PARLIMENT
CONSULTING SERVICES

Challenging Financial Paradigms

Selling Retail Options: Part Two

Deriving Estimates of Their Value

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Iôve just had this brain storm, and Iôve got to tell you about it.

I know, I know, Iôm supposed to talk to you about how you can estimate the value of the retail options which youôve either already including or will be implanting in your products and services. And I will. But hang in there a minute, this is too good to pass up.

Frequent User Discounts é FUDs. Just like the airlinesô frequent flier miles. You can give basis point bonuses for total dollars of interest earned on deposits or paid on loans. Hey, thatôs an even better name, BPBôs- basis point bonuses. The customer could use these accumulated BPBs to either raise rates on deposit products or lower rates on loans. And to encourage households to use your institution, you could allow the transfer of BPBs from one household member to another. And you could have BPB óplateausô at which point the customer would earn óbonusôBPBs. And you might even have BPB ócompanionsôé local businesses from which you could earn additional BPBs. Well, you get the idea.

Just think of the possibilities. Instead of moving their CDs to another Institution for 10 basis points, Grandma and Grandpa are building-up a BPB surplus to get their grandchildren a low, low rate on a home loan. Kids, when they go away (Please, Lord) to college or wherever, are encouraged to maintain banking relationships with the ófamily bankô After all, we want to keep those BPBs accumulating, donôt we?

Sound screwy? Sound like nothing more than a jazzed-up version of a premium promotion? Perhaps. But these ópremiumsôare liquid, transferable from one product or service to another, but ONLY ON PRODUCTS AND SERVICES OFFERED AT YOUR INSTITUTION. Iôll tell you one thing, I go out of my way to fly one particular airline to earn those free trips and the extra status that affords me additional convenience.

Isnôt the whole idea behind ñrelationship bankingòto get customers to open and maintain multiple accounts, or to use a variety of the products and services that you offer? So how do you reward profitable customers or customer households without violating conventions against discriminatory pricing? How about BPBs?

You know, itôs interesting to note that while most mutual fund companies allow transfer of balances between their various funds, much of the competition for deposits and loans comes from secondary market vehicles that rely on standardization to appeal to a wide array of potential investors. A mortgage banker can make a mortgage loan, period. The loan canôt be complicated with non-standard options. The Treasury isnôt about to offer óPop-rateôT-Bills.

So, weôre trying to build a better financial product mousetrap that is based on providing the customer the flexibility of choice and the opportunity for customers to change their minds.

This article will describe designing and pricing retail options on specific products such as prepayment and variable-rate options on loans and deposit products. But as you can see from my ñBPB brain storm,ò you may also design and price retail options on what is essentially your entire menu of products and services.

Think about it.

Deriving An Estimate of An Option Value

Our discussion in Part One of the options article (Apr.-May 95 F&P) brought us to the point of estimating the value of retail options. We substantiated that retail options have some value. We also suggested that because retail options are not uniformly exercised when they go ñin the moneyò, an opportunity exists for financial institutions to profit from selling retail options to customers. The final step is to calculate the value of various retail options to permit managers to price them efficiently.

To calculate the value of various retail options, one must ógo back intoô an estimate of the optionôs value by computing the extent to which the market value of the cash flows change with the impact of various interest rates. (Note that one can look at market values as opposed to forecasted yields resulting from rate changes. This is the only way one can compare the present value of future rate changes.) The market value óprofileôof financial instruments will be compared to different retail options attached. That is, weôll compare market value profile of the cash flows of a product with ópricing mix Aô to the market value profile of a product with ópricing mix Bô

You know I have to give my older partner, TF, credit for developing this ingenious approach. The only way I knew how to approach this problem was to use the much more complex Option Adjusted Spread methodology. TFôs method is theoretically similar to OAS methodology, but much easier to implement given the widespread availability of simulation models which use discounted cash flow algorithms. For people who have access to OAS modeling software, good for you. Use it. Both methods share the same conceptual foundation.

Examining The Value of Prepayment and Variable Rate Options

Our examples are drawn from the case study institution that is discussed throughout this issue of the newsletter.

Figures 11 and 12 are a table and a graph showing the market value profiles of three alternative $1.8 million investments being made by the case study institution. The first investment was a 30-year fixed- rate MBS purchased at par with a yield of 9.07%. The second investment was a 10-

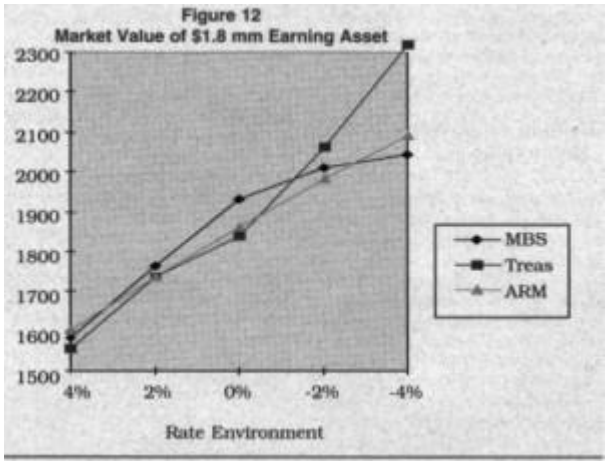
year Treasury instrument with a yield of 7.80%. Because the credit risk of the MBS is negligible, the 127 basis point spread in yield between the MBS and the 10-year Treasury instrument is the marketôs current estimate of the additional yield required to reward the investor for the ôprepayment riskô on the option embedded in the MBS. The third investment was a 5/1 ARM carrying a rate of 8.30% for 5 years and repriced annually at a margin of 2.75% over the one-year T-bill.

Figure 11
Market Values of $1.8 Million in Alternative Earning Assets Under Different Rate Environments

	4%	2%	0%	-2%	-4%
MBS	1,582	1,765	1,930	2,009	2,043
Treas	1,555	1,737	1,838	2,062	2,319
ARM	1,602	1,737	1,862	1,984	2,091

The market value of each mortgage instrument was derived by discounting the cash flows with the Treasury yield curve. This explains why the market value of the mortgage instruments exceed par in a flat rate environment. Since treasury instruments contain neither prepayment nor variable rate options, the differences in calculated market values between the 10-year treasury and the mortgage instruments are interpreted to represent the estimated values of these embedded options. In a flat-rate environment, the expected rate at which prepayments occur on the MBS is more than compensated for by the 127 basis point spread on the remaining principle of the loan compared to the yield on the treasury instrument. This results in a market value differential of $92,000 ($1,930,000 ï $1,838,000) in favor of the MBS.

When rates fall, the market values of all investment alternatives rise. However because of the increased speed of prepayments associated with the drop in rates, the mortgage instruments increase in value more slowly than the treasury instrument. (We assume immediate and permanent changes in rates.) In fact with a 2.0% drop in rates, the market values of both mortgage instruments fall below the market value of the treasury instrument. Thus the initial 1.27% rate spread is not enough to compensate for the decline in the value of the MBS relative to the value of the treasury instrument. This situation is only exacerbated if the 4.0% falling rate environment.



In a rising rate environment, the market values of all the investments fall. However, while the value of the MBS falls more rapidly than the value of the treasury due to slowing prepayment speeds on the mortgages, the MBSôs market value still exceeds slightly the value on the treasury instrument.

Interestingly, while losing value, the ARM winds up with the highest relative value of the three investment alternatives. Thus, in comparing the MBS and the ARM, the variable-rate option was ósoldôto the borrower for the spread differential of 77 basis points (9.07% ï 8.30%) for five years. But it appears that after a rate rise of approximately 3.0%, the market value of the ARM begins to exceed that of the MBS. The value of the variable-rate ópption premiumôcollected by the fixed-rate lender has been used up.

By observing the difference in the market values between alternative instruments over a range of interest rate environments we can gauge the relative value of the option sold to the customer. We can determine whether the seller of the option (the lender) charged too much or too little for the option if we assign some probabilities to the various rate environments. One can ñback intoò a price for by observing the market value profiles of the pricing alternatives for whatever retail option is being considered.

Examining Alternative Funding Sources

Weôre going to use the same ñmarket value profileòapproach for evaluating the pricing alternatives on retail CDs and a Federal Home Loan Bank Advance. The CDs and the advance all have a term of three years. Early withdrawal and pop-rate options are explicitly priced by the institution. But one must calculate a cost of the CDs net of the withdrawal fees collected, and the net of the expected costs of the pop-rate option when rates rise. These net costs are shown in Figure 13.

Figure 13
Effective Annual Costs/Funds

	-4%	-2%	0%	2%	4%
No Penalty CD	6.600%	6.600%	6.600%	6.600%	6.600%
Advance	7.500%	7.500%	7.500%	7.500%	7.500%
Penalty CD	6.850%	6.850%	6.850%	6.850%	6.850%
Prepayment Fees	0.000%	0.000%	0.000%	-0.410%	-0.630%
Total Cost	6.850%	6.850%	6.850%	6.440%	6.220%
Pop Rate CD	6.725%	6.725%	6.725%	6.725%	6.725%
Prepayment Fees	0.000%	0.000%	0.000%	-0.150%	-0.310%
Pop Rate	0.000%	0.000%	0.000%	0.130%	0.510%
Total Cost	6.725%	6.725%	6.725%	6.705%	6.925%

Early Withdrawal Assumptions -Percent\Year

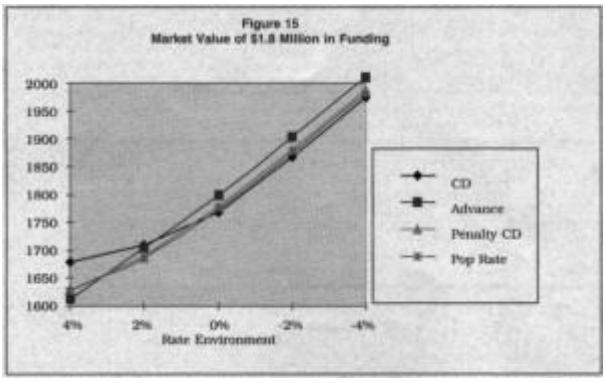
	-4%	-2%	0%	2%	4%
No Penalty CD	35.00%	20.00%	0.00%	0.00%	0.00%
Advance	0.00%	0.00%	0.00%	0.00%	0.00%
Penalty CD	20.00%	10.00%	0.00%	0.00%	0.00%
Pop Rate CD	10.00%	5.00%	0.00%	0.00%	0.00%

The market values of the projected cash flows are reflected in Figure 14 and 15.

Figure 14
Market Values of $1.8 Million in Alternative Funding Under Different Rate Environment

	4%	2%	0%	-2%	-4%
CD	1,680	1,709	1,767	1,867	1,975
Advance	1,614	1,704	1,800	1,902	2,010
Penalty CD	1,629	1,689	1,779	1,880	1,988
Pop Rate	1,627	1,686	1,773	1,874	1,981

The FHLB advance is priced at 7.50%, 40 basis points above the 3-year Treasury note. The net cost of the advance remains at 7.50% in all the rate environments.



The 3-year CD with no early withdrawal penalty is priced at 6.60%, 50 basis points under the 3-year Treasury note. Since there is no early withdrawal penalty, there is no fee income to offset the increased cost of replacing prepaid CD balances. We assumed that 20% of the CD balances will be withdrawn when rates rise by 2.0%, and 35% of the CD balances will be withdrawn when rates rise by 4.0%. Because of this, the market value of the ño-penaltyòCD rises (becomes smallerð remember this is a liability that weôe talking about) at a slower rate as interest rates rise. In fact the 90 basis points spread between the Advance and the CD is blown after a 2.0% rise in rates. Of course, when rates fall, the withdrawal option expires unexercised and the market value differential between the Advance and the CD is preserved.

The 3-year CD that comes with a withdrawal penalty equal to 6-months interest assumes only 10% and 20% rates of withdrawal in the 2.0% and 4.0% rising rate scenarios. It is priced at

6.85%, 25 basis points under the 3-year Treasury note. We're assuming that the depositor has to pay 25 basis points (thereby accepting 6.60% versus 6.85%) to receive the right to prepay the CD without penalty. From the institution's standpoint, the higher cost of the penalty reduces the market value advantage of the no- penalty CD in a falling rate scenario. When rates rise, the market value of the penalty CD increases more rapidly than the market value of the no-penalty CD, thereby hedging the value of the no-penalty CD.

Is there an alternative way of pricing the 3-year CD to preserve the hedging value of the penalty without sacrificing the increased value of the no-penalty CD?

Offer a pop-rate option on the 3-year CD. At the end of one year, give the depositor the option of increasing the rate for the remaining term of the CD. We price this option by offering this "pop-rate" CD at a rate 37.5 basis points below the 3-year Treasury note, a rate of 6.725%. We assume that 20% of the depositors exercise the pop-rate option with a 2.0% rise in rates and 40% of the depositors exercise the option with a 4.0% rise in rates. Because of the pop-rate option the percentage of depositors who withdraw funds is reduced to only 5.0% in a 2.0% rising rate scenario and 10 % in a 4.0% scenario.

Viola! The market value profile of the pop-rate CD traces right on top of the market value profile of the penalty CD. We just "happened" to make the assumptions that delivered this "break-even" result. Ho, ho, ho. It means that if I can raise the same volume of 3-year CDs by offering the pop-rate option for 12.5 basis points less, and fewer depositors exercise the option to "pop" the rate than predicted, then I'm making money. Of course any combination of increased or decreased option fees associated with higher or lower percentages of depositors who exercise their options can be analyzed.

The market value profiling of retail options may be crude, but it helps an institution price its products more effectively.