The Value of Mortgage Assumptions: An Empirical Test

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Abstract. **This study provides an empirical test of the two main techniques for calculating the financing premium for assumption financed sales, cash equivalence adjustment (*CEA*) and financed-fee valuation adjustment (*FFVA*). The results indicate that both the *CEA* and *FFVA* computational techniques overvalue the premium associated with assumption financing. A variation of the empirical test is considered that differentiates this study from previous studies. This variation allows for a test of the hypothesis that the proportion of the financing premium capitalized into the sales price is a function of the loan-to-price ratio. It is concluded that this hypothesis cannot be rejected.**

Introduction

It is commonly accepted that the assumption of an existing mortgage has an effect on the sales price of a single-family house. If the seller is successful in capturing the value attributed to a mortgage assumption (or any form of seller financing) in the sales price, this would result in a sales price that is inflated in relationship to a conventionally financed sale. Unless an adjustment is made, this will create problems whenever sales price of an assumption financed sale is used as a proxy for market value in the absence of special financing.

The overall purpose of this paper is to examine the effect assumption financing has on the sales price of a single-family house. Both of the adjustment techniques suggested in the literature are empirically tested. They are: (1) the traditional cash equivalence adjustment (*CEA*); and (2) the financed-fee valuation adjustment (*FFVA*). The empirical test utilizes residential sales data and a hedonic model.

A specific purpose of this paper, which differentiates it from previous studies, is to test the following hypothesis:

> The proportion of the financing premium (as calculated by *CEA* or *FFVA*) that is capitalized into the price of the house is a function of the loan-to-price ratio.

This paper is organized into four sections. The section following this introduction includes a discussion of the *CEA* and *FFVA* adjustment techniques. An empirical test of

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these techniques is presented in the third section. The final section is a summary of major conclusions.

Adjustment Techniques

The traditional cash equivalence adjustment (*CEA*) is the most frequently recommended approach to adjust for non-standard financing. The *CEA* approach has been a topic in the literature at least since 1972 when Garcia [10] suggested its use. However, the *CEA* approach was not empirically tested until Sirmans, et al. [12] did so in 1983. Sirmans, et al. found that, on average, only 32.2% of the calculated *CEA* financing premium was capitalized in the sales price of the house purchased with an assumption, thus raising questions about the validity of the *CEA* approach.

The *CEA* financing premium can be calculated by finding the present value of the monthly savings accruing to the buyer by taking the assumption mortgage rather than obtaining conventional financing at the current mortgage rate, as shown in equation (1):

$$P = a_{in}(f_{in}L - f_{kn}L) \tag{1}$$

where:

P = financing premium,
a_{rt} = present worth of 1 per period; r indicates the discount rate and t indicates number of periods,
f_{rt} = mortgage constant; r indicates the mortgage interest rate and t indicates number of periods,
i = current interest rate available on conventional first mortgages,
k = contract interest rate on the assumption,
n = periods remaining on the assumption, and
L = balance due on the assumption (or the book value).

See Clauretie [4], Smith, et al. [14], and Sirmans, et al. [11].[1]

In examining the literature, all of the empirical evidence indicates that (on average at least) some of the value attributed to assumption financing is capitalized into the sales price of the house; however, *CEA* appears to over-value it.[2] To explain why *CEA* does not appear to work, authors have developed modified versions of *CEA* or have entered other financing factors into the analysis. These attempts are typically centered on four main criticisms of the *CEA* approach. They are: (1) *CEA* makes no provision for the larger downpayment often required with an assumed mortgage, (2) *CEA* is a before-tax measure and therefore ignores the effect of income taxes, (3) interest-rate risk is ignored by the *CEA* approach, and (4) the holding period of the buyer is not considered.[3]

Most modified versions of *CEA* have received little attention. The exception has been the financed-fee valuation adjustment or *FFVA*, first introduced in 1983 by Findlay and Fischer [9]. The *FFVA* approach has been suggested as a means to overcome one of the potential problems with the *CEA* approach; specifically, that the *CEA* technique makes no provision for the additional downpayment often required with an assumption mortgage (that is, a potential buyer is indifferent to the loan-to-value ratio of the assumable loan). This would imply that the buyer's opportunity cost associated with an additional downpayment is equal to the market rate or that he has the opportunity to borrow the additional downpayment at the same rate as that available on conventional first mortgages. Findlay and Fischer argue that the interest rate on the second mortgage used to make up the difference in downpayments is likely to be higher than the rate on first mortgages because of the additional risk. However, if the combination of the assumed first mortgage and the second mortgage result in a "blended" rate lower than the market rate available on a conventional first mortgage, the potential buyer should be willing to pay a higher purchase price for this special opportunity.

The formula for *FFVA*, as presented by Dale-Johnson, et al. [6, p. 392], is $FFVA =$ maximum $(SP_a - SP_c, 0)$ where SP_c is computed as follows:[4]

$$SP_c = \frac{SP_a - L(1 - a_{sn}/a_{kn})}{1 - M(1 - a_{sm}/a_{im})} \tag{2}$$

where:

SP_a = observed sales price of a given house with assumption financing,
SP_c = true price of the same house with conventional financing,
M = the loan-to-value ratio available on conventional financing,
s = interest rate on second mortgage,
m = periods in amortization schedule of new conventional first mortgage, and remaining terms are defined as before.

Whereas *CEA* has been extensively tested, it appears that *FFVA* has only been tested three times. All of these tests have attempted not only to determine whether 100% of the *FFVA* premium was capitalized into the sales price, but also how *FFVA* compares to the *CEA* approach. Two of these tests used matched-pair analysis while the third used hedonic pricing. The two studies using matched pairs, Dale-Johnson, et al. [6] and Dale-Johnson and Findlay [5], found that the coefficient on the *FFVA* variable was not significantly different from one, whereas, the coefficient on the *CEA* variable was. This implied that *FFVA* was a superior model and that it did not overvalue the financing premium capitalized into the sales price. However, the study using hedonic pricing by Sirmans, et al. [13], found that the financing premium variable for *FFVA* was not significant in explaining pricing behavior. They also found that a financing dummy variable outperformed the *FFVA* approach.

In summary, there are very few conclusions with which all investigators would agree. However, it does appear clear that some adjustment is needed for sales including assumption financing. Further, it appears that the computational *CEA* approach overvalues this premium. Whether or not the *FFVA* technique is the solution is still unclear.

Empirical Test

An appropriate data set and a properly specified model are needed to compare the *CEA* and *FFVA* approaches. After the data set is described and the specification of the model is discussed, the empirical results are presented.

Data

The data used for the empirical tests are derived from information included in Multiple Listing Service comparable books on sales of single-family detached houses located in a cluster of subdivisions (a section) in the southwest portion of Champaign, Illinois, known

Exhibit 1
Description of Variables and Summary Statistics

Variable	Description of Variable	Mean	Standard Deviation	Minimum	Maximum
Dependent Variable:					
SP	Sales Price	60004.0	11838.0	27500.0	94600.0
Independent Variables:					
Physical Characteristics:					
BSQF	Square feet of living area	1495.1	347.32	820.00	2500.0
AGE	Building age (years)	9.0518	7.0624	1.0000	25.000
BATH	Number of bathrooms	1.7565	0.46740	1.0000	3.0000
FIRE	1 if a fireplace is present	0.57513	0.49496	0.0	1.0000
CARS	Number parking spaces available	1.6334	0.55451	0.0	2.5000
CENTRAL	1 if central air is present	0.85751	0.35000	0.0	1.0000
RANCH	1 if building style is ranch	0.62694	0.48424	0.0	1.0000
D15STORY	1 if building style is 1.5-story	0.77720D–02	0.87930D–01	0.0	1.0000
D2STORY	1 if building style is 2-story	0.44041D–01	0.20545	0.0	1.0000
DBILEVEL	1 if building style is bi-level	0.82902D–01	0.27609	0.0	1.0000
DTRLEVEL	1 if building style is tri-level	0.21762	0.41316	0.0	1.0000
DCONTY	1 if building style is contemporary	0.20725D–01	0.14265	0.0	1.0000
NGARAGE	1 if there is no garage	0.31088D–01	0.17378	0.0	1.0000
DATTACH	1 if garage is attached to building	0.88342	0.32134	0.0	1.0000
DDETACH	1 if garage is detached from building	0.75130D–01	0.26394	0.0	1.0000
DCARPT	1 if garage is a carport	0.10363D–01	0.10140	0.0	1.0000
LSQF	Lot square feet	7897.2	1604.8	5460.0	19160.0
Locational Characteristics:					
GMS	1 if in Green Meadow subdivision	0.95855D–01	0.29477	0.0	1.0000
SP1	1 if in Stratford Park No. 1 through No. 3	0.80311D–01	0.27213	0.0	1.0000
SP2	1 if in Stratford Park No. 4 through No. 6	0.18135D–01	0.13361	0.0	1.0000
SPNS	1 if in Stratford Park North	0.67358D–01	0.25097	0.0	1.0000
SPSS	1 if in Stratford Park South	0.64767D–01	0.24643	0.0	1.0000
SVS	1 if in Southwood Village	0.38860D–01	0.19351	0.0	1.0000
SW1	1 if in Southwood No. 1 through No. 20	0.50518	0.50062	0.0	1.0000
SW21	1 if in Southwood No. 21	0.12953	0.33623	0.0	1.0000
Date-of-Sale Characteristics:					
B79	Beginning of 1979	0.16872	0.28621	0.0	1.0000
B80	Beginning of 1980	0.23111	0.27754	0.0	1.0000
B81	Beginning of 1981	0.16893	0.28528	0.0	1.0000
B82	Beginning of 1982	0.81174D–01	0.19944	0.0	1.0000
B83	Beginning of 1983	0.15026	0.26364	0.0	1.0000
B84	Beginning of 1984	0.16462	0.27673	0.0	1.0000
B85	Beginning of 1985	0.35190D–01	0.11484	0.0	1.0000
Financing Characteristics (assumptions only):					
CEA	Value for traditional premium	7878.4	4217.7	105.40	21725.0
FFVA	Value for the FFVA premium	5823.9	4537.0	0.0	20984.0
LTP	Loan-to-price ratio	0.66401	0.15422	0.18392	0.94947
LTPCEA	(LTP) (CEA)	5373.9	3513.1	68.938	17625.0
LTPFFVA	(LTP) (FFVA)	4236.5	3793.9	0.0	17024.0

as the Southwood area. The sample consists of 386 sales that occurred during the period from January 1979 to August 1984. The sample contains 103 sales using assumption financing and 283 using conventional financing. These were the only forms of financing included in the sample, thus avoiding the simultaneity bias problem associated with some of the earlier empirical studies (see Clauretie [3, p. 522]).

Summary statistics for the variables to be included in the hedonic model are presented in Exhibit 1. In order to calculate the magnitudes of the financing variables, a schedule of the prevailing interest rates available on conventional mortgages (at the time of sale) with an amortization of thirty years and a loan to value of 80% was utilized along with the balance due, remaining term, and interest rate on the assumption loans.

Specification of the Model

The specification of the model includes selection of the dependent and explanatory variables to be included, determination of the overall functional form, and specification of the form of the explanatory variables, particularly the finance variables.

Since the concern is the effect that assumption financing has upon the sales price of a house, the actual sales price is used as the dependent variable. This is consistent with previous studies that use a hedonic price model.

Selection of explanatory variables for the model is based on an attempt to incorporate all the physical, locational, financing, and date of sale (to allow for changes in market conditions) variables that would be required to minimize specification bias. In addition, the selection of variables was guided by the results of previous studies and the availability of data. The form of the date-of-sale variable suggested and used by Bryan and Colwell [2] is used here.

The functional form chosen for the model is linear. A linear model is chosen because it allows direct comparison with models developed in many other studies, particularly the one by Sirmans, et al. [13] to which we refer subsequently. Also, linear models have been found to be acceptable in some instances even though nonlinear models would be superior in certain respects (see Donnelly [7, p. 10]). The model can be stated as follows:

$$SP_j = \beta_0 + \beta_1 X_{1j} + \beta_2 X_{2j} + \ldots + \beta_k X_{kj} + \mu_j \qquad (3)$$

where:

SP_j = sales price of the j^{th} property,
X_{1j} to X_{kj} = explanatory variables defined in Exhibit 1,
β's = parameters to be estimated, and
μ_j = the random error term.

Two different variables are used to capture the value of the financing premium. They are the traditional cash equivalence adjustment (*CEA*), presented in equation (1), and the financed-fee valuation adjustment (*FFVA*), presented in equation (2). These two approaches provide the same computational result when the loan-to-sales price ratio on the assumption is equal to the loan-to-sales price ratio available on conventional first mortgages. As the loan-to-sales price ratio declines, the difference between the calculated *CEA* and *FFVA* premiums increases.

A strictly linear model only allows for a constant percentage of the financing premium variable to be capitalized into the sales price. Therefore, the proportion of the financing premium variable capitalized into the sales price will be unaffected by the loan-to-sales price ratio of the assumption loan. Since it is this variable that causes computation of the *CEA* and the *FFVA* variable to differ, it is hypothesized that the coefficient, β, on the financing premium variable (*FIN*), in particular for the *CEA* model, is a function of the loan-to-price ratio (*LTP*). This relationship can be expressed as

$$\beta = \alpha_0 + \alpha_1 \, LTP. \tag{4}$$

Equation (4) can be rewritten as

$$\beta \, FIN = \alpha_0 \, FIN + \alpha_1 \, (LTP) \, (FIN). \tag{5}$$

Equation (5) suggests that an added variable is needed, the product of LTP and the financing premium variable. As a result, two new variables were created. The first, *LTPCEA*, is the product of *LTP* and *CEA*. The second, *LTPFFVA*, is the product of *LTP* and *FFVA*. For the *FFVA* model, this is in a sense taking the loan-to-price ratio into account two ways; once in the computation of the *FFVA* variable and again as a variable in the regression model. By including the loan-to-price ratio in the computation of the *FFVA* variable this assumes a given relationship exists. However, by including the loan-to-price ratio in the regression model it is possible to ascertain the relationship that is determined by the market.[5] In addition, this may help explain the unusual results found by Sirmans, et al. [13] as noted subsequently in our Note 6.

Empirical Results

The null hypothesis for our empirical test is that the proportion of the financing premium capitalized into the sales price is *not* a function of the loan-to-price ratio. A discussion of the results when the loan-to-price ratio is ignored is followed by a presentation of the results when the loan-to-price ratio is included as a variable.

The regression results, based on ordinary least squares estimation using a linear functional form without a loan-to-price ratio variable, are presented for two models in Exhibit 2. Model 1 includes the *CEA* variable and Model 2 includes the *FFVA* variable.

Both of these models have high explanatory power with an R^2 adjusted for degrees of freedom of approximately 0.90. All physical characteristics variables (building style is taken as a group and garage type is taken as a group), subdivision location variables (taken as a group), and date-of-sale variables (taken as a group) have coefficients that are considered statistically significant from zero at the 95% level of confidence. Further, for each of these variables the sign on the coefficient is as expected. For both of the models the financing premium variables have coefficients that are also statistically significant. The coefficient of the *CEA* variable has a positive sign and its magnitude is between zero and unity, which is consistent with the theory presented in a recent paper by Sunderman, et al. [15, p. 17]. We also expected the *FFVA* coefficient to be positive, but with a magnitude higher than that for the *CEA* variable, the opposite of the results reported in Exhibit 2. The results indicate that, on average, just over 18% of the calculated *CEA* premium is incorporated into the price while only about 14.5% of the *FFVA* premium is incorporated.[6]

The regression results when *LTPCEA* and *LTPFFVA* are included in the models are presented in Exhibit 3. Model 3 includes the *CEA* and the *LTPCEA* variables. Model 4 includes the *FFVA* and the *LTPFFVA* variables. The *t*-statistics for the coefficients on both financing premium variables in these two models allow us to reject the null hypothesis at

Exhibit 2
OLS Regression Results
Sales Price as Dependent Variable Using *CEA* and *FFVA* Only

	Model 1 with *CEA*		Model 2 with *FFVA*	
Variable	Estimated coefficient	*t*-statistic (356 DF)	Estimated coefficient	*t*-statistic (356 DF)
BSQF	15.013*	12.721	14.946*	12.528
AGE	−364.04*	−6.5421	−370.64*	−6.6111
BATH	2008.6*	2.7924	2049.5*	2.8269
FIRE	1157.2	2.3028	1172.7*	2.3120
CARS	1873.5*	2.9901	1863.0*	2.9485
CENTRAL	2555.0*	3.5598	2557.2*	3.5327
D15STORY	2291.7	0.96706	2212.9	0.92588
D2STORY	3316.8*	3.0158	3287.5*	2.9653
DBILEVEL	−2356.1*	−2.0825	−2209.4	−1.9376
DTRLEVEL	633.20	0.98108	674.24	1.0349
DCONTY	7659.7*	4.9428	7508.3*	4.8098
DATTACH	3373.7*	2.1709	3406.8*	2.1742
DDETACH	90.981	0.57186D–01	59.684	0.37213D–01
DCARPT	1082.1	0.46154	964.90	0.40821
LSQF	0.17464	1.2542	0.17750	1.2644
GMS	−6043.1*	−4.2236	−5788.7*	−4.0238
SP1	−7203.9*	−6.7365	−7074.4*	−6.5667
SP2	−9397.0*	−5.5313	−9174.2*	−5.3643
SPNS	−898.86	−0.93377	−839.22	−0.86470
SPSS	−702.44	−0.68963	−423.14	−0.41466
SVS	−627.43	−0.52267	−443.54	−0.36719
SW1	−1754.0*	−2.2964	−1539.7*	−2.0093
B80	741.18	0.59725	929.17	0.74335
B81	4030.8*	4.3755	4318.1*	4.6605
B82	3886.8*	2.9450	4164.5*	3.1167
B83	3960.0*	3.6518	4073.8*	3.7243
B84	8708.8*	7.6489	8739.0*	7.6138
B85	6381.5*	2.8790	6322.6*	2.8278
CEA	0.18142*	3.3087	—	—
FFVA	—	—	0.14516*	2.2476
INTERCEPT	25308.0*	11.229	25183.0*	11.079
Adjusted *R*-square	0.8955		0.8938	
Standard error	3827.3		3858.5	

*significantly different from zero at the 95% level of confidence

the 0.05 level of significance. In comparing these models to Model 1 and Model 2, Model 3 and Model 4 provide a better fit since the adjusted R^2 is higher (standard error is lower).

After the parameters for these two models are estimated, the coefficients for *CEA* and *FFVA* can be calculated for a range of loan-to-price ratios with equation (4). These results for both *CEA* and *FFVA* are presented in Exhibit 4. Exhibit 4 shows that the coefficient on the financing premium variable increases as the loan-to-price ratio decreases. The coefficient on *FFVA* is greater than the coefficient on *CEA* except when the loan-to-price ratio is greater than 0.80.[7] In fact, for loan-to-price ratios below 0.80 the difference between the coefficient on *FFVA* and on *CEA* increases as the loan-to-price ratio decreases. This is

Exhibit 3
OLS Regression Results
Sales Price as Dependent Variable Effect of Loan-to-Price Ratio

	Model 3 with *CEA* and *LTPCEA*		Model 4 with *FFVA* and *LTPFFVA*	
Variable	Estimated coefficient	*t*-statistic (355 DF)	Estimated coefficient	*t*-statistic (355 DF)
BSQF	14.880*	12.686	14.988*	12.637
AGE	−359.30*	−6.4993	−358.49*	−6.4035
BATH	1926.5*	2.6946	1953.9*	2.7065
FIRE	1287.8*	2.5667	1295.3*	2.5546
CARS	2014.6*	3.2248	2011.2*	3.1851
CENTRAL	2522.0*	3.5384	2609.3*	3.6242
D15STORY	2628.8	1.1154	2449.8	1.0301
D2STORY	3260.3*	2.9851	3264.1*	2.9615
DBILEVEL	−2403.8*	−2.1396	−2392.9*	−2.1058
DTRLEVEL	653.02	1.0190	603.38	0.93061
DCONTY	7859.9*	5.1014	7693.9*	4.9513
DATTACH	3120.7*	2.0181	3183.3*	2.0397
DDETACH	−54.495	−0.34475D–01	−120.37	−0.75407D–01
DCARPT	881.37	0.37840	813.66	0.34614
LSQF	0.14921	1.0763	0.14691	1.0480
GMS	−6199.0*	−4.3595	−5911.1*	−4.1305
SP1	−7183.2*	−6.7652	−7088.9*	−6.6193
SP2	−9575.6	−5.6718	−9279.5*	−5.4562
SPNS	−777.77	−0.81271	−706.47	−0.73094
SPSS	−1053.3	−1.0315	−763.06	−0.74432
SVS	−703.15	−0.58976	−597.09	−0.49648
SW1	−1797.2*	−2.3692	−1651.5*	−2.1636
B80	697.30	0.56587	786.89	0.63249
B81	3903.9*	4.2615	4030.4*	4.3359
B82	4081.8*	3.1094	4123.6*	3.1042
B83	3911.4*	3.6323	3887.2*	3.5649
B84	8665.8*	7.6650	8687.0*	7.6121
B85	6512.3*	2.9583	6234.0*	2.8043
CEA	0.73435*	3.1954	—	—
LTPCEA	−0.77394*	−2.4765	—	—
FFVA	—	—	0.99454*	2.6445
LTPFFVA	—	—	−1.0928*	−2.2922
INTERCEPT	25793.0*	11.482	25431.0*	11.242
Adjusted R-square	0.8970		0.8950	
Standard error	3800.0		3835.6	

*significantly different from zero at the 95% level of confidence

expected since the difference between *FFVA* and *CEA* increases as the loan-to-price ratio decreases. Now it can be seen that the unexpected results regarding the relative magnitudes of the coefficients for *CEA* and *FFVA*, as presented in Exhibit 2 as well as those found by Sirmans, et al. [13] (as noted in our Note 6), are likely due to the fact that the influence of the loan-to-price ratio on the proportion of the financing premium capitalized into price was not taken into account.

The findings reported in Exhibit 4 suggest that the buyer is paying an increasing percentage of the calculated financing premium as the loan-to-price ratio decreases. There

Exhibit 4
Proportion of Financing Premium Paid
Varying with Loan-to-Price Ratio

Loan to Price	β on CEA	β on FFVA
0.90	0.037804	0.011020
0.85	0.076501	0.065660
0.80	0.115198	0.120300
0.75	0.153895	0.174940
0.70	0.192592	0.229580
0.65	0.231289	0.284220
0.60	0.269986	0.338860
0.55	0.308683	0.393500
0.50	0.347380	0.448140
0.45	0.386077	0.502780
0.40	0.424774	0.557420
0.35	0.463471	0.612060
0.30	0.502168	0.666700
0.25	0.540865	0.721340
0.20	0.579562	0.775980

β is defined in equations (4) and (5) on page 252.

are several possible explanations for why this may be occurring. One possibility is that the higher loan-to-price ratio assumptions (perhaps being more recently acquired by the seller) have the highest interest rates and that buyers anticipate falling interest rates in the near future. The time period covered by this data includes just such an episode. Another possibility is that the lower loan-to-price ratio assumptions have been outstanding for a longer period of time and have lower interest rates. Perhaps, buyers expect to realize more of the financing premium under these circumstances since they will not have to hold the loan as long.

Summary of Major Conclusions

The overall purpose of this paper is to empirically test the cash equivalence adjustment and financed-fee valuation adjustment techniques for calculating financing premiums. One additional specific purpose is to examine the impact of the loan-to-price ratio on the proportion of the financing premium incorporated in the price.

When loan-to-price ratio is not included as a variable, the empirical results in Exhibit 2 indicate that not only the *CEA* computational technique, but also the *FFVA* technique overvalues the premium associated with assumption financing. Based on the results presented in Exhibit 3, the null hypothesis that the loan-to-price ratio has no impact on the proportion of the financing premium included in the sales price is rejected. This in itself is not surprising; however, it appears that as the loan-to-price ratio declines the proportion of the financing premium paid increases. The reason for this result is theorized to be a function of the market conditions during the time period covered by the data. In summary, we find that results are improved when the loan-to-price ratio is included as a variable in the model.

Notes

[1]A second method to calculate the CEA financing premium is to find the difference between the balance due on the assumption loan and the present value of the payments on the assumption loan discounted at the current market rate, as shown in the following equation:

$$P = L - a_{in}(f_{kn}L).$$

See Agarwal and Philips [1] and Sirmans, et al. [12]. It is a simple matter to show that the above equation and equation (1) are equivalent using the notion that $a_{in}f_{in} = 1$.

[2]For a review of the literature see Sirmans, et al. [11].

[3]See Agarwal and Philips [1], Clauretie [4], Ferreira and Sirmans, [8], Sirmans, et al. [12], and Smith, et al. [14].

[4]The notation used by Dale-Johnson, et al. [6] has been changed to match the notation being used in this paper.

[5]If the loan-to-price ratio has no impact on the amount of the *CEA* financing premium capitalized into sales price then the coefficient on *LTPCEA* should be statistically insignificant. If the loan-to-price ratio has been correctly considered in the computation of the *FFVA* financing premium then the coefficient on *LTPFFVA* should be statistically insignificant.

[6]It should be noted that these results are similar to those of Sirmans, et al. [13] who also compared *CEA* and *FFVA* with a hedonic pricing model. They found that the proportion of *CEA* and *FFVA* capitalized into the sales price was higher than these findings (i.e., 32.2% versus 18.1% for *CEA* and 29% versus 14.5% for *FFVA*); however, they also found that the *CEA* performed better in explaining the effect of assumption financing than *FFVA*. This was based on the model's R^2 and the t-statistic of the financing variable. Further, they also found that the coefficient on *FFVA* was smaller than that on the *CEA* variable, the opposite of what one would expect.

[7]Since the computed *FFVA* and *CEA* are equal for all observations with a loan-to-price ratio greater than 0.8, it would be expected that the coefficient on *FFVA* and *CEA*, for that range of loan-to-price ratios, would be equal. However, as Exhibit 4 indicates, this is not the case. It is believed that these results (i.e., the coefficient of *FFVA* is not equal to that for *CEA* when the loan-to-price ratio is greater than 0.8) are an artifact of the functional form chosen.

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