

The Economics of Accelerated Principal Repayment

Philip J. Rushing

Financial writers in the popular press periodically advise readers to accelerate their mortgage repayment schedules. The advice comes when these financial gurus rediscover the “magic” of repaying loans more quickly by increasing the monthly payments. The borrower allegedly realizes a net savings if a loan is retired early, since less total interest is paid.

A good example of an article containing such advice appeared in the *Chicago Tribune* on January 31, 1988. Columnist Robert Bruss applied the prepayment concept to a \$98,500 loan with a 10.25% interest rate and level planned monthly payments for 30 years. The monthly payment under such a plan is \$882.66 throughout the life of the loan, but the amount that is interest progressively falls while the amount that is principal reduction rises. In the first month \$841.35 is interest and \$41.31 is principal reduction, while in the second month \$841.00 is interest and \$41.66 is principal.

Paying Fewer Interest Dollars

The advice offered is to add \$41.66 (the second month’s scheduled principal reduction) to the first month’s regular payment, for a revised initial payment of \$924.32. In the second month the borrower would be a month ahead of schedule on principal reduction, so a second-month payment of \$925.03 would pro-

vide the scheduled third-month provision for interest and principal (\$840.65 and \$42.01, respectively, for a total of \$882.66) plus the fourth month’s scheduled principal reduction of \$42.37.

While the loan payment computations presented are unassailable, the logic of the conclusions drawn is not. Bruss proceeds to state, “This avoided the second month’s \$841 interest payment plus the fourth month’s \$840.29 interest, a total interest *saving* (emphasis added) of \$1,681.29 in just two months.” The writer perceives a savings because the borrower who faithfully followed, to its conclusion, the plan described would repay the entire \$98,500 principal in 15 years rather than 30. We are asked to believe that because fewer payments would be made, the borrower would realize a true financial benefit. However, before the borrower starts looking for a new car to buy with the “interest savings” generated by such a plan, he or she might be wise to examine the issue more closely.

In discussing the above plan, which might be called the “jump ahead” plan, the author could have been even more dramatic and pointed out that the *total* interest “saving” would amount to a whopping \$158,878.80. Indeed, by paying cash for the house, the owner would “save” \$219,257.60 in interest. This “saving” occurs because a loan requiring payments

of \$882.66 per month for 30 years causes the owner to pay a total of \$317,757.60. The \$219,757.60 in interest is the difference between \$317,757.60 and the \$98,500 principal borrowed.

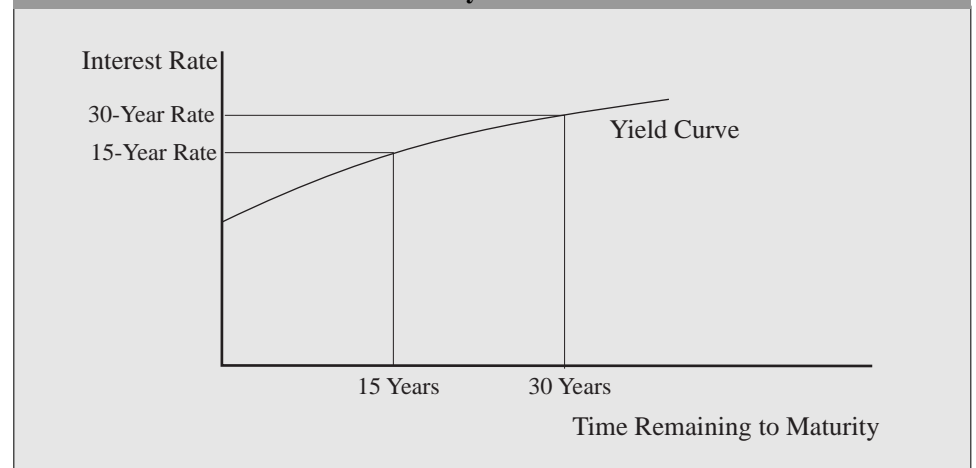
Bruss could also have shared the less-entertaining observation that a borrower can cut the term in half simply by rejecting the 30-year loan in favor of a 15-year loan in the first place. In fact, loans of shorter duration frequently carry lower interest rates and origination fees, thereby providing the potential for *genuine* savings (however, see box below left). Of course, the 15-year loan requires substantially higher level monthly payments (\$1,073.60 vs. \$882.66) than does the 30-year loan. However, the “jump ahead” plan, with initial payments only slightly higher than the 30-year loan, requires gradually *increasing* outlays. Indeed, by the end of year 15, the monthly payment rises from the initial \$924.32 to more than \$1,700.

Wrongly Ignoring Present Value

Perhaps most importantly, under any of the three loan possibilities discussed (the 30-year level-payment loan, the 15-year level-payment loan, and the 30-year “jump ahead” plan with repayment over 15 years), the present value of all payments, discounted at the 10.25% interest rate, is exactly the \$98,500 borrowed.

A borrower would not necessarily realize genuine savings from a shorter-term loan with a lower interest rate. For example, the borrower placing high value on the privilege of spreading payments over the longer period could derive less satisfaction from the lower-rate, shorter-term loan if the interest rate differential were not substantial. In fact, if there were high unanticipated inflation prior to year 30, most borrowers with lower-rate 15-year loans would regret that they had not accepted longer maturities.

Interest Rates and Terms to Maturity



Therefore, in present value terms (the only meaningful way to analyze the issue), a borrower should be indifferent with regard to any of the loan packages. Prepaying \$1.00 in principal during the amortization period's first month "saves" \$3.06645833 in interest over the remaining term of the loan ($\$.1025/12 \times 359$ months), but the present value of the extra dollar of repaid principal (in month one or any other month) is exactly one dollar. If you borrow \$98,500 you repay \$98,500, or, stated differently, "What you see is what you get."

Consider the issue in a slightly different way. If the borrower could invest money at 10.25%, then he could obtain a 30-year loan and, each month, place the \$190.94 difference between the 15-year payment (\$1,073.60) and the 30-year payment (\$882.66) in an account earning 10.25%. At the end of year 15, the account would contain the exact amount needed to repay the balance due on the 30-year loan. (For simplicity, tax on interest paid or earned is ignored.)

Unintended Gifts to Lenders

In addition to simply breaking even in present value terms by prepaying, the borrower actually does the bank a favor and gets nothing in return. The accompanying figure illustrates a *yield curve*. The vertical axis measures interest rates and the horizontal axis shows time to maturity for a financial instrument. The curve's upward slope indicates that long-term rates are higher than short-term rates. (Because it has tended in recent decades to occur more frequently than has its downward-sloped counterpart, we call the upward-sloping curve a *normal yield curve*.) A borrower reduces risk for the bank by repaying a 30-year loan in 15

years, but does not get the benefit of the lower interest rate the bank would gladly have accepted on a 15-year exposure.

Increased mortgage loan payments involve *opportunity costs*; the funds expended are unavailable for other purchases. The cost of added principal reduction, then, is the foregone alternate use for the funds. Since the typical household might view housing as its single biggest investment, foregone investment opportunities might be interesting to consider.

Principal reduction represents a risk-free investment at the mortgage loan interest rate; the borrower invests with 100% certainty of obtaining that rate. If the borrower had a risk-free investment alternative offering 10.25%, he would be indifferent between making extra principal payments and making the alternative investment. (Again, possible tax effects are ignored.) Of course, if there were a risk-free alternative offering more than 10.25%, the borrower would forego extra principal reduction in favor of the profitable risk-free alternative. But even if the only investments offering returns above 10.25% carried risks, the borrower would be wise to skip extra payments on the loan and place available investment funds into the alternative investment if its *risk-adjusted* return exceeded 10.25%.

Accelerated payment represents sound financial logic only if the loan interest rate represents the best risk-adjusted investment opportunity. The higher the interest rate, the higher is the borrower's potential savings. ■

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Generous Contributors

U of I alumnus Robert Levin of Chicago has made a significant financial contribution to ORER. Mr. and Mrs. Howard Builta have done so as well. Both Mr. Levin and the Builtas have been regular contributors for several years. The generous support of alumni and others helps the Office to meet its mission of promoting education, research, and public service.

Alumni Luncheon Scheduled

ORER is scheduling a Spring 1991 luncheon for University of Illinois alumni working in the real estate field. The date of the event will be April 26; the featured speaker is yet to be announced. Alumni luncheons are open only to alumni of the University and their guests. The Office of Real Estate Research will send registration notices to individuals on the mailing list who have identified themselves as U of I alumni.

Cannaday National President

Professor Roger Cannaday has been elected national President and National Executive Council member for Rho Epsilon. He is the faculty advisor to the U of I chapter. An article on the chapter's recent activities will appear in the Spring 1991 *ORER Letter*.

ILD Proposals Adopted

President Alberto Fujimori of Peru has enacted several initiatives based on Institute for Liberty and Democracy policies discussed in "The Creation of Property Rights in Peru" (*ORER Letter*, Summer 1990 issue). Among these policies, described for

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