Testing the Rhetoric

Location-efficient mortgages may have more costs and risks than proponents claim.

By Allen Blackman
Resources for the Future

RECENT POLLS INDICATE THAT AMERicans are more concerned about urban sprawl than crime or unemployment. Among the many tools policymakers use to discourage sprawl, one of the most intriguing is the location-efficient mortgage (LEM). LEMs allow families who want to live in densely populated, transit-rich communities to obtain larger mortgages with smaller down payments than traditional underwriting guidelines allow. According to advocates, LEMs curb sprawl by making homes in "location-efficient" communities more affordable to low- and middle-income borrowers who would ordinarily be forced to live in less expensive fringe areas.

LEMs have attracted considerable attention. Several federal agencies funded development of the new policy and LEMs have figured prominently in national anti-sprawl and climate-change initiatives. In the summer of 1999, Fannie Mae, the nation's largest secondary mortgage institution, launched a $100 million pilot project making LEMs available in Chicago, Los Angeles County, Orange County, San Francisco, and Seattle. LEM programs are under discussion in several other locations, including Philadelphia and Portland.

NO PUBLIC COSTS?

LEMs owe their growing popularity partly to the fact that they represent a bottom-up, incentive-based approach to discouraging sprawl. For many, such an approach is a welcome change from conventional land use policies like zoning restrictions, which seem heavy-handed and autocratic. But, perhaps more important, LEMs have been advertised as an anti-sprawl tool that is virtually costless. As the Institute for Location Efficiency, which developed the LEM concept, claims in its promotional material, the mortgages do not "[rely] on public subsidies to create incentives for sustainable urban living."

On the face of it, LEMs certainly appear to involve costs. They allow borrowers to breach standard underwriting guidelines designed to limit mortgage default risk — most notably requirements for a minimum down payment. The logical inference is that borrowers will default on LEMs more often than they do on conventional mortgages.

The party that currently bears most of the cost of mortgage default is Fannie Mae, the secondary mortgage institution that has agreed to purchase $100 million worth of LEMs from primary lenders during a two-year pilot phase. (Private mortgage insurance purchased by LEM borrowers typically covers only a fraction of default costs). Indeed, at first glance, LEM programs look very much like other Fannie Mae low-down-payment loan programs that trade off higher-than-average default risk in order to achieve the federally mandated goals for expanded mortgage lending in certain income groups and geographic areas.

Yet, advocates contend that, unlike other low-down-payment mortgages, LEMs are no riskier than conventional mortgages. They argue that families living in location-efficient areas have lower-than-average automobile-related transportation expenses and more income available for mortgage payments. In essence, advocates claim that location efficiency significantly reduces the risk of mortgage default. That claim has served as the defining rationale for LEMs, and has been central to mar-

Allen Blackman is a fellow in the Quality of the Environment division at Resources for the Future, a non-profit, non-partisan research institute focusing on environmental and natural resources policy. He can be contacted by e-mail at blackman@rff.org. This research was funded by the Environmental Protection Agency. Thanks to Alan Krupnick, Joe Cook, Terrell Stoessell, and Deirdre Gabbay.

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keting and promotion of the new policy. For example, a descriptive pamphlet on the Institute for Location Efficiency's website states,

> When people live in a location-efficient community, they can do without a car, or if they own one, they can drive it less. The savings that result can be used toward a mortgage.... The LEM enables participating mortgage lenders to recognize the savings and then "stretch" their standard debt-to-income ratios.

How valid is the rationale that underpins LEMs? Does location efficiency, in fact, significantly reduce mortgage default risk? The issue of "truth in advertising" aside, the answer matters: If location efficiency does not reduce default risk, then default rates on LEMs will be higher than those on conventional mortgages. Research has shown that even relatively small increases in default rates can make mortgage programs targeted to low- and moderate-income borrowers unprofitable. In the long run, Fannie Mae and other secondary mortgage institutions are less likely to buy unprofitable mortgage products, and primary mortgage lenders are less likely to promote them. In other words, if the LEM rhetoric is inaccurate, the long-run viability of LEM programs will be open to question.

ASSESSING THE RISK

Unfortunately, LEMs are a new mortgage product, and it will be years before sufficient repayment data are available to determine whether and how they affect default risk. However, it is possible to predict the likely effect. We can do that by using repayment records for existing conventional mortgages together with data on the location efficiency of the properties in question to test the general proposition that location efficiency reduces mortgage default risk.

This article reports on such a test. Our findings, based on an analysis of repayment records for over 8,000 Federal Housing Administration (FHA)-insured mortgages, indicate that, all other things equal, there is no discernable relationship between the location efficiency and the risk of mortgage default. Therefore, contrary to the claims of advocates, LEMs are quite likely to exacerbate default risk.

BACKGROUND

In 1995, three nonprofit organizations — the Center for Neighborhood Technology in Chicago, the Natural Resources Defense Council in San Francisco, and the Surface Transportation Policy Project in Washington, D.C. — formed a consortium to develop LEMs. Funding for the consortium came from the Department of Transportation, the Depart-

ment of Energy, the Environmental Protection Agency, and several private foundations.

After several years of refinement, LEMs were unveiled in 1998. They are 15- to 30-year fixed interest mortgages of up to about $250,000 on one-unit, owner-occupied houses and condominiums. They allow borrowers to "stretch" traditional lending guidelines that mandate a minimum down payment in the range of five to 20 percent of the appraised property value, a maximum housing-expense-to-income ratio of 28 percent, and a maximum debt-to-income ratio of 36 percent. LEMs allow down payments as low as three percent, housing-expense-to-income ratios as high as 35 percent, and debt-to-income ratios as high as 45 percent. In order to receive the mortgages, LEM borrowers are required to undergo pre-purchase financial counseling.

Computer models The actual terms of individual LEMs are determined by computer models developed by the LEM consortium for each city in which the new loans are made. For any given property in one of the cities, the model assesses the location efficiency of the property and then estimates the dollar savings in automobile-related expenditures a prospective owner would enjoy. The resulting "location efficiency value" (LEV) is added to a mortgage applicant's income in calculating the housing-expense-to-income and debt-to-income ratios that determine the maximum mortgage

TABLE 1

Lower Default Risk?

The effects of location efficiency.

Selected logit regression results (Dependent variable = default [yes/no]).

	MODEL 1				MODEL 2			
	1988	1989	1991	1992	1988	1989	1991	1992
n=	2,337	1,683	898	3,225	2,337	1,683	898	3,225
Independent variables:								
Location Efficiency Value (LEV)	-.0006	.0016	-.0026	.0007				
Households per residential acre[1]					.0006	.0035	.0038	.0010
Pedestrian friendliness factor[1]					.1027	.4080	.4923	.3523
Households per total acre[1]					-.0074	-.0007	-.0794	-.0114
Zonal transit access[1]					-.0011	-.0003	.0002	-.0009
Control variables:								
Location								
Urban	.1992	.0854	.1459	.3106	.1469	.0649	.0064	.3320
Mortgage								
Loan-to-value ratio	.0377**	.0466*	-.0111	.0304*	.0375**	.0462*	-.0120	.0309*
Debt-to-income ratio	-.0323***	-.0193	-.0403*	-.0027	-.0323***	-.0191	-.0400*	-.0028
Housing-expense-to-income ratio	.0256	.0760**	.0857	-.0347	.0261	.0764**	.0962	-.0324
Property								
Condominium (yes/no)	-.8140**	-1.1974***	-.6844	-.3629	-.7514**	-1.0807**	-.4993	-.1949
Appraised value of property	.0001	-.0523**	-.0054	-.0304*	-.0003	-.0539**	-.0070	-.0301*
Appraised value, squared	-.0001	.0002	.0000	.0002*	-.0001	.0002	.0000	.0002*
Borrower								
Age	.0053	.0072	.0075	.0010	.0056	.0074	.0082	.0005
Single male (yes/no)	.6389**	.1077	1.0618**	.4757*	.6356**	.0782	1.0293**	.4784**
Asian or American Indian (yes/no)	.2921	.9262	.7790	.5198	.2697	.9685*	.7229	.5426
Black (yes/no)	1.4905***	1.0965***	1.8749***	.8337***	1.4572***	1.0695*	1.7527***	.7928***
Hispanic (yes/no)	-.1072	-.4024	.4337	-.0090	-.1392	-.4290	.3573	-.0328
Number of dependents	.1968***	.1507**	.0827	.2031***	.1900***	.1650**	.0603	.2066***
First-time buyer (yes/no)	-.0725	-.2802	-.5788**	.3437	-.0671	-.2603	-.5793*	.3375
Co-borrower income (yes/no)	-.0586	.2621	-1.1676**	-.0930	-.0467	.2740	-1.1086**	-.0949
Total annual family income	-.0326	.0957*	.0290	-.0295**	-.0328	.1042*	.0286	-.0269*
Income, squared	.0002	-.0009	-.0004	.0000*	.0002	-.0010*	-.0003	.0000
Liquid assets at closing	-.1341***	-.0782***	-.1120***	-.0363**	-.1339***	-.0799***	-.1082***	-.0360**
Liquid assets, squared	.0017***	.0005**	.0007**	.0003**	.0017***	.0006**	.0007**	.0003**
Intercept	-3.7437**	-7.3844**	-1.6259	-3.0792*	-3.8141**	-7.7401***	-1.9706	-3.4333**
Pseudo R2	.1898	.1581	.1615	.1070	.1900	.1595	.1645	.1079

[1] for census tract. *statistically significant at the 10% level. **statistically significant at the 5% level. ***statistically significant at the 1% level.

amount. The end result is that borrowers who apply for loans on homes in location-efficient areas can "get a larger mortgage than possible with any other product now on the market," thus presumably enabling them to afford such homes.

The promotional literature used by the LEM consortium includes the following hypothetical example: A loan applicant with an income of $2,100 per month, no long-term debt, and $6,000 in funds for a down payment, wishes to purchase a $105,000 home in a location-efficient area. The conventional 28-percent limit on the housing-expense-to income ratio implies that the maximum amount the loan applicant can borrow is $76,058, which is too little to afford the home. But, according to the LEM computer model, living in that particular home would enable the borrower to save $653 per month in automobile-related transportation costs relative to living in a location-inefficient home. Adding that savings to the applicant's monthly income in calculating the housing-expense-to-income ratio enables the borrower to get a $115,611 mortgage, which is more than enough to purchase the home.

It is important to note that, because LEMs enable a borrower with a fixed amount available for a down payment to obtain a larger loan, they have the effect of reducing the down payment as a percentage of the appraised property value. For example, in the hypothetical case described above, the down payment is eight percent without a LEM, as compared to five percent with the LEM.

LEV calculation The LEM consortium's computer models calculate LEVs in three steps. First, an econometric model is used to predict both vehicle miles traveled and number of autos owned for a given residence. That model draws on six independent variables: household income, number of persons in the household, households per residential acre, households per total acre, "pedestrian factor," and "transit access." (The first two variables are specific to the loan applicant, and the remaining four relate to the census tract in which the home is located.) In the second step, auto expenses are determined using Federal Highway Administration figures on the costs of owning and operating automobiles. Finally, in the third step, automobile expenses for the applicant's household are subtracted from a base case — automobile expenses for a household of similar size and wealth in a neighborhood with relatively low density, poor transit access, and low pedestrian friendliness. The resulting number is the LEV.

TESTING THE RHETORIC

As noted above, the LEM hypothesis boils down to the contention that location efficiency significantly reduces mortgage default risk. That is a testable hypothesis because it necessarily implies that, if one analyzes historical records of repayment on virtually any type of mortgage product, homeowners in location-efficient areas should default less frequently than similar borrowers with similar mortgages and similar properties who live in location-inefficient areas. More technically, there should be a statistically significant negative correlation between the location efficiency of a home and the probability of mortgage default, all other things equal.

Data We tested for such a correlation using records of over 8,000 FHA-insured mortgages originated in over 1,000 different census tracts in Chicago (both urban and suburban) in 1988, 1989, 1991, and 1992, along with census tract-level information on location efficiency in that region. We focused only on Chicago because, at the time we conducted our analysis, the LEM consortium had only tabulated location efficiency data for that one city. The mortgage records — including detailed information on borrower, mortgage, neighborhood, and property characteristics — were obtained from the Department of Housing and Urban Development while the data on location efficiency were created by the LEM consortium and came from a variety of sources, including the 1990 census, the Chicago Metropolitan Planning Organization, and the Chicago Transit Authority.

Although one could use data on virtually any type of mortgage product to test the LEM hypothesis, the FHA-insured mortgage data are particularly appropriate for a number of reasons. First, they are well suited to analyzing the determinates of default because the incidence of default on FHA-insured mortgages is relatively high. The incidence of default in our data is eight percent. (By contrast, the incidence of default in a sample of over 400,000 loans originated between 1975 and 1983 and purchased by Freddie Mac is just two percent). The more default we have in our sample, the more powerful are our statistical tests. Second, underwriting guidelines for FHA-insured loans and LEMs are somewhat similar and, therefore, one would expect the two programs to attract somewhat similar pools of borrowers. Both types of mortgages require a lower down payment than conventional mortgages and allow higher ratios of housing expense-to-income and debt-to-income. In addition, LEMs and FHA-insured mortgages have similar lending limits and target first-time homebuyers, among other borrowers. Finally, the FHA-insured data are well suited to our analysis because they are extremely rich — they enable us to control for some 19 characteristics of the borrower, mortgage, neighborhood, and property.

It may be helpful to clarify that last point. Mortgage, neighborhood, and property characteristics affect the probability of default. They may also be correlated with location efficiency. Therefore, to test whether location efficiency has an independent effect on the probability of default, one must take care to disentangle the effects of those characteristics. For example, low-income borrowers in our data set default more often than average and also tend to live in location-efficient areas. Hence, to determine whether location efficiency has an independent effect on the probability of default, it is necessary to disentangle the impact location efficiency has on the default risk from the impact of income. Multiple regression analysis enables us to do that.

Analysis Using the FHA-insured mortgage data described above, we regressed the probability of default onto various

combinations of the five different measures of location efficiency used by the LEM consortium — LEV, households per residential acre, "pedestrian friendliness," households per total acre, and "transit access." We used a variety of specifications and tested for — and, where appropriate, corrected for — typical econometric complications (multicolliniarity and heteroskedasticity). We found absolutely no evidence of a statistically significant negative relationship between the probability of default and location efficiency.

Table 1 provides regression results for two of our models. The first model regresses the probability of default onto the LEV — presumably the most accurate overall index of the location efficiency available — along with 19 control variables. LEV is not significant in any of the four annual cohorts.

Although suggestive, the test is not conclusive: It is still possible that one or more of the locational variables used to construct the LEM consortium's index of location efficiency are correlated with the probability of default. The second model tests that hypothesis. It regresses default onto the four census tract-level locational variables used to calculate LEVs — households per residential acre, pedestrian friendliness, households per total acre, and transit access — along with 19 control variables. Again, we find that the locational variables are not statistically significant in any of the four annual cohorts.

WHY IS THE RHETORIC INACCURATE?

Why does location efficiency not have any impact on the propensity of borrowers to default? One explanation is that, while homeowners in location-efficient areas may actually enjoy transportation cost savings, those savings are simply not large enough to affect their propensities to default. Indeed, there are a number of reasons to believe that the estimates of transportation cost savings generated by the LEM computer model — often hundreds of dollars per month — are overstated. For one, the algorithm that the LEM consortium uses to calculate transportation cost savings from location efficiency assumes borrowers purchasing homes in location-efficient areas would otherwise live in a particularly location-inefficient area — an arbitrary assumption that clearly biases cost savings estimates upward. Also, the econometric model the consortium uses to calculate transportation costs assumes vehicle miles traveled are particularly responsive to household density.

A second possible explanation is that real estate markets efficiently capitalize any financial benefits from location efficiency into housing prices. For example, it is well known that houses close to subway stops sell at a premium. Thus, homeowners in location-efficient areas end up spending their transportation cost savings on higher mortgage payments, leaving their disposable income (and their ability to repay debt) unchanged.

Whatever the reason for our results, they should come as no surprise to those who believe that mortgage lenders are reasonably well-informed profit maximizers. A finding that location efficiency does reduce the risk of mortgage default would imply that lenders have overlooked opportunities to increase their profits by conditioning mortgage contracts on an easily observable determinate of loan repayment.

CONCLUSION

Because we found no demonstrable relationship between location efficiency and the probability of default, we would argue that making low-down-payment loans available to borrowers in location efficient areas is tantamount to making such loans available to a random sample of borrowers. That, in turn, means that the loans will exacerbate default risk.

Given our findings, should LEMs be dismissed as a viable policy alternative? Not necessarily. If LEMs are effective in controlling sprawl or achieving other policy objectives, then their cost in terms of default losses would have to be weighed against their benefits, as well as against the costs of achieving those benefits by other means. Our research has not focused on the possible benefits of LEMs, so we are not in a position to speculate on those calculations. Our main point simply is that, just as policy makers recognize that low-down-payment loan programs like those operated by the FHA and Department of Veterans Affairs sacrifice higher default costs to achieve specific policy objectives (e.g., expanded home ownership), they should also recognize that LEMs will entail a quid pro quo. Contrary to the claims of advocates, LEMs are unlikely to be a costless anti-sprawl policy. R

READINGS

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