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Risk Modeling Bulletin Issue 4

Profitability

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This issue deals with the profitability on the balance sheet. How to measure profitability? How to simulate the risks of profitability? The Enhanced NPV Model's transfer pricing curve is the Treasury spot curve. The income derived above the Treasury rates is the investment profit; the interest cost below the Treasury rates is the profit from the fundings. However, the interest income or cost has to be measured on a risk adjusted basis. But how? This issue explains.

Feature Article: Intangibles of Funding Liabilities

The interest costs on the depository accounts are kept below the market rates to derive the funding profits. However, the interest rates on the deposit accounts must continually be adjusted under market competitive forces. Further, the customers' withdrawal behavior reacts to the market rates and the interest rate paid by the banks. Such dynamics are modeled by the Enhanced NPV model. The face value net of the present value of interest costs and withdrawal payments is called the "intangible". The intangible is in essence the gain-on-sale value for the face amount on the balance sheet.

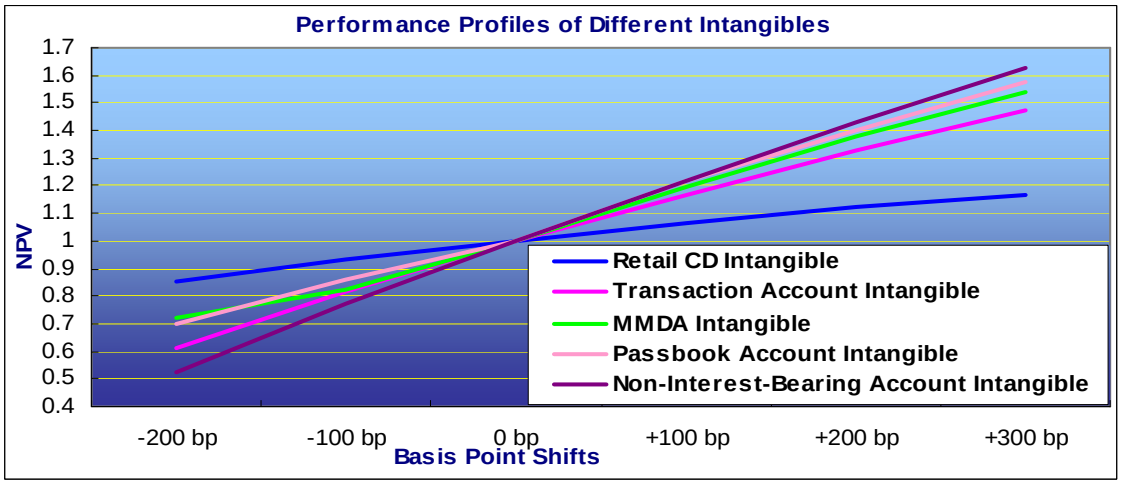
TABLE 1 shows the intangibles' value and the account details for 03/06 cycle of a fictitious bank on a $100 face value. FIGURE 1 shows the performance profiles for all intangibles.

TABLE 1

	WARM	WAC(%)	Intangible Value
Transaction Account Intangible	----	1.26	11.98
Passbook Account Intangible	----	2.03	10.86
Non-Interest-Bearing Account Intangible	----	----	9.37
MMDA Intangible	----	2.60	7.06
Retail CD Intangible	19	3.05	0.14

The results show that the transactional account and passbook have the highest gain-on-sale values, 11.98% and 10.86% on the face respectively. CD account being close to a capital market product, the intangible value is the lowest. Figure 1 depicts the risks of these intangibles.

FIGURE 1



Non-interest-bearing accounts have the highest duration (steepest slope), showing that they should be matched with long duration assets to manage the interest rate risks. By way of contrast, retail CD intangibles are least sensitive to the yield curve parallel shifts. They all have negative convexities because of the customers' withdrawal behavior, similar to the mortgagors' prepayment behavior as discussed in Bulletin #3. The difference is that mortgagors tend prepay when interest rates fall while the customers tend to withdraw when interest rates rise. These negative convexities are embedded in the risks of a bank's earnings. Thus, Enhanced NPV model enables a bank to measure and manage its profitability to answer the question: "What is my profitability risk exposure?"

Reference Ho and Lee Oxford Guide to Financial Modeling 2001 pp 375-380

Market Perspective: Mortgage OAS Values

The mortgages are marked-to-market in the Enhanced NPV model. The profitability is measured by the option adjusted spread (OAS), the spread over Treasury released over the asset life net of the option cost. The spread can be attributed to credit, prepayment and liquidity risks. The Enhanced NPV model uses the market TBA mortgage prices and the OTS prepayment model to determine the OAS values every cycle. These spreads continually changes with the market affecting the NPV value of the balance sheet. Therefore, these market OAS values are important to a bank's asset-liability management.

TABLE 2 and 3 present the OAS values of the 30yr and 15yr mortgage loans on the 03/06 and 06/06 cycles and the details respectively.

TABLE 2

30yr	**WAC(%)**	5.12	5.51	5.96	6.49	7.01	7.55	8.06	8.58
	Price	92.25	95.25	97.66	100	102	102.97	104.63	105.81
	Maturity	354	355	357	355	340	324	306	296
	OAS(%)	0.7222	0.5055	0.4017	0.3338	0.227	0.4787	0.1658	0.4547
15yr	**WAC(%)**	4.57	4.98	5.46	5.95	6.52	6.98	7.55	----
	Price	93.53	95.63	97.53	99.41	101.34	102.22	102.5	----
	Maturity	168	173	177	174	151	128	116	----
	OAS(%)	0.4654	0.3773	0.4045	0.4468	0.5487	0.7543	1.1891	----

TABLE 3

30yr	**WAC(%)**	5.12	5.55	5.96	6.49	7.01	7.55	8.06	8.58
	Price	90.63	93.5	96.06	98.44	100.56	102.38	103.41	105.47
	Maturity	347	352	356	356	355	346	298	292
	OAS(%)	0.68	0.72	0.79	0.86	0.87	0.65	0.91	0.36
15yr	**WAC(%)**	4.57	4.98	5.46	5.95	6.52	6.98	7.55	----
	Price	92.22	94.47	96.28	98.16	100.34	101.41	101.84	----
	Maturity	167	170	174	174	171	132	113	----
	OAS(%)	0.4	0.4	0.5	0.59	0.58	0.76	1.02	----

The OAS values show that the current coupons of the 30 year mortgage loans have widen in June. The 15 year mortgage loans' OAS values have not changed significantly. The widening of the OAS would lead to a fall in the price in June for a given WAC.

Reference Ho and Lee Oxford Guide to Financial Modeling 2001 pp 270-280

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