Structural Analysis of U.S. Appraiser Income

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Abstract. **This study represents the first investigation of appraiser income at the national level. It is especially timely because it addresses the value of Appraisal Institute designations in a post-FIRREA world, in addition to investigating the impact of gender on appraiser income. The study employs a worker-productivity, human-capital model and finds that appraiser income is positively and significantly impacted by the amount of work effort expended, the level of appraisal experience, and the formal education and professional training attained by an appraiser. Appraisal Institute designations are found to have a significant and positive impact on income, even in a post-FIRREA world of required appraiser licensing and certification. Gender does not appear to impact appraiser income. However, questions do arise regarding the status of female (and minority) appraisers.**

Introduction

No group of real estate professionals has been scrutinized, investigated and regulated in such a short period of time as the real estate appraiser in the United States. With the enactment of FIRREA in 1986 and the subsequent initiation of state appraisal acts came hearings before Congressional committees, a set of new ethics and standards from the newly created Appraisal Foundation, mandatory licensing, certification and state regulatory enforcement, and the initiation of new education and experience requirements. These changes created a new generation of appraisers. Concurrently, the user of appraisal services underwent changes in the nature and structure of the real estate asset brought about by the Tax Reform Act of 1986 and the questionable asset management policies of the savings and loan industry.

Current observations might be that appraisers who remain in the business are the best-of-the-best in talent and experience, and are well diversified, as individuals and firms expand their services and undertake additional marketing and training efforts to survive. This may be especially true for residential appraisers, as the need for their expertise has been diminished by creation of new technology and comparable sale data banks. Further, users of residential appraisals have argued that the historical need for appraisals to protect collateral asset values is not as great today as more is known about potential default, values by neighborhoods and credit scoring of loan applicants.

More than ever the appraisal profession needs to be analyzed periodically to determine the characteristics of income. Is appraisal income sufficient to retain the best-of-the-

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best and attract new personnel? Are experience and education critical to income determination? Does possession of a professional designation, such as the MAI or SRA, provide significantly higher income? Does the current market create incentives for the appraiser to operate within complementary firm types such as lending institutions and government agencies?

The purpose of this article is to investigate the characteristics of income for U.S. real estate appraisers. The approach followed is the commonly-known, worker-productivity model, which is based in human capital theory and applied historically by labor economists to study the returns from schooling, training, and experience within the labor force. The model maintains that worker activities are based on experience, education and effort as presented by Mincer (1974), Becker (1975) and Willis and Rosen (1979).

This study is unique in several respects. It is the first investigation of income determinants of real estate appraisers at the national level, sampling from the appraisal registry maintained by the Appraisal Subcommittee. The registry, required under FIRREA, contains nearly 80,000 names of licensed or certified U.S. real estate appraisers, and it has been untapped for analytical purposes. Additionally, the study segregates appraisers having Appraisal Institute professional designations from appraisers having only mandatory licenses and certifications to determine the impact of these designations on income at the national level. Added costs of doing business as a result of mandatory licensing, certification and education should cause appraisers to examine the impact of obtaining or maintaining a non-mandatory appraisal designation. Finally, the characteristics of income determinants soon after implementation of the Florida appraisal act (Diskin and Gatzlaff, 1994) can be compared to similar U.S. characteristics five years later. Although this comparison is weak, as it compares results from a national survey to the results from one state, it may be indicative of trends.

Four recent studies have investigated income determinants in real estate professions. Two cover real estate agents by state, one was a national study of Realtors® and one was done at the state level for real estate appraisers. All rely on a human capital approach. The model here follows in the tradition of these recent studies of Illinois Realtors® (Follain, Lutes and Meier, 1987), Ohio Realtors® (Glower and Hendershott, 1988), the National Association of Realtors® survey (Crellin, Frew and Jud, 1988) and of Florida appraisers (Diskin and Gatzlaff, 1994).

The Literature

The aforementioned studies of earnings in the real estate profession used ordinary least squares as the statistical tool within a human-capital model, worker-productivity approach to uncover significant interrelationships. The first was an investigation into the determinants of income among Illinois Realtors® (Follain, Lutes and Meier, 1987). This study expanded on a previous analysis by Stribbling (1985), who used a univariate approach that included chi-square tests to determine significant differences among relevant groups. Follain et al. examined nineteen variables extracted from a

survey of Illinois Realtors® in the spring of 1985. They found that: (1) hours worked was closely related to income; (2) income increased substantially with years of experience in the early years of a career, but flattened out with more than ten years of experience; and (3) men and women of the same age and education revealed no significant difference in income.

The second study was an investigation of 481 Ohio Realtors® based on a 1986 survey. Glower and Hendershott (1988) found that: (1) male firm owners earned higher incomes than female firm owners; (2) office managers with a college degree earned higher incomes, which increased with the number of people managed; (3) decreasing returns to hours worked may have existed; (4) specialists in areas other than residential sales earned more; (5) non-metropolitan brokers earned higher incomes than their sales associates; (6) agents in metropolitan areas earned more than their non-metropolitan counterparts; (7) agents with a great deal of experience earned more than beginners; and (8) agents with college degrees earned higher incomes than high school graduates, while postgraduate education provided no additional income.

A third study investigated the earnings of 1,621 Realtors® who responded to a nationwide survey conducted by the National Association of Realtors® in 1984 (Crellin, Frew and Jud, 1988). They found that a broker's license, hours worked, years of schooling, years of experience, professional training, firm size, firm ownership and firm management were all positively related to income. Race (minority), gender (female), residential specialization and franchise affiliation were all negatively related to income.

In summary, studies of Realtor® income find that income is positively related to: (1) possession of a broker's license rather than a salesperson's license; (2) hours worked per week; (3) level of education; and (4) years of experience. Additionally, Crellin, Frew and Jud (1988) and Glower and Hendershott (1988) find that elasticity of income with respect to hours worked is significantly less than one, revealing that the implicit wage rate for Realtors® falls as the number of hours worked per week rises above the full-time level.

The only recent analysis of appraiser income studied responses by 258 Florida real estate appraisers to a survey conducted during November, 1992 to February, 1993 (Diskin and Gatzlaff, 1994). The investigation concentrated on seven factors thought to have an impact on appraiser earnings—experience, work effort, education, professional training, individual characteristics, firm characteristics and market characteristics. Their results revealed that appraiser income is mostly influenced by experience, work effort, professional training and market characteristics. Education, individual characteristics and firm characteristics (other than firm size) were found to be of little significance. Four regression models were tested, each improving on the adjusted R^2 by dropping the least significant variable(s) from the prior model.

Several contrasts and comparisons are apparent among factors found to determine income in the one appraisal and three Realtor® studies discussed. They are summarized as follows:

Factor	Realtors®	Appraisers
Age	insignificant	significant and positive
Experience	significant and positive	significant and positive
Gender (*female*)	significant and negative	insignificant
Ethnicity (*minority*)	significant and negative	untested
College education	significant and positive	insignificant
Firm ownership	significant and positive	significant and positive
Work effort	significant and positive	significant and positive

The Model

The model used here is similar to the human-capital, worker-productivity approach previously cited. For comparison purposes, it incorporates the same categories used in the latter study of Florida appraisers. The analysis employs multiple regression analysis to examine the interrelationships among income and other factors, expressed as:

$$\text{Income} = f(\text{experience, work effort, education, professional training,} \\ \text{individual characteristics, firm characteristics,} \qquad (1) \\ \text{market characteristics}).$$

Formally, the estimation equation can be written as:

$$\ln(Income) = \alpha + \Sigma\,\beta_i\,\exp + \Sigma\gamma_i\,eff + \Sigma\delta_i\,edu + \Sigma\xi_i\,trng \\ + \Sigma\eta_i\,indiv + \Sigma\theta_i\,firm + \Sigma\lambda_i\,mark + \varepsilon, \qquad (2)$$

where *exp* represents a vector of experience variables, *eff* is a work effort vector, *edu* equals a vector of formal education attainment, *trng* is a vector of professional training variables, *indiv* represents a vector of individual characteristic variables, *firm* includes characteristics of the firm, *mark* is a vector of market characteristics and ε is an estimate of the stochastic error term. The dependent variable, ln(*Income*), is the natural log of the annual income reported in the 1997 survey. This specification allows the regression coefficients of the independent variables to be easily converted into percentages through the transformation *Percentage Change* $= 100\,(1 - e^x)$ where x is the relevant regression coefficient (Halvorsen and Palmquist, 1980).

The experience vector (*exp*) includes years of appraisal experience and the age of the appraiser. It also includes squared experience and age variables to allow for the possibility of diminishing or increasing marginal income effects. Work effort (*eff*) is captured by a dummy variable coded 1 for full-time appraisal employment and 0 otherwise, and also a variable indicating firm ownership. The formal education attainment vector (*edu*) includes indicator variables signifying attainment of a bachelor's degree, a master's degree and a doctorate. The training vector (*trng*) reflects the level of advancement above state licensure by inclusion of dummy variables signifying a state residential appraiser certificate and a state general appraiser

certificate. It also includes variables indicative of an Appraisal Institute residential appraisal designation (RM or SRA) and of an Appraisal Institute commercial appraisal designation (MAI or SRPA). Because a number of Appraisal Institute members hold both residential and commercial appraisal designations, an interaction variable was included in *trng* to capture the income effect, if any, of holding both types of designations.

Characteristic variables are comprised of a vector of individual characteristics (*indiv*), which includes gender, minority status and the appraiser's type of employment relationship with the appraisal firm—employee or independent contractor. Additionally, they contain a vector of firm characteristics (*firm*) including whether the firm is a national firm, a real estate brokerage firm, a branch of government (federal, state, county and municipal employment were lumped together), a bank (including savings and loans) or an other type of firm.[1] The final market characteristic vector (*mark*) is made up of MSA population, state population, percentage change in MSA population over the 1990–1995 period, a ratio of state population to appraisers practicing in a given state and a measure of the each state's relative cost of doing business. Cost of doing business (CDB) was divided into high-cost, low-cost and typical-cost categories based on the overall CDB index published by Regional Financial Associates ((http://ww.rfa.com), an information source employed by Gordon, Mosbaugh and Canter (1996). Those states with an overall CDB index in the upper quartile were dummy coded as high-cost states and those in the lowest quartile were dummy coded as low-cost states.

The estimation equation is specified to test a number of statistical null hypotheses, including:

H_1: *Years of appraisal experience has no impact on income*.
        Glower and Hendershott (1988) and Diskin and Gatzlaff (1994) showed that experience was important in income determination.

H_2: *Age of the appraiser has no impact on income*.
        The three aforementioned studies of Realtors® revealed that age was not related to income. The survey by Diskin and Gatzlaff (1994) showed that it was significant for Florida appraisers. This question is tested again at the national level.

H_3: *Work effort has no impact on income*. Two work-effort constructs are tested, firm ownership versus non-ownership and full-time work versus part-time work. Compensation is expected for the additional work effort associated with firm ownership, in addition to capital invested in an appraisal enterprise. Firm ownership has consistently been significant in income determination. Likewise, appraisers who have made a full-time commitment to the profession are expected to earn more than part-time workers.[2]

H_4: *Formal education is not an important determinant of appraiser income*.
        The issue of education is always critical with regard to justifying the cost and time involved. Additionally, the Florida appraiser study found

college education to be insignificant in determining appraiser income,
whereas the Realtor® studies support the value of a college education.

H_5:   *State certification* (*residential or general*) *does not influence income*.
Experience and education requirements for residential and general
certifications exceed those for licensure. Additionally, the spectra of
business and responsibility increase with certification. Hence, certified
appraisers are expected to earn more than licensed appraisers.

H_6:   *RM/SRA and MAI/SRPA designations have no impact on income*.
Professional designations are a mark of additional, appraisal-specific
education and experience, and should contribute to additional income.

H_7:   *Female gender has no impact on income*.
Realtor® studies have shown that females have lower incomes than
males. The Florida study of appraisers does not support this finding,
however. This question is tested again at the national level.

H_8:   *Minority status is not a factor in income earned*.
Minorities were shown to earn less in the Realtor® studies, but this
variable has not been tested for appraisers.[3]

H_9:   *Type of firm does not influence the level of income earned*.
The Florida study found that employment in three firm types—
lending, brokerage and government—was insignificant. These
relationships are tested again at the national level.

H_{10}:   *Market characteristics do not influence the level of income earned*.
Diskin and Gatzlaff (1994) found county population to be an
important determinant of appraisal income in Florida. The corollary
(state population) is tested at the national level. MSA population, the
MSA population growth rate, the ratio of state population to appraiser
(a measure of the degree of competition for appraisal services) and
the relative cost of doing business are examined as well.

Data

The survey was mailed to 1,200 appraisers in September, 1997. The survey recipients
comprised a proportional sample selected at random from two sample frames. One
sample frame consisted of the roster of members of the Appraisal Institute, which
contains 13,095 appraisers located throughout the U.S. The other sample frame was
the 79,112-name, national appraisal registry. The sample included 220 Appraisal
Institute members drawn from their roster of members and 980 non-Appraisal Institute
members drawn from the appraisal registry.[4] The survey was administered according
to the Dillman (1978) ''total design method.''[5] Of the 1,200 questionnaires mailed,
14 were returned due to an incorrect address or the person no longer being actively
engaged in appraisal, leaving an effective sample size of 1,186. There were 377 usable
responses, which equates to a 31.7% response rate.[6]

Exhibit 1 contains descriptive data on the respondents. On average, they were 49.1
years of age and had 17 years of appraisal experience. Mean income was $58,132.
Most appraisers were male (80%), white (94%) and employed full time in the
appraisal business (85%). Approximately one in four (24%) had an independent

Exhibit 1
Descriptive Statistics

Variable	N	Mean[b]	Std. Dev.	Min.	Max.
Income ($ per year)	364	58,132	36,805	12,500	225,000
Experience (years)	375	17.01	9.59	3	52
Age (years)	372	49.07	11.37	26	84
MSA population (000)[a]	376	3,434	4,945	0	18,107
State population per appraiser	374	3,453	1,295	1,045	9,745
State population (000)	374	10,468	9,405	481	31,878
MSA population change (%)[c]	376	5.63	5.65	−3.30	33.60
Indicator variables High-CDB state	377	0.29	0.45	0	1
Low-CDB state	377	0.17	0.38	0	1
Full-time appraiser	372	0.85	0.36	0	1
Independent contractor	363	0.24	0.43	0	1
Bachelor's degree	375	0.56	0.50	0	1
Master's degree	375	0.10	0.29	0	1
Doctorate	375	0.01	0.11	0	1
RM or SRA designation	376	0.18	0.39	0	1
MAI or SRPA designation	376	0.17	0.38	0	1
Both RM/SRA and MAI/SRPA	376	0.07	0.25	0	1
Certified residential appraiser	374	0.37	0.48	0	1
Certified general appraiser	374	0.51	0.50	0	1
Gender = female	375	0.20	0.40	0	1
Minority status	370	0.06	0.24	0	1
Company owner	362	0.56	0.50	0	1
Work for a national firm	367	0.10	0.30	0	1
Firm is a brokerage firm	370	0.09	0.29	0	1
Government employee	370	0.06	0.24	0	1
Bank employee	370	0.10	0.30	0	1
Insurance firm employee	370	0.01	0.07	0	1
Accounting firm employee	370	<0.01	0.05	0	1
Other type of firm employee[d]	370	0.03	0.18	0	1

[a]Coded as zero if the appraiser is not located in a MSA.
[b]Proportion of sample for dummy variables.
[c]1990–1995.
[d]Excluding appraisal firms.

contractor relationship with their firm. Since 56% were firm owners, this indicates that the majority (approximately 55%) of non-firm-owner respondents were independent contractors.

Most of the respondents had a bachelor's degree (56%), 10% had a master's degree and 1.3% (5 respondents) had a doctorate. Certified general appraisers were most prevalent (51%), followed by certified residential appraisers (37%). Licensed appraisers made up the remaining proportion (13%). Twenty-eight percent of the respondents were members of the Appraisal Institute, many of whom held more than one Appraisal Institute designation. When Appraisal Institute designations are considered individually, 18% were SRAs or RMs and 17% were SRPAs or MAIs.[7] A majority of the respondents worked for traditional appraisal firms (71%). The remainder consisted of commercial bank or savings and loan employees (10%), associates of real estate brokerage firms (9%), government employees (6%) or other types of firms (3%).

Market characteristics include a mean MSA population of 3.434 million, and MSA population ranging from zero to 18.107 million.[8] State population averages 10.468 million, and ranges from 0.481 million to 31.878 million. MSA growth from 1990 to 1995 ranges from -3.3% to +33.6%. On average it was 5.6%. Mean state population per appraiser is 3,453. It ranges from 1,045 to 9,745. Twenty-nine percent (29%) of the respondents worked in high-CDB states, and 17% worked in low-CDB states.

A Chow (1960) test indicated that the worker productivity model coefficient vector for male appraisers may differ from the coefficient vector for female appraisers (*F*-Statistic = 1.689, *p*-value = .025). Consequently, we tested for interactions between female gender and several of the model's key variables including age, experience, full-time work effort, level of formal education, level of certification and Appraisal Institute designations. However, these variables were so correlated within the female subset of the data that the resulting estimation model's interaction terms were highly multicollinear, and no additional insight could be obtained from the interaction analysis. Furthermore, due to multicollinearity, incorrect and misleading signs on coefficients within the female subset model may have contributed to the significance of the Chow test result. Hence, the female interaction model is not included in the following section. Additionally, there were too few minority responses to allow such an analysis for minority appraisers.

Empirical Results

As shown in Exhibit 2, two regression models are reported, and the set of significant variables remains constant across both models. Variable signs are generally as expected, with the exception of the signs on the market characteristic variables—particularly *State Population* and *State Population Per Appraiser*—in Model 1 and the sign on *Experience*^{2} in Model 2, which is positive rather than negative. Both models do, however, show the expected positive relationship between age, experience and income. Coefficients on the squared terms were very small and insignificant, indicative of essentially linear returns—primarily to experience.

Exhibit 2
OLS Regression Estimates

Independent Variable	Model 1 Coeff.	Model 2 Coeff.
Intercept	9.83	9.80
	(19.5)*	(19.5)*
Experience[a]	0.02	0.02
	(1.57)	(1.32)
Experience^2	−4.0E-05	2.2E-05
	(−0.15)	(0.08)
Age	0.01	0.10
	(0.36)	(0.47)
Age^2	−2.0E-04	−2.2E-04
	(0.95)	(−1.07)
Full-time appraiser	0.55	0.54
	(6.47)*	(6.43)*
Independent contractor	−0.11	−0.13
	(−1.21)	(−1.34)
Bachelor's degree	0.12	0.12
	(1.74)***	(1.74)***
Master's degree	0.10	0.11
	(0.99)	(1.05)
Doctorate	0.71	0.70
	(2.67)*	(2.64)*
RM or SRA designation	0.17	0.16
	(1.81)***	(1.76)***
MAI or SRPA designation	0.23	0.23
	(2.08)**	(2.12)**
Both RM/SRA & MAI/SRPA	−0.09	−0.10
	(−0.53)	(−0.58)
Certified residential appraiser	0.20	0.20
	(2.15)**	(2.19)**
Certified general appraiser	0.16	0.16
	(1.68)***	(1.68)***
Gender = female	−0.08	−0.10
	(−1.09)	(−1.27)
Minority status	−0.04	−0.03
	(−0.30)	(−0.21)
Company owner[a]	0.12	0.12
	(1.39)	(1.41)
Firm is a brokerage firm	0.10	0.09
	(0.94)	(0.88)

Exhibit 2 (continued)
OLS Regression Estimates

Independent Variable	Model 1 Coeff.	Model 2 Coeff.
Government employee	−0.11	−0.10
	(−0.76)	(−0.68)
Bank employee	0.11	0.10
	(0.99)	(0.87)
Other type of firm[b]	−0.29	−0.29
	(1.84)***	(−1.84)***
Work for a national firm	0.14	0.13
	(1.30)	(1.22)
State population per *appraiser*	6.7E-06	2.5E-06
	(−0.30)	(−0.11)
MSA population change (%)[c]	<0.01	<0.01
	(0.58)	(0.32)
MSA population	5.9E-09	
	(0.85)	
State population (000)	−5.7E-09	
	(−1.46)	
High-CBD state	0.04	
	(0.52)	
Low-CBD state	0.09	
	(0.08)	
High-cost, urbanized market		−0.02
		(−0.68)
Observations	334	334
Adjusted R^2	.315	.315
F-Statistic	6.48***	7.13***
White's Test *p*-value	.661	.236

Note: The dependent variable = Ln(*Income*). *t*-Statistics are in parenthesis.
[a]These two variables are significant at the .10 level using a one-tailed test.
[b]Excluding appraisal firms.
[c]1990–1995.
*Significant at the 1% level.
**Significant at the 5% level.
***Significant at the 10% level.

The second model refines the first model by controlling for high correlations among the *State Population*, *MSA Population*, *High-CDB* and *Low-CDB* variables (see Exhibit 3). Model two removes the four most highly correlated market characteristic variables—*State Population*, *MSA Population*, *High-CDB* and *Low-CDB*—from the regression analysis by substituting a single factor signifying a *High-Cost, Urbanized Market*, which captures 55% of the variance of these four variables.[9]

Most of the statistical hypotheses are rejected in favor if the expected, alternative hypotheses. However, unlike results of prior studies, both age and years of experience

Exhibit 3
Market Characteristics Correlation Matrix

	Pearson Correlation Coefficients					
Variable	X_1	X_2	X_3	X_4	X_5	X_6
X_1: *State population per appraiser*	1.000					
X_2: *MSA population change*	−.134	1.000				
X_3: *MSA population*	.044	−.059	1.000			
X_4: *State population*	.130	−.022	**.494**	1.000		
X_5: *High-CDB state*	.135	−.279	**.522**	**.569**	1.000	
X_6: *Low-CDB state*	.225	.006	**−.236**	**−.179**	**−.288**	1.000

Note: **Bold** typeface emphasizes the large positive correlations between high populations and High-CDB states and the large negative correlations between high populations and Low-CDB states.

seem to be less significant in the presence other factors such as education, certifications and designations, which to some extent proxy for age and experience. Each hypothesis is discussed next.

Hypothesis H_1 (*Experience*)

Although experience and age are highly correlated ($r = .632$), both variables and their respective squared terms take on the expected signs in Model 1. The sign on the experience-squared term takes on an unexpected positive sign in Model 2, however. Further tests show that this outcome is most likely a consequence of the high correlation between age and experience.[10]

Experience is not significant in either model, based on the standard two-tailed test (*t*-ratio = 1.57 and 1.32). However, when restated as a one-tailed hypothesis consistent with the expected sign (H_o: $\beta_{Experience} \leq 0$), the *Experience* variable retains moderate significance in both models (Model 1, one-tailed *p*-value = .059; Model 2, one-tailed *p*-value = .091). Income appears to increase by about 1.6% to 1.9% for each year of appraisal experience. Based in the small coefficients and lack of significance for the squared terms, the relationship between experience and income is essentially linear for this sample.

Hypothesis H_2 (*Age*)

Both models fail to reject the hypothesis that *Age* of the appraiser has no impact on income. This result holds also with a one-tailed test. The *Age* and Age^2 terms are appropriately signed in both models, however.

Hypothesis H_3 (*Work Effort*)

As expected, greater work effort, measured as *Full-time* engagement in the appraisal business, results in significantly higher income. Eighty-five percent of appraisers work

full-time in the profession, and they make about 72% more than their part-time counterparts. Firm ownership appears to result in about 13% higher personal income (Model 1, one-tailed p-value = .083; Model 2, one-tailed p-value = .080).

Hypothesis H_4 (*Formal Education*)

Formal education does appear to have a positive impact on appraiser earnings. When compared to those having earned no college degree, appraisers with *Bachelor's Degrees* make significantly more income (12%), the sign on *Master's Degree* is also positive, but not statistically significant. Appraisers with *Doctorates* also make significantly higher incomes (about 100% more). Be cautioned, however, that the number of doctorates in the sample is small (5 responses) and, although they are licensed and/or certified as appraisers, they may be delivering work products that differ from those of the typical appraiser.

Hypothesis H_5 (*Level of State Certification*)

Income increases significantly with the level of state appraisal certification. As expected, *Certified Residential Appraisers* earn significantly more than licensed appraisers (approximately 22%) as do *Certified General Appraisers* (approximately 18%).

Hypothesis H_6 (*Appraisal Institute Designations*)

The data show that professional training, beyond that required for a state license or certificate, results in additional income. Appraisal Institute designees (both residential and commercial) make significantly higher incomes. Residential designees (*SRA* or *RM*) earned about 18% more and commercial designees (*SRPA* or *MAI*) made about 26% more.

Hypothesis H_7 (*Gender*)

After controlling for experience, age, level of state certification, professional designations and other relevant factors; the analysis fails to reject the hypothesis that being female has no impact on income—under either a two-tailed or one-tailed test. Although a Chow (1960) test seems to support the contention that differences exist between male and female coefficient vectors, as discussed earlier this result is at least in part due to multicollinearity in the female subset and consequent misleading signs on the female coefficient vector.

Nevertheless, females do constitute a different class of appraisers. The data show that, as a group, *Females* earn significantly less than their male counterparts ($47,398 versus $60,586, t = 3.40), are less experienced (12.7 years versus 18.0 years, t = 5.82), are less apt to hold a bachelor's degree (.400 versus .607, t = 3.27) or a master's degree (.053 versus .107, t = 1.69), are much less likely to hold a SRPA or an MAI designation (.040 versus .203, t = 5.00), are less likely to hold a general appraisal certification (.240 versus .572, t = 5.32) and are more likely to hold a residential

certification (.640 versus .298, $t = 5.72$). There are no significant gender-based differences, however, in proportion of full-time workers ($t = 0.84$) and in proportion having either a SRA or RM Appraisal Institute designation ($t = 0.59$). Hence, while the worker productivity model supports the contention that females do not earn less when they are compared to equally qualified and experienced males, the data show that females are generally less productive due to significant differences in experience and qualifications.

Hypothesis H_8 (*Minority Status*)

As with gender, after controlling for experience, level of state certification, professional designations, and other relevant factors; the analysis fails to reject the hypothesis that being a member of a minority group has no impact on income. The reliability of this result is questionable, however, due to the small number of minority respondents and lumping together of various ethnic groups. There were 23 minority responses distributed as Native American (4), African American (3), Hispanic (5), Asian (6) and ''other'' (5). What is clear from the random sample is that minorities make up a small proportion of those who are engaged in the real estate appraisal profession. Minorities represented only 6.2% of the survey respondents.

Hypothesis H_9 (*Firm Type*)

Generally speaking, firm type has no significant effect on appraiser earnings. However, there is a miscellaneous category, ''other type of firm employee'' that shows lower earning power in both models. Content analysis of survey responses reveals that the small number of respondents (12) in the other firm type category work for mortgage companies, appraisal management companies, construction companies, property management companies, electric utility companies and title companies. Hence, there may well be differences in the type of work these respondents are doing and the amount of time devoted to appraisal work. Nevertheless, the results show that it is important to control for the effect of employment by *Other Firm Types* when modeling appraiser income.

Hypothesis H_{10} (*Market Characteristics*)

Market characteristics appear to have little, if any, impact on appraiser earnings at the national level. After controlling for the high degree of multicollinearity in the market characteristic variables (Model 2) the coefficient signs do become more intuitively appealing, however. The negative sign on the *High-Cost, Urbanized Market* variable may indicate that appraisers cannot pass all of these costs on to their clients—although the variable is not statistically significant. High growth rate locations do correlate with higher appraiser incomes, but again the variable is not significant. *State Population per Appraiser* retains a counterintuitive negative sign in both models. However, this coefficient on this variable is extremely small and highly insignificant.

The results are summarized in Exhibit 4, which shows the significant findings converted from raw regression coefficients to percentages. The typical appraiser's

Exhibit 4
Significant Income Effects

	Model 1	Model 2
Significant Independent Variable	% Change	% Change
Experience (years)[a]	1.9	1.6
Full-time appraiser	73.0	72.1
Bachelor's degree	12.4	12.4
Doctorate	104.2	102.2
RM or SRA designation	18.2	17.7
MAI or SRPA designation	25.6	26.0
Certified residential appraiser	21.8	21.9
Certified general appraiser	17.6	17.5
Company owner[a]	12.9	13.1
Other type of firm employee[b]	−25.0	−25.0

Note: Exhibit shows percentage income change from Models 1 and 2.
[a]Signifies a one-tailed test.
[b]Excluding appraisal firms.

earnings are shown to increase linearly by somewhat less than 2% for each year of appraisal experience. Also, there are rewards to human capital to be accumulated by finishing a baccalaureate degree, obtaining an Appraisal Institute designation, and earning a state certification beyond the level of state licensed appraiser. Additionally, income is generally higher (roughly 13%) for appraisers who exercise the work effort required of those who own a firm and substantially higher for those who devote full-time effort to the appraisal profession. Also, the data show that it is important to control for possession of a doctorate and working for "other types of firms" when investigating US appraisal population income.

Results and Implications

This is the first national study of the income characteristics of real estate appraisers. The findings substantiate several of the trends cited earlier by Diskin and Gatzlaff (1994) in their study of Florida appraisers including the importance of experience, firm ownership and work effort. The results validate the worker-productivity, human-capital model in that appraiser income is positively related to the amount of work effort expended and the level of experience, formal education and professional training attained by an appraiser.

In addition to validating some of the earlier findings from Florida and uncovering the value of certifications and professional designations; the study reaches two new, and interesting conclusions: (1) the existence of a significant positive relationship between attainment of a bachelor's degree and appraiser income; and (2) a lack of significance

for gender in income determination. The survey data show, however, that females constitute a different and interesting class of appraisers. Lastly, market characteristic variables appeared to have little influence on appraiser earnings at the national level. The results paint a current picture of an income-maximizing appraiser who is highly experienced, educated through the baccalaureate level and holds a professional designation in addition to certification. Additionally, this person typically works full time for a firm that he or she owns.

This study shows that additional research is needed in three areas. First, appraisers need to know which kinds of services produce significant marginal income. The next study should identify the extent to which appraisers are providing diverse types of services or products (other than appraisals) and the amount of work effort being expended in each service area. It could be that firms offering diverse services and products experience more stable income streams. Second, demand by users of appraisal products may be evolving, changing the nature of the typical appraisal assignment. Are appraisers who are able to adapt to a dynamic market for their services more successful? Are appraisers employing new technologies to meet the needs of clients and improve their productivity? Finally, female and minority appraisers should be examined more closely. What factors are associated with females not reaching levels of education, state certification and professional designation as high as their male counterparts. Why are minority appraisers under-represented in the appraisal population?

All of the above require a more in-depth study of appraisers and appraisal firms, perhaps involving numerous case studies. Such a research effort could delve into alterations in firm organization brought on by FIRREA and state regulation and resultant changes in firm costs, product delivery, as-well-as client and employee relations. It could also uncover market and working conditions relevant to female and minority appraisers. Additionally, an investigation structured in this manner could provide the data required for meaningful guidance pertaining to appraisal education and regulation issues.

Endnotes

[1] Variables were also included for accounting firms and insurance companies, but there were only two respondents working for insurance companies and only one respondent working for an accounting firm. Consequently, these two variables were dropped from the analysis.

[2] In order to control for differences in how FICA is withheld and paid for employees versus independent contractors, an *Independent Contractor* appraiser-characteristic, control variable was included in the estimation model. We thank a reviewer for this suggestion.

[3] The minority variable includes all respondents who classified themselves as Native Americans (four respondents), Hispanic (five respondents), African Americans (three respondents), Asian (six respondents) or of an ''other'' ethnicity (five respondents). The number of minority respondents totaled twenty-three, or 6.2% of the observations.

[4] Appraisal Institute members are included in the Appraisal Registry. In order to keep the correct proportions, care was taken to ensure that no Appraisal Institute members were included in the sample drawn from the national registry. Appraisal Institute members constitute 16.6% of the

national roster of appraisers, and they constitute 18.3% of the sample. However, the proportion of Appraisal Institute members in the national roster is actually higher than 16.6% because appraisers licensed or certified in more than one state are double counted in the national roster. The sample proportion of Appraisal Institute members is higher than 16.6% because it allows for the double counting.

[5] The initial questionnaire mailing was followed within one week by a reminder postcard and followed two weeks later by a second questionnaire mailing. Also, transmittal letters were personally addressed, phrased to convey the importance of the research to the recipient and the necessity of a prompt reply, and were personally signed by the researchers. Attention was also paid to the appearance and quality of stationery, the questionnaire and envelopes.

[6] There were 107 Appraisal Institute member responses, which is a 48.6% response rate from this subpopulation. The response rate for non-Appraisal Institute member appraisers (270 responses) was 27.5%.

[7] The American Institute of Real Estate Appraisers and the Society of Real Estate Appraisers merged into the Appraisal Institute, and designations from both parent organizations survived the merger. The SRA and SRPA designations were the residential and commercial property appraisal designations, respectively, of the Society of Real Estate Appraisers. The RM and MAI designations were the residential and commercial property appraisal designations, respectively, of the American Institute of Real Estate Appraisers.

[8] MSA population was coded as zero when an appraiser was located outside of an MSA.

[9] The *High-Cost, Urbanized Market* variable was created by principal component factor analysis, which indicated that the four variables represent a single underlying construct. The eigenvalue for the first dimension was 2.196 and fell dramatically to .873, .513 and .417 for the remaining three dimensions. The standardized scoring equation used to create the new *High-Cost, Urbanized Market* variable was .382(*High-CDB State*) + .363(*State Population*) + .360(*MSA Population*) − .219(*Low-CDB State*). The factor pattern, indicative of the single underlying dimension, was *High-CDB State* (.84), *State Population* (.80), *MSA Population* (.79) and *Low-CDB State* (−.48).

[10] Two additional models were run, modifying Model 2 by dropping either the *Age* and *Age*^{2} or the *Experience* and *Experience*^{2} terms. When modeled alone, each variable set took on the expected signs with the squared terms retaining their low *t*-ratios and only the *Experience* term having even a moderate level of significance using a one-tailed test. Additionally, dropping the *Age* variable set decreased the adjusted R^2 to .290 and dropping the *Experience* variable set decreased the adjusted R^2 to .289. No additional insights were provided by these two additional models, therefore they are not discussed elsewhere in this article.

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