

# U.S. Real Estate Agent Income and Commercial/Investment Activities

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**Abstract**                      This article uses canonical correlation analysis to investigate the income characteristics of active real estate agents in the United States who elected to participate in commercial and investment transactions. The model is unique in that it included activity areas to determine the specialties where agents generated the income and the type of clients who paid for the service. Future studies should consider the multiple dependent variable approach with activity areas to capture the relationship between income and the type of work involved.

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## Introduction

The income characteristics of real estate agents in the United States are critical information to the real estate firm owner and the real estate industry in general. In essence, income generation characteristics as a group are the critical information that a firm needs to maintain and build its sales personnel, which is its most important asset. The survey results in this study provide a profile of the agents that can be used as the basis for future policies on education.

This article contains the results of a large survey of active real estate agents in the U.S. The first part of the sample was drawn from the most recent lists of active sales and broker licensees in ten states. The second was taken from the membership roles of agents who list affiliation with a commercial organization in the National Association of REALTORS® (NAR). The latter included names in thirteen commercial boards and nine commercial divisions for a total coverage of twenty-six states. One objective of the study was to investigate the income characteristics of agents who elect to participate in commercial and investment market transactions.

An analysis of these agent characteristics has not appeared previously in the academic literature. This group is a very significant part of the salesforce that serves clients who are interested in the ownership of income-producing property. Normally, these agents minimize their involvement with single-family residential transactions.

Investigations of this group will become increasingly important as the value of real estate holdings continues to increase with the expansion of the national

economy. The local agents who are familiar with the local commercial and investment real estate market trends will be the logical choice to handle the transaction to assure that the appropriate levels of due diligence are satisfied, and all firm guidelines on financial requirements are met.

This study is unique in three areas. First, it provides a statistical baseline comparison at the national level with previous and future surveys. Second, it uses a relatively new statistical approach in the real estate literature that relies on a bundle of *multiple dependent variables*. This statistical technique was not used in the six previous studies of agent licensee income. Third, it attempts to uncover significant types of activities and clients that provide needed insight into the determinants of agent income. Activity questions are critical to this study and future surveys in an effort to determine the work areas where the agents spend their time and the clients who demand the service.

One conclusion is a recommendation to subsequent researchers that the typical agent makes decisions regarding the level of income in combination with other characteristics. If the purpose of these studies is to explain succinctly the market forces that interact to determine income, the statistical technique selected must be one that utilizes a highly correlated bundle of significant factors. Canonical correlation analysis is shown here as an alternate tool of analysis as opposed to the univariate regression analysis that has appeared in the previous six studies.

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## Literature Review

Comparisons of wages and salaries among various industries typically are based on a human capital approach (Polachek, 1981; McDowell, 1982; and Willis, 1986). The real estate academic literature contains a population of six studies on the characteristics of income for the real estate sales force as shown in Exhibit 1. All six rely on the traditional human capital theory approach (Mincer, 1970; and Becker, 1975). Four are investigations in single states only that include Florida (Sirmans and Swicegood, 1995), Ohio (Glower and Hendershott, 1988), Illinois (Follain, Lutes and Meier, 1987) and Texas (Sirmans and Swicegood, 1997). Two use national data from the NAR (Crellin, Frew and Jud, 1988), and the US Census (Jud and Winkler, 1998), respectively. All six combine brokers and sales agents. The two state surveys in Florida and Texas concentrate the analysis on active agents only. Jud and Winkler (1998) use real estate salesforce data that was extracted from a larger sample on the financial services industry compiled by a 1989 U.S. Census study.

The human capital approach from Mincer (1970) and Becker (1975) and used in a study of Ohio Realtors (Glower and Hendershott, 1988) relies on a univariate regression model of the form:

$$\ln y_i = \alpha_0 + \alpha_1 (sch)_i + \alpha_2 (exp)_i.$$

**Exhibit 1** | Published Articles on Income Characteristics of Real Estate Agents

Author & Date of Publication	Area	Agents	Year of Data	Useable Responses	Response Rate (%)	R <sup>2</sup>
Follain, Lutes & Meier (1987)	Illinois	Realtor	1985	674	?	.47
Glower & Hendershott (1988)	Ohio	Realtor	1986	483	72.50	.65
Crellin, Frew & Jud (1988)	U.S.	Broker & non-broker	1984	1,621	?	.39
Sirmans & Swicegood (1995)	Florida	Active licensee	1995	185	15.40	.61
Sirmans & Swicegood (1997)	Texas	Active licensee	1996	310	12.40	.49
Jud & Winkler (1998)	U.S.	RE sales	1990	9,699	?	.38

*Notes:* All the studies utilized a univariate regression model. In all studies, the dependant variable was log of income.

The model regresses the log of agent income, *y*, on the years of schooling, *sch*, and the years of experience, *exp*. All six investigations expand the set of explanatory variables similar to Rosen (1976) to include some combination of the following:

$$\ln (y)_i = \alpha_0 + \sum \alpha_1(sch)_i + \sum \alpha_2 (exp)_i + \sum \alpha_3(per)_i + \sum \alpha_4(prof)_i + \sum \alpha_5 (firm)_i + \alpha_6 (loc)_i + e_i, \quad (1)$$

where schooling covers different levels of professional and formal education, experience includes work that is part-time, full-time, and in other fields; *per* includes other personal variables such as gender and age; *prof* includes professional items such as various types of technology; *firm* covers characteristics of the firm such as ownership and number of sales staff; *loc* represents the metro location of the agent; and *e* is the error term.

All six studies in Exhibit 2 found that three characteristics were positively related to the level of income: number of hours worked, years of schooling and years of experience. This result suggests strongly that the agent makes an income maximizing decision based on these factors *as a group*. This follows the expected result that the agent is a market player *as an income-setter and not an income-receiver*. The typical real estate agent uses his/her strong entrepreneurial spirit to

**Exhibit 2** | Comparison of Research Results from Published Research on Income Characteristics

Variables										
Author and Date of Publication	Age	Broker	Experience	Gender	Hours Worked	Firm	Location	Race	School	
Follain, Lutes & Meier (1987)	-	Positive	Positive	NS	Positive	-	Positive	-	Positive	
Glower & Hendershott (1988)	-	Positive	Positive	Negative	Positive	Positive	Positive	Negative	Positive	
Crellin, Frew & Jud (1988)	NS	Positive	Positive	Negative	Positive	Positive	-	Negative	Positive	
Sirmans & Swicegood (1995)	Negative	NS	Positive	Negative	Positive	Positive	Positive	NS	NS	
Sirmans & Swicegood (1997)	Negative	NS	Positive	Negative	Positive	NS	NS	NS	NS	
Jud & Winkler (1998)	-	-	Positive	Neg/female	Neg/pt time	-	-	-	Positive	

NS = Not significant.

select the desired level of income simultaneously with the hours of work required to obtain it, years of necessary schooling and years of experience as a bundle. The result is a maximized level of utility received from all together.

This dependent variable bundle approach for market participants who control their own evaluations of risk and resulting activity has been suggested by a number of other authors who have evaluated the residential loan decision (Ang and Willhour, 1976; Black and Schweitzer, 1985; and Epley and Liano, 1999), consumer lending decisions (Elliehausen and Lawrence, 1990) and residential liquidity (Moore, 1987). In addition, Megbolugbe and Cho (1993) used a dependent bundle of four residential loan variables to explain origination patterns in U.S. metropolitan areas. Black, Diaz and Wolverson (1995) used a three-variable bundle consisting of sales price, seller paid charges and buyer paid charges to examine the effect of agency on actual residential sale prices. The one common denominator among these studies is that the relevant decision-maker controls the evaluation of risk using a number of characteristics as opposed to a market situation where the risk levels are accepted, taken and used.

Following the dependent bundle approaches from above, the model in this study uses a two variable dependent set. The first is the expected level of income combined with the decision to practice a commercial investment specialty. This choice is consistent with the objective of the project which was to determine the income characteristics of agents who elected this type of practice.

Further, this article adds a new set of predictor independent variables called "activity areas" and suggests that they be added in all future surveys of real estate agents. Activity areas are the specialties in which the agent earns income and the typical client who requires these activities. Logic dictates that levels of income cannot be explained sufficiently without knowledge of the tasks performed by the agent and the type of client who pays for them.

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## Survey and Data

A sample of 4,000 active real estate sales and broker agents in the U.S. was surveyed in 1999 to estimate their income levels, areas of income-generating activity and need for commercial/investment education. The intent was to identify the income characteristics of agents who were located primarily in non-urban areas. The sample included two populations: active sales and broker licensees who may/may not be members of the NAR and could be specializing or generating income in commercial/investment transactions, and those NAR members who identify and classify themselves as commercial/investment specialists.<sup>1</sup>

The total mailing list was assembled from the names of agents provided by various state licensing agencies and a sample of the agents who were members of the twenty-nine NAR Commercial Boards and Divisions. The first group was collected from the state licensing authorities in ten regionally distributed states. The second group were all members of NAR but did not necessarily possess a NAR

designation. For example, a licensed agent may join a local NAR Board or Division and elect not to pursue one of the NAR designations such as a CCIM, CRE, CPM or GRI.<sup>2</sup> The survey results present a profile of the extent of agents in non-urban areas who are involved with commercial and investment activities.

The questionnaire was pre-tested on a sample of real estate agents who identified themselves as commercial/investment specialists.<sup>3</sup> The initial mailing of 4,000 questionnaires went to agents in twenty-six states in February and March, 1999. A reminder postcard was sent to the original set of names followed by a follow-up letter and questionnaire, for a total of 12,000 mailings.<sup>4</sup> A total of 552 useable questionnaires from the 822 returned were the basis of the analysis. The response rate shown in Exhibit 1 was 20.8%, which is very favorable for a national market compared to the surveys mailed in Florida, 15.4% (Sirmans and Swicegood, 1995) and Texas, 12.4% (Sirmans and Swicegood, 1997). One recommendation for future research is that a national sample must have repeated follow-ups to produce a respectable response rate. Exhibit 3 shows the descriptive statistics.

### Income Activity Areas

The four-page questionnaire was unique in that it contained questions that asked the agent to identify the activity areas that generate income. An early question asked the respondent to identify themselves as a “residential specialist” “commercial/investment specialist,” or “both.” Subsequent questions asked the agent to distribute his or her percentage of time, income and education among each specialty. The results are critical to the analysis of where agents earn their income, devote their time and seek additional education.

In addition, the agents were asked to identify the typical client. This information is needed to uncover the market sector in which the agent produced the resulting level of income. Exhibits 4, 5 and 6 show the 1998 income categories reported in the survey, the type of activities that generated this income and the proportion of business by client type. Each category in each of the three exhibits was compared to determine statistical significance at the 1% level. Each exhibit includes the results for all NAR Commercial Board and Division members, the state licensees in general and the two aggregated.

Extracting patterns from the three exhibits combined is useful in assembling the variables to be used in the subsequent analysis. For example, the largest category of income among the NAR Commercial members is “Greater than \$175,000,” the most frequently reported income activity is “Negotiating sales/purchases” and the largest mean reported is the category composed of “Local individuals.” The second largest level of income is “\$85,001 to \$100,000,” the second largest category of activity is “Negotiating leases” and the second largest group of clients is “Corporations.”

The activity areas shown in Exhibit 5 that produced the income shown in Exhibit 4 indicate that agents who call themselves “Commercial/investment” make

**Exhibit 3** | Means and Standard Deviations

Variable	Mean	Std. Dev.
<i>INC_000</i>	86.30	58.34
<i>EDUC</i>	15.49	2.41
<i>FT_EXP</i>	14.94	10.46
<i>EXP_SQ</i>	332.37	423.28
<i>COM_SP</i>	0.42	0.49
<i>AGE</i>	50.87	11.67
<i>MALE</i>	0.71	0.45
<i>MINORITY</i>	0.03	0.18
<i>BROKER</i>	0.65	0.48
<i>REALTOR</i>	0.92	0.27
<i>N_DESIG</i>	0.60	0.84
<i>DESIG_SQ</i>	1.06	2.36
<i>OWNER</i>	0.40	0.50
<i>INST_CLI</i>	25.35	31.73
<i>IND_CLI</i>	56.49	36.60
<i>SELF</i>	13.65	26.24
<i>FIRM_YRS</i>	24.40	23.73
<i>FIRM_PVT</i>	0.95	0.22
<i>NO_LIC</i>	68.43	335.90
<i>NO_UNLIC</i>	27.07	212.62
<i>CO_POP</i>	614,670	805,125
<i>MSA</i>	0.78	0.42

Note: n = 522.

considerably more income than their “Licensee” counterpart. In addition, the areas of activity that are the most important, such as “Negotiating sales/purchases,” and “Negotiating leases” are usually considered to be specialties of the commercial practitioner. These activity patterns are the reason for including in the dependent set the characteristic, *COM\_SP*, for a specialty in commercial/investment transactions.

The clients that generate the income are shown in Exhibit 6. This information is important to determine the impact from the local as opposed to the non-local market. In addition, the clients may be classified as corporate, non-corporate and myself, as each has distinct financial and tax needs. The results of this analysis shown in Exhibit 7 revealed that the activity area of representing institutional clients, *INST\_CLI*, was positively related and highly significant.

**Exhibit 4** | Gross Income Reported by Type of Agent

Category	U.S. NAR Commercial	U.S. Licensee	Total
	Member Survey	Survey	
	Mean	Mean	
\$25,001 to \$40,000*	0.070 (7)	0.211 (2)	0.138
\$40,001 to \$55,000	0.095 (3)	0.125 (3)	0.109
\$55,001 to \$70,000	0.092 (4)	0.084 (4)	0.088
\$70,001 to \$85,000	0.090 (5)	0.057 (6)	0.074
\$85,001 to \$100,000*	0.100 (2)	0.035 (8)	0.069
\$100,001 to \$115,000	0.077 (6)	0.043 (7)	0.061
\$115,001 to \$130,000*	0.052 (10)	0.024 (9)	0.039
\$130,001 to \$145,000*	0.057 (9)	0.022 (10)	0.040
\$145,001 to \$160,000*	0.050 (11)	0.014 (11)	0.032
\$160,001 to \$175,000	0.020 (12)	0.014 (11)	0.017
Greater than \$175,000*	0.229 (1)	0.065 (5)	0.151

Note: Numbers in parentheses rank the frequency of the income category reported.  
 \*Statistically significant across subgroups at 1%.

Interestingly, the number one client by a wide margin was the local individual as shown in Exhibit 6, but the institutional client, *INST\_CLI*, became the most positive and significant to the generation of income shown in Exhibit 7. The highest ranking frequencies in Exhibit 6 included those agents who are attempting to serve corporations, non-local individuals and their own personal assets. These results indicate that predictor variables should be added to the analysis to account for the type of clients that generate the income. It is entirely possible that high/low income producing agents may have a client base that is specialized within a specific client group. The variables, *INST\_CLI*, representing corporations and financial institutions, *IND\_CLI* for local and non-local individuals, and *SELF* for my own assets, were added to the canonical analysis to account for these client areas.

### The Canonical Correlation Model

The canonical model can be expressed as:

$$(c_1 \cdots c_n) = f(p_1 \cdots p_n) \tag{2}$$



**Exhibit 5** | Area of Activity and Source of Agent Income

Category	U.S. NAR Commercial	U.S. Licensee	Total
	Member Sample	Sample	
	Mean	Mean	Mean
Analysis and counseling*	1.97 (6)	1.46 (8)	1.74 (8)
Appraisal*	1.44 (13)	1.31 (11)	1.39
Construction and development*	1.67 (9)	1.42 (9)	1.55
Contract preparation	1.88 (8)	1.75 (3)	1.82 (6)
Exchange accommodation*	1.45 (12)	1.21 (13)	1.34
Exchanging*	1.58 (10)	1.18 (15)	1.40
Expert witness*	1.26 (17)	1.14 (16)	1.20
Facilitation and intermediation*	1.44 (13)	1.25 (12)	1.35
Financing	1.44 (13)	1.35 (10)	1.40
Locating development sites*	2.12 (5)	1.51 (7)	1.84 (5)
Managing my own assets*	2.19 (3)	1.93 (2)	2.07 (3)
Negotiating leases*	2.78 (2)	1.53 (6)	2.22 (2)
Negotiating sales/purchases*	3.18 (1)	2.14 (1)	2.71 (1)
Property management*	1.94 (7)	1.63 (5)	1.80 (7)
Prospecting for clients*	2.16 (4)	1.72 (4)	1.96 (4)
Subleasing*	1.58 (10)	1.11 (17)	1.37
Tenant improvements*	1.43 (16)	1.21 (13)	1.33

*Note:* Numbers in parentheses rank the frequency of selection of each area by the agent.  
 \*Statistically significant across subgroups at 1%.

where  $c$  are the criterion-dependent variables, and  $p$  are the predictor-independent variables. The basic task of the model requires the estimation of a number of canonical variates or linear functions from each of the two sets so that the correlation between the two is maximized (Cooley and Lohnes, 1971; Hair Anderson, Tatham and Black, 1987; and Van de Geer, 1993). The first canonical variate extracted will account for the maximum amount of variance between the two combinations. The second variate will maximize the variance not used in the first variate. Successive variates are extracted from the residual variance leftover from the previous extraction. As each variate is extracted only from residual variance, each set is orthogonally independent from the previous variate (Hair, Anderson, Tatham and Black). The first root of the canonical loadings represents the maximum amount of variance and is uncorrelated with successive extracted roots (Hair, Anderson, Tatham and Black).

**Exhibit 6** | Type of Client that Generated Agent Income

Category	U.S. NAR Commercial	U.S. Licensee	Total
	Member Survey	Survey	
	Mean	Mean	Mean
Corporations*	0.247 (2)	0.041 (4)	0.153 (2)
Financial institutions*	0.068 (5)	0.034 (6)	0.053 (5)
Myself*	0.114 (3)	0.179 (3)	0.144 (4)
Pension funds*	0.021 (7)	0.002 (8)	0.012 (8)
Local individuals	0.388 (1)	0.434 (1)	0.409 (1)
Government	0.020 (8)	0.011 (7)	0.016 (7)
REITs*	0.020 (8)	0.002 (8)	0.012 (8)
Nonlocal individuals*	0.088 (4)	0.230 (2)	0.153 (3)
Other sources	0.037 (6)	0.040 (5)	0.038 (6)

Note: Numbers in parentheses rank the frequency of selection of each area by the agent.  
\*Statistically significant across subgroups at 1%.

The traditional approach has involved two parts. The first is an analysis of the sign and magnitude of the coefficient or canonical loading for each variable to determine its contribution to the function (Black and Schweitzer, 1985; and Rencher, 1992). The second part is to rank the variables according to their contribution to the function (Rencher). The generally accepted level of statistical significance for  $n > 300$  has been  $\pm .15$  and  $\pm .11$  for 1% and 5%, respectively (Child, 1970; and Hair, Anderson, Tatham and Black, 1987). Generally, any coefficient over  $\pm .30$  should be regarded as nontrivial when  $n > 50$  (Child, 1970; and Cooley and Lohnes, 1971).

As the coefficients are not from a regression, they are not subject to the same  $t$ -test. The relationship between the two sets of variables may be examined through a Stewart-Love redundancy index that is similar to the coefficient of determination, an  $F$ -test and a canonical correlation (Hair, Anderson, Tatham and Black, 1987).

This article adds additional information to the analysis with a varimax rotation as recommended by Kaiser (1958), Child (1970) and Thompson (1984). An orthogonal rotation distributes the variance from earlier factors to later ones to achieve a more meaningful pattern. The result is a stronger pattern of relationship between the two sets of variables than is revealed in the first root.<sup>5</sup> The rotation results are shown in Exhibit 10.

**Exhibit 7** | Canonical Loadings, Principal Components and Rank of the Roots

	Canonical Loadings			Principal Components		
	Root 1	Rank Root 1	Root 2	Factor 1	Rank Factor 1	Factor 2
<b>Dependent</b>						
<i>INC</i>	.8016 <sup>abc</sup>	2	-.5979 <sup>abc</sup>	.6471 <sup>abc</sup>	3	-.1807 <sup>ac</sup>
<i>COM_SP</i>	.8817 <sup>abc</sup>	1	.4719 <sup>abc</sup>	.5614 <sup>abc</sup>	4	-.5009 <sup>abc</sup>
<b>Independent</b>						
<b>Personal</b>						
<i>AGE</i>	-.2345 <sup>ac</sup>	14	-.1125 <sup>a</sup>	.2061 <sup>ac</sup>	15	.5264 <sup>abc</sup>
<i>MALE</i>	.5455 <sup>abc</sup>	4	.0342	.4555 <sup>abc</sup>	9	-.2835 <sup>ac</sup>
<i>MINORITY</i>	-.0994	19	.0636	-.0899	19	-.0308
<b>Professional</b>						
<i>BROKER</i>	.3017 <sup>abc</sup>	10	-.5832 <sup>abc</sup>	.4899 <sup>abc</sup>	6	.3654 <sup>abc</sup>
<i>REALTOR</i>	.1105 <sup>a</sup>	18	-.1967 <sup>ac</sup>	.1794 <sup>ac</sup>	16	.0165
<i>N_DESIG</i>	.0551	21	-.4660 <sup>abc</sup>	.3888 <sup>abc</sup>	11	.4878 <sup>abc</sup>
<i>DESIG_SQ</i>	.0300	22	-.4149 <sup>abc</sup>	.3527 <sup>abc</sup>	12	.4838 <sup>abc</sup>
<i>EDUC</i>	.3886 <sup>abc</sup>	8	.1360 <sup>a</sup>	.2701 <sup>ac</sup>	14	-.2869 <sup>ac</sup>
<i>FT_EXP</i>	.4477 <sup>abc</sup>	6	-.4312 <sup>abc</sup>	.7500 <sup>abc</sup>	1	.3982 <sup>abc</sup>
<i>EXP_SQ</i>	.3546 <sup>abc</sup>	9	-.2934 <sup>ac</sup>	.6793 <sup>abc</sup>	2	.3879 <sup>abc</sup>
<b>Activity Area</b>						
<i>INST_CLI</i>	.7331 <sup>abc</sup>	3	.3548 <sup>abc</sup>	.5101 <sup>abc</sup>	5	-.5559 <sup>abc</sup>
<i>IND_CLI</i>	-.3926 <sup>abc</sup>	7	-.1213 <sup>a</sup>	-.4558 <sup>abc</sup>	8	.2882 <sup>a</sup>
<i>SELF</i>	-.2133 <sup>ac</sup>	15	-.1590 <sup>ac</sup>	.0218	22	.2037 <sup>ac</sup>
<b>Firm</b>						
<i>OWNER</i>	.2912 <sup>ac</sup>	12	-.5132 <sup>abc</sup>	.4090 <sup>ac</sup>	10	.3307 <sup>abc</sup>
<i>FIRM_YRS</i>	.2350 <sup>ac</sup>	13	.0219	.1717 <sup>ac</sup>	18	-.3109 <sup>abc</sup>
<i>FIRM_PVT</i>	-.1436 <sup>a</sup>	17	-.0251	-.0629	21	.2905 <sup>ac</sup>
<i>NO_LIC</i>	.0688	20	.0382	.0745	20	-.3446 <sup>abc</sup>
<i>NO_UNLIC</i>	.2076 <sup>ac</sup>	16	-.0682	.1736 <sup>ac</sup>	17	-.3592 <sup>abc</sup>
<b>Location</b>						
<i>CO_POP</i>	.2936 <sup>ac</sup>	11	-.0161	.3254 <sup>abc</sup>	13	-.1246 <sup>a</sup>
<i>MSA</i>	.5004 <sup>abc</sup>	5	.3519 <sup>abc</sup>	.4713 <sup>abc</sup>	7	-.2866 <sup>ac</sup>

*Notes:* Canonical correlation = 0.73; Canonical  $R^2$  = .53; Eigenvalue = 1.12; Redundancy Index = 0.38; Degrees of freedom = 40; and the F-value = 15.2\*.

\* Statistically significant at 1%.

<sup>a</sup> Significant at 5% for  $n > 300$  if coefficient is greater than or equal to .11.

<sup>b</sup> Nontrivial root for  $n > 50$  if coefficient is greater than or equal to .30.

<sup>c</sup> Significant at 1% for  $n > 300$  if coefficient is greater than or equal to .15.

### Limitations of Canonical Analysis

The coefficients from the canonical loadings or the varimax rotation are not comparable to the more traditional regression results found in the previous six studies shown in Exhibit 1. The tools mentioned above are used to determine the accuracy of the canonical loadings. The varimax rotation does not have any typical statistical interpretations other than the taxonomies that the coefficients suggest.

The appropriate method for interpreting the results is to examine: (1) the signs of the coefficients to determine if the relationship with the dependent set of criterion variables is the one expected; (2) the magnitude of the coefficients to determine if they are non-trivial (Hair, Anderson, Tatham and Black, 1987; and Lambert and Durand, 1975); (3) the magnitude is significant at 1% as suggested by Elliehausen and Lawrence (1990) and Child (1970); (4) the rank of the absolute values (Rencher, 1992).

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### The Empirical Model

The empirical model is:

$$(y_1 \cdots y_2) = f(\text{per}, \text{prof}, \text{firm}, \text{activity}, \text{loc}), \quad (3)$$

where  $y$  is a bundle of two dependent variables. The variables included and their specification follows:

#### **Dependent Criterion Variables:**

*INC* = 1998 income in dollars<sup>6</sup>; and  
*COM\_SP* = Agent classifies self as a commercial/investment specialist.

#### **Independent Predictor Variables:**

##### **Personal (*per*):**

*AGE* = Age of the agent in years;  
*MALE* = Male gender; and  
*MINORITY* = 1 = minority, 0 otherwise.

##### **Professional (*prof*):**

*BROKER* = 1 = broker's license, 0 sales license;  
*REALTOR* = 1 = yes, 0 no;  
*N\_DESIG* = Number of designations held;  
*DESIG\_SQ* = Designations-squared to include a negative influence on the level of income from additional professional designations;

*EDUC* = Number of years of formal education;  
*FT\_EXP* = Number of years employed full-time in real estate; and  
*EXP\_SQ* = Experience squared to include negative influences on the level of income from additional years in the business.

#### Activity Area (*activity*) from Exhibit 6:

*INST\_CLI* = 1 = clients that are corporations, financial institutions, pension funds, governments or REITs, 0 otherwise;  
*IND\_CLI* = 1 = clients that are local or non-local individuals, 0 otherwise;  
 and  
*SELF* = 1 = clients include self, 0 otherwise.

#### Firm (*firm*):

*OWNER* = 1 = co-owner or owner of firm, 0 otherwise;  
*FIRM\_YRS* = Years of firm operation;  
*FIRM\_PVT* = 1 = privately owned, 0 otherwise;  
*NO\_LIC* = Number of licensees with the firm; and  
*NO\_UNLIC* = Number of unlicensed staff with the firm.

#### Location (*loc*):

*CO\_POP* = 1997 population of county where agent works; and  
*MSA* = 1 = agent is located in MSA, 0 otherwise.

The agent's income, *INC*, ranged from "less than \$25,000" to "greater than \$175,000" in increments of \$15,000, for a total of twelve categories. The second variable, *COM\_SP*, represents the decision of the agent to be a commercial/investment specialist.

Logic dictates that a decision to concentrate in one specialty only, such as commercial and investment, is made jointly with the level of anticipated income. The alternative is to be a residential specialist.

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## Results

The CANCELL procedure in SAS produced the matrix for the canonical loadings used in this set that are shown in Exhibit 7. The coefficients are evaluated using the recommendation by Child (1970), Hair, Anderson, Tatham and Black (1987) and Epley and Liano (1999) that the canonical correlation, eigenvalue, percentage of variance and probability be used to judge the number of significant roots. The canonical correlation of .73 and the  $R^2$  of .53 show that the model performed well. The eigenvalue of 1.12 suggests that at least the first root be retained for further analysis as any value above or near 1.0 satisfies this criteria. The *F*-Statistic of 15.2 was significant at 1%. The analysis includes a useable set of 552 questionnaires once the final variable specification was completed.

### Number of Roots

A number of researchers have suggested that an interpretation of the first root only is sufficient (providing the eigenvalue is at least 1.0) for meaningful canonical analysis as it captures the maximum variance in the estimation of the first canonical variate (Child, 1970; Elliehausen and Lawrence, 1970; Fraiser, Phillips and Rose, 1974; Black and Schweitzer, 1985; Rencher, 1992; and Epley and Liano, 1999). Each subsequent root captures only the residual variance that remains from the previous calculation.

The results of both roots are shown here to present a clear picture of the technique and the analysis of the results. The canonical loadings with the principal components factors<sup>7</sup> are shown in Exhibit 7. The latter is included here to provide a basis of comparison with the results from the canonical correlation. The rotation is shown in Exhibit 10.

### Interpretation

The canonical analysis must reveal three patterns to convey confidence to the user that the interactions between the dependent-criterion set and the independent-predictor variables are accurate and reliable (Ang and Willhour, 1976). First, the relationships among the variables in the dependent set must illustrate the expected pattern. Second, the profile of the independent variables must reveal relationships with the dependent set that uncovers an expected interaction with the dependent set and typical market forces. Third, the activity areas undertaken by the agents to produce the desired level of income must reveal patterns that match expectations.

### Dependent Variable Tradeoffs

Exhibit 8 shows that the first root canonical loading performed well. Both dependent variables revealed positive signs, were highly significant and non-trivial and ranked 1–2, which means that the commercial specialty was significantly correlated with income as expected. These results strongly support the conclusion that the agent's desired level of income is a joint decision that is made in conjunction with the area of activity that produces the income. This result is an important conclusion in this study and to the design of future surveys. Any questionnaire designed to estimate the human capital model should identify the areas that produce income, analyze the activities to determine the significant areas, and include these in the predictor set.

*Relationship of the independent variables to the dependent set and the market.* One of the most interesting results is the education and experience coefficients. The number of years of education, *EDUC*, was significant, non-trivial, and ranked

**Exhibit 8** | First Root Rankings and Coefficients

	Canonical		Prin comp	
	Rank	Coefficient	Rank	Coefficient
Highest 10				
COMM_SP	1	.8817 <sup>abc</sup>	4	.5614 <sup>abc</sup>
INC	2	.8016 <sup>abc</sup>	3	.6471 <sup>abc</sup>
INST_CLI	3	.7331 <sup>abc</sup>	5	.5101 <sup>abc</sup>
MALE	4	.5455 <sup>abc</sup>	9	.4555 <sup>abc</sup>
MSA	5	.5004 <sup>abc</sup>	7	.4713 <sup>abc</sup>
FT_EXP	6	.4477 <sup>abc</sup>	1	.7500 <sup>abc</sup>
IND_CLI	7	-.3926 <sup>abc</sup>	8	-.4558 <sup>abc</sup>
EDUC	8	.3886 <sup>abc</sup>	14	.2701 <sup>ac</sup>
EXP_SQ	9	.3546 <sup>abc</sup>	2	.6793 <sup>abc</sup>
BROKER	10	.3017 <sup>abc</sup>	6	.4899 <sup>abc</sup>
Lowest 10				
FIRM-YRS	13	.2350 <sup>ac</sup>	18	.1717 <sup>ac</sup>
AGE	14	-.2345 <sup>ac</sup>	15	.2061 <sup>ac</sup>
SELF	15	-.2133 <sup>ac</sup>	22	.0218
NO-UNLIC	16	.2076 <sup>ac</sup>	17	.1736 <sup>ac</sup>
FIRM_PVT	17	-.1436	21	-.0629
REALTOR	18	.1105 <sup>a</sup>	16	.1794 <sup>ac</sup>
MINORITY	19	-.0994	19	.0899
NO_LIC	20	.0688	20	.0745
N_DESIG	21	.0551	11	.3888 <sup>abc</sup>
DES_SQ	22	.0300	12	.3527 <sup>abc</sup>

<sup>a</sup>Significant at 5% for  $n > 300$  if coefficient is greater than or equal to .11.  
<sup>b</sup>Nontrivial root for  $n > 50$  if coefficient is greater than or equal to .30.  
<sup>c</sup>Significant at 1% for  $n > 300$  if coefficient is greater than or equal to .15.

eighth in the first root loadings, but declined in importance in the first factor principal component that caused a fall in ranking to fourteenth. Further information is revealed in Exhibit 10 where the rotation first root for education fell in rank to twenty-first and the magnitude of the coefficient dropped to .0066. This conclusion is in contrast to the results shown in the previous studies in Table 1 that the number of years of education is an important factor in determining the level of agent income.

In contrast, the first root loading for the number of years of full-time experience, *FT\_EXP*, and its squared term, *EXP\_SQ*, are positively related to the dependent set, significant and nontrivial, and ranked in the top ten with all three tests. The results indicate that for a commercial/investment specialist, the amount of

experience is much more important than the amount of education in determining the level of income.

Interestingly, belonging to the NAR, *REALTOR*, is not an important factor in the determination of income. All of the first root coefficients are positively related to income, but the level of significance is relatively low and none of the roots are non-trivial (coefficient  $\pm .30$ ). Further, none of the first root coefficients in Exhibits 7–9 are ranked in the first 10. Commercial investment specialists do not associate membership with their income.

In addition, possession of a number of designations, *N\_DESIG*, was positive related to income in Exhibit 8, but not ranked in the top ten. In this case, the rotation added conflicting information as this variable became much more significant and was ranked higher. This result warrants further investigation to determine the worthiness of professional membership.

*Personal category.* Other interrelationships were very comparable with the results in the previous studies shown in Exhibit 2. For example, the first root canonical loading reached the same conclusion as Glower and Hendershott (1988) and Crellin, Frew and Jud (1988) that race or minority has a negative association with income. The coefficient,  $-.0994$ , was ranked nineteenth, which means that it was low in its contribution to the model. The rotation showed almost the same result,  $-.0872$  and the first root principal component,  $.0899$ , was almost the same magnitude with a different sign. This result, which is consistent with the six studies shown in Exhibit 2, could serve as the basis for targeted education to minorities to improve their potential level of income.

Further, Exhibit 8 shows that these agents are predominately male. Both coefficients are highly significant, positive, and ranked in the highest ten.

*Professional category.* One squared term was inserted to capture a possible diminishing influence on the dependent variables as each becomes larger. The first root, number of years of experience, *EXP\_SQ*, was highly significant, non-trivial, and ranked in the highest ten in Exhibits 7, 8 and the rotation. This means that the relationship between income with a commercial specialty has a curvilinear relationship with the years of experience. Experience has an increasing impact on income.

In addition, holding a broker's license is very relevant to the level of income. All first roots were highly significant, positively related to the dependent set and ranked in the highest ten.

*Firm category.* Being the owner of the firm was important only in the rotation. The number of years the firm has been in operation, *FIRM\_YRS*, revealed positive and somewhat significant results in the loadings and principal components analysis, but was negative in the rotation. All three coefficients were ranked in the lowest ten.

A privately owned firm, *FIRM\_PVT*, showed negative, nonsignificant coefficients in Exhibit 9 that were ranked in the lowest ten. The number of licensees in the



**Exhibit 9** | Comparison to Previous Research Results

Author and Date of Publication	Variables									
	Age	Broker	Experience	Gender	Hours Worked	Firm Owner	Metro	Race	School	
This study (2000)	Neg/Pos Sig Low 10	Positive Sig High 10	Positive Sig High 10	Positive Sig High 10	Positive Sig High 10	Positive Sig Second 10	Positive Sig High 10	Negative Not sig Low 10	Positive Sig Mixed	
Follain, Lutes & Meier (1987)	-	Positive	Positive	Not sig	Positive	-	Positive	-	Positive	
Glower & Hendershott (1988)	-	Positive	Positive	Negative	Positive	Positive	Positive	Negative	Positive	
Crellin, Frew & Jud (1988)	Not sig	Positive	Positive	Negative	Positive	Positive	-	Negative	Positive	
Sirmans & Swicegood (1995)	Negative	Not sig	Positive	Negative	Positive	Positive	Positive	Not sig	Not sig	
Sirmans & Swicegood (1997)	Negative	Not sig	Positive	Negative	Positive	Not sig	Not sig	Not sig	Not sig	
Jud & Winkler (1998)	-	-	Positive	Neg/female	Neg/pt time	-	-	-	Positive	

firm, *NO\_LIC*, revealed positive coefficients, nonsignificant and ranked twentieth. The rotation did not add additional information. Information on the firm characteristics and fellow colleagues does not appear to be important to the model.

*Location category.* This area revealed that a MSA location is highly important. This variable in Exhibit 9 is positive, highly significant and ranked in the highest ten.

*Expected positive relationship between the activity areas and dependent set.* Exhibit 8 and the rotation revealed that the income activity area of representing institutional clients, *INST\_CLI*, was very important and positively related to the dependent variables. The first root of the rotation was positive, but not significant or ranked in the highest ten. The picture painted here is that the type of client appears to be a critical activity area to identify and include in this analysis and future questionnaires.

The important income activity areas representing individual clients, *IND\_CLI*, was negative and significant through all roots. One explanation for this result is the non-urban emphasis on the sample that restricts the potential clientele. Local institutional commercial needs may be easier to fulfill than the constant generation of new individual clients from regional markets.

The variable for managing my own assets, *SELF*, revealed a mixed result. The first canonical loading was significant, negative and ranked fifteenth in contrast to the first root of the principal component analysis that nonsignificant, positive and ranked twenty-second. The rotation coefficient was positive, significant and ranked thirteenth. Logically, commercial and investment agents should desire a personal investment portfolio of real estate properties that they can manage full time to produce an acceptable level of income. One part of that portfolio could be the ownership and management of their own firm that employs a number of licensed and unlicensed personnel. The variable “myself” was inserted into the survey to capture this activity. Exhibit 6 reveals that it was ranked in the third and fourth position as an activity area. The impact of this potential wealth effect on work effort by accumulating and managing one’s own personal assets is important to an analysis of income characteristics and deserves further attention in future research.

### Summary of Results

The canonical correlation loading analysis involves discussion of non-trivial roots that are of the magnitude  $\pm .30$  when  $n > 50$  combined with significant coefficients at the 1% and 5% levels. Using this analysis, a pattern of the income characteristics of an active agent who elects to participate at some level in commercial/investment transactions may be summarized as follows: (1) income and a commercial specialty are highly related in a joint decision that makes the agent an income-setter as opposed to an income-taker; (2) male gender; (3) not a minority; (4) licensed as a broker; (5) age does not add significantly to income;

(6) years of full-time experience is more important than years of education; (7) years of full time experience has a curvilinear relationship with the level of income and a commercial specialty; (8) income and commercial specialty are highly correlated with the activity area of institutional clients; (9) activity area of individual clients is negatively related to income and the commercial specialty; (10) managing my own assets is not a significant contribution to income; (11)

**Exhibit 10** | Rotation of Canonical Loadings, Roots 1 and 2, and Rank of Root One

	Varimax Rotation		
	Root 1	Rank Root 1	Root 2
<b>Dependent</b>			
<i>INC</i>	.3561 <sup>abc</sup>	9	.5697 <sup>abc</sup>
<i>COM_SP</i>	.7695 <sup>abc</sup>	2	.7484 <sup>abc</sup>
<b>Independent</b>			
<b>Personal</b>			
<i>AGE</i>	.5071 <sup>abc</sup>	8	-.2498 <sup>abc</sup>
<i>MALE</i>	.1453 <sup>ac</sup>	15	-.5165 <sup>abc</sup>
<i>MINORITY</i>	-.0872	19	-.0379
<b>Professional</b>			
<i>BROKER</i>	.6082 <sup>abc</sup>	5	.0604
<i>REALTOR</i>	.1436 <sup>a</sup>	16	.1088 <sup>a</sup>
<i>N_DESIG</i>	.6161 <sup>abc</sup>	4	-.0981
<i>DESIG_SQ</i>	.5867 <sup>abc</sup>	6	-.1196 <sup>a</sup>
<i>EDUC</i>	.0066	21	.3945 <sup>abc</sup>
<i>FT_EXP</i>	.8224 <sup>abc</sup>	1	.2116 <sup>ac</sup>
<i>EXP_SQ</i>	.7633 <sup>abc</sup>	3	.1715 <sup>ac</sup>
<b>Activity Area</b>			
<i>INST_CLI</i>	.0019	22	.7546 <sup>abc</sup>
<i>IND_CLI</i>	-.1424 <sup>a</sup>	17	-.5201 <sup>abc</sup>
<i>SELF</i>	.1534 <sup>ac</sup>	13	-.1357 <sup>a</sup>
<b>Firm</b>			
<i>OWNER</i>	.5250 <sup>abc</sup>	7	.0316
<i>FIRM_YRS</i>	-.0824 <sup>a</sup>	20	.3450 <sup>abc</sup>
<i>FIRM_PVT</i>	.1493 <sup>ab</sup>	14	-.2570 <sup>ac</sup>
<i>NO_LIC</i>	-.1807 <sup>a</sup>	10	.3084 <sup>abc</sup>
<i>NO_UNLIC</i>	-.1139 <sup>a</sup>	18	.3823 <sup>abc</sup>
<b>Location</b>			
<i>CO_POP</i>	.1564 <sup>ac</sup>	11	.3114 <sup>abc</sup>
<i>MSA</i>	.1549 <sup>ac</sup>	12	.5294 <sup>abc</sup>

<sup>a</sup>Significant at 5% for  $n > 300$  if the coefficient is greater than or equal to .11.  
<sup>b</sup>Nontrivial root for  $n > 50$  if the coefficient is greater than or equal to .30.  
<sup>c</sup>Significant at 1% for  $n > 300$  if the coefficient is greater than or equal to .15.

firm ownership and the number of licensed colleagues is not significantly related to income; (12) professional membership as a Realtor does not add significantly to income; (13) number of professional designations does not contribute as much to the model as other variables in the highest ten; and (14) located in a MSA.

The first root of the rotation makes the following changes to the above list: (1) adds age; (2) drops male; (3) adds number of designations and number of designations squared; (4) drops education; (5) drops institutional clients and individual clients; (6) adds owner of the firm; and (7) drops MSA.

A likely scenario of income characteristics that are exhibited by the first root canonical loadings combined with the first root of the principal components analysis is the following. As this agent in question grows older, he/she relies on experience rather than additional education. The agent works full time. The number of designations held is not important initially. Local institutional clients are more important to income than the constant generation of new individual clients. A broker's license is important, and the agent should be located in a MSA. The agent is male and not a minority. Membership in the NAR and the number of professional designations held is not a significant factor.

Exhibit 10 is a convenient comparison of nine conclusions from this study with similar results from the previous research. Canonical loading analysis revealed similar conclusions in all categories and produced additional information for the user such as the ranking (Rencher, 1992).

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## Conclusion

This study adds to the literature by revealing the characteristics of active real estate agents in the U.S. who elect to participate at some level in commercial investment real markets and the activities in which they engage to produce the income. It suggests strongly that additional questions must be added to any future questionnaire that determines the activities in which the agents were involved to produce the income, and the typical clients that requested these services. The significant variables should be added as part of the independent predictor set. Further, this analysis suggests strongly that the dependent set should include the level of income and the identification as a commercial specialist. Also, the conclusions show that these agents enjoy an income level that could be considered to be attractive, which is opposite to the low per capita income found among real estate agents by Johnson, Dotson and Dunlap (1988).

The conclusions suggest that canonical correlation is a viable tool of analysis as the commercial investment agent determines the level of expected income simultaneously with a commercial specialty. The model must be able to capture and measure the impact of these interactive relationships. Future research should be devoted to more accurate delineation of the activity areas that produce the income, and the type of clients that pay for these services. Once those significant

activities have been determined, detailed studies of individual agents would add the design of future surveys.

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## Appendix

A rotation was employed successfully by Simonson, Stowe and Watson (1983) in their study of commercial bank assets and liabilities, and again, in a study of company balance sheets (Stowe, Watson, and Robertson, 1980). Recently, it was used successfully to reveal patterns of residential mortgage origination trends in U.S. banks (Epley and Liano, 1999).

The varimax rotation included two constraints recommended by Perreault and Spiro (1978) to find results that maximize predictable variance—the rotation must be orthonormal and the independent and dependent variables must be rotated with the same transformation matrix. The predictable variance is the same for the rotated and unrotated solution, and the coefficients are allocated more uniformly across the roots. The original eigenvalues no longer reflect the variance accounted for by the rotated function (Perreault and Spiro, 1978).

Further, an advantage of the varimax rotation is that it reallocates the variance among the coefficients and redefines a simple function with only 1s and 0s in the column (see Exhibit 10). The result is that it should clarify the patterns among the variables and simplify the interpretation of any classifications (Perreault and Spiro, 1978). The rotation should not result in a loss of total variance. As no information is lost, the rotation should illustrate a definitive pattern in a well-performing model.

Future studies that examine the income characteristics of real estate agents should consider the multiple dependent variable approach with activity areas to capture the relationship between income and the type of work involved.

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## Endnotes

<sup>1</sup> The agent who elects to participate at some level in the “commercial/investment” market can be labeled as a “commercial agent” similar to the label used by the NAR. Either a broker or a salesperson can assume this title without special education or licensing. No state requires or issues a license in this specialty. A “commercial” agent can join a NAR Board or Division and solicit clients in this area. In addition, a designation such as a CCIM (Certified Commercial and Investment Member) can be earned from the NAR through additional education and specialized experience. In addition, selected NAR commercial/investment designations may be held by members who are not licensed. Thus, the label “commercial agent” can cover a variety of individuals with varying backgrounds who may/may not hold a state license, be a member of NAR or hold a NAR designation.

<sup>2</sup> These designations are awarded by either the NAR or one of its societies or institutes. The CCIM is the Certified Commercial and Investment Member awarded by the Commercial Investment Real Estate Institute; the CRE is the Counselor of Real Estate

awarded by the Society of Real Estate Counselors; the CPM is the Certified Property Manager awarded by the Institute of Real Estate Management; and the GRI is the Graduate Realtors Institute awarded by the NAR.

- <sup>3</sup> All real estate agents in the questionnaire test possessed the CCIM designation. Names were selected to cover all parts of the U.S.
- <sup>4</sup> The survey was structured to include one pretest of the questionnaire, one initial mailing with a cover letter, one postcard reminder to those who did not respond to the initial mailing and a final mailing of the questionnaire to those who did not respond to the first two. Approximately 12,000 mailings were distributed within a two-month period. This magnitude of mail distribution is necessary in a national sample to obtain a sufficiently large response of useable questionnaires.
- <sup>5</sup> Rencher (1992) suggests that the additional step of rotation does not add information to the analysis. His argument is that the resulting rotated solutions are correlated and do not maximize the correlation among the canonical variates.
- <sup>6</sup> Income is reported in categories and nominal dollars. Both are consistent with the six previous studies reported in Exhibit 1, and more recently, a survey of recent transactions by homebuyers and sellers (Elder, Zumpano and Baryla, 2000). Nominal income is appropriate as the survey results are a cross-sectional measurement in one period only.
- <sup>7</sup> The principal components method of factor analysis derives “factors” by grouping correlated variables into smaller sets by removing redundant information. These can be compared to the “roots” from canonical correlation that correlates the weighted set of criterion variables with the independent predictor set (Kachigan, 1986).

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*The author gratefully acknowledges financial support from the Commercial and Investment Real Estate Institute, Chicago. This article has been improved by the comments of two anonymous readers, the editor and Marvin Wolverton.*