AESS

International Journal of Asian Social Science

journal homepage: http://www.aessweb.com/journal-detail.php?id=5007

THE IMPACT OF COMPENSATION SCHEME ON HOUSING AGENT PERFORMANCE

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ABSTRACT

This paper discusses the impact of compensation schemes on housing agent performance. This study treats housing agents as subjects and distributed 867 questionnaires by mail. A total of 776 responses were retrieved, of which 510 were effective samples for a valid return rate of 66.5%. The feasible generalized least squares (FGLS) method was used for estimation. According to the empirical results, the individual performance of agents under a Type I compensation scheme, which is similar to the Japanese model of a high base salary and a low proportion of compensation based on performance, is not significantly better than the individual performance of agents under a Type II compensation scheme, which is similar to the American model of zero base salary and a high proportion of compensation based on performance. The empirical results suggest that in recent years, compensation schemes in Taiwan's brokerage industries have gradually shifted from the Japanese model with a high base salary to the American model without a base salary.

Key Words: Individual performance, Compensation scheme, Feasible generalized least squares (FGLS)
JEL Codes: J33; M52; L85

INTRODUCTION

Most literature on the performance of employees in real estate industries (such as the studies by Follain, Lutes, and Meier (1987); Glower and Hendershot (1988); Crellin, Frew, and Jud (1988); Sirmans and Swicegood (1997) and Johnson, Zumpano, and Anderson (2007)) use human capital models to discuss the performance of agents at work. In addition to traditional discussions on the performance of agents at work from a human capital perspective, agent compensation choice has

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been another way to study agent productivity. Previous studies have analyzed the impact of different compensation schemes on agent productivity (Munneke and Yavas, 2001; Allen, Faircloth, Forgey, and Rutherford, 2003; Johnson, Zumpano, and Anderson, 2008) and found that risk, human capital investment, job satisfaction and the attraction of higher income are influencing factors for agent compensation scheme. Moreover, the compensation scheme is related to agent income. Johnson et al. (2008) discussed the relationship between incentives and agent performance for two types of agents, 100% agents and split commission agents. The results revealed that 100% agents sell their listed properties faster and at higher premiums.

The Taiwanese housing brokerage industry compensation schemes mix the Japanese model and the American model and thus can be divided into two types. Type I is a model with a base salary, an 8-14% individual performance compensation proportion and team compensation. Type I has a high base salary and a low proportion of compensation based on performance. Type II is a model without a base salary a 40-80% of compensation is based on individual performance. Type II has zero base salary and a high proportion of compensation based on performance. Type I follows the Japanese brokerage industrial practices while Type II follows the American brokerage industrial practices. Due to the diversity of Taiwan's housing brokerage industry, compensation schemes emphasizing performance and team cooperation have been developed. The peer structure of competition and cooperation is very suitable for an empirical test of various compensation schemes.

In recent years, the developmental trends of the Taiwanese brokerage industry suggest that compensation schemes have changed considerably, from the previous, Japanese-based schemes with a high base salary to an American model without a base salary. Examples of this change include Yongqing Housing, Pacific Housing, and Rebar Housing. This changing trend is an important topic.

Differences in compensation schemes make it difficult to discuss the effect of individual or team compensation on the performance of agents. This paper discusses the impact of the two types of compensation schemes on individual performance. Under the Type I scheme, in addition to a low proportion of compensation based on performance, the agents have a base salary (a guaranteed minimum income) and may enjoy team performance compensation. Under the Type II scheme with no base salary and a high proportion of compensation based on performance, payment is purely based on personal capabilities. Therefore, individual agent performance variance is larger, and thus estimations made using the traditional OLS (ordinary least squares) method may be vulnerable to grouped data heterogeneity, violating the assumption of the homogeneity of error variances. This paper first tests the heterogeneity of model errors. If the heterogeneity is confirmed, the feasible generalized least squares (FGLS) will be applied for parameter estimates.

This paper is organized into five sections. Section 1 presents the introduction, and Section 2 describes the research methods and the structure of the empirical model. Section 3 explains the data source and provides a description of the sample. Section 4 presents the empirical analysis and results, and Section 5 presents the conclusions and suggestions for future research.

RESEARCH METHODS

Explanation of the variables

The variables are defined as shown in Table 1. Individual performance is measured by the natural logarithmic value of the average monthly sales performance of the agent in the previous three months. Both Rubin and Perloff (1993) and Booth and Frank (1999) used "income" as a proxy variable for performance or productivity. However, income reflects both an employee's performance and salary structure; therefore, it does not entirely reflect "performance." Using sales performance as a proxy for performance or productivity of sales personnel may result in lower measurement error compared to other proxy variables (e.g., income).

Regarding compensation schemes, one approach emphasizes the impact of individual compensation on performance, finding that compensation schemes are related to the agent income (e.g., Munneke and Yavas, 2001; Allen et al., 2003; Johnson et al., 2008).

Another approach emphasizes team interaction and team performance. Kandel and Lazear (1992) conducted a theoretical analysis of general Japanese manufacturers and found that peer pressure in a team establishes a team norm to impose peer pressure on members who deviate from these norms to improve overall team performance. However, these conclusions have not been tested empirically. Lazear (1998) argued that a team's job characteristics, incentive mechanisms (e.g., compensation scheme), design and size affect the efforts and the interactive relationships of the team members.

Notably, Lazear (1998) proposed that although a team compensation scheme may enhance a team's performance, it might additionally create a free-rider problem and reduce the incentive for some employees to work. Karau and Williams (1993) noted that team cooperation may reduce an individual's motivation to work and create social loafing behavior, as team members expect more from others than themselves. Using data from Continental Airlines from 1994 to 1996, Knez and Simester (2001) found that a team compensation scheme could improve a company's internal performance. They additionally discussed the effect of company size on the free-rider problem and found no free-rider effect.

The compensation schemes of the housing brokerage industry in Taiwan can be divided into two types. The Type I compensation scheme, similar to the Japanese model, includes a base salary, an individual performance compensation of 8-14% commission incomes and team compensation. Type I is a combination of various types of payment. The Type II compensation scheme, similar to the American model, has no base salary but an individual performance compensation proportion between 40-80% commission incomes. The Type II scheme depends purely on individual performance. Which type has a greater influence on individual performance is an important topic. This paper uses dummy variables with Type II as the reference. If a branch adopts a Type I compensation scheme, the variable ($TYPE$) is set as 1, otherwise it is set to 0.

Regarding the selection of other control variables, in terms of gender, Glower and Hendershott (1988), Crellin et al. (1988), Sirmans and Swicegood (1997), and Jud and Winkler (1998) noted that the income of females is lower than that of males. In contrast, Abelson, Kacmar, and Jackofsky (1990) argued that the income of females is higher than that of males. Therefore, in this paper, if the agent is male, the gender variable is set to 1; otherwise, the gender variable is set to 0. The expected coefficient value is uncertain.

The educational level represents investment in human capital. Accumulated professional knowledge results in higher expected levels of performance. For example, Follain et al. (1987), Glower and Hendershott (1988), Crellin et al. (1988), Jud and Winkler (1998), and Abelson et al. (1990) found that schooling has a significant effect on income. In other words, a higher level of schooling can result in higher expected income. In this paper, the educational level of agents is divided into three categories: high school and vocational school, junior college, and university and above. The reference group is high school and vocational school and university and above. If an agent's educational level is college, the education variable is set to 1, otherwise, the education variable is 0. The coefficient of this variable is expected to be positive.

With respect to age, Sirmans and Swicegood (1997; 2000) found that older age is associated with lower income. Crellin et al. (1988) noted that older age is associated with lower income did not reach the 10% significance level. The coefficient of the variable for age is expected to be negative in this paper. With respect to marital status, the expected performance of employees who are married and have children older than the age of six is higher than employees who are married with children younger than six (Mincer, 1970). Therefore, the performance of married agents with children aged above six is expected to be better in this paper. In terms of management personnel, Glower and Hendershot (1988), Crellin et al. (1988), and Sirmans and Swicegood (1997) found that management personnel usually have more experience in the industry; therefore, their performance is comparatively better than non-management personnel.

Longer daily hours worked is associated with more work effort and, thus, better performance (Follain et al., 1987; Glower and Hendershott, 1988; Crellin, et al., 1988; Sirmans and Swicegood, 1997; Abelson et al., 1990). Therefore, the coefficient of the variable of hours worked is expected to be positive. In terms of experience, Follain et al. (1987), Glower and Hendershott (1988), Crellin et al. (1988), Sirmans and Swicegood (1997), and Jud and Winkler (1998) all suggested that the longer that an individual worked represents richer working experience and better performance; therefore, the coefficient for years worked is expected to be positive. The square of years worked is used to represent the diminishing returns of work experience. Regarding working experience outside the brokerage industry, if the respondent has engaged in work other than the house brokerage industry, the variable is set to 1; otherwise, the variable is set to 0. The coefficient of this variable is expected to be positive.

With respect to variables related to the intermediary agency, branches closer to the downtown area usually have more business activities and higher transaction prices resulting in better performance. Follain et al. (1987), Glower and Hendershott (1988), and Sirmans and Swicegood (1997) suggested that agents in the housing brokerage industry who work in branches in the downtown area usually have higher income. Hence, in this paper, if a branch is located in a downtown area, the downtown variable is set to 1; otherwise it is set to 0.

Table-1. Variable descriptions and definitions

Variable	Operational Definition
Y	Individual performance is the natural logarithmic value of the average monthly sales performance of the respondent in the past three month (unit: 10,000 NTD)[2], namely, performance during the period from July to September 2011.
GENDER	If the agent is male, the variable is set to 1; otherwise, the variable is set to 0.
COLLEGE	If the agent has a college education, the variable is set to 1; otherwise, the variable is set to 0.
AGE	The respondent's age measured in years.
CHILD	If the respondent has children age six or older, the variable is set to 1; otherwise, the variable is set to 0.
MANAGE	If the respondent is the shop director, manager or broker, the variable is set to 1; otherwise, the variable is set to 0.
HOUR	An individual's work hours, namely, the average number of hours worked by the respondent every day (unit: hour).
EXP	Work experience, represented by years of working in the agent's housing brokerage (unit: year).
EXPS	Square of work experience, as represented by the square of the

[2]For example, if monthly sales performance was 3 million in the recent three months and the commission rate is 6%, then performance is 0.18 million NTD.

	work experience variable.
EXPO	If the respondent has engaged in work other than the house brokerage industry, the variable is set to 1; otherwise, the variable is set to 0.
LOCATION	If the branch is located in the down area of Kaohsiung, for example, the Sanmin District, the Hsinhsing District, the Lingya District, the Qianjing District, or the Yencheng District, or when the branch is located in the suburbs, such as the Qianchen District, the Tsuoyin District, the Gushan District, the Qijin District, the Hsiaogang District, and the Nantse District, the variable is set to 1; otherwise, the variable is set to 0.
TYPE	Compensation schemes are divided into two types: Type I (with a basic salary, individual performance compensation of approximately 8-14% commission incomes, and team compensation) and Type II (no base salary and individual performance compensation of approximately 40-80%). Type II is the reference benchmark. The variable value is set to 1 in case of Type I, otherwise 0.

Model setting

The dependent variable of the empirical model is Y (individual performance). The explanatory variables include $GENDER$, $COLLEGE$ (college graduates), AGE, $CHILD$ (agents with children above age 6), $MANAGE$ (manager), $HOUR$ (individual working hours), EXP (work experience), $EXPS$ (work experience squared), $EXPO$ (agents with experience of working outside the brokerage industries), $TYPE$ (compensation scheme) and $LOCATION$ (branches located in downtown area). The settings are as follows:

$$\begin{aligned} Y_i &= \beta_0 + \beta_1 GENDER_i + \beta_2 COLLEGE_i + \beta_3 AGE_i + \beta_4 CHILD_i + \beta_5 MANAGE_i \\ &+ \beta_6 HOUR_i + \beta_7 EXP_i + \beta_8 EXPS_i + \beta_9 EXPO_i + \beta_{10} LOCATION_i + \beta_{11} TYPE_i + \varepsilon_i, \\ & N \sim (0, \sigma^2) \end{aligned} \quad (1)$$

Because individual agent performance varies greatly under the Type II compensation scheme, the Type II scheme may result in grouped data heterogeneity when using traditional OLS for estimation, violating the assumption of homogeneity in error terms. Hence, this paper uses the Goldfeld-Quandt to test whether there is heterogeneity in the model error terms. In the case of confirmed heterogeneity, the feasible generalized least squares (FGLS) method will be applied for parameter estimation.

We use the Goldfeld-Quandt test to compare the estimated error variances of each group by using the subscript 1 to represent the observations with a Type I compensation scheme and 2 to represent the observations with a Type II compensation scheme. The separation equations of the two groups are below:

$$\begin{aligned} Y_{1i} &= \beta_{10} + \beta_1 GENDER_{1i} + \beta_2 COLLEGE_{1i} + \beta_3 AGE_{1i} + \beta_4 CHILD_{1i} + \beta_5 MANAGE_{1i} \\ &+ \beta_6 HOUR_{1i} + \beta_7 EXP_{1i} + \beta_8 EXPS_{1i} + \beta_9 EXPO_{1i} + \beta_{10} LOCATION_{1i} + \varepsilon_{1i} \end{aligned} \quad (2)$$

$$Y_{2i} = \beta_{20} + \beta_1 GENDER_{2i} + \beta_2 COLLEGE_{2i} + \beta_3 AGE_{2i} + \beta_4 CHILD_{2i} + \beta_5 MANAGE_{2i} + \beta_6 HOUR_{2i} + \beta_7 EXP_{2i} + \beta_8 EXPS_{2i} + \beta_9 EXPO_{2i} + \beta_{10} LOCATION_{2i} + \varepsilon_{2i} \quad (3)$$

The above equations imply that the coefficients of the variables are the same and the intercepts are different. Due to the variance of the error terms estimated in Eq.(2) and Eq.(3), we use $F = \hat{\sigma}_2^2 / \hat{\sigma}_1^2$ to test the heterogeneity of the error terms. If the null hypothesis is rejected, the error terms of the two groups are significantly different. The estimation using FGLS uses $1/\sigma_1$ or $1/\sigma_2$ as the weights with the settings shown below:

$$\frac{Y_{1i}}{\sigma_1} = \beta_{10}\left(\frac{1}{\sigma_1}\right) + \beta_1\left(\frac{GENDER_{1i}}{\sigma_1}\right) + \beta_2\left(\frac{COLLEGE_{1i}}{\sigma_1}\right) + \beta_3\left(\frac{AGE_{1i}}{\sigma_1}\right) + \beta_4\left(\frac{CHILD_{1i}}{\sigma_1}\right) + \beta_5\left(\frac{MANAGE_{1i}}{\sigma_1}\right) + \beta_6\left(\frac{HOUR_{1i}}{\sigma_1}\right) + \beta_7\left(\frac{EXP_{1i}}{\sigma_1}\right) + \beta_8\left(\frac{EXPS_{1i}}{\sigma_1}\right) + \beta_9\left(\frac{EXPO_{1i}}{\sigma_1}\right) + \beta_{10}\left(\frac{LOCATION_{1i}}{\sigma_1}\right) + \left(\frac{\varepsilon_{1i}}{\sigma_1}\right) \quad (4)$$

$$\frac{Y_{2i}}{\sigma_2} = \beta_{20}\left(\frac{1}{\sigma_2}\right) + \beta_1\left(\frac{GENDER_{2i}}{\sigma_2}\right) + \beta_2\left(\frac{COLLEGE_{2i}}{\sigma_2}\right) + \beta_3\left(\frac{AGE_{2i}}{\sigma_2}\right) + \beta_4\left(\frac{CHILD_{2i}}{\sigma_2}\right) + \beta_5\left(\frac{MANAGE_{2i}}{\sigma_2}\right) + \beta_6\left(\frac{HOUR_{2i}}{\sigma_2}\right) + \beta_7\left(\frac{EXP_{2i}}{\sigma_2}\right) + \beta_8\left(\frac{EXPS_{2i}}{\sigma_2}\right) + \beta_9\left(\frac{EXPO_{2i}}{\sigma_2}\right) + \beta_{10}\left(\frac{LOCATION_{2i}}{\sigma_2}\right) + \left(\frac{\varepsilon_{2i}}{\sigma_2}\right) \quad (5)$$

Next, Eq.(4) and Eq.(5) are combined to obtain the FGLS estimates. Because σ_1 and σ_2 are unknown, we use $\hat{\sigma}_1$ and $\hat{\sigma}_2$, estimated by Eq.(2) and Eq.(3) instead. We suppose $\hat{\sigma}_i = \hat{\sigma}_1$, when $TYPE_i = 1$ and $\hat{\sigma}_i = \hat{\sigma}_2$ when $TYPE_i = 0$. OLS is used to estimate the following transformation model:

$$\frac{Y_i}{\hat{\sigma}_i} = \beta_{20}\left(\frac{1}{\hat{\sigma}_i}\right) + \beta_1\left(\frac{GENDER_i}{\hat{\sigma}_i}\right) + \beta_2\left(\frac{COLLEGE_i}{\hat{\sigma}_i}\right) + \beta_3\left(\frac{AGE_i}{\hat{\sigma}_i}\right) + \beta_4\left(\frac{CHILD_i}{\hat{\sigma}_i}\right) + \beta_5\left(\frac{MANAGE_i}{\hat{\sigma}_i}\right) + \beta_6\left(\frac{HOUR_i}{\hat{\sigma}_i}\right) + \beta_7\left(\frac{EXP_i}{\hat{\sigma}_i}\right) + \beta_8\left(\frac{EXPS_i}{\hat{\sigma}_i}\right) + \beta_9\left(\frac{EXPO_i}{\hat{\sigma}_i}\right) + \beta_{10}\left(\frac{LOCATION_i}{\hat{\sigma}_i}\right) + \delta\left(\frac{TYPE_i}{\hat{\sigma}_i}\right) + \left(\frac{\varepsilon_i}{\hat{\sigma}_i}\right) \quad (6)$$

where $\beta_{10} = \beta_{20} + \delta.$

DATA COLLECTION AND DESCRIPTION OF THE SAMPLE STATISTICS

Data collection

Our survey was conducted in October 2011 through mailed questionnaires. The brokerage companies covered in the survey are chain branch companies, such as Pacific Rehouse, Sinyi, 21st Century, U-trust, H&B Housing, Eastern Realty, China Trust Real Estate, Taiwan Housing, and Yongqing Realty. This study distributed 867 questionnaires by mail to sales agents at these companies' branches in Kaohsiung and obtained 776 responses. After eliminating samples with missing data, 510 valid samples remained for a valid return rate of 66.5%.

The contents of the questionnaire include basic personal data on agents (e.g., gender, educational level, age, with or without children aged six and older, being a manager or not), work-related data (e.g., years working, performance on the job, work hours, work experience outside the agency industry), and data related to agency branch characteristics (e.g., compensation scheme and branch location).[3]

Description of the sample statistics

This study processes the descriptive statistics using SPSS19.0 and HLM6.05 for the empirical model estimation. The basic statistical characteristics of the variables are shown in Table 2. The average value of individual performance is NT$ 124,400 (exchange rate of US$ 1 to NT$ 29.6 in April 2012). Most (56%) of the respondents are male (286 people). Respondents with a college degree account for 25% of the sample (128 people). The average age is 37. Respondents with children over six years of age account for 39% of the sample (199 people). Respondents at the management level account for 11% of the sample (56 people). The average daily number of hours worked is 8.88 hours. The average number of years worked is approximately 4.82 years. Workers with work experience outside the housing brokerage industry account for 63% (321 people) of respondents. Branches in the downtown area account for 32% (163 people) of all branches. In addition, agents under a Type I compensation scheme account for 9% of the sample (48 people), and agents under a Type II compensation scheme account for 91% of the sample (462 people).

EMPIRICAL RESULTS AND ANALYSIS

This paper conducts a Goldfeld-Quandt test to determine whether heterogeneity of error terms exist and finds that there is a problem with the heterogeneity of error terms.[4] FGLS is employed for estimation in this study, and heteroskedasticity-consistent standard errors are used for model comparisons.

The empirical estimation results, shown in Table 3, suggest that the F-value of the estimation results from the OLS and FGLS methods is 6.504 and 6.750, respectively. Both values are significant at the 5% significance level, indicating that model fit is good. R^2 is 10.6% and 11.1%, respectively, suggesting that the FGLS estimate has better explanatory power for the variance. Except for the coefficient for $MANAGE$, all the coefficients of the FGLS estimate are larger than the coefficients of the OLS estimate. However, because the heterogeneity of the error terms has been confirmed by the empirical model diagnosis results, the OLS estimator is not the best; that is, the standard errors of the OLS estimation are incorrect. Using the standard errors for hypothesis

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[3] Detailed questionnaire items are available on request.

[4] $F = \frac{\hat{\sigma}_2^2}{\hat{\sigma}_1^2} = \frac{0.676}{0.247} = 2.737 > F_{(0.95, 45, 137)}$, suggesting a significant difference in the error term variance.

verification is misleading. However, in the OLS estimate, when using heteroskedasticity-consistent standard errors (sometimes called robust standard errors) to modify the standard errors, the OLS is a consistent variance estimator in the case of a large-scale sample. As shown in Table 3, the general standard errors and the robust standard errors are significantly different in size. Nevertheless, when the estimated general standard errors and robust standard errors are significantly different, the data and the model assumption distribution are not consistent. In fact, in case of heterogeneity of error terms, a more correct method is to use FGLS for model transformation to comply with the assumption of error term heterogeneity.

According to the FGLS estimation results, shown in Table 3, the coefficient for *TYPE* is 0.088 and does not reach a 5% significant level, indicating the performance of agents under a Type I compensation scheme (similar to the

Table-2. Description of the sample statistics

Variables	Mean	S.D.	Min.	Max.
Y	12.44	11.82	0.5	100
MALE	0.56	--	0	1
COLLEGE	0.25	--	0	1
AGE	36.84	8.88	20	77
CHILD	0.39	--	0	1
MANAGE	0.11	--	0	1
HOUR	8.88	2.35	2	18
EXP	4.82	5.41	1	31
EXPS	52.38	113.66	1	961
EXPO	0.63	--	0	1
LOCATION	0.33	--	0	1
TYPE	0.09	--	0	1

Japanese model) is not significantly better than the performance of agents under the Type II compensation scheme (similar to the American model). The reason may be that the base salary of the Type I compensation scheme improves working incentives, and team compensation will encourage individuals to work harder. However, there may be a free-rider and a social loafing problem (Lazear, 1998; Karau and Williams, 1993). In addition, a low proportion of compensation based on performance will result in relatively lower levels of work incentives. A combined scheme will decrease or increase working incentives, such that the individual performance of agents under a Type I compensation scheme will not be significantly higher than the individual performance of agents under a Type II compensation scheme.[5]

5 In Taiwan, the Type I compensation scheme is mainly adopted by companies with a direct sales system. Under such a scheme, the decisions of the headquarters can be more easily implemented and the control of branches is more direct and effective. It is easier to control the qualifications and quality of agents and maintain a uniform image of the company. The logistics will be more physical and the inter-branch communications will be better. Because the binding force of the company is greater, it is easier to require a certain level of service quality. Hence, companies with a direct system have a better public image and service quality, which are the major appeals to consumers of companies adopting the Type I compensation scheme.

These empirical results have been confirmed by the development of Taiwan's brokerage industry. Among the nine major chain brokerage companies investigated in this study, four companies used the Type I compensation scheme and five companies used the Type II compensation scheme in the past. However, only one company is now using the Type I compensation scheme.

Regarding other control variables, in terms of gender, the estimated coefficient value is –0.058 and is not significant. Regarding the effect of gender on performance, the results conflict with the conclusions from previous studies. For example, the findings by Glower and Hendershott (1988), Crellin et al. (1988), Sirmans and Swicegood (1997), and Jud and Winkler (1998) suggest that female workers earn less income than male workers. However, Abelson et al. (1990) argued that female workers earn more income than male workers. This paper concludes that the performance of women is not significantly lower than the performance of men.

The estimation coefficient of the college educational level is 0.162 and is significant at the 10% level. This result suggests that the performance of agents with a college education is better than the performance of agents with a high school, vocational school, or university education or more. Education represents an investment in human capital. A higher education should produce better performance. However, the empirical results suggest that the effect of education level on agent performance is determined by the type of education. Jud and Winkle (1998) and Carroll and Clauretie (2000) showed that salaries of agents who graduated from college are significantly higher than salaries agents with high school degrees; however, agents with a master's degree did not earn significantly more than agents with a high school degree.

The estimation coefficient for age is –0.018 and is significant at the 5% level. This result is consistent with the findings of Sirmans and Swicegood (1997; 2000), who found that older agents had lower incomes. The coefficient for having children above age six is 0.236 and is significant at the 5% level. This result suggests that agents with children over the age of six have more time to work than agents with children under the age of six, resulting in better performance at work, which is consistent with Mincer (1970).

The coefficient for manager is 0.266 and is significant at the 5% level. This result suggests that manager performance is significantly better than agents who are not in management, as suggested in previous studies. For example, Glower and Hendershot (1988), Crellin, Frew, and Jud (1988), and Sirmans and Swicegood (1997) found that being in management represents richer experience in the industry; thus, the performance of such individuals is relatively better than individuals without such experience. Longer daily hours worked may be a result of a higher level of effort and better job performance. The coefficient for the daily number of hours worked is 0.017, which is not significant.

The coefficient estimate of EXP is 0.069 and is significant at the 5% level. The coefficient estimate of $EXPS$ is -0.002 and reaches a 10% significance level. This result suggests that work experience improves performance, but the effect decreases after a certain level of work experience. This result is consistent with Glower and Hendershott (1988) and Sirmans and Swicegood (1997), who show that experience increases the performance of brokers or salespeople but beyond some point, additional experience is less valuable. The coefficient for work experience outside the housing brokerage industry is 0.147 and reaches a 10% significance level. This result suggests that agents with work experience outside the housing brokerage industry perform better than those without such experience.

The coefficient for branch location is 0.226 and reaches the 5% significance level. This result suggests that the individual performance of agents working in branches in the downtown area is higher than that of branches in the suburbs, confirming the findings of previous studies. For example, Follain et al. (1987), Glower and Hendershott (1988), and Sirmans and Swicegood (1997) suggested that the income of agents working in the house brokerage industry in the metropolitan areas is higher than those outside metropolitan areas.

CONCLUSIONS AND SUGGESTIONS

This paper has agents in the housing brokerage industry as the analysis subjects and uses FGLS to analyze whether individual performances vary under different compensation schemes. According to the empirical results, being a college graduates, age, having children above age six, being a manager, working experience, working experience squared, working experience outside the brokerage industry and location of the branch have a significant influence on individual performance. The performance of agents in branches located in downtown areas is better than the performance of agents in suburban branches. The individual performance of agents under the Type I compensation scheme (similar to the Japanese model) is not significantly higher than that of the agents working under the Type II compensation scheme (similar to the American model)

According to the concepts proposed by Lazear (1986), the selection of a compensation scheme reflects the optimal selection of the businesses. In recent years, the development trends of Taiwan’s brokerage industry have suggested that compensation schemes have substantially changed from the Type I/Japanese model with a high base salary to the type without a base salary, similar to the American model. This trend can be additionally confirmed by the empirical results. The individual performance of agents under the Japanese-style scheme is not significantly higher than that of the agents under American-style scheme.

This study helps understand the impact of individual attributes on individual performance and whether theories of compensation schemes can be tested with data. More accurate estimates can be made after obtaining internal data from the companies.

Table-3. Empirical results and analysis (N=510)

Model	OLS	OLS Heteroskedasticity-consistent standard errors	FGLS
C	2.212 (0.262)**	2.212 (0.240)**	2.232 (0.278)**
GENDER	-0.053 (0.073)	-0.053 (0.054)	-0.058 (0.073)
COLLEGE	0.158 (0.084)*	0.158 (0.076)*	0.162 (0.084)*
AGE	-0.017 (0.006)**	-0.017 (0.005)**	-0.018 (0.006)**
CHILD	0.215 (0.095)**	0.215 (0.086)**	0.236 (0.096)**
MANAGE	0.282 (0.123)**	0.282 (0.120)**	0.266 (0.123)**
HOUR	0.017 (0.016)	0.017 (0.017)	0.017 (0.016)
EXP	0.066 (0.020)**	0.066 (0.023)**	0.069 (0.020)**
EXPS	-0.002 (0.001)	-0.002 (0.001)	-0.002 (0.001)*
EXPO	0.142 (0.077)*	0.142 (0.082)*	0.147 (0.078)*
LOCATION	0.215 (0.078)**	0.215 (0.104)**	0.226 (0.078)**
TYPE	0.086 (0.128)	0.086 (0.139)	0.088 (0.157)
R^2	0.126	0.126	0.130
$\bar{R}^2$	0.106	0.106	0.111
F	6.504**	6.504**	6.750**

Notes:*p<0.10, **p<0.05.

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