A Comparison of Alternative Models for Pricing GNMA Mortgage-Backed Securities: Discussion
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which could impact upon cash prices, have been rare—at least prior to last October 6.

Because of the difficulty involved in rationalizing destabilizing effects, the conclusion of the Figlewski paper must be viewed with considerable skepticism. Of course, it still might be contended that this remains an empirical issue, and appeal possibly could be made to Kaldor's suggestion—offered back in 1940—that destabilizing speculation might persist in futures markets if a small group of professional speculators were able to prey upon a constantly changing group of rank amateurs.

In any case, the empirical support offered in the Figlewski paper for the destabilization conclusion is not convincing. It is clear that factors producing volatility in interest rates generally—such as actual or expected shifts in monetary policy—as well as changes in the size and liquidity of the cash market for GNMAs, should be recognized in any serious effort to identify the net effect of GNMA futures markets on spot market prices. However, in attempting to build a model to explain the short-run volatility of GNMA spot prices, the author was rather unsuccessful in his attempts to account for fluctuations in general financial market conditions. In fact, he eventually excluded volatility measures constructed for Treasury and agency bonds, noting that some investment characteristics of GNMAs—such as their uncertain lives and cash flow patterns—really make these securities different from bonds. This is true, of course, but after the variables for the bonds were dropped no attempt was made to account either for general interest rate volatility or for differential movements in GNMA yields associated with the peculiarities of the instrument. Thus what was purported to be a major feature of the models somehow got lost in the shuffle of variables.

Partly because of this development, the positive correlations found between the measure of volatility for GNMA spot prices and the futures market variables simply do not provide convincing evidence of causation running from futures to cash markets. Indeed, the major hypotheses for destabilization run in terms of the existence or non-existence of futures markets and do not necessarily suggest that the effects should increase with the size of the markets; on the other hand, it is clear that the degree of price variability in cash markets is the phenomenon that provokes futures market activity. Finally, a strong positive correlation between changes in GNMA spot and futures prices ordinarily would be expected on the basis of the so-called axiom of "parallelism" which specifies that spot and futures prices ordinarily move in the same direction. This relationship reflects arbitrage activities and suggests nothing about direction of causation.

DISCUSSION

ANTHONY J. CURLEY*: Dunn and McConnell have constructed an interesting and a potentially valuable application of the options model for pricing mortgages and mortgage-backed securities. The relevance of their model has yet to be tested—with respect to both term structure and prepayment patterns—and its

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usefulness as a practical tool remains open to question. But that does not detract from the value of the paper in exploring mortgage pricing variables. Moreover, their simulation experiments suggest that differences between their estimates and values calculated under existing rules-of-thumb are sufficiently large to justify efforts to validate the model empirically. The simulations are also useful in exposing the significance and impact of the several model variables.

The simulation experiments focus on the contingent claims model and two conventional approaches which assume prepayment either at average life or in accordance with average FHA mortality experience. The latter approach (CG*) is described as an application of a model proposed earlier by Jack Guttentag and myself, but the use of aggregate FHA data (1957–1977) is a poor representation of the probabilistic model which we suggested. The "percent of FHA" method views the paydown experience for pooled mortgages as somehow at variance with average experience, with some recognition that this may occur because of changes in the level of mortgage interest rates. The paydown factor for a pool or mortgages is compared to the cumulative FHA experience for a single family mortgage of the same age; future termination rates are then estimated as some percentage of FHA terminations, on the basis of the observed relationship. This is a welcome departure from the assumption of a single prepayment at average life and it recognizes that prepayment probabilities differ among different securities, but it ignores the determinants of termination rates almost entirely. The prepayment equation was the main thrust of our earlier work. We used disaggregated data in an effort to explain termination patterns for borrowers who behave rationally; subsequent work by ourselves and by others has been successful in associating observed prepayment patterns with a number of reasonable explanatory variables. To the extent that a predictive equation can be properly specified and estimated, the "suboptimal" prepayment term in the options model becomes a random variable with zero expectation.

The Dunn-McConnell model differs from others in specifying the value of the borrower's call option and in allowing different assumptions as to the term structure of interest rates. In the case of constant payment or graduated payment mortgages, one or both of these extensions may prove to be significant. But the model is potentially more powerful in the case of variable rate and renegotiable rate contracts where cash flows depend on the level of interest rates and where options available to both borrowers and lenders are far more difficult to evaluate. As mortgage contracts become more complicated, rules-of-thumb are increasingly irrelevant and price is far more sensitive to expectations concerning both the level and term structure of interest rates. Reinvestment opportunities assume added significance as yields become more volatile. In this dynamic and uncertain environment, contingencies will have to be evaluated, and the model presented here provides one plausible approach to solving that problem.