South Carolina Bankers School

Investments and ALM Review

Ron Best

Why Invest in Securities?

- Why banks invest in securities?
  - Yield
    - Generally less than loans, but some securities carry tax advantages
  - Liquidity
    - Most securities are readily convertible to cash (still face price risk)
  - Satisfy regulations
    - Pledging requirements and risk adjustment

- Relative to loans, investment securities are generally:
  - Less expensive to manage
  - Priced more competitively
  - Less risky (default risk)

Interest Rate Implications for Securities

- Banks do not control interest rate movements
  - Primarily the result of economic scenario
  - "Pushed" by Fed

- Two Important Interest Rate Risks
  - Reinvestment Risk
    - As investments and loans mature (or are paid off), they must be replaced at current market rates
  - Price Risk
    - Interest rate changes impact the value of securities and loans

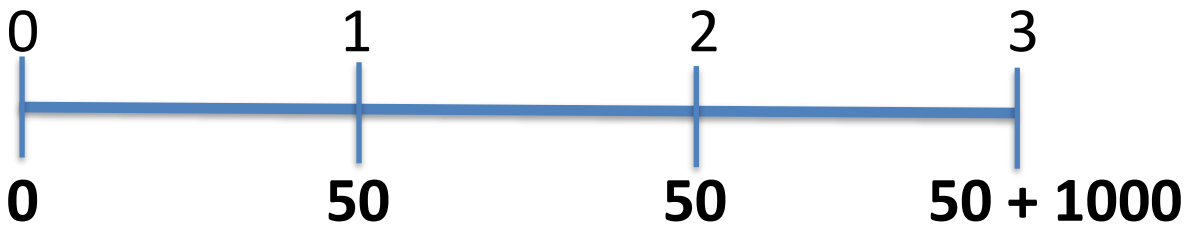
Present Value Review

Value of asset = Present value of future cash flows

$$PV = \sum_{t=1}^{n} \frac{CF_t}{(1+i)^t}$$

CF_t = cash flow in year t
i = required return

Example: $1000 par value bond with 5% annual coupon rate and three year maturity
(Receive 5% of par value each year and par at maturity)



Basic Rate/Price Relationship

Example: $1000 par value bond with 5% annual coupon rate and three year maturity

If required return = 3% --- then --- PV = 1056.57
If required return = 5% --- then --- PV = 1000.00
If required return = 7% --- then --- PV = 947.51

Rule 1:

- **Interest rates and the values of fixed-rate assets move in opposite directions**

Another Rate/Price Relationship

Rule 2:

- **For a given change in interest rates, the change in value for longer term assets is greater than for shorter term assets**

Basic Logic:

- Shorter term assets allow the interest rate received to adjust more quickly
- Less time locked into higher (or lower) than market payments

Bond Information

	N	Coupon%	YTM
Bond 1	5 years	5.38%	5.38%
Bond 2	30 years	5.90%	5.90%

Par Value = $10,000,000

Annual interest: @5.38% = $538,000

@5.90% = $590,000

Price = Par Value (for both bonds)

(Coupon rate = YTM = Required return)

Price Impact: Immediate Rate Change

Rates decrease 20 Basis Points (go down 0.2%)

	N	P	ΔP
Bond 1	5 years	$10,086,160	$ 86,160
Bond 2	30 years	$10,301,240	$301,240

Rates increase 20 Basis Points (go up 0.2%)

	N	P	ΔP
Bond 1	5 years	$9,914,781	- $ 85,219
Bond 2	30 years	$9,711,876	- $288,124

Decision Question

Should we buy the 5-year asset or the 30-year asset?

- Annual interest is higher on 30 year bond (yield curve is usually upward sloping).
- What if you need to sell in the future?
- Is the extra interest income and the possible gain of 3+ times worth the potential cost of 3+ times?
- The “cost” of the extra interest income is the extreme loss if selling when rates have risen.

Accounting Considerations

- Available for Sale (AFS):
  - Carried at market value on the balance sheet
  - Unrealized gains and losses do not impact income statement, but do impact capital account
  - Advantage – Liquidity
  - Disadvantage – Potential capital drain

- Held to Maturity (HTM):
  - Carried at amortized cost on the balance sheet
  - Unrealized gains and losses do not impact income statement and do not impact capital account
  - Advantage – Protects regulatory capital from price risk
  - Disadvantage – More difficult to sell (regulatory oversight)

Types of Securities in BankExec

- U.S. Treasuries (default risk free)
  - Bills (short maturities; sold on discount basis; little price risk)
  - Bonds (mat. up to 30 years; sold on a coupon basis; potential price risk)

- Agencies
  - Sold on coupon basis
  - Subject to call risk and price risk

- Tax-Exempt Municipals
  - Sold on coupon basis and subject to price risk
  - Tax-Equivalent yield often above other yields
  - Can have credit or default risk in real world
  - Limited availability in BankExec ($5 million per quarter)

Effects of Mark-to-Market

- See Starting Point, Report B10
- In BankExec:
  - Treasuries and Agencies are marked-to-market (AFS)
  - Municipals are not marked-to-market (HTM**)

Impact of Securities Portfolio Gain/Loss on Owners Equity

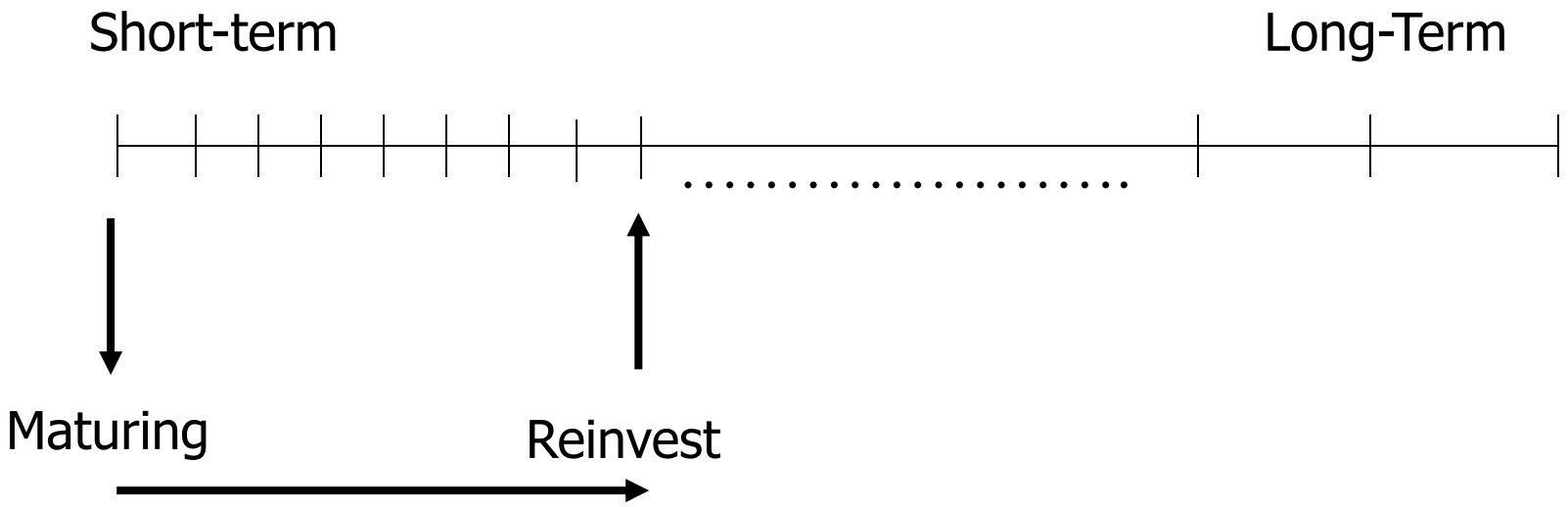
	12/31/29	09/30/29	
Common Stock + Retained Earnings	47.691	47.731	
Gain/Loss in Portfolio (B12)	-0.067	0.566	(Not Incl. TE)
Owners Equity (B01)	47.625	48.297	

Small change in CS + RE, but over $600,000 change in value of AFS securities.

Basic Investment Strategies

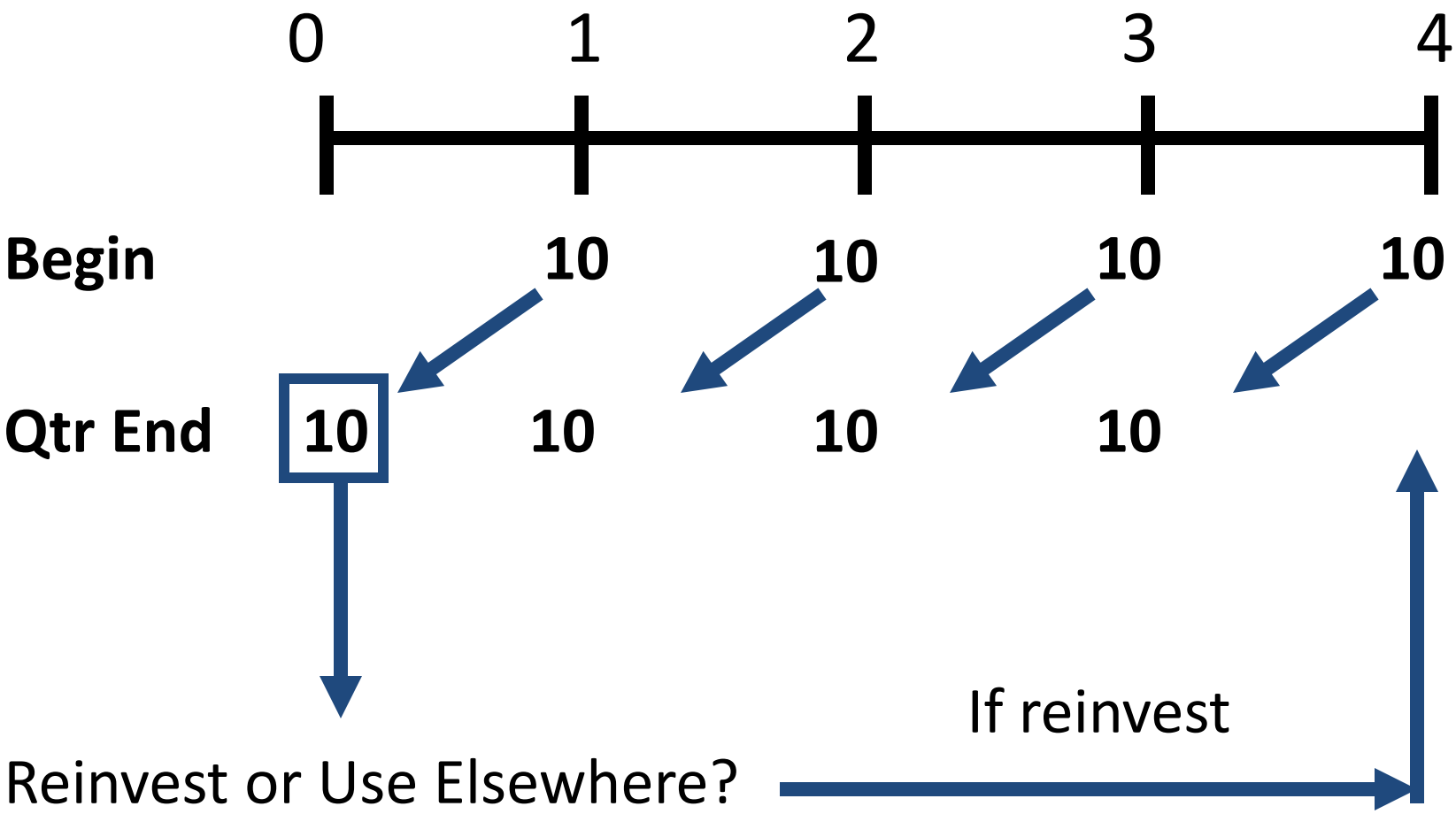
- Short Portfolio
  - Liquidity
  - Less price risk
  - But lower yield
- Long Portfolio
  - Higher yield
  - More price risk
  - Less liquidity
- Mixed Portfolio
  - “Adequate” liquidity
  - “Acceptable” price risk
  - “Enhanced” yield

Short-Term Ladder Strategy

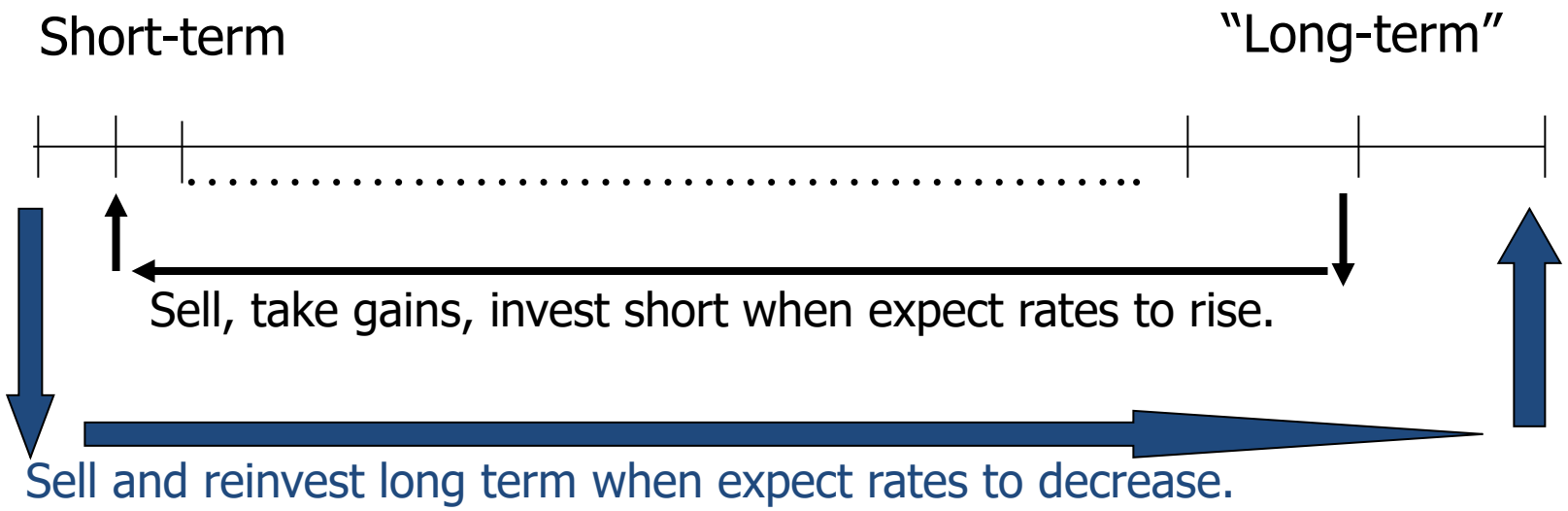


- **Ladder Strategy**
  - **Easy to manage**
  - **Minimizes trading cost**
  - **Consistent liquidity**
  - **Passive approach**

Four-Quarter Ladder Maintenance



Barbell Approach



- **Barbell Strategy**
  - **Split portfolio between short and long**
  - **Liquidity from short-term holdings**
  - **Income from long end (with upward sloping yield curve)**
  - **More active approach and more likely to be affected by rate outlook**

Purpose of Asset Liability Management

- Manage size and composition of bank's assets and liabilities to keep liquidity and interest rate risk within pre-specified tolerance ranges

- Requires bank to plan, organize, and control asset and liability volumes, mix, maturities and durations

- Requires continual measurement of risk and risk adjustment activities

Interest Rate Risk

The prospect that the bank's earnings or value of its equity will be adversely affected by market interest rate changes

- **Earnings Focus** (reinvestment/refinancing risk)
  - Net impact of interest rate movements on asset and liability cash flows (yields, cost rates, margin)
  - Impact of economic setting on non-interest income
- **Valuation Focus** (market/price risk)
  - Net impact of rate changes on the values of the bank's assets and liabilities

Basic ALM Tools

- Earnings Focus
  - GAP – measures net sensitivity of assets and liabilities to rate changes across various time periods with an emphasis on net interest income/margin (BX – B05)
  - Earnings Sensitivity Analysis – computer model to show impact of changing economic conditions on income
- Valuation Focus
  - Duration GAP – measures net duration of assets and liabilities to show value sensitivity of equity
  - Economic Value of Equity Models – computer models that show impact of changing economic conditions on the value of the bank's equity position

Gap Analysis

Gap = Rate sensitive assets – Rate sensitive liabs

- An asset or liability is rate sensitive over a given time horizon if it is expected to take on new rate during the time period under consideration
  - It matures
  - It is a variable-rate instrument
  - It prepays or is withdrawn

Cumulative Gap = Sum of incremental gap buckets

Relative Gap = Gap/Total assets

See Report B05

	Total 12/31		Estimated Interest Rate Sensitivity				
	Amt	Inc/Exp	1 Qtr	2 Qtr	3 & 4 Qtr	1-4 Qtr	Over 1 Year
Assets							
Federal Funds Sold	0.0	0.0	0.0			0.0	
Securities (Book Value)	64.9	0.8	0.0	9.9	10.0	19.9	45.0
Business Loans	217.7	3.5	217.7			217.7	
Real Estate Loans	310.1	4.9	33.9	10.1	47.8	91.8	218.2
Consumer Loans	102.9	1.9	28.4	11.9	11.3	51.5	51.3
Other Loans	0.0	0.0	0.0			0.0	
All Other Assets	81.7						81.7
Total	777.2	11.0	279.9	31.9	69.1	380.9	396.3
Liabilities and Equity							
Federal Funds Borrowed	29.2	0.1	29.2			29.2	
Repos	0.0	0.0	0.0			0.0	
FHLB Borrowing	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Corporate CDs	37.1	0.3	20.6	16.5	0.0	37.1	
Checking and Savings *	400.2	2.0	187.2			187.2	213.0
Retail Time Accounts	233.9	3.2	62.4	6.1	23.2	91.7	142.2
Subordinated Debentures	0.0	0.0					0.0
Equity & Other Liabilities	76.6						76.6
Total	777.1	5.6	299.4	22.7	23.2	345.3	431.8
Summary Positions							
Net Balance Sheet Position (A - L)		5.4	-19.5	9.3	45.9	35.6	-35.6
Fixed Rate Swaps		0.0	0.0	0.0	0.0	0.0	0.0
Variable Rate Swaps		-0.0	10.0	0.0	0.0	10.0	-10.0
Interest Rate Gap		5.3	-9.5	9.3	45.9	45.6	-45.6
Interest Rate Gap / Assets (%)		0.7	-1.2	1.2	5.9	5.9	-5.9

GAP Addresses Impact of Changing Rates

Question: Are assets and liabilities "matched" from a portfolio perspective?

- Steps:
  - Select series of "time buckets" for determining when assets and liabilities will reprice
  - Group assets and liabilities into the "time buckets" based on when they are expected to take a new rate
  - Calculate the difference in RSAs and RSLs for each "time bucket "
  - Estimate the change in net interest income given an assumed change in interest rates

Net Interest Income and GAP

Change in NII = Change in rate X GAP

- Assumes that GAP is correctly measured
- Assumes that all rates move by same amount
  - Parallel shift in yield curve
  - Rates on individual assets and liabilities change by like amounts

- GAP= 0
  - "Immunizes" bank's NII when interest rates change
- If GAP is positive:
  - Rate increases result in higher NII
  - Rate decreases result in lower NII
- If GAP is negative:
  - Rate increases result in lower NII
  - Rate decreases result in higher NII

On Balance Sheet Actions to Affect GAP

- Reduce asset sensitivity if Gap is positive
  - Buy long-term securities
  - Lengthen loan maturities
  - Move from floating-rate loans to fixed-rate loans
- Increase liability sensitivity if Gap is positive
  - Pay premiums to attract short-term deposit instruments
  - More non-core short-term purchased liabilities
- Increase asset sensitivity if Gap is negative
  - Buy short-term securities
  - Shorten loan maturities
  - Make more loans on a floating-rate basis
- Reduce liability sensitivity if Gap is negative
  - Pay premiums to attract longer-term deposit instruments
  - Borrow long-term from the Federal Home Loan Bank

Off Balance Sheet

- Derivatives Used to Manage Interest Rate Risk
  - Financial Futures Contracts
  - Forward Rate Agreements
  - Interest Rate Swaps
  - Options on Interest Rates
  - Interest Rate Caps
  - Interest Rate Floors
  - Interest Rate Collars

Using Swaps to Affect Gap in BankExec

- If Gap is positive, choose “Fixed Rate Swap”
- If Gap is negative, choose “Variable Rate Swap”
- Size of swap depends on size of Gap
  - Assumes rate change is same for bank and swap
  - Swaps are marked to market quarterly
  - Swaps can be sold in the secondary market

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