisers and appraisal companies, behavior of other appraisers, view of the appraiser on the development of the industry and public view of appraisers.

3.1 Characteristic Variables of the Appraiser and Appraisal Company

(1) **Work Experience:** The real estate appraiser system was officially launched in Taiwan in 2000 and has been implemented for more than 10 years. Many currently practicing appraisers had already been practicing when the system was launched. In this study, it is hypothesized that the work experience of the appraiser will have both positive and negative effects on the objective cognition of the appraisal. More work experience is correlated with increased rejection of resorting to subjective experience (negative effect), and increased realization of the importance of the objective cognition of the appraisal (positive effect). More work experience also allows the appraiser to acquire a relatively objective basis for professional judgment. Therefore, the impact of work experience on independent cognition depends on the net impact of the positive and negative effects.

(2) **Education Level:** In this study, it is hypothesized that a higher education level means that it is more likely that the appraiser will commit to the appraisal profession, which has a positive impact on the objective cognition of the appraiser.

(3) **Personal Annual Income:** the influence of income on objective cognition has both positive and negative effects. When an appraiser has a relatively lower level of objective cognition, he/she may be able to earn a higher income because he/she is more willing to accommodate to clients. However, if the reverse is true, he/she may be less willing to cooperate with clients because he/she is already doing well financially.

(4) **Scale of the Firm (of the Appraiser):** The scale of the firm of the appraiser should have a positive impact on the objectivity of the appraiser, because a larger scale firm requires individual appraisers to appear more professional, which has a positive effect on objective cognition.

3.2 Impact of Behavior of Other Appraisers

(1) **Expertise of Other Appraisers**

The objective cognition of an appraiser may be affected by the actions of other appraisers. If an appraiser finds that other appraisers are not exactly professional, his/her objective cognition may be affected due to herding.

(2) **Independent Cognition of Other Appraisers**

The objective cognition of an appraiser may be affected by the independent cognition of other appraisers. If an appraiser has a relatively lower level of independent cognition, then he/she will have a relatively lower level of objective cognition.

3.3 Opinion of Appraiser on Future Development of Industry

(1) **Market Demand**

The objective cognition of an appraiser may be affected by job market demand for appraisers. In this study, it is hypothesized that if the appraiser believes that the number of practicing appraisers is seriously insufficient, he/she will have relatively lower level of objective cognition.

(2) **Overall Income**

The objective cognition of an appraiser may be affected by his/her overall income level. In this study, it is hypothesized that if the appraiser believes that his/her current income is relatively low compared to other professionals, he/she will have relatively lower level of objective cognition.

(3) **Acquisition of Qualifications**

In the past, fewer appraiser licenses were issued compared to other professions, that is, it was relatively difficult to obtain qualifications as an appraiser. In this study, it is hypothesized that if an appraiser considers that it is difficult to obtain the qualifications to become an appraiser, he/she will have a higher level of objective cognition. In this study, two issues, namely, “whether the current examination for real estate appraisers is overly challenging” and “whether you are in favor of relaxing the restrictions to qualify as a real estate appraiser”, will be used to reflect the impact.

(4) **Relevance between Firm Size and Expertise**

Currently, appraisal firms are either individually and jointly operated. The public may believe that the expertise of an appraisal firm is higher if they are

larger in scale. In this study, it is hypothesized that appraisers who agree with this view have a relatively higher level of objective cognition.

(5) **Establishing an Assessment System for Appraisers**

The appraisal system in Taiwan has been formally established for more than fifteen years, but reactions among appraisers have been mixed. In this study, it is hypothesized that those who do not support the establishment of an assessment system for real estate appraisers will have a relatively lower level of objective cognition.

3.4 Public Opinion of Appraisers

(1) **Public Recognition of Expertise of Appraisers**

The objective cognition of an appraiser may be affected by public recognition of the expertise of appraisers. If an appraiser believes that the public highly recognizes the expertise of appraisers, then he/she will have a relatively higher level of objective cognition.

(2) **Public Recognition of Fairness of Appraisers**

As stated above, the independent cognition of an appraiser may be affected by public recognition of the fairness of appraisers. If the appraiser believes that the public views appraisers as being fair, it is expected that he/she will have a relatively higher level of objective cognition.

4. Results of Empirical Analysis

4.1 Data Collection

In this study, questionnaires are used to analyze the factors that influence the objectivity of real estate appraisers. The main questions include views around the real estate appraisal industry (Part One), real estate appraisal behaviors (Part Two), and basic personal information. The questionnaire targeted practicing real estate appraisers in Taiwan. The questionnaire survey period was from June to July 2014.³ A total of 315 questionnaires were sent to appraisers by electronic mail, and a total of 116 were returned, of which 110 were valid. The questionnaire recovery rate and valid questionnaire recovery rate were 36.8% and 34.9%, respectively.⁴

³ Although the empirical data used in this study were collected in 2014, almost all of the regulations related to real estate appraisal and appraisers have remained unchanged since 2013. Thus, the empirical results of this study still serve as a useful reference for the development of the real estate appraisal system.

⁴ The general response rate for academic mailed questionnaires is 10 to 15 percent in Taiwan. The response rate of our questionnaire is 36.83 percent. While this cannot be considered to be high, it is significantly above average.

The basic demographics of the interviewed real estate appraisers is shown in Table 1. The age and work experience of the interviewed appraisers are evenly distributed. In terms of age, the group of those who are 41 to 45 years old account for a higher proportion (29.1%), and in terms of work experience, most have 6 to 15 years (50%). As for the scale of the real estate appraisal firm, most firms have one appraiser in the company (42.7%). More than half of the firms have an annual revenue less than NT\$5 million (USD161,290) (56.3%). Furthermore, the annual income of the appraisers is mostly less than NT\$1.5 million (USD48,387), which accounts for about 70% of the respondents, thus indicating that the business model of Taiwanese appraisers is mainly small in scale. In terms of education and background, 60% of the respondents are college or university graduates, and 40% have a Master's degree. Among them, about 41.8% graduated from land and real estate related subjects, with a considerable number of education majors.

Table 1 Basic Information of Respondents (N = 110)

Variable	Demographics	Frequency	Percentage
Work experience			
Age	Less than 30 years old	4	3.6
	31-35 years old	11	10.0
	36-40 years old	24	21.8
	41-45 years old	32	29.1
	46-50 years old	16	14.5
	More than 51 years old	23	20.9
	Work experience	Less than 2 years	4
2-5 years		18	16.4
6-10 years		29	26.4
11-15 years		26	23.6
16-20 years		17	15.5
More than 21 years		16	14.5
Size of appraisal firm			
Appraiser	1	47	42.7
Accounts	2	22	20.0
	3	16	14.5
	4	5	4.5
	5	9	8.2
	6	4	3.6
	7	4	3.6
	Above 10	3	2.7
Annual Revenue	Less than 1 million (32,258)	24	21.8
	1.01~5 million (32,580~161,290)	38	34.5
NT\$ (USD)	5.01~10 million (161,612~322,581)	11	10.0
	More than 10 million (322,581)	37	33.6

(Continued...)

(Table 1 Continued)

Variable	Demographics	Frequency	Percentage
Education			
Degree	Bachelor or College degree	66	60.0
	Master's degree	44	40.0
Background	Land Administration or Real Estate	46	41.8
	Civil Engineering or Architecture	14	12.7
	Economics or Business Administration	34	30.9
	Science or Engineering or Agriculture or Medicine	12	10.9
	Law or Political Science	2	1.8
	Humanities and Philosophy	1	0.9
	Other	1	0.9
Income			
Personal	Less than 1 million (32,258)	32	29.1
Annual	1.01~1.5 million (32,580~48,387)	45	40.9
Income	1.51~2 million (48,710~64,516)	15	13.6
NT\$	2.01~3 million (64,839~96,774)	10	9.1
(USD)	3.01~4 million (97,097~129,032)	4	3.6
	4.01~5 million (129,355~161,290)	2	1.8
	More than 5.01 million (161,613)	2	1.8

4.2 Analysis of Objective Cognition of Real Estate Appraisers

Each question in the questionnaire⁵ was scored based on a 5 point Likert scale, which ranged from 1 point for “strongly disagree” and 2 points for “disagree” to 5 points for “strongly agree”. Table 2 shows the summarized response to each question. Among the cognitive variables of objectivity, the average score of y6 is 3.45, which is the highest with 70% who “agree” and “strongly agree”. Next is y3 and y2 with an average score of 3.15 and 3.13, respectively. The average score of y1, y4, and y5 is relatively lower, or less than 3. Among them, the average score of y5 is the lowest at 2.3, with 80.0% of the respondents who “disagree” or “strongly disagree” with the statement. The average score of y1 is 2.79, with 50.91% who “disagree” or “strongly disagree” with the statement. In addition, Table 3 shows the correlation analysis of the objectivity question items. Question items y1 to y6 are positively correlated with each other. Among them, the correlation coefficient between y1 and y2 is 0.454, y3 and y4 is 0.467, and y3 and y6 is 0.473, which are all relatively high.

Among the variables affected by the behavior of other appraisers, the average score of the “appraisers are very professional” is 2.68, with 54.55% of the

⁵ Provided by authors upon request.

respondents who “disagree” or “strongly disagree” with the statement, thus indicating that more than half of the appraisers do not agree that other appraisers are professional. However, the average score of “real estate appraisers are highly independent when deciding on the final results” is 3.55, and the percentage who “agree” and “strongly agree” with this statement is 64.5%, thus indicating that even though more than half of the appraisers do not consider appraisers to be very professional, most agree that appraisers have a high degree of independence in their final pricing decisions.⁶

Among the variables of the views of the appraisers on the development of the industry, the average score of “there is a serious shortage of practitioners” is 2.68, with 60.9% of the respondents who “disagree” or “strongly disagree” with the statement, thus indicating that most appraisers feel that there are enough appraisers in the industry. The average score of “the income is low” is 4.08, and 82.7% “agree” or “strongly agree”, thus indicating that most appraisers believe that their own income is low. The average score for relaxing qualifications is 2.13, with 77.3% of the respondents who “disagree” or “strongly disagree”, thus indicating that most appraisers do not support a substantial relaxation of the restrictions on acquiring qualifications to become an appraiser. The average score of those who believe that a larger scale firm points to more expertise is 2.58, and 62.7% “disagree” or “strongly disagree” with this statement. The average score for “an assessment system for appraisers should be established” is 3.30, with 51.8% who “agree” or “strongly agree”, thus indicating that more than half of the respondents support the establishment of an assessment system.

Among the variables related to the public opinion around appraisers, the average score of “the expertise of appraisers is publicly recognized” is 2.57, with 60.9% who “disagree” or “strongly disagree”, thus indicating that most appraisers do not consider that they are publicly recognized for their expertise. The average score of “the fairness of the appraisers is publicly recognized” is 2.69, with 52.7% who “disagree” or “strongly disagree”, thus indicating that more than half of the appraisers do not consider that their fairness has been publicly acknowledged.

In this study, y1, y2, y3, y4, y5 and y6 are used as the dependent variables to measure the objective cognition of real estate appraisers, and four primary variables, that is, the characteristics of the appraisers and appraisal companies, behavior of other appraisers, view of the appraiser on the development of the industry, and public view of appraisers are used as the independent variables to perform a regression analysis of the ordered logistic model. Six models are shown in Table 4, where the chi-squared value of the likelihood ratio (LR) test of the model is used to measure the overall explanatory ability of the independent variables. All six models reach a significant level, thus indicating

⁶ In our questionnaire, the “independence and objectivity” of real estate appraisers were rated by appraisers. The rating took into consideration all real estate appraisers instead of specific appraisers in Taiwan.

that the model can well interpret the characteristics.⁷ The pseudo R² shows the strength of the relationship between the independent and dependent variables.

Table 2 Basic Statistics of Objective Cognition of Real Estate Appraisal and Impact Variables (N = 110)

Objective Cognition Variable (Dependent Variable)	Mean	Std. Dev.	Disagree (Not Objective)	Not Clear or No Opinion	Agree (Objective)
The appraiser has an objective basis for determining the relevant adjustment rate when using the comparison approach (y1).	2.79	0.93	50.91%	18.18%	30.91%
The decision of the appraiser on the relative weight between comparison targets is very objective (y2).	3.13	0.89	30.91%	25.45%	43.64%
The appraiser is often very objective in determining the cost or expense ratio when using the income approach (y3).	3.15	0.94	34.55%	18.18%	47.27%
The appraiser is often very objective in determining the rate of capitalization of income when using the income approach (y4).	2.85	1.02	48.18%	17.27%	34.55%
The appraiser is quite objective in determining the profitability of construction development when using the land development analysis method (y5).	2.30	0.91	80.00%	0.91%	19.09%
The appraiser is quite objective in determining the comprehensive interest rate on capital interest when using the land development analysis method (y6).	3.45	0.95	27.27%	2.73%	70.00%

(Continued...)

⁷ The coefficients of each independent variable and the error term in the six regression models were checked. Most of their coefficients were less than 0.2, and only some of them reached around 0.3. This reveals that the problem of endogeneity is not serious in this study. Furthermore, we also checked the correlation of the independent variables. The results show that there is no serious collinearity problem.

(Table 2 Continued)

Factor that affects the Objective Cognition of Appraisers (Independent Variable)	Mean	Std. Dev.	Disagree (Not Objective)	Not Clear or No Opinion	Agree (Objective)
1. Impact of Behavior of other Appraisers					
Currently, practicing appraisers are very professional (X1).	2.68	0.92	54.55%	20.00%	25.45%
Real estate appraisers are highly independent in deciding on the final results (X2).	3.55	0.92	18.18%	17.27%	64.55%
2. Opinion on future development of industry					
There is a severe shortage in the number of currently practicing appraisers (X3).	2.68	1.06	60.91%	9.09%	30.00%
The income of appraisers is relatively low (X4).	4.08	0.86	6.36%	10.91%	82.73%
The real estate appraiser examination is overly challenging (X5).	2.61	0.92	54.55%	30.91%	14.55%
The restrictions with regard to the qualifications of real estate appraisers should be relaxed (X6).	2.13	0.90	77.27%	11.82%	10.91%
Larger firms are more professional (X7).	2.58	1.03	62.73%	8.18%	29.09%
An appraiser assessment system should be established (X8).	3.30	1.15	27.27%	20.91%	51.82%
3. Public opinion on appraisers					
The expertise of appraisers has been publicly recognized (X9).	2.57	0.88	60.91%	18.18%	20.91%
The fairness of appraisers has been publicly recognized (X10).	2.69	0.90	52.73%	24.55%	22.73%

Note: The question items for factors that affect the objective cognition of appraisers are given scores based on the degree of agreement: Disagree very much: 1 point, Do not agree: 2 points, etc., to Agree very much: 5 points.

Table 3 Correlation of Objective Cognition Variables

Dependent Variable	y1	y2	y3	y4	y5
The appraiser has an objective basis for determining the relevant adjustment rate when using the comparison approach (y1).	1				
The decision of the appraiser on the relative weight between comparison targets is very objective (y2).	0.454	1			
The appraiser is often very objective in determining the cost or expense ratio when using the income approach (y3).	0.247	0.218	1		
The appraiser is often very objective in determining the rate of capitalization of income when using the income approach (y4).	0.257	0.154	0.467	1	
The appraiser is quite objective in determining the profitability of construction development when using the land development analysis method (y5).	0.366	0.167	0.223	0.377	1
The appraiser is quite objective in determining the comprehensive interest rate on capital interest when using the land development analysis method (y6).	0.212	0.191	0.473	0.282	0.337

In Table 4, y1 and y2 are used to measure the objectivity of the appraiser with the comparison approach. Based on the empirical results, the variables such as “currently, practicing appraisers are very professional”, “real estate appraisers are highly independent when deciding on the final results”, and “the fairness of appraisers has been publicly recognized” have a significantly positive impact on the objective cognition. This in turn indicates that when the appraiser thinks that other appraisers are very professional, the decision on the final price is highly independent, and the public recognizes the fairness of the appraiser, the objective cognition level of the appraiser will be higher. Conversely, the “income of appraisers is relatively low ” and there is a “severe shortage in the number of currently practicing appraisers ” have a significantly negative impact on objective cognition, which indicates that when the appraiser believes that his/her income is relatively low compared to other professionals or that there are not enough appraisers in the field, his/her objective cognition will also be lower. In addition, “personal annual income” has a significantly negative impact on y1, and “annual revenue” has a significantly positive impact on y2. These results are generally in line with the predictions.

Table 4 Results of Ordered Logistic Regressions

	y1	y2	y3	y4	y5	y6
Impact of Behavior of Other Appraisers						
Currently, practicing appraisers are very professional (X1).	0.580**	0.486**	-0.012	0.258	0.039	-0.600**
Real estate appraisers are highly independent when deciding on the final results (X2).	0.465*	0.660***	0.222	0.477**	0.037	-0.017
Opinion on Future Development of Industry						
Agree that there is a severe shortage in the number of currently practicing appraisers (X3).	-0.389*	-0.490**	-0.145	-0.133	-0.199	-0.507**
Agree that the income of appraisers is relatively low (X4).	-0.771***	-0.582**	-0.633**	-0.701***	-0.753**	-0.228
Agree that the real estate appraiser examination is overly challenging (X5).	-0.286	0.410	-0.285	0.020	-0.445	-0.192
Agree that the restrictions with regard to the qualifications of real estate appraisers should be relaxed (X6).	0.292	-0.072	-0.219	-0.043	0.500*	-0.058
Agree that larger firms are more professional (X7).	-0.006	0.012	0.175	-0.331*	-0.028	0.173
Agree that an appraiser assessment system should be established (X8).	0.105	0.228	0.167	0.094	-0.151	-0.076
Public Opinion of Appraisers ⁸						
The fairness of appraisers has been publicly recognized (X10).	0.572**	0.478*	0.570**	0.708***	0.922***	0.373
Characteristics of Appraisers and Appraisal Company						
Work Experience (X11)	0.105	-0.067	0.339**	0.259*	0.574***	0.692***
Education Level (X12)	0.015	0.558	-0.514	0.037	-0.371	0.189
Personal Annual Income (X13)	-0.327**	-0.208	0.093	-0.007	0.036	-0.011
Firm Size of Appraiser (X14)	0.004	0.372*	0.229	0.422**	0.117	0.389*
LR chi ² (13)	30.66	33.29	28.02	31.85	29.43	38.57
Prob > chi ²	0.0038	0.0015	0.009	0.0025	0.0057	0.0002
Log likelihood	-109.632	-110.767	-110.904	-123.586	-81.5755	-78.0715
Pseudo R ²	0.1227	0.1306	0.1122	0.1141	0.1528	0.1981

Note: *** p<0.01, ** p<0.05, and * p <0.1

⁸ The correlation coefficient between the expertise and fairness of appraisers is considered to be too high, and so we just keep the variable “The fairness of appraisers has been publicly recognized (X10)” in the model.

In Table 4, y3, y4, y5, and y6 measure the objectivity of the real estate appraiser in using the income and the cost approaches. Among them, “work experience” has a positive and significant impact, which indicates with more years in the industry, the degree of objectivity is increased. The “annual revenue” also has a positive impact on y3 to y6, but does not reach the 10% significance level for y3 and y5, thus indicating that a larger scale firm results in higher objective cognition. Furthermore, “the fairness of appraisers has been publicly recognized ” has a positive impact on y3 to y6, but does not reach the 10% significance level for y6, which indicates that if the fairness of appraisers is recognized by the public, the objective cognition will be relatively high. Finally, “the income of appraisers is relatively low ” has a negative impact on y3 to y6, but does not reach the 10% significance level for y6, which indicates that when the appraiser believes that his/her income is relatively low compared to other professionals, his/her objective cognition will also be lower.

4.3 Analysis and Discussion

Table 1 shows the size and structure of appraisal firms in Taiwan. Firms with only one appraiser account for 42.7% of the appraisal firms, two appraisers for 20%, three appraisers for 14.5%, and four or more appraisers for 22.8%. About 40% of the appraisers have a Master’s degree or higher, and 55% have an educational background directly related to real estate, which indicates that the business model in the appraisal industry in Taiwan is mainly small in scale, with a medium scale in terms of the educational and professional background of the appraisers.

Table 2 presents the views of the appraisers on the behavior of other appraisers. The table shows that more than half of the appraisers do not consider that currently practicing appraisers are very professional, but believe that the decision of the appraisers on the final price is highly independent. The response to the question regarding the views of the appraisers on the development of the industry shows that most appraisers do not think that the number of practitioners is seriously insufficient, and so they are not in favor of greatly relaxing the qualifications for appraisers, with most appraisers believing that their income is relatively low compared to that of other professionals. Furthermore, most appraisers do not believe that a larger scale firm points to more expertise, and so most appraisers support the establishment of an assessment system. As for the public recognition of appraisers, most appraisers do not consider that they are publicly recognized for their expertise and fairness.

As for the objective cognition part of the appraisal that this research focuses on, the appraisers have different degrees of agreement towards the six variables (y1 ~ y6), which indicates that they have different levels of professional judgment when applying different appraisal approaches. Therefore, when it is easier to reach the six variables supported by market information, their objective cognition level is increased. For example, in terms of the decision on capital

interest, as many as 70% of the respondents agree with y6 because there are clear market practices for the ratio of own to borrowed funds, and it is easier to obtain the cost of both own and borrowed funds from the financial market. Similarly, since y3 asks if “the appraiser is often very objective in determining the cost or expense ratio when using the income approach”, there is a certain cost rate interval to refer to, and y2, “the decision of the appraiser on the relative weight between comparison targets is very objective” could be determined based on the absolute value of the adjustment rate of each comparison target, the objectivity of the two variables is relatively high. More than 40% of the respondents agree that the decision was very objective.

On the contrary, y1 measures the objectivity of the adjustment rate decision when using the comparison approach. Since the decision regarding the related adjustment rate in the comparison approach requires more professional judgment on the part of the appraiser, his/her objective cognition is therefore relatively low. For y4, it is necessary to find a comparison target similar to the survey target, and then to make the related adjustments based on the comparison approach, which is almost a reconstruction of the comparison approach. Regardless whether it is the adjustment of regional or individual factors, the professional judgment of the appraiser is required. Therefore, the objective cognition is relatively low. Nearly 50% disagree with the objectivity of the two above items. Finally, y5 measures the objectivity of the profitability of construction development. Theoretically, there is a certain range for reference of the profitability of construction development but the profitability varies according to the economic stage, region, scale of development, and period of development. Profitability has quite an impact on the land development analysis price, and an overwhelming 80% of the interviewed appraisers expressed that they do not agree that there is objectivity.

Based on the empirical results in Table 4, as far as the individual appraisal approaches are concerned, variables such as “practicing appraisers are very professional”, “fairness of appraisers has been publicly recognized”, and “real estate appraisers are highly independent when deciding on the final results” have a significantly positive impact on the objective cognition among the variables that significantly influence the objective cognition in the comparison approach. By contrast, variables such as “income of appraisers is relatively low” and “there is a severe shortage in the number of currently practicing appraisers” have a significantly negative impact. However, those with higher annual incomes are less likely to agree that there is an objective basis for the decision on the adjustment rate, but when the annual revenue is high, the decisions regarding the relative weight between the comparison targets are more objective. Among the variables that significantly affect the objective cognition in the income approach, two variables, namely, “work experience” and “fairness of appraisers has been publicly recognized” have significantly positive effects on objective cognition, and “income of appraisers is relatively low” has a significantly negative impact on objective cognition. Among the variables that have a significant impact on the objective cognition in the cost approach, only

“work experience” has a significantly positive impact on y5 and y6 at the same time, while the other variables only affect y5 or y6. This may be because y6 is the easiest indicator to objectively quantify, while y5 is the most difficult.

Overall, the most significant variables that affected the objective cognition of the appraisers are “the income of appraisers is relatively low” and “fairness of appraisers has been publicly recognized”. Both of these have significantly negative and positive effects on y1 to y5, respectively, which show that when the appraiser considers that his/her income is low compared to other professionals, his/her objective cognition is reduced. By contrast, when the appraiser believes that his/her fairness is recognized by the public, his/her objective cognition increases. The results above show that increasing the income of appraisers relative to other professionals and increasing public recognition of the fairness of the appraisers both help to improve the objective cognition of appraisers. Secondly, “work experience” has a significantly positive impact on y3 to y6, thus indicating that the objective cognition is higher in appraisers with more work experience. This finding indicates that more senior appraisers should play a more active role in promoting the objectivity of the appraisal industry.

In addition, variables such as “annual revenue”, “severe shortage in the number of currently practicing appraisers”, and the “high independence of the final pricing decision” reached significant levels for three of the six objective cognition variables. Among them, “annual revenue” and “real estate appraisers are highly independent when deciding on the final results” have a significantly positive impact on objective cognition, and “severe shortage in the number of currently practicing appraisers” has a significantly negative impact on objective cognition. This result shows that larger appraisal firms and increased acknowledgement of the appraisers for an independent final pricing decision are related to higher objective cognition of the appraisers. Conversely, when the appraiser believes that the number of practitioners is seriously insufficient and the market relatively lacks competition, his/her objective cognition would be lower. In addition, “practicing appraisers are very professional” also reaches a significant level among the three objective cognition variables, but has a significantly positive impact on y1 and y2 and a significantly negative impact on y6, which reveals inconsistency. The results above show that when appraisers think that other appraisers are very professional, they also have a relatively higher objective cognition. As for the negative impact on y6, this may be because y6 is the easiest means of exercising professional judgment objectively.

5. Conclusions and Recommendations

Most of the existing studies related to the behavior of appraisers have focused on the factors that affect their independence. However, there are few empirical

analyses on the objectivity of the appraisers. The certified appraiser system in Taiwan was established less than two decades ago in 2000, which is still a relatively short period of time for an emerging professional industry. One of the main objectives of this paper is to examine the objectivity of real estate appraisers after 15 years since the establishment of the certified appraiser system in Taiwan. The empirical results of this study reveal several important and interesting findings.

The comparison approach shows that variables such as “currently, practicing appraisers are very professional”, “the fairness of appraisers has been publicly recognized”, and “real estate appraisers are highly independent when deciding on the final results” have a significantly positive impact on the objective cognition of the appraisers. However, variables such as “low income” and “severe shortage in the number of currently practicing appraisers” have a significantly negative impact on the objective cognition of the appraisers.

The income approach shows that variables such as “work experience” and “the fairness of appraisers has been publicly recognized” have a significantly positive impact on the objective cognition of the appraisers; whereas “low income” has a significantly negative impact. The cost approach shows that only “work experience” has a significantly positive effect on the objective cognition of the appraisers.

We conclude that the income of real estate appraisers relative to other professionals and public opinion on the fairness of these appraisers are the two most important factors that affect the objectivity of real estate appraisers. When the appraisers believe that their income is lower compared to other professionals, their objective cognition will be reduced. When the appraisers believe that their fairness is publicly recognized, their objective cognition will be higher. Furthermore, the work experience of the appraiser, total revenue of the real estate appraisal firm, and independence of the final appraisal result all have a significantly positive impact on the objectivity of real estate appraisers. The awareness of the lack of appraisers in the market has a significantly negative impact on the objectivity of real estate appraisers.

Based on the above conclusions, this study suggests that increasing the income of appraisers relative to that of other professionals, as well as increasing public recognition of the fairness of appraisers, can be regarded as the most important factors to improve the objectivity of appraisers. Work experience and the scale of the appraisal firm have a significantly positive impact on the objective cognition of the appraisers. It is therefore recommended that more senior appraisers and larger appraisal firms should have a more active role in promoting the objectivity of the appraisal industry. Increasing the independence of the final pricing decision of appraisers and moderately increasing the number of practicing appraisers can also improve the objective cognition of appraisers.

As for further research, we offer the following suggestions. First, this study examines the factors that affect the objectivity of appraisers based on 15 years of observations of the development of the certified appraiser system in Taiwan. We suggest that similar studies are conducted every five to ten years for comparison purposes, to determine how this relatively immature industry advances over time. Second, the response rate in relation to the questionnaire in this study is only 36.82 percent. To avoid potential selection bias, it is recommended that researchers attempt to achieve a higher response rate in the future. Third, there are several independent variables that could also be included in the questionnaire, such as the city/county in which the firm of the appraiser is located, as well as the gender, marital status, and previous job experience of the appraiser. Finally, we assume that the relationship between the objectivity of the appraiser and the explanatory variables are linear. However, it would be worth exploring other potential nonlinear relationships to obtain a better fit of the model.

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