Lecture Materials

LOAN PORTFOLIO MANAGEMENT – YEAR 1

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August 9, 2017
GSB Credit Track
Effective Loan Pricing

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Effective Loan Pricing

• At school
  – What we need to know to price a loan
  – Four different models for making loan pricing decisions

• Second two parts when you are working on your intersession project
  – Session 2 - Pricing individual loans
  – Session 3 – Pricing deals and relationships
Challenges in Asset Selection

• Common fear of available assets
  – Fixed rate, longer term
    • Interest rate risk
      – Capped earnings
      – Variable funding costs
    • Credit quality
      – Borrower stability (migration)
    • Liquidity

• Concerns with current market
  – Balloons
    • Credit risk at renewal
  – Variable rates
    • Interest rate risk (floors, caps)
    • Credit risk (payment shock)
    • Prepayment risk (refinance risk)
    • Caps?

• Role of Loan Pricing tool in ALCO
  – Do we set the rate or evaluate the ability to offer the product at all?
  – At the loan officer level take allowed assets and ensures profitability.

• Loan Pricing options
  – 1-4 Family
  – CRE
  – Ag
  – Consumer

• Funding options
  – Funding “gap”
  – Core deposit value in asset selection
  – Use of wholesale in “efficient frontier” model
Optimal Earning Asset Matrix

- Every balance sheet mix carries maximum return volatility combinations
- Finding your optimal earnings frontier is key to strategic capital plan
  - What strategy has higher earnings potential and less “risk”

Where is your current and projected performance vs. actual? Given your “risk appetite” what is your “domain” of optimal return?
Use of Pricing Models

• Given others set market rates
  – Identify well priced loans
  – Identify poorly priced loans
  – Aggressively compete for well priced loans
  – Do not aggressively compete for poorly priced loans

• Loan pricing models
  – Market View
    • Investment benchmarks
    • Valuation
  – Balance sheet view
    • RAROC – Risk Adjusted Return on Capital
    • ROA - Net income produced
Factors in Pricing Loans

- **Cash flows, not maturity**
  - Do you view a Mortgage Backed security the same way as a Municipal bond?

- **Funding costs**
  - Potential funding costs at time of origination are what matters

- **Risks to consider**
  - Interest rate risk – cash flows
  - Credit risk (ALLL and losses)
  - Servicing costs
    - *Origination*
    - *Incremental cost of additional servicing*
    - *Direct or general overhead allocations?*
  - Option risk – cash flow volatility
    - *Prepayment*
    - *Caps/floors*
  - Market rates?
    - *Competitors that are making bad decisions should not be followed over the cliff!*

Competitors that are making bad decisions should not be followed over the cliff!
Cash Flow and Repricing Characteristics

<table>
<thead>
<tr>
<th>Pricing</th>
<th>Structure</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Origination Rate: 5.250%</td>
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<tr>
<td></td>
<td>Reprice Rate: 5.250%</td>
</tr>
<tr>
<td>Cash Flows</td>
<td></td>
</tr>
<tr>
<td>Typical Balance</td>
<td>$100,000</td>
</tr>
<tr>
<td>Average Balance</td>
<td>$0</td>
</tr>
<tr>
<td>Prepay Speed</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

60 Month Bullet Loan

- Term or Revolving
  - Amortizing?
  - Term
  - Balloon?
    - Amortization Term
  - Prepayment Speed
- Fixed or Variable
  - Origination Rate
  - First Reprice
  - Repricing Rate
  - Repricing Frequency

• Term or Revolving
• Fixed or Variable
Loan Pricing – Cash Flows

**Pricing**
- Origination Rate: 5.250%
- Yield: 5.250%
- Reprice Rate: 5.250%

**Cash Flows**
- Typical Balance: $100,000
- Average Balance: $0
- Prepay Speed: 0.00%

**Structure**
- Revolving Credit
- Mature in 60 Mths
- Amortizing
- Balloon
- Amortize Over 60 Mths
- Teaser Rate
- Variable Rate
- First Reprice In 1 Mths
- Reprice Every 1 Mths

60 Month Bullet Loan

<table>
<thead>
<tr>
<th>Cum Prin CF</th>
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</thead>
<tbody>
<tr>
<td>$120,000</td>
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<tr>
<td>$100,000</td>
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<tr>
<td>$80,000</td>
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<td>$60,000</td>
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<td>$40,000</td>
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<tr>
<td>$20,000</td>
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</table>

**Match**

**60 Month Bullet**

**Duration**: 4.46

**Considers Interest Cash Flows**

**Funding Cost**

**Rates**
Loan Pricing – Cash Flows

**Pricing**
- Origination Rate: 5.250%
- Reprice Rate: 5.250%

**Cash Flows**
- Typical Balance: $100,000
- Average Balance: $0
- Prepay Speed: 25.00%

**Structure**
- Mature in: 60 Mths
- Amortizing
- First Reprice In: 1 Mths
- Reprice Every: 1 Mths

**Graph:** 60 Month New Car - 20% PP
- Duration: 1.73
- Considers Interest Cash Flows

60 Month Amortizing Loan with 25% annual prepayments
Loan Pricing – Cash Flows

**Pricing**
- Origination Rate: 5.250%
- Yield: 5.250%
- Reprice Rate: 5.250%

**Cash Flows**
- Typical Balance: $100,000
- Average Balance: $0
- Prepay Speed: 8.00%

**Structure**
- Revolving Credit: No
- Maturities: 360 Mths
- Amortizing: Yes
- Balloon: No
- Teaser Rate: No
- Variable Rate: Yes
- First Reprice In: 12 Mths
- Reprice Every: 12 Mths

**Graph**
- Duration: 0.84
- Considers Interest Cash Flows & Repricing

**Chart**
- Match

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CREATE SYNERGY. DRIVE PROFITABILITY

10
Loan Pricing – Interest Rate Risk

• Interest Rate Risk
  – When you are pricing loans you are pricing cash flows not maturities.
  – With fixed-rate loans, pieces reprice as cash flows come in. Few reprice at maturity.
  – Principal cash flows are often uncertain
    • Prepayment options
  – Variable rate loans reprice
    • When cash flow pieces come in
    • When contractual repricing occurs, but ...
    • Variable rate loans may not respond immediately or completely at reset points
    • Reset frequency
    • Restrictions on adjustments (caps)

• To manage interest rate risk, institutions need to match funding to the repricing of the loans of loans. Two approaches:
  – Simplistic – match based on duration
  – More complex – Match fund individual repricing flows.

• While in the real world you may not match, in making pricing decision, we should assume matching.

X – Approach taken in this course
Market Curve Usage

- Curves Used for
  - Investment Benchmarks – Used in Investment Benchmark Analysis
  - Wholesale Funding Curves – Used in Funds Transfer Pricing (ROE & ROA) and Valuation

![Benchmarks Table]

**Benchmarks**

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<tr>
<th>Curves As Of: Mar-18-2010</th>
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<tr>
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<tr>
<td>Investment: Indexed Agency Bond</td>
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<tr>
<td>Funding: FHLB Bullet Advances</td>
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Cash Flow Matching Example

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<tr>
<th>Period</th>
<th>begBalance</th>
<th>rate</th>
<th>interest</th>
<th>payment</th>
<th>principal</th>
<th>prepay</th>
<th>remBalanci</th>
<th>prinCF</th>
<th>matchMo</th>
<th>rfmMatch</th>
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<td>437.50</td>
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<td>2,052.89</td>
<td>96,486.01</td>
<td>3,513.99</td>
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<td>0.00%</td>
<td>0.00%</td>
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<td>0.48%</td>
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<td>0.56%</td>
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<td>1,570.88</td>
<td>1,257.34</td>
<td>1,466.86</td>
<td>68,942.25</td>
<td>2,724.19</td>
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<td>0.83%</td>
<td>0.56%</td>
<td>0.83%</td>
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<td>5.25%</td>
<td>301.62</td>
<td>1,538.15</td>
<td>1,236.53</td>
<td>1,410.54</td>
<td>66,295.19</td>
<td>2,647.07</td>
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<td>0.83%</td>
<td>0.56%</td>
<td>0.83%</td>
</tr>
<tr>
<td>11</td>
<td>66,295.19</td>
<td>5.25%</td>
<td>290.04</td>
<td>1,506.11</td>
<td>1,216.07</td>
<td>1,355.81</td>
<td>63,723.38</td>
<td>2,571.88</td>
<td>11</td>
<td>0.83%</td>
<td>0.66%</td>
<td>1.05%</td>
</tr>
</tbody>
</table>

60 Month Auto loan – 1st 12 months of amortization.

Weighted average investment benchmarks and funding costs are calculated from these matches.
Loan Pricing – The Basics

Interest Rate Risk – Conclusions
• Interest rate risk driven by the cash flow and repricing characteristics of the loan rather than the term of the loan
• To model most accurately, each cash flow and repricing point is matched
• The loan can be matched up to an appropriate point of:
  – A funding curve when matching funding
    • Funds Transfer Pricing (FTP)
  – An investment curve when looking at investment alternatives.
    • Pricing loans off investment alternatives
    • Valuing loans
Which Credit Risk History to Use?

• Was history from 2005-2007 or 2013-2016 a legitimate predictor of credit losses in loans originated in 2017?

• Are 2008-2012 losses a legitimate predictor of losses of newly originated loans in 2017?

• Do we even have legitimate loss history for loans originated today?
  – Changes in collateral coverage
  – Changes in underwriting standards
  – Changes in kinds of loans originated
Loan Pricing – Servicing

Servicing Cost
- Marginal Origination Cost
  • Cost of originating the next loan
- Marginal Servicing Cost
  • Cost of servicing the next loan
- Direct Overhead Allocation
  • Fixed costs directly related to loan production
- General Overhead Allocation
  • President’s salary, human resources, etc.

Arguments
- Economist – Continue to produce widgets until marginal revenue equals marginal cost.
- Accountant – Without overhead allocation, you end up with profitable loans and an unprofitable institution.

OTS Cost Assumptions
- 0.20% - FR Mortgages
- 0.38% - ARMs
- 0.20% - Multi & Non-Res
- 0.20% - Const & Land
- 0.20% - Second Mtg.
- 0.20% - Commercial
- 0.20% - Consumer
- 1.00% - Credit Card

• Is there a better source for generic servicing costs
**Servicing Example**

- Differential pricing on A, B, C credits should reflect both additional charge offs, and additional servicing costs due to legal and collection fees.
Loan Pricing – The Basics

Option Risk – Dealing with uncertain cash flows
• We imbed options in loan contracts that allow customers to modify cash flow characteristics of loans when they consider it to their advantage to do so.
  – Prepayments
    • Basic prepayment levels – death, divorce, transfer, upgrades, etc.
    • Incentive driven prepayments
      – Customer prepays to refinance at a lower rate
      – Customer can't afford to move or upgrade because of interest rate jump.
      – Up to the customer to execute the option
      – In some cases, subject to penalty – primarily commercial contracts
  – Adjustable rate mortgage caps
    • Annual caps, lifetime caps
    • Automatically executed by the institution.
    • Loan floors
  • Ideally the institution is compensated with rate for making the option available.
Option Risk – What Is It

- 15 year FRM example showing remaining principal under different rate environments
  - Falling – 25% CPR – 2.75 year duration
  - Flat – 8% CPR – 4.64 Year duration
  - Rising – 5% CPR – 5.21 Year Duration
Consider Option Risk in Pricing Loans?

• Against
  – Not a true cost like charge offs, servicing costs, or costs of matching funding.
  – Considering option risk will cause loans to be unprofitable.
  – Not the loan officer’s problem.
  – Very difficult to calculate
  – May be inherently hedged in balance sheet of retail financial institution.

• For
  – Option risk can damage the performance of un-hedged institutions. It costs money to hedge option risk
  – Price/yield of securities reflects option risk. Securities are securitized loans
  – If loan officers are not ‘charged’ for options, they will give away options in exchange for rate
  – Can be derived from securities market.

• Source
  – Securities Markets
Getting to the iPrice Engine
iPrice Engine

Inputs
• Gets cash flow of loan
• Gets other important inputs – rates, fees, costs, credit losses, etc.
• Allows you to model up to three loans concurrently

Outputs
• Profitability of loan
  – Investment benchmark
  – Market value
  – ROA
  – ROE (RAROC)
• Amortization Schedule
• PDF containing inputs and outputs
<table>
<thead>
<tr>
<th>Scenario Name:</th>
<th>Scenario #1</th>
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<tbody>
<tr>
<td>Account:</td>
<td>5/20 Balloon Fixed Rate Mortgage</td>
</tr>
<tr>
<td>Orig Date:</td>
<td>7/12/2017</td>
</tr>
<tr>
<td>Amount:</td>
<td>$500000</td>
</tr>
<tr>
<td>Commit Amount:</td>
<td>$500000</td>
</tr>
<tr>
<td>Rate:</td>
<td>4.50</td>
</tr>
<tr>
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<td>Credit Grade:</td>
<td>3</td>
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<td>Credit Loss %:</td>
<td>0.50</td>
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<td>Prepayment %:</td>
<td>10</td>
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<tr>
<td>Term (months):</td>
<td>60</td>
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<tr>
<td>Amort Term (months):</td>
<td>240</td>
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<tr>
<td>Variable Rate?:</td>
<td>No</td>
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<tr>
<td>Time before 1st Pricing change (months):</td>
<td>0</td>
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<tr>
<td>Re-pricing Frequency (months):</td>
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<tr>
<td>Expense Type 1:</td>
<td>Upfront $</td>
</tr>
<tr>
<td>Expense Type 2:</td>
<td>Reoccuring %</td>
</tr>
<tr>
<td>Expense Type 3:</td>
<td>Expense Type</td>
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<tr>
<td>Fee Income 1:</td>
<td>Fee Type</td>
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<td>Fee Income 2:</td>
<td>Fee Type</td>
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<tr>
<td>Fee Income 3:</td>
<td>Fee Type</td>
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</tbody>
</table>
### Scenario #2

**Scenario Name:** Scenario #2  
**Account:** 20 Year Fixed-Rate Commercial R/E  
**Orig Date:** 7/12/2017  
**Amount:** $500000  
**Commit Amount:** $500000  
**Rate:** 4.5  
**Reprice Rate:** 0  
**Credit Grade:**  
**Credit Loss %:** 0.50  
**Override default?**✓  
**Prepayment %:** 10  
**Override default?**✓  
**Term (months):** 240  
**Amort Term (months):** 240  
**Variable Rate?:**  
**Time before 1st Pricing change (months):** 0  
**Re-pricing Frequency (months):** 0  
**Expense Type 1:** Upfront $  
**Expense Type 2:** Reoccurring $  
**Expense Type 3:** Expense Type  
**Fee Income 1:** Fee Type  
**Fee Income 2:** Fee Type  
**Fee Income 3:** Fee Type
Investment Benchmark

- Market rather than internal benchmark
- Compares performance of loan to closest investment benchmark after adjusting for risk and cost differences.
- Most relevant when
  - You are trying to decide how to invest cash already raised.
  - Anytime investing in a security is an alternative to making a loan
  - You are trying to derive market adjustments for
    - Interest rate risk
    - Option risk

- Required inputs
  - Cash flow characteristics
  - Risk free curve
  - Investment benchmark curve
  - Pricing – Rates and fees
  - Operating expenses
  - Credit risk adjustment
  - Additional option risk adjustments

- Calculated adjustments
  - Interest rate risk adjustment
  - Option risk adjustment
  - Loan’s spread to investment benchmark after adjustments
  - Test – Is spread positive (good) or negative (bad)?

- Not considered
  - Funding cost curve
  - Capital requirement
  - RAROC Goal
  - Institution Tax Rate
Investment Benchmark Comparison 5/20

Balloon

Investment Benchmarks

Risk Free Rate : 1.136%
+ Int Rate Risk Adjust : 0.737%
  = Risk Free Match : 1.873%
  + Option Risk Adjust : 0.750%
  = Investment Benchmark : 1.873%
  + Credit Risk Adjust : 0.500%
  + Expense Adjust : 0.391%
+ Add'l Option Risk Adjust : 0.750%
  = Retail Equiv Benchmark : 3.514%
Wtd Loan Yield : 4.500%
Spread to Benchmark : 0.986%

1 Month Agency
Wtd Avg Matched Agency
Investment Benchmark Comparison 5/20 Balloon vs 20 Year FR CRE

- 20 Yr FR amortizing loan only 13 bp less profitable than 5/20 balloon
- Longer cash flows requires more IRR coverage
- How much of a premium be extracted from the customer for certainty
- Duration extends < 2 years

Conclusion: 20 Yr FR fully amortizing CRE loan can be a profitable loan when compared to investment alternatives. Covers the inherent risks and costs!
Valuation

- Market rather than internal benchmark
- Compares market value of loan as compared to book at time of origination.
- Most relevant when
  - You are going to sell loan after origination.
  - When you are trying to improve the franchise value of your institution by holding well priced loans

- Required inputs
  - Cash flow characteristics
  - Risk free curve
  - Investment benchmark curve
  - Discount rate curve
  - Pricing – Rates and fees
  - Operating expenses
  - Credit risk adjustment
  - Additional option risk adjustments

- Calculated outputs
  - Market value vs book value of loan
  - Price
  - With and without origination fees
  - Test – Is price at or above 100 (good) or below 100 (bad)?

- Not considered
  - Funding cost curve
  - Capital requirement
  - RAROC Goal
  - Institution Tax Rate
Valuation - Steps

- **Value Cash flows**
  - Project amount and timing of cash flows
  - Use discount rates to mark cash flows to market.

<table>
<thead>
<tr>
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<th>discRates</th>
<th>ttlCashFlow</th>
<th>mktValue</th>
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<td>8,523.31</td>
<td>8,428.60</td>
</tr>
<tr>
<td>11</td>
<td>1.35 %</td>
<td>8,454.85</td>
<td>8,351.56</td>
</tr>
<tr>
<td>12</td>
<td>1.38 %</td>
<td>8,386.88</td>
<td>8,272.71</td>
</tr>
</tbody>
</table>

Discount Rate = Investment Benchmark + Adjustments (not including expense)

The sum of the market values of individual cash flows is the market value of the instrument.

Market Value = 105.75

\[ PV_1 = \frac{FV_1}{(1+i)^n} = \frac{9126.26}{(1 + (1.31\%/12))^1} = 9152.32 \]

Note: Cash flows continue for an additional 48 months.
## Valuation

<table>
<thead>
<tr>
<th></th>
<th>5/20 Balloon</th>
<th>20 Fixed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Market Value</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Book Value</td>
<td>$500,000.00</td>
<td>$500,000.00</td>
</tr>
<tr>
<td><strong>With Initial Fees</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market Value</td>
<td>$518,049.31</td>
<td>$526,648.07</td>
</tr>
<tr>
<td>Price</td>
<td>103.61</td>
<td>105.33</td>
</tr>
<tr>
<td><strong>Without Initial Fees</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market Value</td>
<td>$518,049.31</td>
<td>$526,648.07</td>
</tr>
<tr>
<td>Price</td>
<td>103.61</td>
<td>105.33</td>
</tr>
<tr>
<td>Duration</td>
<td>3.37</td>
<td>5.19</td>
</tr>
</tbody>
</table>

**Note:** By Valuation standards, these are well priced loans as market value exceeds book at the time of origination.
Internal Profitability Measures

• How institutions make money
  – Loan Yield  6.0%
  – Funding Cost  2.0%
  – Spread  4.0%

• Who owns the spread?
  – Loan Officer?
  – Funding Provider?
  – Treasury Function?
Funds Transfer Pricing

- Internal profitability benchmark
- Evaluates whether a loan is profitable within context of balance sheet
- Most relevant when
  - You are trying to decide whether you can make money originating a loan
  - Anytime you are trying to assess the profitability of a relationship, product or profit center
- Can focus on:
  - Dollar contribution to profit (ROA)
  - Return on required capital (RAROC)

- Required inputs
  - Cash flow characteristics
  - Cost Curve
  - Pricing – Rates and fees
  - Operating expenses
  - Credit risk adjustment
  - Additional option risk adjustments
  - Capital Requirement (RAROC)
  - Capital Goal (RAROC)
  - Institution Tax Rate

- Calculated adjustments
  - Pretax Spread ($ or %)
  - After tax spread ($ or %)
  - RAROC
  - Spread to RAROC Goal
  - Test – Is spread positive (good) or negative (bad)?

- Not considered
  - Risk free curve
  - Investment benchmark curve
  - Capital Requirement (ROA)
Funds Transfer Pricing Curve

• Requires a cost curve for funding costs
  – Your cost of funds is not recommended.
    • Penalizes lending function if inefficient at pricing funds, may cause out of market rate setting
    • Does not reward funding providers for gathering well priced funding
  – Recommended: True wholesale curve
    • FHLB, Jumbo/Brokered/Internet/CDARS/SWAP
    • Pick closest match to curve you would use, and allowed for by liquidity/funding policies & strategies
Selecting a FTP Curve

• Not Recommended - Your Cost of Funds Curve
  – Penalizes loan function for inefficient funds gathering, rewards for efficient funds gathering. Could force you to price out of the market.
  – Fails to reward and provide an incentive for funds providers to gather funds efficiently.
  – History based curve is used to price newly originated instruments.

• Recommended - Your true wholesale funding alternative
  • FHLB Advance
  • Jumbo/Brokered/I-net CD
  • AAA corporate
  • Swap Curve
  – Use the one that comes closest to your true wholesale funding cost.
  – Credits deposit gathering functions for sub-wholesale deposits. Levels the playing field for lending functions.
Transfer Pricing Components

Assume an entity originates a $100K 7 year duration loan yielding 6% and raises a $80K 1 year deposit at a cost of 2%. Do they deserve to be credited with the 4% spread they generated?

– A FTP curve is plotted representing the cost of different durations of wholesale funding
– Many shops compromise by using a funding curve at a spread below wholesale rates. Doing so:
  • Improves profitability of loans
  • Reduces profitability of deposits

– Loan and deposit plotted on curve based on rate and duration
  • Loan is above FTP curve
  • Deposit is below FTP curve
Transfer Pricing Components

**Spread - Deposit** is credited to the entity. In this example:

- Deposit rate for 1 year deposit is 2.0%.
- FTP rate for 1 year deposit is 3.0%.
- A spread of 1.0% on $80K is allocated to the deposit gathering unit.
Transfer Pricing Components

• Spread – Rate Risk due to mismatch is transferred to Treasury.
  – Only the Treasury can manage this risk and they need the margin contribution to do so.
  – In this example, the slope in the yield curve between the 1 and 7 year points is 1% (4% - 3%).
Transfer Pricing Components

• **Spread – Option Risk** is transferred to Treasury

  – Most FTP systems ignore this risk, but it is becoming a more and more substantial portion of the risk on financial institution balance sheets.

  – To not transfer this risk adjustment would encourage lenders to grant options in exchange for higher rates and/or volumes.

  – Lenders cannot manage option risk. This can only be done by Treasury and the spread needs to be available to buy the risk protection.

  In this example, spread-option risk of 1% is transferred to the Treasury.
Transfer Pricing Components

**Spread – Loan** is credited to lending unit. Spread includes credit risk which is unit’s responsibility to manage.

- In this example, spread-loan is 1% on $100K.
- The entity retains 2% of the 4% spread between loan rate and deposit rate.
- The other 2% is transferred to Treasury to provide spread needed to manage the institution’s interest rate risk and option risk.
Transfer Pricing Components

• **Return on Equity (RAROC) for the transaction** - is calculated by:
  - Summing net interest income contribution from loan and investment
  - Adding fees and subtracting allocated operating expenses.
  - Net income is divided by capital required to calculate Return on Capital (ROE)

• **So FTP income can be measured with**
  - Net Income (ROA)
  - RAROC

<table>
<thead>
<tr>
<th></th>
<th>Balance</th>
<th>Rate</th>
<th>FTP Rate</th>
<th>Spread</th>
<th>Net Int Inc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loan</td>
<td>100,000</td>
<td>6.00%</td>
<td>5.00%</td>
<td>1.00%</td>
<td>1,000</td>
</tr>
<tr>
<td>Deposit</td>
<td>80,000</td>
<td>2.00%</td>
<td>3.00%</td>
<td>1.00%</td>
<td>800</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1,800</td>
</tr>
<tr>
<td>Fees</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>500</td>
</tr>
<tr>
<td>Expenses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1,000</td>
</tr>
<tr>
<td>Net</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1,300</td>
</tr>
<tr>
<td>Capital Requirement (8%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8,000</td>
</tr>
<tr>
<td>ROE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>16.25%</td>
</tr>
</tbody>
</table>
Capital Allocation

• Why assign a capital requirement to a loan?
  – Relates profitability of an entity (loan) to a primary earnings measurement ratio (ROE)
  – Allows for adjustments in return based on differential capital needs for different loans and investments.

• Should you bother with a capital allocation model?
  – Will adding this level of complexity have a material effect on analysis or decisions?
  – Is capital a constraint
    • Regulatory requirements
    • Self-imposed requirements

• What capital allocation model should I use?
  – Leverage Requirement
    • Core capital requirement
    • Internal capital goals
  – Risk Based Requirement
    • Basel III
    • Internal Model
      – I suspect we'll see a movement toward internal models
FTP Analysis – RAROC – 5/20

RAROC (Lifetime)

Wtd Loan Yield : 4.500%
  + Wtd Fees : 0.000%
- Wtd Fund Bench : 2.074%
  - Option Risk : 0.375%
  - Credit Risk : 0.500%
    - Expense : 0.391%
      = Spread : 1.159%
  - Tax Adjust : 0.406%
= After Tax Spread : 0.753%
  / Capital Req. : 10.000%
= ROE (RAROC) : 7.534%
  ROE Target : 10.000%
  ROE Spread : -2.466%

Weighted Average Costs

Decision – Don’t make the loan !!!
FTP Analysis – Income – 5/20

Horizon Income
Horizon Period (yrs): 3.0
Interest Income: $55,915.63
  + Fees: $0.00
  - Fund Expense: $25,245.51
    - Option Risk: $4,659.64
    - Credit Risk: $6,212.85
  - Oper. Expense: $5,098.99
= Net Income B4 Tax: $14,698.64
  - Taxes: $5,144.52
= After Tax Net Income: $9,554.12
Avg Net Principal: $414,189.84

Horizon ROA: 1.538%

Decision Tool
Make the loan !!!
### FTP Analysis – RAROC

<table>
<thead>
<tr>
<th>RAROC (Lifetime)</th>
<th>5/20</th>
<th>20 FR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wtd Loan Yield</td>
<td>4.500%</td>
<td>4.500%</td>
</tr>
<tr>
<td>+ Wtd Fees</td>
<td>0.000%</td>
<td>0.000%</td>
</tr>
<tr>
<td>- Wtd Fund Bench</td>
<td>2.074%</td>
<td>2.708%</td>
</tr>
<tr>
<td>- Option Risk</td>
<td>0.375%</td>
<td>0.375%</td>
</tr>
<tr>
<td>- Credit Risk</td>
<td>0.500%</td>
<td>0.500%</td>
</tr>
<tr>
<td>- Expense</td>
<td>0.391%</td>
<td>0.024%</td>
</tr>
<tr>
<td>= Spread</td>
<td>1.159%</td>
<td>0.893%</td>
</tr>
<tr>
<td>- Tax Adjust</td>
<td>0.406%</td>
<td>0.313%</td>
</tr>
<tr>
<td>= After Tax Spread</td>
<td>0.753%</td>
<td>0.581%</td>
</tr>
<tr>
<td>/ Capital Req.</td>
<td>10.000%</td>
<td>10.000%</td>
</tr>
<tr>
<td>= ROE (RAROC)</td>
<td>7.534%</td>
<td>5.806%</td>
</tr>
<tr>
<td>ROE Target</td>
<td>10.000%</td>
<td>10.000%</td>
</tr>
<tr>
<td>ROE Spread</td>
<td>-2.466%</td>
<td>-4.194%</td>
</tr>
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Wtd Fee is 1% origination fee amortized over duration of the loan.
Decision Rules Summary

Summary Results

- Retail Benchmark Spread: 0.986%
- Investment Benchmark Spread: 2.627%
- Lifetime ROE: 7.521%
- Horizon ROE: 7.689%
- ROE Target: 10.000%
- Horizon ROA: 1.538%

- Avg Annual Horizon Income (ROA numer.): $3,185
- Avg Net Principal (ROA denom.): $414,190
- Market Value: 103.61

Which model do you use? In this case, three lights are green and one is red?
Decision Rules Sequence

• Pass Investment Benchmark Test
  – No – Don’t make the Loan
  – Yes – Proceed to #2

• Is liquidity or capital a constraint?
  – Yes – Use RAROC ROE
    • Pass – Make the Loan
    • Fail – Can you sell it?
  – No – Use Investment Benchmark
    • Pass – Make the Loan
    • Fail – Can you sell it?

• Are you considering selling the loan?
  – Use Market Value Test
    • Pass – Make the loan
    • Fail – Don’t make the loan
Decision Rules Summary

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- Market Value: 103.61

Let's say we are up against a liquidity constraint. What should we do?
**Decision Rules Summary**

### Summary Results

<table>
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<tr>
<th>Metric</th>
<th>Percentage</th>
</tr>
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</tr>
<tr>
<td>Market Value</td>
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</tr>
</tbody>
</table>

---

Let's say we are not up against a liquidity or capital constraint. What should we do?
Session 2

• Recorded Webinar
  – Individual loan modeling
    • Review of 4 decision models
    • Modeling and tweaking examples
    • iPrice Instruction – iPrice is browser based – results on our servers.
      – Logging on
      – Building a relationship
      – Modeling a loan
      – Tweaking a loan
  – If you know which loan you would like to model, you can immediately go in and model the loan.
Session 3

• Recorded Webinar
  – Modeling Deals and Relationships
    • Modeling and tweaking examples
    • iPrice Instruction
      – Building a relationship
      – Modeling a loan
      – Adding loans and deposits to the relationship
      – Tweaking the relationship
      – Evaluating relationship profitability

  – If you know which relationship you would like to model, you can immediately go in and model the loan.