A HEDONIC APPROACH
TO SOME ASPECTS OF THE COVENTRY HOUSING MARKET

by

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Most previous studies of the demand for houses have been at the aggregated level.(1) This paper, however, is concerned with certain aspects of individual house sales. One of the difficulties involved in such a study arises from the very wide qualitative differences between houses. This has two effects. The first is that the prices of the various houses on sale must be adjusted to take into account the quality differences. The second is that even apart from differences which manifest themselves in price differences, some types of houses containing particular sets of qualitative attributes will have a larger number of buyers and sellers than other types of houses. These segments of the market will tend to be more perfect than the less "popular" segments.

To some extent these difficulties can be overcome by means of the so-called "hedonic" technique. This involves obtaining implicit prices for each qualitative attribute and then synthesising the expected price for a house with a specific set of these attributes. The difference between the actual and expected price is then the quality-adjusted price for the house in question.

One of the questions considered is how sensitive the sales are to variations in quality-adjusted price. For most commodities thes would be measured by variations in sales volume or market share.(2) For the individual seller of a house, however, the relevant variable is how long it takes for the house to be sold. Here again the qualitative aspects of each house will enter into the relationship.

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1. See, for example, Muth, Richard F, "The demand for non-farm housing" in [6].

2. For an application of the hedonic technique in this area see Cowling and Cubbin [2].

The general availability of mortgages will also have an important influence on house selling time both directly on the house in question and indirectly through a chain of effects. Advertising and price cuts can also be expected to play some part in hastening the sale of a house. However, price cuts and advertising expenditure will also be to some extent a reaction to failure to sell and this will complicate the analysis.

Adjustments for quality differences

The level of utility derived from a house depends on the existence of certain attributes, most of which are in principle measurable. These quality variables may be physical, for example room area, or legal such as whether the house is freehold or leasehold, or more vague concepts such as quality of location.

We should therefore expect that the price that the seller can successfully charge should be some function of these quality variables. Indeed, under certain assumptions we can estimate the parameter of this function. If house A is being sold for price P_A and house B for P_B, and a particular buyer is willing to buy either of them and is indifferent as to which one he buys then his valuation of all the differences between A and B is $P_A - P_B$. Of course, people differ in their valuations of various marginal quality differences and prices may not be set with sufficient skill to reflect the valuations of potential buyers. Those whose prices which are set too high will experience difficulty in selling and those whose prices are set lower than the valuation of the average buyer should encounter less difficulty in selling than average. However a regression of price at which each house is actually sold on a set of quality variables, suitably chosen and of suitable functional form, will give an estimate of the marginal market valuation on each term in the regression equation.

From this estimated equation can be derived the expected price for each house. The difference between this and the actual price we call the quality-adjusted price. If actual price is greater than expected price this gives us a positive quality-adjusted price. We should therefore expect houses with high quality-adjusted prices to take longer to sell on the average than houses with low quality adjusted prices.

The price quality relations

Usable information was obtained from two estate agents' offices on a total of eighty-three successful sales. This information amounted to data on room sizes, age, size of grounds, type of central heating (if any) and other items which it is standard to give on estate agents' particulars. A complete list of given in Appendix I. In order to preserve confidentiality exact addressed were not recorded - only the name of the district in which each house was located. This had the disadvantage that when in the course of the investigation clarification was needed on some points in the data it was impossible to go back to the original source. For example, it was realised too late that the number of unsuccessful sales "subject to contract" before the final successful sale was a most useful piece of information in analysing the time taken to sell. This data was available and the analysis suffered as a result of not being able to use it.

Both the initial asking price and the finally agreed price were collected and notes made on the timing of price reductions where this information was available. The time taken to sell was defined as the number of days elapsing between the receiving of instructions by the agent and the sale of the property through the office of the agent to the buyer who finally exchanged contracts on the property. The estate agents seemed to regard this as the period relevant to this type of study rather than the time elapsing to completion of the deal.

The lowest-priced house on which data was collected was £2,350 and the highest was £7,700, with only four houses over £6,000 being included in the sample. Houses above this price constitute only a small part of the housing market. Such houses would probably not conform to the pricing function suitable for houses in the mass market. Since these houses are not really in the same market we can no longer assume that the price differences represent anybody's valuation of the quality differences. For a similar reason houses below £2,350 were excluded from the sample, as were houses which had exceptional characteristics such as a thatched roof. One observation which slipped through this net was on a dormer bungalow, with the result that it did not fit well into any of the regressions.

The price-quality relationships

The original plan was to use the 83 observations for inductive purposes and to collect further observations for prediction tests from a third estate agent. However, shortage of time prevented this plan from being carried out. Four dependent variables were experimented with - initial asking price, finally agreed price, and their respective logarithms. As expected the ability to explain agreed price was greater than the ability to explain initial asking price since agreed price is more likely to be close to a 'realistic' price. However, for purposes of explaining selling time the initial asking price, being the price advertised for some if not all of the period of offer, probably has greater relevance.

The result of the price-quality regressions are shown in columns 1 - 5 of Table 1. Inspection shows that the differences in coefficients resulting from using different forms of the dependent variable are small, as are the differences in the test statistics. (Of course the absolute size of the coefficients are much smaller when the dependent variable is $\log_{10}$ price, but their relative sizes in this case remain much the same).

Looking at the estimated equation with agreed price as dependent variable we see that only eight of the coefficients are significant at the 10% level and only three of these at the 5% level. This indicates that the individual coefficients should be be taken too seriously. Three possible contributory factors suggest themselves.

The first is mis-specification of the equation. One obvious improvement, for example, would be to relate the price on central heating to the size of the area heated. This could be done by adding in a variable "central heating x floor area". To some extent this is achieved by the logarithmic formulation which imposes the assumption that central heating increases the price by a proportional rather than absolute amount.

Secondly, the scope of houses considered may have been too wide. This is highlighted by inspection of the residuals. Three observations in this regression have residuals of over ± £1,000. Of these the two whose residuals were negative were in fact located in Leicestershire, where house prices are generally lower. The third, with a positive residual, was the only dormer bungalow in the sample and was situated in a rather "exclusive" village some miles from Coventry. Those high residuals suggest either a mis-specification of the relationship (so that, for example, another variable "Leicestershire" should have been introduced) or that these houses, and probably others, should be regarded as belonging to a different market. The latter course seems to be the better one to adopt since otherwise the number of variables necessary become unmanageable.

The third factor is multicollinearity. This arises from the fact that the various explanatory variables are not independently distributed. For example, there is a high correlation (0.6) between the total area of reception rooms and the total bedroom area. In addition it is to be expected that there are some more complicated inter-relationships each involving several variables. In such cases the matrices of correlation between the individual variables or their coefficients are not sufficient for detecting multicollinearity. It may conveniently be done however by estimating regression equations involving the sets of variables suspected of multicollinearity.

As one example of this the following equation was estimated:-

$$\text{(Area of reception rooms)} = \underset{(7.03)}{189} + \underset{(3.24)}{0.269}\text{ (area bedrooms)} - \underset{(3.27)}{66.8}\text{ (flat)}$$

$$- \underset{(-4.28)}{77.4}\text{ (maisonette)} + \underset{(1.95)}{23.4}\text{ (semi-detached)} + \underset{(0.088)}{155}\text{ (detached)}$$

$$- \underset{(-1.34)}{37.5}\text{ (detached bungalow)} - \underset{(-2.87)}{70.4}\text{ (other bungalow)}$$

$R^2 = 0.581$ $\qquad \bar{R}^2 = 0.536$ $\qquad F = 14.9$

Figures in parentheses are t-statistics.

The value of R^2 is not as high as in some time series analyses but is probably sufficient to raise estimated standard errors considerably.

For the purposes of obtaining an estimated value for a house within the sample multicollinearity does not pose any serious problem, in contrast to the biases resulting from specification error. This has a bearing on the number of explanatory variables which should be included in the regression. If theoretical considerations suggest a variable should be included then for the purposes of obtaining a quality adjusted price it should be included. If it turns out not to be a significant independent source of variation in price through multicollinearity or otherwise no harm will have been done since the net effect on estimated price will be small. If the variable turns out to be an important determinant of price much harm would be done by omitting it. The quality-adjusted prices so estimated would be biased by the contribution to its price of the effect of the omitted variable.

Even so it is certain that the quality-adjusted price is measured subject to error. The state of decoration and repair have not been taken into consideration, although the coefficients on the age variables will take some account of this. The linear form, although convenient, is probably an over-simplification and will result in further random variations in the residuals.

As well as the quality-adjusted prices, the individual coefficients on quality variables are of interest. Here multicollinearity does present a problem The only real answer is to obtain independent variation in the explanatory variables. Some information, however, can be gleaned by omitting some of the variables which appear to be least significant. If this is done care must be taken in the interpretation of the results thus obtained. In such a case the coefficients show the effect not only of the included variable, but of those parts of the excluded variables which are correlated with the included variables.(3) For this reason the coefficient on 'number of inside toilets', for example, reflects not only the

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3. See Goldberger [4], p. 26 et seqq.

impact of this variable but also the effect of those characteristics which are associated with houses containing two toilets and which are not taken account of in the other variables.

This should be borne in mind in looking at column 5 of Table 1. The location variables have been eliminated as have the time trend number of bedrooms and number of reception rooms. The F-statistic and coefficient of determination after correction for degrees of freedom have increased.

The coefficients on floor area are now significant but do not change greatly in size. It appears that the marginal price of a square foot of bedroom area is about the same as for reception rooms at about £4 per square foot. The coefficient on kitchen area is much smaller and not significant. This perhaps explains why kitchens are often so small, as the reward for devoting more space to reception rooms is greater.

The coefficient on the garage variable is £380. This compares very favourably with the cost of having a garage installed, assuming land and planning permission are available. If the average size of a single garage is 8' x 16' this works out at £3 per square foot.

"Size of grounds" does not appear to be significant. This may be because the classification into large, medium or small was different for the two estate agents consulted. The two age variables were, however, significant. The reason for two age variables is as follows. For most of the observations age in years was available. For the remainder only rough data was given, often in the form of a photograph. On this basis the house was classified as new, medium or old and given the index value of 1, 2 or 3 respectively. This is equivalent to the following multivariate regression scheme:-

$$y_1 = a_1 x_1 + b_1 x_2 + u_1$$

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$$y_2 = a_1 x_1 + b_2 x_3 + u_2$$

where x_2 is the exact age data and x_3 is the imprecise age data.

$$\begin{bmatrix} y_1 \\ \hline y_2 \end{bmatrix} = \begin{bmatrix} x_1 \end{bmatrix} a_1 + \begin{bmatrix} x_2 \\ \hline 0 \end{bmatrix} b_2 + \begin{bmatrix} 0 \\ \hline x_3 \end{bmatrix} b_3 + \begin{bmatrix} u_1 \\ \hline u_2 \end{bmatrix}$$

Ordinary least squares gives unbiased efficient estimators under these conditions(4) and given the other usual assumptions 5 was added to each item of the precise age data so that the price differences between a house aged zero years and any other house was not infinite. Adding in such a constant term slowed down the initial decay in price relative to the rate of decay for older houses. Furthermore an increase of 1 in the value of $\log_{10}$ (age in years plus 5) is equivalent to the difference between a one year old and a 55 year old house (since $\log_{10} (1 + 5) + 1 = \log_{10} (55 + 5)$). This is also the difference between the values 1 and 3 in the age index; so an increase of 1 in the exact age variable is approximately equivalent to an increase of 2 in the imprecise age data. This fact is borne out by the relative size of the coefficients.

The "house type" dummy variables appear to vary in significance from one to the other. As estimated here these values are in comparison with a terraced house. We can say for example that other things being equal a semi-detached house costs on average £360 more than a terraced house and the end house of a terrace cost £320 more than one in the middle of the row. A detached house seems to cost £1,000 more and a detached bungalow nearly £2,000 more.

The estimate of the increase in value upon installing oil central heating seems rather high. The ranking of the various types of central heating seems in accord however with what estate agents say about people's preferences. Oil and gas are cheaper fuels than electricity and solid fuels especially when convenience and

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4. See Goldberger [3] p. 207.

flexibility are taken into account. Against this there is generally a higher capital cost. The combined effect of these two influences will tend to lead to a higher price on oil and gas central heating than on the other two types. The size of these coefficients is quite close to installation cost, which we should expect as a result of economically 'rational' behaviour under conditions of good knowledge.

The coefficient on the dummy variable "freehold" is not significant and changes sign between the two regressions. Given a typical ground rent of £10-£15 one would expect the value of this coefficient to be approximately £100. Since a false estimate of this coefficient can make such a large difference to estimated quality-adjusted price to impose this value on the coefficient. If this is done the dependent variable in the regression then becomes

$$\text{Price} - 100\,F \;;\quad F = \begin{cases} 1 & \text{when house is freehold} \\ 0 & \text{when house is leasehold} \end{cases}$$

The idea obviously extends to other variables where the coefficients as estimated has a large standard error but where an extraneous estimate is available.(5)

The coefficient on the variable "modern kitchen", although not statistically significant shows little difference between the two regressions and is very close to any estimate based on cost considerations.

The grouping of the area dummy variables was based on the advice of estate agents and Coventry citizens. They are measured as deviations from the value of houses in area 2. Without knowing very much about Coventry I cannot comment on the values estimated except that they seem to be correlated with the "niceness" of the area. Details of the area variables are given in Appendix I.

Estimation of Price Sensitivity

This section of the paper is concerned with trying to explain why some houses take longer to sell than others. The effect of different prices on the expected

5. As in the case of budget studies where an estimate of income elasticity from cross-sectional data is imposed on time series data.

length of time taken to sell we will, for convenience, call price sensitivity.

A great deal of the variation can be put down to chance. If we assume that in any period the probability of a buyer turning up is x in all periods the probability that the dwelling will be sold in period T is $(1 - x)^T x$.

This defines a geometric distribution. Its moment generating function is (6)

$$E[(T)_r] = r!\ \left(\frac{1-x}{x}\right)^r$$

$$\therefore\ E(T) = \frac{1-x}{x}$$

$$\mathrm{Var}(T) = E(T)^2 - [E(T)]^2$$

$$= 2\left(\frac{1-x}{x}\right)^2 - \left(\frac{1-x}{x}\right)^2$$

$$= \left(\frac{1-x}{x}\right)^2$$

i.e. the variance is the square of the mean.

In our sample the mean value of T is 67 days. The standard deviation is 57 days. However there is also a fixed element in T, being the time taken to advertise the property and for the buyer to view it, discuss the matter with his family and to negotiate a price. If we assume this to be exactly 10 days we obtain the theoretical distribution shown in Figure 1. The actual distribution is also shown.

This illustrates the point that even if the expected value of the time taken to sell is known the actual time taken can never be predicted with great accuracy.

First the power of the variable 'quality-adjusted price' was tested. The following result was obtained:

$$\underset{(12.7)}{T = 59.2} - \underset{(-3.49)}{358U_1}$$

$$R^2 = 0.135 \qquad \bar{R}^2 = 0.113$$

T = time in days for house to be sold

U_1 = residual from regression 2 of Table 1 (dependent variable $\log_{10}$ initial asking price).

Figures in brackets are t-statistics.

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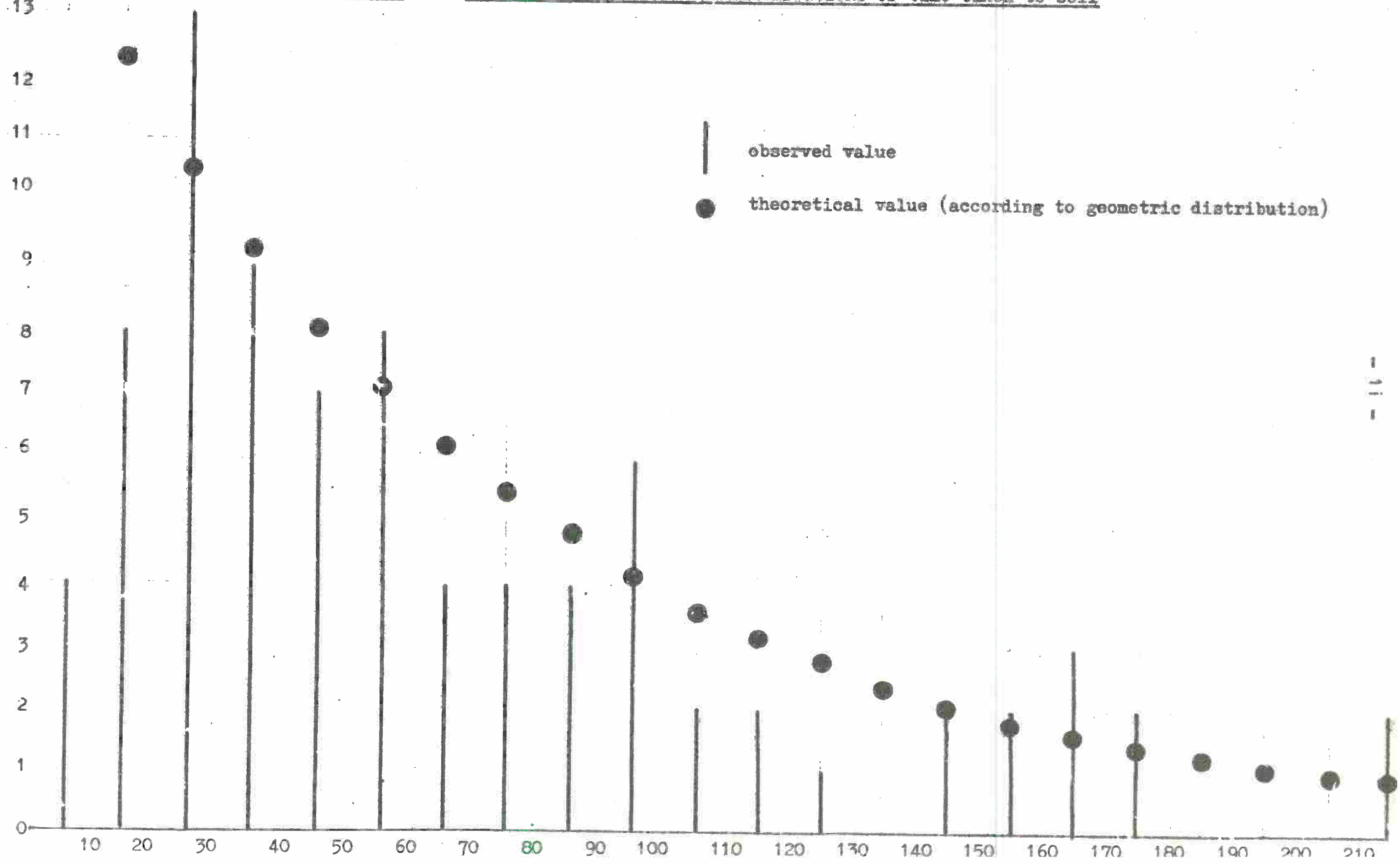
6. Lindgren [8], p. 75.

FIGURE 1 Observed and theoretical distributions of time taken to sell



To see what this means consider a 5% difference in house price - say £200 on a £4,000 house. The difference in E (T) is 358 x log (1.05)

= 358 x 0.0212 = 7.6 **days.**

Since U is measured subject to error this value will be biased downwards and we can regard this as a lower limit. Following Burstein,[7] we can obtain an upper limit by estimating the equation with U as the dependent variable. The following result was obtained:

$$U_1 = \underset{(2.60)}{0.0210} - \underset{(-3.49)}{0.000378T}$$

On this estimate the same 5% price differential is associated with a difference of selling time of 0.0212 + 0.000378 = 56 days. Clearly, an upper and a lower limit are of little use when they are so far apart. With knowledge of the variances of the respective errors in the variables an unbiased estimate could be made [8] but unfortunately this is not available.

One way out of the predicament could be to regard the variables U and T as jointly determined. The variables determining T would then be U, the estate agent handling the property, the availability of mortgages, and one or two aspects of quality which in addition to their effect on price also affect the time taken to sell. The quality adjusted price would be based on agreed price. This would be a decreasing function of time, because failure to sell often results in price cuts and willingness to negotiate on the price. The exogenous variables in this equation would be initial asking price and the set of quality determining expected price. Unfortunately the two stage least squares program was not able to handle the full set of variables as it ran out of labels for them, so an abbreviated set was used.

The resultant estimates were:

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7. In "The demand for Household Refrigeration in the United States" in [6].

8. [7], p. 157-158.

$$T = \underset{(10.4)}{75.8} - \underset{(1.08)}{29.\hat{U}_2} - \underset{(20.3)}{25.6}\text{ (oil central heating)} - \underset{(16.0)}{32.7}\text{ (gas central heating)}$$

$$- \underset{(9.30)}{16.6}\text{ (agent Q)} - \underset{(9.4)}{19.4}\text{ (period 2)} + \underset{(10.5)}{23.7}\text{ (price < £3251)}$$

$$U_2 = \underset{(0.30)}{-3.13} + \underset{(0.0209)}{0.000143\hat{T}} + \underset{(0.000)}{0.963}\log_{10} P_1 + \underline{Xb}$$

Where $\underline{X}$ is a list of quality variables whose coefficients (vector $\underline{b}$) are given in column 6 of Table 1. The figures in brackets underneath are estimated standard errors.

This gives an estimated time difference of just over 6 days for a 10% difference in price. This estimate is even smaller than the two-variable regression estimate. The high estimated standard error of the coefficient on $\hat{T}$ suggests that this particular simultaneous model in inappropriate; U seems not to depend on T. The meaning of this must be that price cuts are unrelated to time taken to sell. In fact the sample correlation coefficient between initial asking price ÷ agreed price and T is +0.248 which is just significant at the 2.5% level for a one-tailed test.(9) Although the correlation is small its significance makes the very high estimated standard error and the sign of the coefficient surprising. However the other coefficients are very close to what would be expected.

The estate agents said that oil and gas-fired central heating, as well as adding value to a house increased its sale-ability. To test this hypothesis these variables were included in the two-stage least squares regressions. A difference of 25-30 days could be quite important in selling a house. Assuming the lowest estimated value of the payoff between time and price of £200 for 56 days (10) this implies a further increase of £100 in value for a house with oil or gas-fired central heating. This is in addition to the value estimated in the price-quality regressions.

The choice of estate agent between P or Q seems to make a difference of about a fortnight on average. However, part of this difference may be due to the types of house dealt with by the different agents, agent P dealing in general more with

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9. [10] p. 146, table 13.

10. Page 12, tenth line, above.

the popular types which could be expected to have a faster turnover. Therefore this coefficient does not necessarily reflect their relative efficiencies.

The period covered by the sample, June 1968 - June 1970, was split very conveniently into two, according to one local agent. Apparently there was a "change overnight" for the better on the 1st July, 1969. Accordingly all houses for which instructions were received after 1st June, 1969 were placed in period 2. This seems to make a difference of nearly three weeks in selling time.

All these results are very similar to the ordinary least squares estimates:

$$T = \underset{(7.14)}{71.9} - \underset{(-1.82)}{36.4}\,(\text{oil central heating}) - \underset{(-1.93)}{29.8}\,(\text{gas cen. htg.}) - \underset{(-1.56)}{14.1}\,(\text{agent Q})$$

$$- \underset{(-2.21)}{20.0}\,(\text{period 2}) + \underset{(2.02)}{36.5}\,(\text{area 8}) + \underset{(2.54)}{25.3}\,(\text{price} < £3251) - \underset{(2.89)}{291U_1}$$

$$R^2 = 0.362 \qquad \bar{R}^2 = 0.291 \qquad F = 5.82$$

The figures in brackets are t-statistics.

Area 8 is defined as everywhere outside Coventry, its suburbs, and Kenilworth. Since this segment of the market is rather small and specialised it will take longer to find a buyer. The same applies to the variable "price $<$ £3251".

The proportion explained is quite significant when the high residual variance to be expected from the working of the probability model (p. 10, above) is taken into account.

Summary of Conclusions

It seems possible in principle to estimate meaningful price-quality relations for houses. This would probably be very useful for estimating quality-adjusted price indexes both over periods and between regions.(11)

With an improvement in specification of the price-quality relations (notably by greater market segmentation), more precise estimates of quality-adjusted prices for individual house could be obtained. The sensitivity of selling time to price differences could then be estimated with greater accuracy. The existence of a significant relationship has been demonstrated but the "pay-off" between time and money is of uncertain size.

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11. See [1], [11], [5] for the application of this technique to automobiles and tractors.

Appendix

The data was obtained from files which were "dead", i.e. on which business had been concluded. Advertising expenditure was often listed, otherwise it could be deduced from the agent's invoice. In addition various dates could be deduced - the date instructions were received by the firm, the date contracts were exchanged and the date the person who exchanged contracts said he would buy. Sometimes there were several such "sale subject to contract" before contracts were exchanged. In such cases only the date of the sale which was eventually successful was recorded.

All the other data was obtained from the agents particulars or index card. The only data from this source not used in any of the regressions was rateable value. The area, house type, modern kitchen, and central heating variables were all zero-one dummy variables. The garage space variable was an indication of the number of cars which would be sheltered so it took on the values zero, one and two. This imposes the restriction that a two-car garage is worth twice a one-car garage.

The division into areas was done by asking the advice of the estate agents as to which grouping of the various districts would make each resultant area as homogeneous as possible. This is analogous to the situation when using stratified sampling where one tries to maximise the inter-stratal variance and so minimise the intra-stratal variance. Ten areas were thus obtained. Unfortunately in some areas there were only one or two observations, so the districts were regrouped. This was done in such a way as to preserve as much intra-group homogeneity as possible.

The final grouping was:-

Area 1. Stivichall, Cannon Park, Baginton, Allesley, Cheylesmore, Finham, Binley, Green Lane.

Area 2. Walsgrave, Wyken, Stoke, Whitley. This area was used as the base area.

Area 3. Potters Green, Willenhall, Bell Green, Alderman's Green, Longford, Court House Green, Foleshill.

Area 4. Keresley, Radford, Whitmore Park, Coundon, Holbrooks.

Area 5. Whoberley, Earlsdon, Chapelfields, Hearsall Common.

Area 6. Broad Lane, Canley, Tile Hill, Eastern Green.

Area 7. Kenilworth, and everywhere else beyond the suburbs of Coventry.

TABLE 1: Coefficients and t-statistics
(except in column 6 where the figures in parentheses are estimated standard errors)

Dependent variable / Explanatory variable	(1) P_1 (ask. price)	(2) P_2 (agreed pr.)	(3) Log_{10} P_1	(4) Log_{10} P_2	(5) P_1	(6) U
Constant term	1,309 0.97	1,438 1.09	3.29 24.7	3.29 24.1	1,809 1.82	-3.13 (0.301)
Time trend	0.42 0.73	0.55 0.97	0.000017 0.301	0.000029 0.50		
Garage size	0.421 0.73	310 1.63	0.0407 2.12	0.0401 2.04	384 2.32	-0.0456 (0.000788)
Number of reception rooms	- 113 0.412	- 165 - 0.66	- 0.00618 - 0.24	- 0.00986 - 0.382		
Total area of reception rooms	4.65 1.96	4.57 1.97	0.000409 1.75	0.000407 1.70	4.05 2.31	-0.000392 (0.000058)
Number of bedrooms	- 162 - 0.55	- 146 - 0.51	0.00224 0.08	0.00353 0.12		
Total area of bedrooms	4.12 2.17	3.48 1.88	0.000390 2.08	0.000332 1.73	4.12 3.04	
Area of kitchen	0.852 0.214	1.26 0.32	0.000175 0.45	0.000248 0.62	2.88 0.81	-0.000177 (0.000143)
Number of inside toilets	632 1.41	511 1.17	0.0685 1.55	0.0570 1.26		-0.0796 (0.0273)
Size of grounds	107 0.75	81.8 0.59	0.0151 1.08	0.0131 0.92	68.3 0.55	-0.0121 0.00473
Log_{10} (age + 5)	-1,034 - 2.48	-1,033 - 2.54	- 0.1056 - 2.56	- 0.1120 - 2.66	-1,160 - 3.01	0.0992 (0.0160)
Age Index	- 515 - 2.50	- 531 - 2.64	- 0.0552 - 2.70	- 0.0603 - 2.90	- 577 - 3.27	0.0552 (0.0000)
Flat	42.4 0.06	- 5.35 - 0.007	- 0.0177 - 0.24	- 0.0135 - 0.18	- 391 - 0.58	
Maisonette	143 0.22	128 0.20	- 0.0208 - 0.32	- 0.0148 - 0.23	- 212 - 0.37	
Semi-detached house	419 1.65	464 1.88	0.0504 2.01	0.0588 2.30	359 1.61	-0.0554 (0.000232)
Detached house	836 2.06	977 2.48	0.0690 1.73	0.0840 2.06	1,014 3.17	-0.0652 (0.0000)
End terrace	260 1.14	346 1.55	0.0328 1.46	0.0459 1.99	320 1.57	-0.0360 (0.0000)
Detached bungalow	1,336 1.73	1,259 1.67	0.187 2.45	0.179 2.29	1,896 3.80	-0.1881 (0.00965)

Table 1 - Continued...

Other bungalow	879	930	0.102	0.111	806	-0.0987
	1.81	1.97	2.13	2.27	1.89	(0.000529)
Oil central heating	169	236	0.0110	0.0182	600	-0.0116
	0.42	0.60	0.28	0.45	1.76	(0.0271)
Solid fuel central heating	98.9	-20.8	0.00390	-0.00504	202	-0.0188
	0.32	-0.07	0.13	-0.16	0.75	(0.0000)
Gas-fired central heating	266	284	0.0347	0.0371	341	-0.0312
	0.92	1.00	1.21	1.26	1.25	(0.0000)
Electric central heating	160	146	0.0198	0.0174	321	-0.0224
	0.64	0.60	0.80	0.69	1.42	(0.000696)
separate w.c.	253	237	0.0249	0.0249		-0.0324
	0.97	0.93	0.97	0.94		0.0171
Freehold	182	237	-0.0117	0.00289	-95.6	-0.00372
	0.33	0.44	-0.22	0.05	-0.19	0.000342
Modern kitchen	152	243	0.0242	0.0367	234	-0.0261
	0.61	0.99	0.98	1.45	1.02	(0.0006)
Area 1	110	66.3	0.00896	0.00316		
	0.42	0.26	0.35	0.12		
Area 3	-303	-438	-0.0312	-0.0507		
	-0.90	-1.33	-0.94	-1.49		
Area 4	1.23	-22.3	-0.00767	-0.0112		
	0.004	-0.08	-0.29	-0.41		
Area 5	-116	-188	-0.0126	-0.0233		
	-0.43	-0.71	-0.47	-0.85		
Area 6	168	124	0.0238	0.0182		
	0.46	0.35	0.67	0.49		
Area 7	453	519	-0.00552	0.00186		
	0.84	0.99	-0.10	0.03		
T						0.000143
						(0.0209)
Log_{10} P_1						0.963
						(0.000)
R^2	0.818	0.829	0.826	0.834	0.785	Not applic. in 2SLS procedure
$\bar{R}^2$	0.705	0.722	0.717	0.730	0.713	
F	7.42	7.99	7.83	8.29	11.34	

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