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Hedonic Housing Prices in Ciudad Juarez

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To my family, Irma and Miguel Fierro, and to Angel Echavarri for their support and encouragement.

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Abstract

Studies of the valuation of housing attributes abound. Empirical studies of this nature for Latin America and Mexico are less common. This study utilizes data for 175 new houses in Ciudad Juarez to estimate a hedonic pricing model. All units in the sample were completed and sold between November 2006 and April 2007. For each house, a total of fourteen characteristics, both structural and locational, are employed as explanatory variables. Empirical results indicate that the structural characteristics play a bigger role than the neighborhood amenities. Surprisingly, neighborhood parks are found to lower housing values.

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Chapter 1

Introduction

Studies of housing valuation abound. Numerous examples exist for Africa, Europe, and North America. Similar research for Latin America and Mexico is less common.

The current effort employs a sample of 175 new houses for Ciudad Juarez, an important metropolitan economy in northern Mexico. All houses in the sample were completed and sold between November 2006 and April 2007. For each house, a total of fourteen characteristics, both structural and locational, are utilized to model housing prices in this urban market.

The objective of this study is to estimate hedonic price equations for new dwellings in Ciudad Juarez. Linear regression analysis is used to estimate coefficients for a combination of qualitative and numeric variables. It is expected that all of the characteristics will increase housing values. Several different equations are utilized to analyze the data.

Subsequent materials are organized as follows: a brief literature review is presented in section 2. Section 3 describes the data and methodology. Section 4 summarizes the empirical estimation results. Concluding remarks are offered in Section 5.

Chapter 2

Literature Review

Previous work on housing markets has broadly analyzed the demand for amenities or physical attributes. Some of this research utilizes data from developing countries, but the demand for housing in Mexico has generally been analyzed using other approaches. Most of the hedonic attributes articles are based on the methodology proposed by Rosen (1974). Examples include Blomquist and Worley (1981), Arimah (1992), Cheshire and Sheppard (1995), and Pasha and Butt (1996).

Blomquist and Worley (1981) work with hedonic housing prices for the Springfield, Illinois housing market. The main objective is to compare alternative specifications to find the best functional form, given the non-linear nature of hedonic price specifications. In all cases structural amenities are included, plus community demographic characteristics, as explanatory variables. Empirical results for the six housing traits exhibit the hypothesized signs and are statistically significant.

Smith and Tesarek (1991) specify housing prices as functions of structural and locational amenities. For this purpose, a price index is developed using the coefficients of characteristics of the base year to be evaluated in subsequent years. Most of the estimated coefficients are statistically significant and show the expected sign. The resulting equation explains 80% of the cases. The results show that Houston housing prices declined by 10 to 20 percent between 1970 and 1989.

Can (1992) examines spatial neighborhood characteristics impacts on housing prices. Vicinity or adjacency externalities are added as a third set of explanatory variables. Two sets of estimates are completed. The first includes only structural and neighborhood amenities. The second also includes adjacency externalities. The results indicate that specifications that account for spatial adjacencies are more complete than those relying exclusively on structural attributes.

Arimah (1992) and Pasha and Butt (1996) study these relationships on housing markets in two developing countries, Nigeria and Pakistan. A number of physical characteristics are included in each study, as well as composite indices of housing quality. In Pakistan, elasticities for each attribute and the index are low, thus facilitating overcrowding. In the Nigerian study, Arimah (1992) distinguishes between renters and owners. A wider variety of housing attributes is also included, with structural, locational, and neighborhood attributes entered as explanatory variables. Elasticities are also low in Nigeria and the most important determinants of housing attributes demands are socioeconomic and demographic characteristics of the population such as family structure.

Jones, Jimenez, and Ward (1993) study housing policies in Mexico between 1988 and 1992. The land market is found to be highly sensitive to macroeconomic policies. Trade liberalization plus the introduction of market-oriented economic policies represent departures from the previous state-controlled economic policies. Uncertainty combined with optimistic expectations to unleash speculative price pressures in Mexican real estate markets.

Cheshire and Sheppard (1995) analyze data from towns in the United Kingdom. Although a large variety of structural attributes of housing are included, the main focus is on land location. Housing prices are determined by amenities, but also by proximity to metropolitan or infrastructure centers, as well as regional climates. Moreover, a second set of attributes that are related to location, such as surrounding facilities or services, also impact housing prices. The evidence indicates that unobserved location amenities are systematically reflected in housing prices.

Gonzalez (1997) examines the demand for housing in Mexico. In this study, each house is considered as a unit, not a group of attributes. A probit model is used to analyze housing selection. Demand for housing is included as part of a family's budget along with other goods. The probit model is designed to analyze a key decision: if the family decides to treat the house as an investment, they will purchase; if the family gives priority to the consumption of housing services, then they will rent. Consequently, housing demand is determined by family demographic characteristics, as well as income, wealth, and the interest rate.

Noguchi and Hernandez-Velasco (2005) analyze the demand of low-income housing in Aguascalientes, Mexico. The analysis takes into account that the supply of low-income housing is determined by governmental institutions producing "ready-built" houses. Since these houses do not really meet the needs of the home owners, modifications are made after occupancy. The development of "mass custom design" housing production is proposed. In this scheme, the future owner can select elements of the future house from a pre-determined group of amenities.

This study uses a hedonic modeling framework to analyze housing prices in Ciudad Juarez, Mexico. For this purpose, structural and neighborhood amenities are considered as explanatory variables. The sample includes a variety of structures built in different neighborhoods. Because Ciudad Juarez is relatively large, access to roads and infrastructure is expected to play a crucial role in housing selection. The real-estate market in Juarez offers an opportunity to examine these relationships within the context of a growing urban economy in a middle-income country.

Chapter 3

Data and Methodology

The objective of the hedonic modeling approach is to account for how attributes typically associated with residential structures affect housing prices. The methodology is widely employed by numerous organizations, including the United States Census Bureau in its quarterly housing market analysis. The Census Bureau approach incorporates twelve distinct structure characteristics (Rappaport, 2007). Of those variables, six are used in this effort. Another eight amenities not used by the Census Bureau are also included in this study. The variables employed are listed in Table 1.

Table 1: Mnemonics and Description

Series	**Description**
HP	Housing prices in pesos.
LOT	Property area in square meters.
FLS	Floor area in square meters.
BED	Number of bedrooms.
BATH	Number of bathrooms.
PSP	Number of parking spaces.
LEV	Number of floors.
MATNC	Non-Concrete walls.
FLOORNC	Non-Cement floors.
GATE	Gated neighborhood.

GUARD	Guard post in the neighborhood.
PARK	Park or green areas in the neighborhood.
SCH	School located nearly.
COMM	Commercial area located nearly.
ML	Major avenue or street access.

Despite the widespread interest in the determination of housing prices, hedonic models have yet to be developed for Mexico. Ciudad Juarez has a unique identity as a result of its history, geographic location and demographic characteristics. Consequently, amenity values will potentially differ what has been measured for other regions (Arimah, 1992; Cheshire and Sheppard, 1995; Pasha and Butt, 1996). Similar to other large cities, Ciudad Juarez is laid out in a polycentric manner and residents commute to the various employment centers. Residential zones have also developed around each of the employment centers in the city (Fuentes, 2001).

For this, the value or price of the house (HP), measured in Mexican pesos, is modeled as a function of the selected fourteen housing characteristics. Explanatory variables include the size of the property measured in squared meters (LOT), the size of the house floor area measured in squared meters (FLS), the number of bedrooms (BED), the number of bathrooms (BATH), and the number of stories (LEV). These are all numeric variables.

In addition, several dummy variables are also included as structural amenity regressors. For parking spaces (PSP), (0) represents one space with no roof, (1) is one roofed space, (2) represents two spaces without roof, and (3) means two roofed spaces. For construction materials, (MATNC) is a binary dummy where (1) represents any material other than concrete and (0) is concrete walls. Floor materials (1) include any other than cement (FLOORNC) and (0) represents the presence of cement as floor material.

Location or neighborhood attributes are also measured using qualitative variables. They include the presence of the dwelling within a gated neighborhood (GATE), whether the neighborhood has a guard post (GUARD), and if the neighborhood has a park or green areas (PARK). Also, metropolitan area location (ML) is represented as location of the house close to a high speed road (2), a main avenue (1), or none of these (0). Proximity to an elementary school (SCH) and proximity to a commercial area (COMM) complete the explanatory variables list. As defined, all of these variables are expected to increase housing values (Bible and Hsieh, 2001; Lang and Nelson, 2007).

The sample includes 175 observations for new houses on sale in Ciudad Juarez between November of 2006 and April of 2007. Because all of these units are less than 12 months old, neither age nor age squared are included as arguments in the hedonic specification (Dehring, Depken, and Ward, 2007). Every house in the sample possesses a different bundle of characteristics. In this sense, each of the 175 observations differs from the rest. Summary statistics for the variables that comprise the sample are reported in Tables 2 and 3.

Table 2 reports the arithmetic mean and standard deviation calculated for the numeric variables in the sample. The average price per unit is 896,208 pesos, approximately $82,000 in dollar terms. Lots average approximately 160.2 square meters with roughly 130.5 square meter floor areas. Reflective of the 4 person households that prevail throughout the city (INEGI, 2005), a typical unit includes three bedrooms and two bathrooms. Most of the houses in the sample are two-story structures. For the qualitative variables summarized in Table 3, mode and frequency provide a better idea of the sample distribution. Minimum and maximum reflect the qualitative values assigned to each variable, while frequency refers to the values observed most. For the sample as a whole, only 147 observations include complete information for all of the attributes selected for the analysis conducted below.

Table 2: Summary Statistics. Numeric Variables

Series	Mean	Standard Deviation	Minimum	Maximum	Observations
HP	896,208	397,224	68,000	4,000,000	175
LOT	160.189	79.184	103	1,110	173
FLS	130.530	44.773	42	440	175
BED	2.85	0.38	2	4	174
BATH	2.23	0.56	1	3.5	174
LEV	1.98	0.13	1	2	174

Table 3: Summary Statistics. Nominal Variables

Series	Mode	Frequency	Minimum	Maximum	Observations
PSP	2	98	0	3	174
MATNC	1	153	0	1	157
FLOORNC	1	150	0	1	174
GATE	1	147	0	1	173
GUARD	1	150	0	1	173
PARK	1	134	0	1	175
SCH	0	109	0	1	169
COMM	1	107	0	1	174
ML	0	75	0	2	175

Although all the variables are expected to increase housing values, these increments are expected to occur at decreasing rates, especially for the numeric variables. To reflect diminishing returns, logarithmic transformations are applied to those variables (DiPasquale and Wheaton, 1996; Sirmans, Macpherson, and Zietz, 2005).

The housing prices are modeled as follows:

$$\begin{aligned}\log HP = {} & \log\beta_0 + \beta_1 \log LOT + \beta_2 \log FLS + \beta_3 \log BED + \beta_4 \log BATH + \beta_5 \log LEV \\ & + \beta_6 PSP + \beta_7 MATNC + \beta_8 FLOORNC + \beta_9 GATE + \beta_{10} GUARD + \beta_{11} PARK + \beta_{12} SCH \\ & + \beta_{13} COMM + \beta_{14} ML + \varepsilon \end{aligned} \tag{1}$$

For the variables PSP, and ML, the coefficients are hypothesized to linearly increase housing prices because the assigned values to each category assume better quality or better location. In addition, MATNC, FLOORNC, GATE, GUARD, PARK, SCH, and COMM are binary variables where values of 1 indicate that they are present for that housing unit. Consequently, none of the qualitative variables are logarithmically transformed (Cassel and Mendelsohn, 1985; Pindyck and Rubinfeld, 1998).

Chapter 4

Empirical Results

Parameter estimation results for the housing price equation are summarized in Table 4. The coefficient of determination for this model is 0.67; adjusted for degrees of freedom it is 0.63. All of the coefficients for the continuous independent variables exhibit the hypothesized signs, but only that for floor area (FLS) is significant at the 5-percent level. Among the qualitative discrete variables, only three exhibit the hypothesized positive signs. The only dummy variable that has a statistically significant parameter estimate, PARK, also has a negative sign attached to it.

Table 4: Equation 1 Results.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.003679	0.879627	9.098942	0.0000
LOG(LOT)	0.257786	0.211525	1.218703	0.2251
LOG(FLS)	0.937219	0.186707	5.019740	0.0000
LOG(BED)	0.063463	0.171759	0.369490	0.7124
LOG(BATH)	0.250020	0.146802	1.703118	0.0909
LOG(LEV)	-0.167879	0.297459	-0.564378	0.5735
PSP	-0.007249	0.039888	-0.181742	0.8561
MATNC	-0.220547	0.179553	-1.228312	0.2215
FLOORNC	-0.025344	0.081607	-0.310563	0.7566
GATE	-0.063682	0.077267	-0.824187	0.4113
GUARD	0.041668	0.101525	0.410425	0.6822
PARK	-0.148768	0.066499	-2.237157	0.0270
SCH	0.028633	0.055163	0.519057	0.6046
COMM	0.036201	0.059646	0.606931	0.5449
ML	-0.003810	0.039419	-0.096644	0.9232

R-squared	0.671592	Mean dependent var	13.57692
Adjusted R-squared	0.636760	S.D. dependent var	0.478240
S.E. of regression	0.288232	Akaike info criterion	0.446351
Sum squared resid	10.96628	Schwarz criterion	0.751497
Log likelihood	-17.80679	F-statistic	19.28132
Durbin-Watson stat	0.721546	Prob(F-statistic)	0.000000

Table 5: Explanatory Variable Correlation Coefficients.

	LOG(LOT)	LOG(FLS)	LOG(BED)	LOG(BATH)	LOG(LEV)	PSP	MATNC
LOG(LOT)	1.000000	0.754606	0.275564	0.547132	0.211372	0.346321	0.009645
LOG(FLS)	0.754606	1.000000	0.395402	0.779621	0.384455	0.586541	-0.106059
LOG(BED)	0.275564	0.395402	1.000000	0.300113	0.182661	0.231681	-0.061156
LOG(BATH)	0.547132	0.779621	0.300113	1.000000	0.381900	0.464060	-0.079998
LOG(LEV)	0.211372	0.384455	0.182661	0.381900	1.000000	0.303117	-0.020833
PSP	0.346321	0.586541	0.231681	0.464060	0.303117	1.000000	-0.159425
MATNC	0.009645	-0.106059	-0.061156	-0.079998	-0.020833	-0.159425	1.000000
FLOORNC	0.257401	0.210965	-0.067588	0.240240	-0.057279	0.133947	-0.057279
GATE	-0.154422	-0.099964	-0.034634	0.040965	-0.066907	-0.016842	-0.066907
GUARD	0.394274	0.449205	0.339429	0.341946	0.335140	0.564413	-0.062163
PARK	0.179442	0.148348	0.135496	-0.019832	-0.079173	-0.088864	-0.079173
SCH	0.161548	0.045199	0.027799	-0.033717	-0.183995	-0.210915	-0.084921
COMM	0.032044	-0.104676	-0.171106	-0.205044	-0.118185	-0.163171	0.176277
ML	0.265899	0.119697	0.056836	-0.061443	0.148672	0.195938	0.148672

Table 5: Explanatory Variable Correlation Coefficients (cont.).

	FLOORNC	GATE	GUARD	PARK	SCH	COMM	ML
LOG(LOT)	0.257401	-0.154422	0.394274	0.179442	0.161548	0.032044	0.265899
LOG(FLS)	0.210965	-0.099964	0.449205	0.148348	0.045199	-0.104676	0.119697
LOG(BED)	-0.067588	-0.034634	0.339429	0.135496	0.027799	-0.171106	0.056836
LOG(BATH)	0.240240	0.040965	0.341946	-0.019832	-0.033717	-0.205044	-0.061443
LOG(LEV)	-0.057279	-0.066907	0.335140	-0.079173	-0.183995	-0.118185	0.148672
PSP	0.133947	-0.016842	0.564413	-0.088864	-0.210915	-0.163171	0.195938
MATNC	-0.057279	-0.066907	-0.062163	-0.079173	-0.084921	0.176277	0.148672
FLOORNC	1.000000	-0.183953	-0.007059	-0.217677	-0.097283	0.160816	-0.049535
GATE	-0.183953	1.000000	0.291114	-0.042858	-0.113636	-0.270442	-0.071589
GUARD	-0.007059	0.291114	1.000000	-0.103015	-0.047740	-0.123439	0.299445
PARK	-0.217677	-0.042858	-0.103015	1.000000	0.131305	-0.087097	0.150967
SCH	-0.097283	-0.113636	-0.047740	0.131305	1.000000	0.070765	0.054781
COMM	0.160816	-0.270442	-0.123439	-0.087097	0.070765	1.000000	0.362582
ML	-0.049535	-0.071589	0.299445	0.150967	0.054781	0.362582	1.000000

In all, 12 of the 15 coefficients shown in Table 4 fail to satisfy the 5-percent significance criterion. The F-statistic is, however, significant at the 1-percent level, implying that multicollinearity may be present in the sample (Pindyck and Rubinfeld, 1998). That possibility is further underscored by many of the values shown in the correlation matrix reported in Table 5. To examine whether multicollinearity is present, several alternative specifications are also considered below.

Equation 2 omits all nine of the qualitative variables since they collectively seem to contribute little to the model explanatory power shown in Table 4. The coefficients included in Equation 2 are: lot size (LOT), floor area (FLS), number of bedrooms (BED), number of bathrooms (BATH), and number of stories (LEV). Under this reduced specification, the parameter magnitudes for LOT, FLS, and BATH are very close to those reported in Table 4. In contrast, the absolute magnitudes for the BED and LEV coefficients in Table 6 are substantially below those of their respective counterparts in Table 4. Also, the adjusted coefficient of determination and the log likelihood function value increase with Equation 2.

$$\log HP = \log \beta_0 + \beta_1 \log LOT + \beta_2 \log FLS + \beta_3 \log BED + \beta_4 \log BATH + \beta_5 \log LEV + \varepsilon \quad (2)$$

Table 6: Equation 2 Results.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.822667	0.650734	12.02130	0.0000
LOG(LOT)	0.289107	0.162592	1.778119	0.0772
LOG(FLS)	0.855610	0.137326	6.230515	0.0000
LOG(BED)	0.018162	0.146220	0.124210	0.9013
LOG(BATH)	0.299057	0.118765	2.518048	0.0127
LOG(LEV)	-0.058393	0.249070	-0.234443	0.8149
R-squared	0.651436	Mean dependent var		13.60134
Adjusted R-squared	0.640938	S.D. dependent var		0.451157

S.E. of regression	0.270341	Akaike info criterion	0.255999
Sum squared resid	12.13202	Schwarz criterion	0.365795
Log likelihood	-16.01588	Hannan-Quinn criter.	0.300546
F-statistic	62.04805	Durbin-Watson stat	1.132773
Prob(F-statistic)	0.000000		

Equation 3 excludes BED, but includes four of the discrete variables. The parameter estimates for FLS and BATH are statistically significant. BATH fails to meet the 5 percent criterion in Equation 1, but is significant in Equation 3. As in previous specifications, the coefficient for LEV is negative. The slope parameter for PSP changes from negative in Equation 1 to positive in this version. It is not, however, statistically different from zero. The parameter for COMM is almost twice as large as its original estimate in equation 1.

$$\log HP = \log \beta_0 + \beta_1 \log LOT + \beta_2 \log FLS + \beta_3 \log BATH + \beta_4 \log LEV + \beta_5 PSP + \beta_6 GUARD + \beta_7 SCH + \beta_8 COMM + \varepsilon \quad (3)$$

Table 7: Equation 3 Results.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.117161	0.714920	11.35395	0.0000
LOG(LOT)	0.204641	0.182396	1.121964	0.2636
LOG(FLS)	0.861216	0.161982	5.316726	0.0000
LOG(BATH)	0.324610	0.129583	2.505035	0.0133
LOG(LEV)	-0.073192	0.265442	-0.275737	0.7831
PSP	0.006562	0.034414	0.190680	0.8490
GUARD	0.051316	0.079695	0.643912	0.5206
SCH	0.027576	0.048185	0.572290	0.5680
COMM	0.070842	0.046361	1.528059	0.1285

R-squared	0.656877	Mean dependent var	13.59955
Adjusted R-squared	0.639053	S.D. dependent var	0.459896
S.E. of regression	0.276301	Akaike info criterion	0.318977
Sum squared resid	11.75667	Schwarz criterion	0.489798
Log likelihood	-16.99664	Hannan-Quinn criter.	0.388328
F-statistic	36.85239	Durbin-Watson stat	1.149280
Prob(F-statistic)	0.000000		

Equation 4 is another departure from Equation 1. This version includes only three continuous variables: lot size (LOT), floor area (FLS), and number of bathrooms (BATH). It also includes four discrete variables: parking spaces (PSP), guard post (GUARD), neighboring school (SCH), and neighboring commercial area (COMM). As shown in Table 8, all of the parameters are positive as hypothesized but only FLS and BATH are statistically significant. Coefficient magnitudes for the continuous variables do not differ greatly from those reported in Table 4. The discrete variable parameter estimates are very close to those shown in Table 7, as are the goodness of fit measures.

$$\log HP = \log\beta_0 + \beta_1 \log LOT + \beta_2 \log FLS + \beta_3 \log BATH + \beta_4 PSP + \beta_5 GUARD + \beta_6 SCH + \beta_7 COMM + \varepsilon \quad (4)$$

Table 8: Equation 4 Results.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.079868	0.699914	11.54408	0.0000
LOG(LOT)	0.209352	0.181051	1.156314	0.2493
LOG(FLS)	0.854715	0.159779	5.349353	0.0000
LOG(BATH)	0.320452	0.128318	2.497318	0.0136
PSP	0.007062	0.034263	0.206114	0.8370
GUARD	0.046969	0.077887	0.603048	0.5474
SCH	0.029845	0.047336	0.630502	0.5293
COMM	0.071169	0.046207	1.540212	0.1255

R-squared	0.656708	Mean dependent var	13.59955
Adjusted R-squared	0.641204	S.D. dependent var	0.459896
S.E. of regression	0.275476	Akaike info criterion	0.307201
Sum squared resid	11.76248	Schwarz criterion	0.459041
Log likelihood	-17.03686	Hannan-Quinn criter.	0.368846
F-statistic	42.35866	Durbin-Watson stat	1.147810
Prob(F-statistic)	0.000000		

Appendix B contains alternate specifications that also shed light on coefficient magnitudes partially masked by sample multicollinearity. Results from these simpler specifications indicate that most of the variables included in the sample are attributes that affect housing values in Ciudad Juarez. A surprising outcome associated with these results is the negative sign that consistently occurs for the PARK discrete variable. Other studies (Cheshire and Sheppard, 1995; Lang and Nelson, 2007) have generally shown that type of neighborhood amenity increases housing values.

Overall results from the various specifications are largely as hypothesized. As in other studies of this nature, alternate versions that exclude characteristic subsets, help clarify attribute values (Can, 1992). Contrary to what is reported in prior research (Cheshire and Sheppard, 1995; Bible and Hsieh, 2001; Lang and Nelson, 2007) where additional variables enrich outcomes, dummy variables such for floor materials, gated neighborhoods, and neighboring schools, do not prove helpful and are omitted from alternate specifications 6 to 11. Those equation results indicate that lot size, floor space, and the number of bathrooms reliably contribute to housing values in Ciudad Juarez. The coefficients for the number of bedrooms are sensitive to the inclusion of additional variables, but also appear to add value to residential structures in this market. Parking spaces, guard posts, and proximity to commercial centers also seem to raise housing prices. Surprisingly, proximity to parks is inversely related to the housing price data in this sample, possibly because they provide meeting places for gangs and other suspicious activities (El Diario de Ciudad Juarez).

The sample contains 175 observations. For a city of more than 1.4 million residents, that is a relatively small number of data points. Access to a larger sample would potentially improve upon the results reported above and help reduce multicollinearity. Because relatively few empirical analyses of the values of housing attributes exist for Mexico and other Latin American economies, carrying out similar exercises for other regional markets may prove instructive.

Chapter 5

Conclusion

This research relies on a sample of 175 housing units in Ciudad Juarez to examine the values of physical and locational attributes. Fourteen different explanatory variables are used to estimate hedonic equations for this market. The results indicated that structural characteristics are more influential in housing valuation than locational elements. Moreover, neighborhood parks persistently reduced housing prices.

The rest of the variables behave as hypothesized, with the number of bathrooms, lot size, and floor area playing important roles. Even when coefficient magnitudes are concealed by sample multicollinearity, experimentation with the explanatory variable vector helped clarify what each element contributes to housing values. While those outcomes are useful, additional sampling may also prove helpful.

Despite a relatively large volume of research regarding hedonic housing prices, few studies of this nature have been completed for Mexico. Empirical analyses for housing market data from other cities would also be useful for comparison purposes. The size and diversity of metropolitan economies throughout the country should allow interesting results to emerge from such efforts. As regional mortgage markets expand in Mexico, the call for this type of quantitative analysis will likely increase.

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Appendix A

Sample data.

obs	HP	LOT	FLS	BED	BATH	LEV	PSP
1	517848	130	110.667	3	2.5	2	3
2	449000	130	86.35	3	1.5	2	1
3	251000	103	42	2	1	1	0
4	301000	120	54	2	1	1	0
5	342000	120	64	3	1	1	0
6	401000	120	77	2	1.5	2	0
7	461000	120	91	3	1.5	2	0
8	427000	130	79.3	2	1.5	2	0
9	508000	130	92.23	3	1.5	2	0
10	515000	130	94	3	1.5	2	0
11	515000	130	94	3	1.5	2	0
12	650000	130	121	3	2.5	2	1
13	650000	130	121	3	2.5	2	1
14	488000	131.25	76.71	3	1.5	2	2
15	488000	131.25	76.71	3	1.5	2	2
16	698880	131.25	103	3	2.5	2	2
17	698880	131.25	103	3	2.5	2	2
18	765000	157.5	107.58	3	1.5	2	2
19	925000	168	134.34	3	2.5	2	2
20	930000	168	166.57	3	2.5	2	2
21	670000	157.5	93	2	1.5	2	2
22	646377	130.425	102	3	1.5	2	2
23	646377	130.425	102	3	1.5	2	2
24	790088	130.425	129	3	2.5	2	3
25	790088	130.425	129	3	2.5	2	3
26	880000	160	128	3	2.5	2	2
27	880000	160	128	3	2.5	2	2
28	517000	130	80	2	1.5	2	1
29	517400	130	97.75	3	1.5	2	0
30	657000	130	110.35	3	2.5	2	0
31	835000	162	154	3	2.5	2	0
32	794000	162	147	3	2.5	2	0
33	784259	237	111	3	2.5	2	0
34	1108200	162	185	3	2.5	2	3
35	919200	162	154.3	3	2.5	2	3
36	1062000	162	174	3	2.5	2	3
37	1090000	140	185.18	3	2.5	2	3
38	953000	140	183.44	3	2.5	2	3
39	780000	140	116.49	3	1.5	2	2
40	1013150	174.64	152	3	2.5	2	3
41	1013150	168.2	152	3	2.5	2	3
42	1170000	150.12	151.29	3	2.5	2	3
43	1170000	150.12	151.29	3	2.5	2	3
44	874000	135	114	3	2.5	2	2

Sample data (cont.).

obs	HP	LOT	FLS	BED	BATH	LEV	PSP
45	591600	130	89.06	2	2.5	2	2
46	594600	130	97.75	3	1.5	2	2
47	657000	130	110.35	3	2.5	2	2
48	537408	130	79	3	1.5	2	2
49	706825	130	102	3	2.5	2	2
50	980000	140	186.86	3	2.5	2	3
51	938000	140	170.46	3	1.5	2	2
52	1170000	150.12	151.29	3	2.5	2	3
53	546250	131.47	94.2	3	1.5	2	2
54	690650	130.828	121.05	3	2.5	2	2
55	567150	130.828	102.68	3	1.5	2	2
56	1078400	NA	141.05	3	2.5	2	2
57	1154000	NA	147.48	3	2.5	2	2
58	932490	144	127.64	3	2.5	2	2
59	932490	144	127.64	3	2.5	2	2
60	832490	144	106.49	2	2	2	2
61	832490	144	106.49	2	2	2	2
62	1102601	190	141.31	3	2.5	2	2
63	1102601	190	141.31	3	2.5	2	2
64	1267240	190	157.36	3	2.5	2	2
65	1267240	190	157.36	3	2.5	2	2
66	759389.7	137.498	121.05	3	2.5	2	3
67	784149.5	134.125	128.73	3	2.5	2	3
68	995000	180	157	3	2.5	2	3
69	995000	180	157	3	2.5	2	3
70	1140000	180	164	3	3.5	2	3
71	1140000	180	164	3	3.5	2	3
72	743000	136.5	97	3	1.5	2	2
73	743000	136.5	97	3	1.5	2	2
74	875000	146.6325	113.656	3	2.5	2	2
75	875000	146.6325	113.656	3	2.5	2	2
76	511500	120	82	3	2.5	2	2
77	486000	120	82	3	2.5	2	2
78	548000	140	92.74	3	1.5	2	2
79	548000	140	93.96	3	1.5	2	2
80	761000	150	106	3	1.5	2	2
81	669000	128	98	3	1.5	2	2
82	1062200	154.66	146	3	2.5	2	2
83	1181000	208.89	123.27	3	2.5	2	2
84	798226.4	248.52	111.35	3	1.5	2	0
85	806012	162.76	117.16	3	2.5	2	0
86	995000	142	172	3	2.5	2	3
87	875000	142	135	3	2.5	2	3
88	850000	140.97	135	3	2.5	2	3

Sample data (cont.).

obs	HP	LOT	FLS	BED	BATH	LEV	PSP
89	920000	142	172	3	2.5	2	3
90	517000	130	80	2	1.5	2	2
91	517000	130	80	2	1.5	2	2
92	1334404	185.94	176	3	2.5	2	2
93	1026000	162	129.94	3	2.5	2	2
94	1056960	162	129.94	3	2.5	2	2
95	68000	157.5	93	2	1.5	2	2
96	68000	157.5	96	3	1.5	2	2
97	811000	157.5	107.58	3	1.5	2	2
98	981000	168	134.34	3	2.5	2	2
99	1092000	168	134.34	3	2.5	2	2
100	906500	160	128	3	2.5	2	2
101	874000	135	114	3	2.5	2	2
102	428406	120	74	2	1.5	2	2
103	479016	120	84	3	1.5	2	2
104	606900	130	89.06	2	2.5	2	0
105	612400	130	95.46	2	2.5	2	0
106	629000	130	98.63	2	2.5	2	0
107	629000	130	97.7	3	1.5	2	0
108	680000	130	110.35	3	2.5	2	0
109	538000	131.25	76.71	2	1.5	2	2
110	840000	131.25	102.5	3	2.5	2	2
111	1149000	140	190.52	3	2.5	2	3
112	650000	140	93.96	3	1.5	2	2
113	1216000	150.12	152.29	3	2.5	2	3
114	568000	130	94	3	1.5	2	2
115	597000	130	102	3	1.5	2	2
116	727000	130	121	3	2.5	2	3
117	940000	160	117	3	2.5	2	2
118	1140000	160	192	3	2.5	2	3
119	1300000	160	160	3	2.5	2	3
120	1036119	144	127.64	3	2.5	2	2
121	1037888	144	127.64	3	2.5	2	2
122	928282.3	144	106.49	2	2	2	2
123	929857.2	144	106.49	2	2	2	2
124	1222357	190	141.31	3	2.5	2	2
125	1224548	190	141.31	3	2.5	2	2
126	1392870	190	157.36	3	2.5	2	2
127	1395261	190	157.36	3	2.5	2	2
128	995000	180	157	3	2.5	2	3
129	995000	180	157	3	2.5	2	3
130	1140000	180	164	3	3.5	2	3
131	1140000	180	164	3	3.5	2	3
132	1250000	180	185	3	3.5	2	3

Sample data (cont.).

obs	HP	LOT	FLS	BED	BATH	LEV	PSP
133	1250000	180	185	3	3.5	2	3
134	497000	120	82	3	2.5	2	2
135	497000	120	82	3	2.5	2	2
136	761000	150	105	3	1.5	2	2
137	690000	128	98	3	1.5	2	2
138	668000	128	94	3	1.5	2	2
139	1033000	152	174.9	2	2.5	2	3
140	1055400	168	168.2	2	2.5	2	3
141	1248000	190	210.16	2	2.5	2	3
142	1493424	226	171.9	3	2.5	2	3
143	1336484	176	187.24	3	2.5	2	2
144	1056960	144	139.23	3	2.5	2	2
145	1056960	144	139.23	3	2.5	2	2
146	1011060	162	129.94	3	2.5	2	2
147	1011060	162	129.91	3	2.5	2	2
148	1112400	162	155.29	3	2.5	2	2
149	1112400	162	155.29	3	2.5	2	2
150	680000	157.5	93	2	1.5	2	2
151	680000	157.5	93	2	1.5	2	2
152	811000	157.5	107.58	3	1.5	2	2
153	811000	157.5	107.58	3	1.5	2	2
154	981000	168	134.34	3	2.5	2	2
155	981000	168	134.34	3	2.5	2	2
156	1092000	168	166.57	3	2.5	2	2
157	1092000	168	166.57	3	2.5	2	2
158	874000	136	114	2	2.5	2	2
159	4000000	1100	440	NA	NA	NA	NA
160	1270000	190	141.31	2	2.5	2	2
161	1398169	190	157.36	2	2.5	2	2
162	875000	138	135	3	2.5	2	3
163	941000	168	152	3	2.5	2	3
164	1011000	187	172	3	2.5	2	3
165	1012000	169	169	3	2.5	2	3
166	1195000	165	160	3	2.5	2	3
167	1195000	165	160	3	2.5	2	3
168	1376000	165	190	3	2.5	2	3
169	1376000	165	190	3	2.5	2	3
170	1812000	280	236	3	3.5	2	3
171	1812000	280	236	3	3.5	2	3
172	1990000	327	256	4	3.5	2	3
173	1990000	327	256	4	3.5	2	3
174	461000	120	74	2	1.5	2	2
175	477420	120	84	3	1.5	2	2

Sample data (cont.).

obs	MATNC	FLOORNC	GATE	GUARD	PARK	SCH	COMM	ML
1	1	1	1	1	1	0	0	1
2	1	1	1	1	1	0	0	1
3	1	1	1	0	1	1	1	0
4	1	1	1	0	1	1	1	0
5	1	1	1	0	1	1	1	0
6	1	1	1	0	1	1	1	0
7	1	1	1	0	1	1	1	0
8	1	1	0	0	1	0	1	0
9	1	1	0	0	1	0	1	0
10	1	0	1	1	1	1	0	1
11	1	0	1	1	1	1	0	1
12	1	0	1	1	1	1	0	1
13	1	0	1	1	1	1	0	1
14	1	1	1	1	1	1	0	1
15	1	1	1	1	1	1	0	1
16	1	1	1	1	1	1	0	1
17	1	1	1	1	1	1	0	1
18	1	1	1	1	1	0	1	2
19	1	1	1	1	1	0	1	2
20	1	1	1	1	1	0	1	2
21	1	1	1	1	1	0	1	2
22	1	0	1	1	1	0	1	1
23	1	0	1	1	1	0	1	1
24	1	0	1	1	1	0	1	1
25	1	0	1	1	1	0	1	1
26	1	1	1	1	0	0	1	0
27	1	1	1	1	0	0	1	0
28	1	1	0	0	0	1	1	1
29	1	1	0	0	1	1	1	0
30	1	1	0	0	1	1	1	0
31	1	1	1	1	1	1	0	0
32	1	1	1	1	1	1	0	0
33	1	1	1	1	1	1	0	0
34	1	1	1	1	0	1	0	0
35	1	1	1	1	0	1	0	0
36	1	1	1	1	0	1	0	0
37	1	1	1	1	1	1	1	0
38	1	1	1	1	1	1	1	0
39	1	1	1	1	1	1	1	0
40	1	1	1	1	1	0	0	1
41	1	1	1	1	1	0	0	1
42	0	1	1	1	1	1	0	0
43	0	1	1	1	1	1	0	0
44	1	1	1	1	0	1	1	1

Sample data (cont.).

obs	MATNC	FLOORNC	GATE	GUARD	PARK	SCH	COMM	ML
45	1	1	0	0	1	0	0	0
46	1	1	0	0	1	0	0	0
47	1	1	0	0	1	0	0	0
48	1	1	1	1	0	0	1	1
49	1	1	1	1	0	0	1	1
50	1	1	NA	NA	1	0	1	0
51	1	1	NA	NA	1	0	1	0
52	0	1	1	1	1	0	NA	0
53	1	0	1	0	1	0	0	1
54	1	0	1	0	1	0	0	1
55	1	0	1	0	1	0	0	1
56	1	1	1	1	0	0	1	2
57	1	1	1	1	0	0	1	2
58	NA	1	1	1	0	NA	1	1
59	1	1	1	1	0	NA	1	1
60	1	1	1	1	0	NA	1	1
61	1	1	1	1	0	NA	1	1
62	1	1	1	1	1	1	1	2
63	1	1	1	1	1	1	1	2
64	1	1	1	1	1	1	1	2
65	1	1	1	1	1	1	1	2
66	1	1	1	1	1	0	0	0
67	1	1	1	1	1	0	0	0
68	1	1	1	1	1	0	0	0
69	1	1	1	1	1	0	0	0
70	1	1	1	1	1	0	0	0
71	1	1	1	1	1	0	0	0
72	1	1	1	1	0	0	0	1
73	1	1	1	1	0	0	0	1
74	1	1	1	1	0	0	0	1
75	1	1	1	1	0	0	0	1
76	1	1	1	1	0	0	0	0
77	1	1	1	1	0	0	0	0
78	1	1	1	1	1	NA	1	0
79	1	1	1	1	1	NA	1	0
80	1	1	0	1	0	0	1	1
81	1	1	0	1	0	0	1	1
82	1	1	1	1	1	1	0	0
83	1	1	1	1	1	1	0	0
84	1	0	1	1	1	1	0	0
85	1	0	1	1	1	1	0	0
86	NA	0	1	1	1	0	0	0
87	NA	0	1	1	1	0	0	0
88	NA	0	1	1	1	0	0	0

Sample data (cont.).

obs	MATNC	FLOORNC	GATE	GUARD	PARK	SCH	COMM	ML
89	NA	0	1	1	1	0	0	0
90	1	1	0	0	0	1	1	1
91	1	1	0	0	0	1	1	1
92	1	1	0	1	1	0	1	0
93	NA	1	1	1	1	0	1	1
94	NA	1	1	1	1	0	1	1
95	1	1	1	1	1	0	1	2
96	1	1	1	1	1	0	1	2
97	1	1	1	1	1	0	1	2
98	1	1	1	1	1	0	1	2
99	1	1	1	1	1	0	1	2
100	1	1	1	1	1	0	1	0
101	1	1	1	1	0	0	0	1
102	1	0	1	1	1	1	1	1
103	1	0	1	1	1	1	1	1
104	1	1	1	0	1	0	1	0
105	1	1	1	0	1	0	1	0
106	1	1	1	0	1	0	1	0
107	1	1	1	0	1	0	1	0
108	1	1	1	0	1	0	1	0
109	1	1	1	1	0	0	1	1
110	1	1	1	1	0	0	1	1
111	1	1	1	1	1	0	0	0
112	1	1	1	1	1	0	0	0
113	0	1	1	1	1	0	0	0
114	1	0	1	1	1	0	0	1
115	1	0	1	1	1	0	0	1
116	1	0	1	1	1	0	0	1
117	1	1	1	1	0	0	1	0
118	1	1	1	1	0	0	1	0
119	1	1	1	1	0	0	1	0
120	1	1	1	1	0	0	1	1
121	1	1	1	1	0	0	1	1
122	1	1	1	1	0	0	1	1
123	1	1	1	1	0	0	1	1
124	1	1	1	1	1	1	1	2
125	1	1	1	1	1	1	1	2
126	1	1	1	1	1	1	1	2
127	1	1	1	1	1	1	1	2
128	1	1	1	1	1	0	0	0
129	1	1	1	1	1	0	0	0
130	1	1	1	1	1	0	0	0
131	1	1	1	1	1	0	0	0
132	1	1	1	1	1	0	0	0

Sample data (cont.).

obs	MATNC	FLOORNC	GATE	GUARD	PARK	SCH	COMM	ML
133	1	1	1	1	1	0	0	0
134	1	1	1	1	0	0	1	0
135	1	1	1	1	0	0	1	0
136	1	1	0	1	1	0	1	1
137	1	1	0	1	1	0	1	1
138	1	1	0	1	1	0	1	1
139	1	1	1	1	1	0	0	1
140	1	1	1	1	1	0	0	1
141	1	1	1	1	1	0	0	1
142	1	1	0	1	1	0	1	0
143	1	1	0	1	1	0	1	0
144	NA	1	1	1	1	0	1	1
145	NA	1	1	1	1	0	1	1
146	NA	1	1	1	1	0	1	1
147	NA	1	1	1	1	0	1	1
148	NA	1	1	1	1	0	1	1
149	NA	1	1	1	1	0	1	1
150	1	1	1	1	1	0	1	2
151	1	1	1	1	1	0	1	2
152	1	1	1	1	1	0	1	2
153	1	1	1	1	1	0	1	2
154	1	1	1	1	1	0	1	2
155	1	1	1	1	1	0	1	2
156	1	1	1	1	1	0	1	2
157	1	1	1	1	1	0	1	2
158	1	1	1	1	0	0	0	1
159	NA	NA	1	1	0	0	1	2
160	1	1	1	1	0	1	1	0
161	1	1	1	1	0	1	1	0
162	NA	1	1	1	1	1	0	0
163	NA	1	1	1	1	1	0	0
164	NA	1	1	1	1	1	0	0
165	NA	1	1	1	1	1	0	0
166	1	1	0	1	1	1	1	2
167	1	1	0	1	1	1	1	2
168	1	1	0	1	1	1	1	2
169	1	1	0	1	1	1	1	2
170	1	1	0	1	1	1	1	2
171	1	1	0	1	1	1	1	2
172	1	1	0	1	1	1	1	2
173	1	1	0	1	1	1	1	2
174	1	0	1	1	1	1	1	1
175	1	0	1	1	1	1	1	1

Mnemonics and Description.

Series	Description
HP	Housing prices in pesos.
LOT	Property area in square meters.
FLS	Floor area in square meters.
BED	Number of bedrooms.
BATH	Number of bathrooms.
PSP	Number of parking spaces.
LEV	Number of floors.
MATNC	Brick walls.
FLOORNC	Cement floors.
GATE	Gated neighborhood.
GUARD	Guard post in the neighborhood.
PARK	Park or green areas in the neighborhood.
SCH	School located nearly.
COMM	Commercial area located nearly.
ML	Major avenue or street access.

Appendix B

Additional Estimation Results.

$$\log HP = \log\beta_0 + \beta_1 \log LOT + \beta_2 \log BED + \beta_3 \log BATH + \beta_4 \log LEV + \beta_5 PSP + \beta_6 MATNC + \beta_7 FLOORNC + \beta_8 GATE + \beta_9 GUARD + \beta_{10} PARK + \beta_{11} SCH + \beta_{12} COMM + \beta_{13} ML + \varepsilon \quad (5)$$

Table 9: Equation 5 Results.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.755226	0.942350	9.290839	0.0000
LOG(LOT)	0.836409	0.192818	4.337807	0.0000
LOG(BED)	0.225031	0.183423	1.226836	0.2221
LOG(BATH)	0.654571	0.133397	4.906931	0.0000
LOG(LEV)	0.095628	0.318313	0.300420	0.7643
PSP	0.073455	0.039687	1.850882	0.0664
MATNC	-0.258997	0.195027	-1.328010	0.1864
FLOORNC	-0.023351	0.088720	-0.263201	0.7928
GATE	-0.081101	0.083918	-0.966436	0.3356
GUARD	0.043152	0.110374	0.390964	0.6964
PARK	-0.070907	0.070301	-1.008620	0.3150
SCH	0.055640	0.059686	0.932217	0.3529
COMM	0.072269	0.064374	1.122645	0.2636
ML	-0.029675	0.042488	-0.698441	0.4861

R-squared	0.608901	Mean dependent var	13.57692
Adjusted R-squared	0.570673	S.D. dependent var	0.478240
S.E. of regression	0.313357	Akaike info criterion	0.607448
Sum squared resid	13.05965	Schwarz criterion	0.892251
Log likelihood	-30.64745	Hannan-Quinn criter.	0.723167
F-statistic	15.92825	Durbin-Watson stat	0.760055
Prob(F-statistic)	0.000000		

$$\log HP = \log\beta_0 + \beta_1 \log LOT + \beta_2 \log BED + \beta_3 \log BATH + \beta_4 PARK + \varepsilon \quad (6)$$

Table 10: Equation 6 Results.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.217414	0.706908	11.62445	0.0000
LOG(LOT)	0.911260	0.149831	6.081918	0.0000
LOG(BED)	0.291048	0.158327	1.838277	0.0678
LOG(BATH)	0.741706	0.101248	7.325607	0.0000
PARK	-0.083919	0.056967	-1.473131	0.1426

R-squared	0.574089	Mean dependent var	13.60134
Adjusted R-squared	0.563887	S.D. dependent var	0.451157
S.E. of regression	0.297939	Akaike info criterion	0.444781
Sum squared resid	14.82417	Schwarz criterion	0.536278
Log likelihood	-33.25115	Hannan-Quinn criter.	0.481903
F-statistic	56.27515	Durbin-Watson stat	1.092857
Prob(F-statistic)	0.000000		

$$\log HP = \log\beta_0 + \beta_1 \log LOT + \beta_2 \log BED + \beta_3 PSP + \varepsilon \quad (7)$$

Table 11: Equation 7 Results.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.768479	0.700595	9.661046	0.0000
LOG(LOT)	1.232153	0.145847	8.448231	0.0000
LOG(BED)	0.349495	0.169762	2.058736	0.0411
PSP	0.138802	0.029729	4.668858	0.0000

R-squared	0.486136	Mean dependent var	13.60134
Adjusted R-squared	0.476960	S.D. dependent var	0.451157
S.E. of regression	0.326284	Akaike info criterion	0.620881
Sum squared resid	17.88544	Schwarz criterion	0.694079
Log likelihood	-49.39579	Hannan-Quinn criter.	0.650579
F-statistic	52.97821	Durbin-Watson stat	1.025995
Prob(F-statistic)	0.000000		

$$\log HP = \log\beta_0 + \beta_1 \log LOT + \beta_2 \log BED + \beta_3 \log LEV + \varepsilon \quad (8)$$

Table 12: Equation 8 Results.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.814270	0.708493	8.206531	0.0000
LOG(LOT)	1.358023	0.147911	9.181351	0.0000
LOG(BED)	0.422836	0.175811	2.405062	0.0173
LOG(LEV)	0.774702	0.294487	2.630682	0.0093

R-squared	0.442429	Mean dependent var	13.60134
Adjusted R-squared	0.432473	S.D. dependent var	0.451157
S.E. of regression	0.339876	Akaike info criterion	0.702511
Sum squared resid	19.40668	Schwarz criterion	0.775709
Log likelihood	-56.41598	Hannan-Quinn criter.	0.732210
F-statistic	44.43571	Durbin-Watson stat	1.025388
Prob(F-statistic)	0.000000		

$$\log HP = \log \beta_0 + \beta_1 \log LOT + \beta_2 \log BED + \beta_3 GUARD + \varepsilon \qquad (9)$$

Table 13: Equation 9 Results.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.398427	0.749359	8.538529	0.0000
LOG(LOT)	1.324907	0.155790	8.504459	0.0000
LOG(BED)	0.371310	0.182373	2.035991	0.0433
GUARD	0.185221	0.086192	2.148940	0.0331

R-squared	0.437994	Mean dependent var	13.59931
Adjusted R-squared	0.427837	S.D. dependent var	0.453422
S.E. of regression	0.342975	Akaike info criterion	0.720928
Sum squared resid	19.52685	Schwarz criterion	0.794711
Log likelihood	-57.27886	Hannan-Quinn criter.	0.750868
F-statistic	43.12348	Durbin-Watson stat	1.014547
Prob(F-statistic)	0.000000		

$$\log HP = \log \beta_0 + \beta_1 \log LOT + \beta_2 \log BED + \beta_3 GUARD + \beta_4 ML + \varepsilon \qquad (10)$$

Table 14: Equation 10 Results.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.164615	0.752269	8.194697	0.0000
LOG(LOT)	1.383909	0.157308	8.797424	0.0000
LOG(BED)	0.334669	0.181749	1.841378	0.0674
GUARD	0.220661	0.087312	2.527269	0.0124
ML	-0.072348	0.036630	-1.975108	0.0499

R-squared	0.450974	Mean dependent var	13.59931
Adjusted R-squared	0.437665	S.D. dependent var	0.453422
S.E. of regression	0.340016	Akaike info criterion	0.709325
Sum squared resid	19.07584	Schwarz criterion	0.801554
Log likelihood	-55.29262	Hannan-Quinn criter.	0.746751
F-statistic	33.88310	Durbin-Watson stat	1.028585
Prob(F-statistic)	0.000000		

$$\log HP = \log \beta_0 + \beta_1 \log LOT + \beta_2 \log BED + \beta_3 \log LEV + \beta_4 MATNC + \beta_5 PARK + \varepsilon \quad (11)$$

Table 15: Equation 11 Results.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.971416	0.742966	8.037264	0.0000
LOG(LOT)	1.452247	0.153119	9.484463	0.0000
LOG(BED)	0.410814	0.181528	2.263090	0.0251
LOG(LEV)	0.641738	0.300449	2.135929	0.0343
MATNC	-0.430239	0.174971	-2.458912	0.0151
PARK	-0.163245	0.067198	-2.429305	0.0163

R-squared	0.483171	Mean dependent var	13.57913
Adjusted R-squared	0.465828	S.D. dependent var	0.469346
S.E. of regression	0.343031	Akaike info criterion	0.735951
Sum squared resid	17.53292	Schwarz criterion	0.853761
Log likelihood	-51.03623	Hannan-Quinn criter.	0.783803
F-statistic	27.85934	Durbin-Watson stat	0.728701
Prob(F-statistic)	0.000000		

Curriculum Vita

Karen Patricia Fierro graduated from the Universidad Autonoma de Ciudad Juarez where she received a Bachelor of Science Degree in Economics in May 2004. During her stay at UACJ, she was vice-president of the Economics Students Association from 2002-2003. She began her graduate studies at the University of Texas at El Paso in the Fall of 2005. In UTEP, she also was vice-president of the Economics Students Association from 2007-2008. While at UTEP she worked as a Teaching Assistant for the department of Economics and Finance, and as Research Assistant for the Border Region Modeling Project. She was also awarded with the James Foundation Scholarship. Currently, she combines her research at the Border Region Modeling Project with her position as Lecturer at UACJ.

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