DISCOUNT POINTS AND HOUSING PRICES REVISITED

Peter F. Colwell, Department of Finance

Karl L. Guntermann, Texas Technological University
C. F. Sirmans, University of Georgia

#512

College of Commerce and Business Administration
University of Illinois at Urbana-Champaign
Summary:

Zerbst and Brueggeman question the extent to which FHA and VA discount points paid directly by house sellers are shifted to buyers through higher prices. Unfortunately, their model is consistent with any percentage being shifted. Their calculation that 43 percent of FHA discount points are shifted assumes that asking price is unrelated to the seller's expectations of financing and having to pay points. More reasonable assumptions yield higher estimates of shifting.

A model is developed in this paper which allows for the direct estimation of the proportion shifted. It is estimated that 77 percent of FHA discount points are shifted. However, it is not possible to reject the hypothesis that 100 percent are shifted.
DISCOUNT POINTS AND HOUSING PRICES REVISITED

Peter F. Colwell
Associate Professor
Department of Finance
University of Illinois - Urbana

Karl L. Guntermann
Associate Professor
Department of Finance
Texas Technological University

C. F. Sirmans
Associate Professor
Department of Real Estate and Urban Development
University of Georgia
DISCOUNT POINTS AND HOUSING PRICES REVISITED

Lenders make FHA insured and VA guaranteed mortgage loans at a discount. One important reason for doing this is to make up for the difference between the ceiling-contract interest rate and the market interest rate. Because lenders are unable to extract this discount from the borrower-buyer legally, they charge the seller discount points, a percentage of the loan amount. The seller, in turn, attempts to shift this burden back to the buyer through a higher selling price than would be charged if the sale were financed conventionally.

Zerbst and Brueggeman [Z&B, 3] question the extent to which discount points paid directly by house sellers are shifted to buyers through higher prices. They should be congratulated for asking this interesting question. Unfortunately, their model is incapable of answering it. Narrowly interpreting their results, Z&B find that only about 43% of points shifted to FHA buyers.\(^1\) Their problem stems from not treating asking price as a function of the probability of a non-conventional loan. This is untenable because there are some neighborhoods in which FHA mortgages are likely and others in which FHA mortgages are unlikely. Furthermore, there are individual sellers who refuse to sell when an FHA mortgage is sought by the buyer. Recognition that some financing outcome can be reasonably anticipated by the seller gives rise to the possibility that sellers adjust their asking prices to reflect anticipated financing.

\(^1\)Using almost identical methodology and Chicago data, Hiton [2] found that 77.5% of the FHA points were shifted.
Thus, the Z&B model can be shown to be consistent with any shifting experience, including complete shifting of discount points.

This paper clarifies the problem with the Z&B approach, develops a model which allows the direct estimation of the proportion of points shifted, estimates that proportion, and tests whether the estimate is significantly different from unity (i.e., 100% shifted).

The Z&B Approach

Considering only conventional and FHA insured mortgages (i.e., excluding VA guaranteed mortgages for simplicity), the Z&B model is roughly as follows:

\[
\frac{SP}{AP} = .96 + .0227(FHA)
\]

where \(SP\) = selling price,
\(AP\) = asking price, and
\(FHA\) = a dummy variable where \(1\) = an FHA financed sale and \(0\) = conventional.

Suppose that asking price may be decomposed into the selling price anticipated with conventional financing plus a pad which is a function of the probability that FHA financing is used. Thus,

\[
AP = SP_c + f(P),
\]

where \(SP_c\) = the selling price anticipated with conventional financing, and \(P\) = the probability that FHA financing is used. Multiplying both sides of equation (1) by the decomposed asking price (2) yields

\[2\]

The selling period variable is omitted for simplicity; the loan to value ratio is omitted because it was not significant.
(3) \[ SP = .96(\frac{SP_c + f(P)}{SP_c}) + .0227(\text{FHA})(\frac{SP_c + f(P)}{SP_c}). \]

Now suppose there is a house which has a zero probability of selling with FHA financing. Substituting zero for both P and FHA in equation (3) and dividing both sides by \( SP_c \) yields

(4) \[ \frac{SP}{SP_c} = .96 + .96 \frac{f(0)}{SP_c} \]

Of course when \( P = 0 \), \( SP/SP_c = 1 \). Therefore, equation (4) may be solved for the pad which the Z&B model appears to require if the house sells with conventional financing. This is .0417 or slightly more than 4% of the expected sale price is added to get the asking price.

Taking the other extreme, suppose there is a house which is certain to sell with FHA financing. Substituting into (3) and dividing by \( SP_c \) results in the following:

(5) \[ \frac{SP}{SP_c} = .9827 + .9827 \frac{f(1)}{SP_c} \]

Assuming that the loan to value ratio is .95 and there are 5-3/4 points, the ratio of selling price to the hypothetical selling price with conventional financing would have to be 1.0578 if all the points were shifted. By substituting this magnitude into the left side of equation (5), it is possible to solve for the pad which is necessary to result in the shifting of all the points. The pad is .0761 or 7.61% above the hypothetical price with conventional financing or only 1.73% above the actually selling price. Recall that the calculated pad was 4.16% with conventional financing a certainty. So a pad of only 3.44%
more is sufficient to shift all points when FHA financing is a certainty. Thus the Z&B results are consistent with complete shifting (among many possibilities) depending on behavior with respect to setting the asking price to reflect the anticipated financing of a sale. Their particular result of 43% shifting implicitly assumes essentially no difference in asking price as a result of differences in expectations of financing.

The Model

Rather than relying on an indirect estimate of the shifting as is found in the Z&B article, it is desirable to have a statistical test of whether the shifting indicated by an estimate of the model differs significantly from 100%. It is the purpose of this paper to estimate directly the proportion of points shifted by using the following model which is very different from that of Z&B.

$$SP_i = \beta_0 \exp \left[ \beta_1 \left( \frac{PTS(t)}{V} \right) + \sum_{j=2}^{7} \beta_j X_{ij} \right] \prod_{j=8}^{10} \beta_j$$

where $$\left( \frac{L}{V} \right)_i$$ = the expected loan to value ratio, and

- $$PTS(t)$$ = the number of points charged directly to the seller during the month in which the $$i$$th property sold,
- $$X_{ij}$$ = the $$j$$th characteristic of the $$i$$th property or sale.

The X's are conventional explanatory variables and will be described later so as not to distract the reader from the principal hypothesis.

The coefficient $$\beta_1$$ may be interpreted as the proportion of the points which are shifted from seller to buyer. If $$\beta_1$$ is equal to unity, then 100% of the points are shifted from house seller to buyer through higher
solving prices. The test is whether the estimate of $\beta_1$ is significantly different from unity.

The Results

The model was estimated using data on 2,408 sales of single-family, detached houses in Lubbock, Texas. These sales took place from January 1970 through December 1975. The sample is divided equally between FHA and conventionally financed sales. The selling prices in the sample are all below the mortgage loan ceilings set by FHA during the sample period (i.e., $33,000 before 8/22/74 and $45,000 thereafter). Thus sellers could reasonably expect the maximum loan to value ratio (i.e., .95) with FHA financing.

The data on FHA discount points charged at the end of each quarter came from the largest of 8 local lenders accounting for over 40% of the residential mortgage loans and approximately 60% of FHA and VA loans in Lubbock. It is assumed that the points charged during a quarter were the points charged on the last day of the quarter.

After transforming (6) by taking the natural logarithms of both sides, the coefficients were estimated using ordinary least squares. The results are as follows:

(7) \[ \ln SP_i = 4.312 + .773 \frac{[L_i]}{[V_i]} e^{\frac{[PTS(t_i)]}{100}} - .013 FHA_i - .002 DIST_i - .013 AGE_i + .008 t_i \]

\[ + .063 AIR_i + .104 FIRE_i + .787 \ln SQFT_i + .008 \ln FNTG_i + .121 \ln BATH_i \]

\[ (.113) \quad (.319) \quad .012 \quad (.004) \quad (.0005) \quad (.001) \quad (.007) \quad (.007) \quad (.016) \quad (.004) \quad (.008) \]
where $FHA_i$ = a dummy variable where $1 =$ FHA financing and $0 =$ conventional financing for the $i^{th}$ property,

$DIST_i$ = the distance in miles of the $i^{th}$ property from Texas Technological University,

$AGE_i$ = the age of the $i^{th}$ property in years at the time of sale,

$t_i$ = the month of sale of the $i^{th}$ property where $0 =$ 1970/1 and $71 =$ 1975/XII

$AIR_i$ = a dummy variable where $1 =$ central air conditioning and $0 =$ no central air conditioning,

$FIRE_i$ = a dummy variable where $1 =$ a wood burning fireplace and $0 =$ no wood burning fireplace,

$SQFT_i$ = the number of square feet of living area in the $i^{th}$ property,

$FNTG_i$ = the number of front feet, the frontage, of the $i^{th}$ property, and

$BATH_i$ = the number of bathrooms in the $i^{th}$ property.

The coefficient of determination is .892, and all but two of the independent variables, FHA and DIST, have coefficients which are significantly different from zero at the 95% level of confidence. All coefficients have the expected signs.

The estimate of $\beta_1$ is .773 indicating that slightly more than 77% of the points are shifted. Although this coefficient is significantly different from zero at the 95% level of confidence, it is not significantly different from unity. Therefore, the hypothesis that all points are shifted cannot be rejected.

The FHA dummy variable was included in an attempt to capture any effects of FHA housing not captured by points or other included variables.
null
For example, FHA housing may be inferior to conventional with respect to finish or neighborhood quality. On the other hand, FHA financing may involve delays and risk which are in excess of that associated with conventional financing so sellers charge a premium to buyers who wish to go the FHA route. The FHA dummy variable may capture a net effect. However, the coefficient on the FHA dummy variable is not significant in this test.

The coefficient on distance from the university (i.e., the residential property value gradient) is not significantly different from zero probably as a result of DIST being highly correlated with AGE. Whereas the coefficient on AGE is significantly different from zero, and its negative sign indicates that older homes sell for less than newer ones, ceteris paribus. However, this depreciation of 1.3% per year is swamped by the rate of appreciation holding age constant. The monthly rate of appreciation can be read directly as the coefficient on t. Multiplying by 12, yields an annual rate of appreciation of 9.6%. Thus, a typical house in Lubbock gained 8.3% (i.e., 9.6% - 1.3%) per annum from 1970 through 1975.

The coefficients on the central air and fireplace dummy variables are both significant at the 95% level of confidence. The magnitudes of these coefficients indicate that central air adds about 6% to the selling price while a fireplace adds about 10%. If these magnitudes seem a bit on the high side, it may be that these variables are correlated with excluded variables which also contribute to selling price.

The coefficient on building square feet is significantly greater than zero and less than unity at the 95% level of confidence. This indicates that building size has a diminishing marginal contribution to selling
price. Because it was not possible to obtain data on lot depth, the variable FNTG probably serves as a proxy for lot area rather than measuring the effect of frontage alone. Thus, the magnitude of the significant coefficient on lot frontage indicates that lot size also has a diminishing marginal contribution to selling price. This is also true of the number of bathrooms.

Conclusions

The model developed by Z&B is consistent with any percentage of discount points being shifted. After estimating their model, they calculated that 43% of FHA discount points are shifted. This calculation assumes that asking price is unrelated to the seller's expectations of financing and having to pay points. More reasonable assumptions about the formulation of asking price yield higher estimates of shifting.

A model is developed in this paper in which selling price is a transcendental function of points charged the seller, and a number of other characteristics of the sale and the house itself. This model provides a means of directly estimating the proportion shifted. Although it is estimated that 77% of FHA discount points are shifted, it is not possible to reject the hypothesis that 100% are shifted. With the exception of transitional periods during which increases in points are not fully anticipated, it is difficult to imagine a market structure in which less than 100% of the discount points would be shifted. The conventional wisdom is that 100% are shifted [1, fn 15]; this is not disputed by the results in this paper.
REFERENCES


