ON THE DISTRIBUTIONAL IMPLICATIONS OF MORTGAGE REVENUE BONDS AND CREATIVE FINANCE***

DAN DURNING* AND JOHN M. QUIGLEY**

ABSTRACT

The presumed benefits of below-market mortgage financing have been used to justify tax-exempt mortgage revenue bond financing and other government policies. This paper analyzes the extent to which the benefits of below-market mortgage finance are reflected in variations in housing prices. The analysis considers direct seller-to-buyer financing, mortgage "blends," and local government mortgage revenue bond financing.

The empirical results suggest that, at least in the particular market analyzed, buyers gained a great deal through loan assumptions and seller financing. The results also indicate that mortgage revenue bond financing is capitalized, suggesting that the value of this tax-subsidy program to targeted first-time home buyers is even lower than previously expected.

I. Introduction

The unprecedented increases in mortgage interest rates during the late 1970s resulted in a substantial revision of mortgage lending patterns; alternative means of housing finance were fashioned to provide "affordable" credit. The most important forms of alternative finance are below-market mortgage loans, financed by tax-exempt commercial paper issued by state and local governments, and direct seller-to-buyer financing, better known as "creative finance."1

When these types of alternative finance are made available to borrowers, the financial terms themselves may have value apart from the bundle of housing services purchased. The extent to which these below-market financial terms are reflected in market prices, in turn, is important in understanding the consequences of a number of tax and regula-

*Duke University
**University of California, Berkeley

Copyright © 2001 All Rights Reserved
tial effects upon housing prices. Section III presents a simple empirical model to measure these effects and indicates the extent of capitalization which occurred in one market during the early part of 1982. Conclusions are presented in Section IV.

II. Financial Terms and Housing Prices

A. Direct Seller-to-Buyer Financing

When a below market mortgage loan is made available by the seller of a property, potential buyers should be willing to pay more for it. With perfect certainty and no institutional constraints, a buyer would be equally well-off paying some initial price or paying that higher price which equates payment streams at the below market interest rate with streams calculated at market rate financing. In the presence of uncertainty, differential taxes, transactions costs, liquidity constraints, etc., the price offer which would actually make the buyer indifferent to a specific below market mortgage loan is an empirical matter.

Despite this, there has been a surprising consensus among many appraisers, financial analysts and real estate professionals about the ways in which "creative" financial terms negotiated between buyers and sellers are actually reflected in the selling prices of residential properties (and hence agreement about the appropriate adjustment to be made in the posted prices of otherwise comparable properties sold subject to differing financial terms). In particular, the cash value of "creative" financial terms (the difference in present values between market terms and the actual financial terms of the transaction) is to be subtracted from the contractual selling price of a dwelling to reflect the effects of concessionary financial terms (Friedman and Lindeman 1979A, 1979B, Lipscomb 1981; Maes 1982; D'Ardenne 1980). The result, the cash equivalent sales price, is, according to conventional wisdom, the amount paid for the housing bundle.

There remain some controversial de-tails—whether the cash equivalence calculation should be gross or net of federal taxes (Clauret e 1982) and the ways in which the calculation should be adjusted to reflect differences in the market rates for junior mortgages (Findlay and Fischer 1983). Nevertheless, there is reasonable agreement on the underlying principle.

As noted above, this line of reasoning is generally incorrect. The specific financial terms associated with the sale of a residential property are a bundle of valuable services, is the bundle of public services and taxes which are associated with that property. The proposition that the selling prices of dwellings should be adjusted by the cash value of concessionary financial terms is no more plausible than the proposition that property tax differentials are capitalized dollar for dollar into housing values (cf. Oates 1969, Yinger 1982). Both conclusions depend upon the behavior of suppliers and demanders in a market for highly differentiated commodities, not upon principles of accounting or appraisal (Chinloy 1978, Church 1974, MacEachern 1981).

Sellers are willing to offer differing packages of financing in return for other benefits. In particular, sellers may be quite willing to offer concessionary financial terms, and to incur liquidity losses and some risk of default when compared to a cash sale. In return for these concessions, the seller may garner certain tax advantages and may expect to reduce the time required to sell a property.

Similarly, buyers are willing to bid for differing packages of financial terms, obtaining the advantages of lower interest rates, lower down payments, avoiding the payment of loan origination points, and gaining more flexible contractual provisions (including the avoidance of institutional rules for mortgage qualification). In return for these advantages, whose value to a buyer is similarly affected by tax considerations and expected tenure in the house, a buyer may be quite willing to bid higher prices.

Equilibrium in the market for differentiated financial terms can be defined as the locus of points where the bid prices of demanders coincide with the offer prices.
of suppliers. Presumably consumers of differing incomes and tax brackets will have differing bid prices, and suppliers of differing circumstances and liquidity constraints will make differing offer prices. The distribution of suppliers and demanders of various characteristics will determine the equilibrium market price for alternative financial terms, that is, the capitalization of concessionary finance. There is no reason at all why this market capitalization function need be the same as the function which computes the cash value of differing financial terms; with differentiated buyers and sellers no arbitrage process insures that the market capitalization and cash equivalence functions will be identical.

B. "Blended" Concessionary Financing

In many states, mortgage lenders have been permitted to enforce due-on-sale clauses, but have chosen to compromise with borrowers. The compromise is often a "blend," a three-party financing transaction through which the buyer obtains a new mortgage loan at a rate below the market rate but higher than the rate charged for the existing mortgages.

The blended mortgage provides to the buyer some of the interest rate advantages of a loan assumption, but the transaction is stripped of many of the important features of direct buyer-to-seller financing. A blended mortgage (unlike seller financing) typically requires the buyer to meet the underwriting standards of the lender and to pay a loan origination fee. In many cases, the "blend" is changed from a fixed-rate to an adjustable-rate mortgage. The loss of many features that make seller-to-buyer financing attractive—if they, in fact, are valuable—should affect the capitalization of concessionary terms.

C. Mortgage Revenue Bonds

In contrast to direct seller-to-buyer finance and blends, the concessionary financial terms provided by mortgage revenue bonds are supplied by a third party external to the transaction itself. There are at least three ways in which revenue bond financing could lead to an increase in the price of housing:

First, since housing supply is relatively inelastic, at least in the short run, an injection of mortgage revenue bond financing in a local housing market, if sufficiently "large," could drive house prices above their short-run equilibrium levels. The additional capital for mortgage financing—to the extent that it did not merely displace other local investment funds—would increase the local demand for housing. The increased local demand, given inelastic supply, would tend to increase the price of all housing, at least until a supply response occurred.

Second, mortgage revenue financing provides an open-ended rebate in the unit price of housing services. A rebate of, say, Z percent acts to reduce the private returns to a more intensive search for a lower priced dwelling since the housing demander only saves \((100 - Z)\) percent of any "bargain" uncovered in the market. Thus the form of the subsidy may result in less efficient search or shopping behavior by housing demanders who are thus observed to pay higher prices for otherwise comparable dwellings.

Third, the institutional arrangements for dispensing revenue bond financing (in particular, through suppliers or builders) may permit sellers to obtain the benefits of the tax financed subsidy simply by rationing access. For example, if a small number of qualified buyers were given a voucher which enabled them to shop and to purchase a house, knowing they would receive a subsidized mortgage loan, then there would be little opportunity for sellers to capture any of the value of the subsidy through a higher sales price. In contrast, if sellers or their agents can control access to subsidized mortgages and can assign them to particular houses, they may be able to hold firmly to asking prices that capitalize some or all of the subsidy. If either inefficient shopping or institutional reasons lead to higher housing prices, only those dwellings financed by mortgage revenue bond loans would be affected.

The determination of capitalization,
whether inadvertent or by design, is an empirical matter which can only be settled by evidence about the operation of the housing market.

III. Empirical Evidence

A. The Model

The relationship between housing prices and concessionary financial terms is estimated by the familiar hedonic regression equation:

\[ S = \sum \alpha_i x_i + \beta T \]  \hspace{1cm} (1)

where \( S \) is the selling price of a home, \( x_i \) is the \( i \)th housing characteristic, \( T \) represents financial terms, and the \( \alpha_i \) and \( \beta \) are parameters. Specifically, the hypothesis that housing values reflect the cash equivalence of concessionary financial terms implies:

\[ T = (PDV_c - PDV_m) \]  \hspace{1cm} (2)

where \( PDV_c \) and \( PDV_m \) are the present values of the agreed upon payment stream ("points," monthly payments, and "balloons") at the contractual rate and the market rate of interest respectively, and:

\[ \beta = 1 \]  \hspace{1cm} (3)

\( PDV_m \) and \( PDV_c \) could be computed by examining sales agreements; hence equation (1) could be estimated directly. This procedure, however, overlooks a potential statistical complication. By definition, the selling price of each house is equal to the down payment \( d \) plus the present value of the payment stream at the contractual rate:

\[ S = d + PDV_c \]  \hspace{1cm} (4)

and substitution of (4) and (2) into (1) yields:

\[ S = \sum \alpha_i x_i + \beta[S - d - PDV_m] \]  \hspace{1cm} (5)

The spurious correlation introduced by including \( S \) or the right hand side of (5) means that straightforward ordinary least squares regression relating selling prices to the present discounted value of the savings arising from concessionary financing will yield biased and inconsistent estimates of capitalization effects. \(^{11}\)

Subtracting \( S \) from both sides of (5) and solving for \( S \) removes the spurious correlation in (5) i.e.,

\[ S = \Sigma \gamma_i x_i + \delta(PDV_m - d) \]  \hspace{1cm} (6)

where

\[ \gamma_i = \alpha_i / (1 - \beta), \quad \delta = \beta / (1 - \beta) \]  \hspace{1cm} (7)

Thus consistent estimates of the parameters of (5) are obtained by ordinary least squares estimation of (6) and solving for the \( \alpha \)'s and \( \beta \). In particular, a consistent estimate of the capitalization effect is:

\[ \beta = \delta / (1 + \delta) \]  \hspace{1cm} (8)

B. The Data

Our empirical analysis of the effect of mortgage revenue bonds and creative financial terms on house prices is based upon observations on sales of 118 single-detached dwellings advertised in the multiple listing service (MLS) in a single housing market (greater Little Rock, Arkansas) during the three-month period, December 1981–February 1982. Information on the characteristics of the dwellings was obtained from the MLS records, and information on the financial terms associated with each transaction was obtained by inspecting county records maintained by Pulaski County, Arkansas.

The Little Rock data offer a rich sample of the major forms of alternative finance. During this period, the proceeds of two Pulaski County Residential Facilities Board bond issues were available for households with incomes below $37,500 to purchase homes with mortgages less than $75,000. \(^{12}\) At this time, many lenders insisted that loan assumptions be "blended," but here were still a substantial number of direct assumptions of
loans.\textsuperscript{14} Seller financing was used with both direct assumptions and blends, and some seller first mortgage loans were recorded.\textsuperscript{15}

The average selling price of houses in this sample was about $69,000, and the average concession, compared to market interest rates,\textsuperscript{16} was about $11,000 in present value terms. The average concession for institutionally financed transactions was $10,000, including market rate financing (at no concession), mortgage revenue bond financing (at a $12,000 average concession), and blends (at almost $14,000 on average). The present value of the savings associated with seller financed transactions was almost $15,000, including $7,600 in buydowns, $15,500 mortgage assumptions, and over $19,000, on average, in seller-financed first mortgages.\textsuperscript{17}

\section*{C. The Regression Results}

Table 1 presents estimates of equation (6), the hedonic relation between the selling price of houses and their characteristics. Column (1) includes four physical characteristics of dwellings.\textsuperscript{18} The coefficients of the living area and lot size variables are highly significant, and indicate that larger dwellings on larger parcels command a premium. The age coefficient, also highly significant, suggests that, \textit{ceteris paribus}, a dwelling ten years older would sell for a discount of about $3,200; the results also indicate a substantial premium for dwellings with fireplaces (generally a proxy for higher quality luxury homes).

In column (2), the model is expanded to include dummy variables for the more centrally located properties in the cities of Little Rock and North Little Rock.\textsuperscript{19} The results are consistent with a sizeable accessibility premium in the metropolitan housing market. These simple regressions explain about 60 percent of the variation in housing prices. The results reported in columns (1) and (2) are broadly consistent with expectations and with previous results on price determination in the market for owner-occupied housing.

The next two columns report the results when the cash equivalent of concessionary financial terms is added to the model. The coefficients of both variables are highly significant; with the addition of these variables, the simple regressions explain about three quarters of the variation in selling prices. These results suggest substantial capitalization of concessionary seller financing into housing prices. Specifically, from equation (8) the regression results indicate that 34–35 percent of the cash equivalent of these negotiated terms is reflected in higher selling prices. Stated another way, in contrast to the assumption that concessionary financial terms are reflected dollar-for-dollar in increased housing prices, these empirical results suggest that roughly two-thirds of the face value of the concession represents a true price reduction, about one third of the concession is reflected in higher prices.\textsuperscript{20}

The coefficients in columns (3) and (4) also suggest that institutionally financed concessionary terms (here defined to include blends as well as bond loans) are capitalized into significantly higher sales prices. Interpreted at face value, the coefficients suggest that one quarter of the face value of the concessionary terms is capitalized into higher prices. In part, this result may be attributable to the importance of blends; it suggests that sellers are able to sell the right to apply to the lending institution for a blend for about one fifth of the prospective savings.

In columns (5) and (6), the cash value of institutional finance is reported separately for mortgage revenue bonds and blends. Quite strikingly, the results indicate that the subsidies provided by blends and tax-exempt bonds are capitalized at the same rate. It is understandable that blends are capitalized at a lower rate than those creative financing arrangements negotiated wholly outside of institutional lenders. This difference reflects the value of the origination points, and the avoidance of scrutiny and verification of institutional lenders' underwriting standards. The difference may also reflect the differential value of fixed-rate mortgages compared to variable-rate mortgages. Most assumed loans were
TABLE 1

ESTIMATES OF CAPITALIZATION OF TAX EXEMPT BOND AND CREATIVE FINANCE

DEPENDENT VARIABLE: SALES PRICE
118 OBSERVATIONS ON SINGLE DETACHED HOUSING
(T-RATIOS IN PARENTHESES)

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>(sq. feet)</td>
<td>(8.68)</td>
<td>(8.86)</td>
<td>(5.31)</td>
<td>(4.81)</td>
<td>(5.24)</td>
<td>(4.73)</td>
</tr>
<tr>
<td>Lot Size</td>
<td>0.99</td>
<td>1.13</td>
<td>1.47</td>
<td>1.53</td>
<td>1.48</td>
<td>1.54</td>
</tr>
<tr>
<td>(sq. feet)</td>
<td>(3.74)</td>
<td>(4.21)</td>
<td>(6.45)</td>
<td>(6.80)</td>
<td>(6.41)</td>
<td>(6.74)</td>
</tr>
<tr>
<td>Age</td>
<td>-315.30</td>
<td>-412.50</td>
<td>-222.95</td>
<td>-278.15</td>
<td>-220.76</td>
<td>-276.02</td>
</tr>
<tr>
<td>(Years)</td>
<td>(2.40)</td>
<td>(3.04)</td>
<td>(2.05)</td>
<td>(2.48)</td>
<td>(2.02)</td>
<td>(2.44)</td>
</tr>
<tr>
<td>Fireplace</td>
<td>10395.10</td>
<td>9429.30</td>
<td>6162.84</td>
<td>6398.50</td>
<td>6000.24</td>
<td>6287.48</td>
</tr>
<tr>
<td>(1 = Yes)</td>
<td>(2.41)</td>
<td>(2.19)</td>
<td>(1.66)</td>
<td>(1.75)</td>
<td>(1.60)</td>
<td>(1.71)</td>
</tr>
<tr>
<td>Little Rock</td>
<td>10028.40</td>
<td>6128.18</td>
<td></td>
<td></td>
<td>6072.12</td>
<td></td>
</tr>
<tr>
<td>(1 = Yes)</td>
<td>(2.41)</td>
<td>(1.78)</td>
<td></td>
<td></td>
<td>(1.75)</td>
<td></td>
</tr>
<tr>
<td>N. Little Rock</td>
<td>7172.00</td>
<td>11550.20</td>
<td></td>
<td></td>
<td>11496.90</td>
<td></td>
</tr>
<tr>
<td>(1 = Yes)</td>
<td>(1.28)</td>
<td>(2.49)</td>
<td></td>
<td></td>
<td>(2.51)</td>
<td></td>
</tr>
<tr>
<td>Seller Finance</td>
<td>0.535</td>
<td>0.537</td>
<td>0.527</td>
<td>0.539</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Cash Equiv.)</td>
<td>(7.56)</td>
<td>(7.57)</td>
<td>(7.54)</td>
<td>(7.54)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inst. Finance</td>
<td>0.360</td>
<td>0.371</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Cash Equiv.)</td>
<td>(5.53)</td>
<td>(5.57)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blends</td>
<td></td>
<td></td>
<td>0.347</td>
<td>0.462</td>
<td>(4.81)</td>
<td>(4.94)</td>
</tr>
<tr>
<td>Bonds</td>
<td>0.373</td>
<td>0.380</td>
<td></td>
<td></td>
<td>(5.13)</td>
<td>(5.15)</td>
</tr>
<tr>
<td>Constant</td>
<td>6703.12</td>
<td>214.12</td>
<td>1898.20</td>
<td>-2345.66</td>
<td>1130.29</td>
<td>-3262.10</td>
</tr>
<tr>
<td></td>
<td>(1.14)</td>
<td>(0.03)</td>
<td>(0.39)</td>
<td>(0.45)</td>
<td>(0.21)</td>
<td>(0.58)</td>
</tr>
<tr>
<td>$^2$</td>
<td>0.61</td>
<td>0.62</td>
<td>0.74</td>
<td>0.75</td>
<td>0.73</td>
<td>0.74</td>
</tr>
</tbody>
</table>

B: ESTIMATED CAPITALIZATION RATES (%)

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seller Finance</td>
<td>34.42</td>
<td>34.94</td>
<td>34.51</td>
<td>35.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inst. Finance</td>
<td>26.47</td>
<td>27.06</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blends</td>
<td>25.76</td>
<td>26.58</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mortgage Revenue Bonds</td>
<td>27.17</td>
<td>27.53</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Copyright © 2001 All Rights Reserved
### TABLE 2

ESTIMATES OF CAPITALIZATION OF TAX EXEMPT BOND AND CREATIVE FINANCE

DEPENDENT VARIABLE: SALES PRICE
118 OBSERVATIONS ON SINGLE DETACHED HOUSING
(T-RATIOS IN PARENTHESES)

<table>
<thead>
<tr>
<th>Variable</th>
<th>SELLER FINANCE</th>
<th>INSTITUTIONAL FINANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A. REGRESSION ESTIMATES</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Living Area (sq. feet)</td>
<td>15.65</td>
<td>12.10</td>
</tr>
<tr>
<td>Lot Size (sq. feet)</td>
<td>1.88</td>
<td>1.86</td>
</tr>
<tr>
<td>Age (Years)</td>
<td>-479.08</td>
<td>-517.89</td>
</tr>
<tr>
<td>Fireplace (1 = Yes)</td>
<td>6721.80</td>
<td>6855.99</td>
</tr>
<tr>
<td>Little Rock (1 = Yes)</td>
<td>7307.78</td>
<td>10356.80</td>
</tr>
<tr>
<td>N.Little Rock (1 = Yes)</td>
<td>23302.90</td>
<td>11713.90</td>
</tr>
<tr>
<td>Seller Finance (Cash Equiv.)</td>
<td>0.498</td>
<td>0.538</td>
</tr>
<tr>
<td>Inst. Finance (Cash Equiv.)</td>
<td>0.231</td>
<td>0.222</td>
</tr>
<tr>
<td>Blends</td>
<td>0.220</td>
<td>0.220</td>
</tr>
<tr>
<td>Bonds</td>
<td>0.231</td>
<td>0.221</td>
</tr>
<tr>
<td>Constant</td>
<td>1610.63</td>
<td>-1295.64</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.70</td>
<td>0.73</td>
</tr>
<tr>
<td>Number of Observations</td>
<td>50</td>
<td>83</td>
</tr>
</tbody>
</table>

### B. ESTIMATED CAPITALIZATION RATES (%)

<table>
<thead>
<tr>
<th>Seller Finance</th>
<th>Blends</th>
<th>Mortgage Revenue Bonds</th>
</tr>
</thead>
<tbody>
<tr>
<td>33.24</td>
<td>18.70</td>
<td>18.03</td>
</tr>
<tr>
<td>34.98</td>
<td>18.03</td>
<td>18.03</td>
</tr>
</tbody>
</table>
fixed-rate mortgages, but lenders required almost all of the blends to be changed to variable rate mortgages.

Capitalization of the subsidy provided by mortgage revenue bonds is more surprising. To test the robustness of this result (and to satisfy our own skepticism), we conducted one further statistical analysis—a stratification of the sample by type of finance. Table 2 presented the results of this investigation. Columns (1) and (2) compare seller-financed transactions (N = 35) with arms-length market rate transactions (N = 15); columns (3) through (6) compare all forms of institutional finance, bonds, blends, and market rate finance. The estimated capitalization rates are quite similar to those reported in Table 1. Concessionary seller finance is capitalized at 33-35 cents on the dollar and institutional finance at 18-19 cents. The capitalization rates for blends and bonds are roughly the same.

As noted previously, the form of the subsidy, the "matching grant" provided by the tax subsidy may lead bond subsidy recipients to search less intensively for housing, thus to pay more for otherwise comparable housing than non-recipients, and thus lead to the capitalization of the subsidy by sellers. The results in Tables 1 and 2 are consistent with a strong "shopping effect."

Conversations with participants in the local housing market during this period clearly establish that sellers, builders and realtors were well aware of the existence of below-market bond financing and, frequently, of the identities of prospective purchasers who qualified for subsidized tax-exempt financing.

In the market for existing housing, realtors had an informal arrangement with lenders. Real estate firms could "reserve" a certain amount of bond money for a limited period of time, though they did not pay commitment fees for the funds. When they matched a buyer qualified for a bond loan with a seller whose house also qualified, real estate brokers could direct the buyer to the lender who had "their" bond money. Since realtors are often counselors to sellers and are often involved in setting asking prices and providing advice about the prevailing market situation, they are in a position to help sellers capitalize the bond money.

In the market for new housing, it may have been easier for builders to capitalize the subsidy into higher prices and profits. A major portion of the bond proceeds was set aside for new house financing. Builders used bond funds as "takeout" loans, paying commitment fees to lenders to reserve the money. Builders thus directly controlled access to subsidized revenue bond financing.

The empirical evidence presented here does not distinguish among these possible explanations. It does suggest that about a fifth of the subsidy provided by tax exempt bond finance is reflected in higher prices—due to less aggressive search by purchasers, due to institutional arrangements, or weakly competitive markets, or for some other reason.

IV. Summary and Conclusions

In recent years, a number of policy choices have been advocated based, at least in part, upon judgments about the magnitude and distribution of benefits of below-market mortgage financing. For example, the presumption that the cash value of assumed mortgages would be fully capitalized into higher housing prices was used as an argument by the federal executive branch to encourage legislative action to permit the enforcement of due-on-sale clauses. Similarly, the conclusion that federally financed mortgage revenue bonds would make housing more "affordable" to first-time buyers is based upon the theoretical presumption that such subsidies would not be capitalized into higher prices.

At the local level, the appropriate appraisal practices for adjusting sales prices of comparable properties and local assessment policies for computing tax liability based on real property valuation similarly depends upon some "judgment" about capitalization or some empirical evidence.

This paper indicates why the resolution of this issue requires empirical evidence, and it presents a statistical analysis of the
capitalization of financial terms in one housing market. The results, obtained during a period of high interest rates in early 1982, suggest that 34–35 percent of the cash value of seller financing was capitalized into house prices. Stated another way, these results suggest that about 65 percent of the cash value of the concessionary terms offered by sellers during this period of high interest rates was, in fact, concessionary. When concessionary loan assumptions involved an institutional lender, creating “blends,” the rate of capitalization was somewhat less, about 18–26 percent. The lower rate of capitalization indicates that non-financial features of direct buyer-to-seller financing have considerable value. The results also indicate, rather clearly, that subsidized revenue bond mortgages, below-market loans procured by buyers from mortgage lenders, are capitalized at about 18–27 percent, at least in this metropolitan housing market.

Taken together, these results weaken the principal argument which was used to justify a federal override of those state laws and court decisions which limited the enforcement of due-on-sale clauses. Since sellers were able to capitalize only about a third of the transfer from lenders, the nullification of due-on-sale clauses actually would have made housing more “affordable” for some buyers.

Also, the results may make even stronger those arguments against the use of local government mortgage bonds. Since sellers appear to capture a substantial fraction of the value of bonds, the benefits of the bond program in terms of “affordable housing” are even lower than had been claimed. For local governments, the results suggest that the institutional arrangements for distributing the proceeds of mortgage revenue bonds are important in targeting their benefits to homebuyers, builders, or sellers of existing dwellings. Finally, the results indicate that local governments intending to tax housing assets should be wary of “rules of thumb” about the value of creative finance.

The quantitative findings about the capitalization of alternative financing in Pulaski County during early 1982 are certainly not generalizable to all housing markets at other times. Nevertheless, the empirical evidence about the distribution of the benefits of below-market financing among housing market participants does suggest that simplistic accounting assumptions about the full or partial capitalization of benefits are unwarranted.

FOOTNOTES

***This research was supported by the Center for Real Estate and Urban Economics, University of California, Berkeley, and by a grant from the Sloan Foundation to the Graduate School of Public Policy, University of California, Berkeley.

The so-called “creative finance” includes those home purchase financing instruments which institutional lenders do not directly originate and which typically appear to be written in concessionary terms. The most common form of creative finance has been the assumption of an existing mortgage, often combined with the seller financing of a second mortgage. For new dwellings, a builder or developer may offer “buy downs”; typically, the builder will pay a lending institution to reduce the interest rate (and hence the monthly payments) charged to a buyer for some specified period. Depending upon the specific rules of thumb used by the lending institution, such an arrangement can often be structured to make more potential buyers “qualified” for institutional finance.

*In the 33 states where “due-on-sale” clauses have been enforceable under state law, contract purchase agreements have been widespread. Under these agreements, the seller retains title to the house until the last monthly payment is made by the purchaser. In this way, the sale date of the property can be made to coincide with the term of an existing mortgage.

In 1981, about 50% of all purchases of existing houses were financed, at least in part, by mortgage assumptions. (Real Estate Today, January 1982, p. 18).

In June 1982, the U.S. Supreme Court permitted federally chartered Savings and Loan Associations to enforce due-on-sale clauses written into mortgage contracts, reducing the supply of assumable mortgages (Fidelity Federal Savings v. Reginald de le Cuesta). The potential supply of assumable mortgage was further reduced by congressional action (the Garn-St. Germain Depository Institutions Act) in 1982.

3This paper does not address the general question of the “appropriate” vehicle for providing subsidies to “deserving” households. For example, Lurie (1982) shows that interest rate reductions are generally inefficient vehicles for providing subsidies. Other evidence (see U.S. General Accounting Office, 1983) suggests that most of the direct benefits of mortgage revenue bonds accrue to households who are not deserving, at least on income grounds. The analysis below considers how the indirect market effects of existing programs affect the distribution of benefits between targeted homebuyers and others, given the targeting of the program and the form of the subsidy.

Some opponents of local government revenue bond programs argue that, in fact, the value of below-mar-
ket loans is capitalized: "Shallow interest rate subsidies, such as those produced by municipal tax-exempt mortgage revenue bonds, are likely to be capitalized into higher home purchase prices, thereby creating unnecessary inflationary pressure in local housing markets and eliminating any cost savings provided by the subsidy." "Mortgage Bond Plans Inflate Home Prices, Property Taxes," Savings and Loan News, May 1979, p. 38.

Economic theory suggests that sellers should be able to appropriate most of this gain by selling their houses at a higher price than sellers of houses without assumable mortgages. . . . If, at current market interest rates, buyers are willing to pay the market price for a house, they should be willing to pay a higher price in order to assume a below-market rate loan. Competition among buyers should assure that selling prices rise by just enough to eliminate any advantages for borrowers. . . . We conclude that it is the original borrower who receives most of the benefits of low rate mortgages." U.S. Department of Housing and Urban Development, 1981, p. 5 See also, Federal Home Loan Bank Board Task Force on Due-on-Sale, 1982, p. 5.

There are uncertainties involved in both situations that make full capitalization problematic. In the case of property tax differentials, house buyers and sellers are uncertain about the future level of taxes and public services; buyers may therefore be unwilling to bid the full value of the present bundle of public services associated with the property. In the case of creative finance, buyers are typically uncertain of their expected length of tenure and thus unsure of the total value of the savings arising from the below-market financing. Uncertainty about the value of savings is further increased since they typically depend upon future interest rates, given rules (and costs) for refinancing. Finally, in the case of variable rate mortgages, interest rate variations directly affect the present value calculations.

These potential advantages may include the benefits of installment sale reporting and the sheltering of capital gains from the 15% minimum additional tax (which may arise when capital gains and liabilities are spread over several years) and the benefits of converting ordinary income into capital gains.

This is a straightforward application of the modern analysis of the "hedonic prices" of differentiated products. See Rosen (1974).

See Kraft (1981) for a concise history of mortgage revenue bond programs and a sympathetic view of tax-exempt subsidy.

Such a behavioral result is consistent with the results observed for low-income households in the Experimental Housing Allowance Program. See Friedman and Weinberg (1982) pp. 115-124.

The only other papers we have seen which analyze the capitalization of financial terms make this error (Rosen 1984, Sirmans, Sirmans, and Smith 1983).

After drafting this paper we became aware of a similar argument advanced by Clauterlie (1983). Clearly, however, even though the bracketed term in (6) does not include S, it may still not be independent of the error term in the regression. More generally, negotiated contractual terms surely vary with the income and tax positions of buyers and sellers, the urgency of selling, and so forth. None of these are controlled for in these single-equation models.

13Pulaski County was an early and frequent issuer of local government mortgage revenue bonds. The funds available in late 1981 and early 1982 were left over from December 1980 bond issues, among the last in the nation before the restrictions of the Mortgage Subsidy Bond Act of 1980 came into effect. Pulaski County has been referred to as the "nation's housing bond capital." Lee Smith, "Tax Free Housing Bonds Cost More Than They Are Worth," Fortune, July 2, 1979, p. 90.


The availability of "creative" finance and mortgage revenue bond financing was widespread nationally during this period. The National Association of Realtors estimated that only about 25 percent of all first mortgage loans were conventionally financed during 1981-1982. Surveys by the California Association of Realtors indicated that only about 30 percent of financing was in the form of new conventional first mortgages during 1981-1982. In Pulaski County, Arkansas, loan as unreported for about 34 percent of all mortgage financing while mortgage revenue bond financing accounted for 30 percent.

For each observation, the concession is calculated according to equation (2). PDV is computed directly from information on mortgage amounts and contract terms filed pursuant to Arkansas law in the county court house. PDV is discounted the payments flows (including any points or balloon payments) at the market rate of interest unadjusted for taxes or any idiosyncratic condition.

The market rate of interest was calculated as the average of December 1981 and January and February 1982 contract interest rates for loans made for the purchase of existing houses as reported in the Federal Home Loan Bank Board Journal, May 1982, table 5-1. The analysis was not conducted using an alternative discount rate, the market value of a treasury note with a term equivalent that of each mortgage. The results were indistinguishable from those reported below.

A more detailed description of the physical, locational, and financial characteristics of the houses in this sample is available from the authors.

Several other variables describing house characteristics were collected and included in preliminary models. These variables included number of rooms, number of bathrooms, number of bedrooms, number of garages, and duration for the presence of basements and for wood or brick construction. In addition, intra-city location variables were included in regression models.

Several of these variables were problematic because of inaccuracies in measurement (e.g., the reliability of the Multiple Listing Service data has been questioned for such descriptors as the number of rooms and bedrooms).

Variables that we consistently statistically insignificant were dropped. The R^2 of the models reported in Tables 1 and 2 are almost unchanged from those in the alternative models in which the other variables were included. A more detailed presentation and discussion of these alternate regression models is available from the authors See Butler (1982) for a
discussion of some of these issues.

The introduction of dummy variables for each jurisdiction is, of course, the most general method of controlling for differences in jurisdictionwide tax and public service packages. Variations in effective tax rates across these jurisdictions were quite small (0.14% or about $140 a year on a $100,000 house) suggesting that most of the variation among jurisdictions is due to differences in public services or accessibility.

It is worth reporting that when the spurious regression, equation (1), is estimated directly, the coefficients imply that the level of capitalization exceeds 100 percent. This finding, an upwardly biased artifact of the estimation technique, is consistent with the results reported by Rosen (1984). See Clauaretie (1983).

REFERENCES


