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Bank Investment Management

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Managing the Investment Portfolio

- Securities activities of large and small banks are fundamentally different.
 - Many small banks buy securities and hold to maturity.
 - Large banks buy securities for their own portfolios and also trade them prior to maturity to make profits.
 - May also manage a trading account and have underwriting subsidiary that helps issue securities.
- Historically, bank regulators have limited risk associated with banks owning securities by:
 - limiting debt instruments to investment grade securities
 - prohibiting banks from purchasing common stock (for income purposes) and mandating they effectively monitor the credit quality of individual securities
- Increasingly, banks are pursuing active strategies in managing investments in a search for higher yields.

Investment activities objectives

- When banks buy securities, they must indicate the underlying objective for accounting purposes:
 - **Held-to-maturity securities** are recorded at amortized cost on the balance sheet with changes in value having no impact on the income statement.
 - **Available-for-sale securities** are reported at market value with any changes in market value due to interest rate changes recorded as unrealized in stockholders' equity.
 - **Trading account** represents securities held for resale. Listed separately on balance sheet and marked to market with gains or losses reported on income statement.

Bank Investment Trading Activities

- Banks perform three basic functions within their trading activities:
 - Offer *investment advice and assistance* to customers managing their own portfolios.
 - Maintain *security inventory* for possible sale to investors.
Willingness to buy and sell securities is called making a market.
 - Traders *speculate* on short-term interest rate movements by taking positions in various securities.
- Banks earn profits from their trading activities in several ways:
 - When making a market, they price securities at an expected positive spread charging a higher price on securities sold than price paid on securities purchased.
Bid is the price the dealer is willing to pay.
Ask is the price the dealer is willing to sell.
 - Traders can also earn profits if they correctly anticipate interest rate movements.

Objectives of the Investment Portfolio

- A bank's investment portfolio differs markedly from a trading account as investment securities are held to meet one of six general objectives:
 - Safety or preservation of capital
 - Liquidity
 - Yield
 - Credit risk diversification
 - Help in manage interest rate risk exposure
 - Assistance in meeting pledging requirements

Objectives of the Investment Portfolio

- Safety or Preservation of Capital:
 - Banks typically balance considerable loan portfolio default risk with lower default risk in their investment portfolios.
 - Primary objective is to preserve capital by purchasing securities where there is only a small risk of principal loss.
 - Regulators encourage this policy by requiring that banks concentrate their holdings in high quality securities.
- Yield:
 - To be attractive, investment securities must pay a reasonable return for the risks assumed.
 - Return may come in the form of price appreciation or interest and be fully taxable or exempt from taxes.

Objectives of the Investment Portfolio

– Liquidity:

- Banks purchase debt securities to help meet liquidity requirements.

- Securities with maturities < 1 year classified as liquid.

Most securities with a market value about book value can also be quickly converted to cash, regardless of maturity, because management is willing to sell them.

– Diversify Credit Risk:

- Diversification objective linked to safety objective and difficulties banks have diversifying their loan portfolios.

Investment portfolios give banks the opportunity to spread credit risk outside their geographic region and across industries.

– Help Manage Interest Rate Exposure:

- Investment securities are very flexible instruments for managing a bank's overall interest rate risk exposure.

Banks can select terms that meet needs without antagonizing the borrower and can readily sell the security if their needs change

Objectives of the Investment Portfolio

– Pledging Requirements:

- By law, commercial banks must pledge collateral against certain types of liabilities.

Banks that borrow via repurchase agreements essentially pledge part of their securities portfolio against this debt.

Banks that borrow at the discount window or from the FHLB must collateralize the loan.

Banks that accept public deposits must pledge government securities against uninsured portions of the deposit.

- Banks have some discretion in choosing what to pledge.
Should pledge the least liquid acceptable asset.

Composition of the Investment Portfolio

- Money market instruments with short maturities and durations include:
 - Treasury bills, large negotiable CDs and Eurodollars, banker's acceptances, commercial paper, security repurchase agreements.
- Capital market instruments with longer maturities and duration include:
 - Long-term government securities, obligations of government agencies, municipal bonds, mortgage-backed securities backed both by government and private guarantees, corporate bonds, foreign bonds, and other asset-backed securities.

Establishing Investment Policy Guidelines

- Each bank's asset and liability or risk management committee (ALCO) is responsible for establishing investment policy guidelines.
 - Guidelines define parameters within which investment decisions help meet overall return and risk objectives.
- Because securities are impersonal loans that are easily bought and sold, they can be used at the margin to help achieve a bank's liquidity, credit risk, and earnings sensitivity or duration gap targets.
- Investment guidelines identify specific goals and constraints regarding:
 - Return Objectives
 - Portfolio Compositions
 - Liquidity Considerations
 - Credit Risk Considerations
 - Interest Rate Risk Considerations
 - Total Return versus Current Income

What Are Suitable Investment Securities?

- In order for an investment to be suitable, the answer to the following questions must be YES:
 - Does the security meet one or more of the bank's stated objectives?
 - Does management understand the security's underlying cash flows and can changes in cash flows be reasonably forecast under different interest rate and economic scenarios?
 - Can the bank readily see the security at a reasonable price because there is an active secondary market for it?
 - Can the security be used to meet pledging requirements so that the bank can borrow against it?

Yield Curve Strategies

Playing the yield curve - take advantage of expected movements in the shape and level of the yield curve.

Example: purchase short-term securities when interest rate levels are low and switch to long-term securities when rates are high. As rates subsequently fall, earn a capital gain on long-term securities. Also, when rates were rising, capital losses are avoided.

Riding the yield curve - assumes that the yield curve will not move in the near future.

Example: assume that the yield curve is upward sloped. Buy securities and hold them so that their maturity decreases and (due to the shape of the yield curve) their yields decline (prices rise). Sell for a capital gain.

$$Y_h = Y_0 + T_r(Y_0 - Y_m) / T_h$$

Example: given the original yield on a bond is 10%, time remaining to maturity on the bond when sold is 1 year, the time lapsed between the purchase and sale of the bond is 1 year, and the yield at the end of the holding period when the bond is sold is 9%, we have

$$Y_h = 0.10 + 1(0.10 - 0.09)/1 = 0.11 \text{ or } 11\%$$

Active Investment Strategies

– Passive Maturity Strategies

- The barbell maturity strategy differentiates investments between those purchased for liquidity versus income.

Short-term securities are held for liquidity and long-term securities for income.

– Active Maturity Strategies

- Active portfolio management involves taking risks to improve total returns by adjusting maturities, swapping securities and periodically liquidating discount instruments.
- To be successful, bank must avoid trap of aggressively buying fixed-income securities at relatively low rates when loan demand is low and deposits are high.
- Riding the yield curve works best when the yield curve is upward-sloping and rates are stable. Three basic steps:

Identify the appropriate investment horizon.

Buy a par value security with a maturity longer than the investment horizon and where the coupon yield is higher in relationship to the overall yield curve.

Sell the security at the end of the holding period when time remains before maturity.

Passive Maturity Strategies

- **Spaced-maturity approach** (or ladder approach)
 - Spread available investment funds evenly across a specified number of periods within the bank's investment horizon.
 - Simple and low transactions costs, but passive with respect to interest rate conditions and liquidity is sacrificed to some extent.
- **Split-maturity approach** (or barbell approach)
 - Greater quantities of short-term and long-term securities are held.
 - This strategy balances liquidity and higher income.
 - Can adapt to front-end loaded and back-end loaded approaches.

Effect of Riding the Yield Curve on Total Return when Interest Rates Are Stable

<i>Cash Flows</i>	Buy a 5-Year Security		Buy a 10-Year Security and Sell It after 5 Years	
Period: Year-End	Coupon Interest	Reinvestment Income at 7%	Coupon Interest	Reinvestment Income at 7%
1	\$ 7,600	—	\$ 8,000	—
2	7,600	\$ 532	8,000	\$ 560
3	7,600	1,101	8,000	1,159
4	7,600	1,710	8,000	1,800
5	7,600	2,362	8,000	2,486
Total	\$38,000	\$5,705	\$40,000	\$6,005
5	Principal at Maturity = \$100,000		Price at Sale after 5 years = \$101,615 when rate = 7.6%	

Expected total return:*

$$\text{5-Year Security : } i = \left[\frac{(100,000 + 38,000 + 5,705)}{100,000} \right]^{1/5} - 1$$

$$i = 7.52\%$$

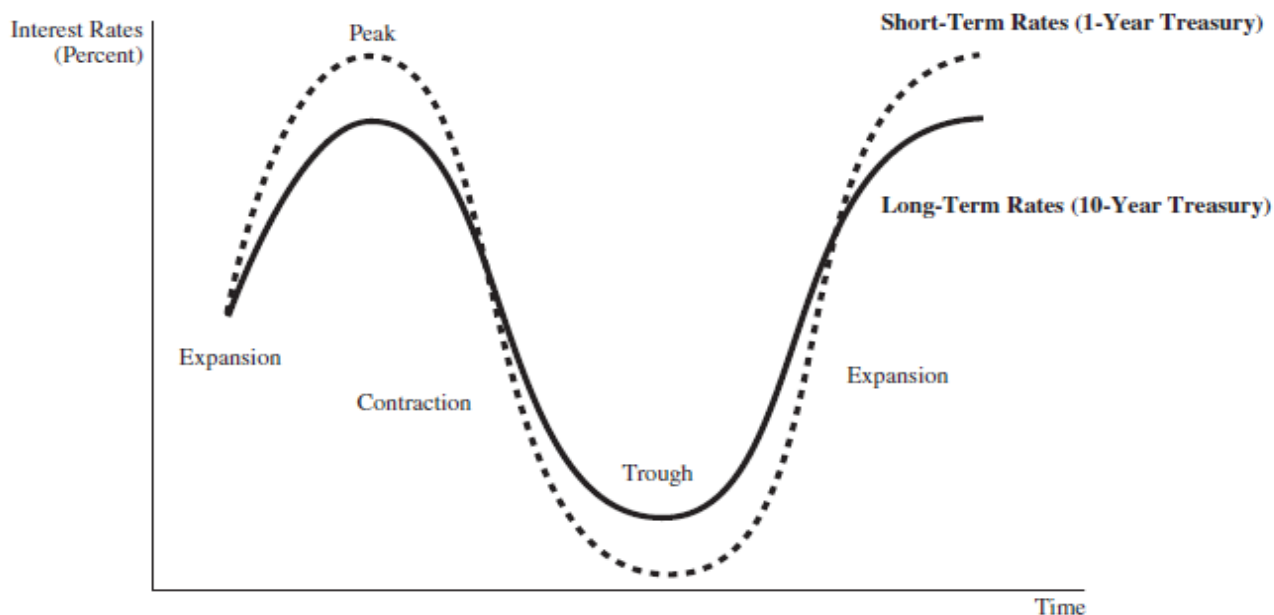
$$\text{10-Year Security : } y = \left[\frac{(101,615 + 40,000 + 6,005)}{100,000} \right]^{1/5} - 1$$

$$y = 8.10\%$$

$$\text{Difference in Total Returns : } y - i = 0.58\%$$

*Realized yield with an assumed reinvestment rate different from the yield to maturity.

Interest Rates over the Business Cycle with Constant Inflation Expectations



The inverted U.S. Treasury yield curve has predicted these recessions:

Date when 1-Year Rate First Exceeds 10-Year Rate	Length of Time until Start of Next Recession
April 1968	20 months (December 1969)
March 1973	8 months (November 1973)
September 1978	16 months (January 1980)
September 1980	10 months (July 1981)
February 1989	17 months (July 1990)
December 2000*	3 months (March 2001)
December 2005*	24 months (December 2007)
	14 months average

LSEG Curve function



Strategies Underlying Security Swaps

- Active portfolio strategies enable banks to sell securities prior to maturity whenever economic conditions dictate returns can be earned without a significant increase in risk.
- In most cases, banks reinvest sales proceeds to improve long-term profitability.
- Banks are reluctant to sell securities at a loss.
- Investors who hold securities to maturity may suffer an opportunity loss by not selling security at a loss or give up substantial value by selling at a premium to capture gain.
- Banks can effectively improve portfolios by:
 - Upgrading bond credit quality by shifting into high-grade instruments when quality yield spreads are low.
 - Lengthening maturities when yields expected to level off or decline.
 - Obtaining greater call protection when rates expected to fall.
 - Improving diversification when management expects economic conditions to deteriorate.

Bond-swapping strategies

Substitution or price swap - sell overvalued securities and buy undervalued securities that may occur due to temporary market disequilibrium.

Yield-pickup or coupon swap - exchange low-coupon for high-coupon bonds, or vice versa, due to interest rate risk and tax differences between these two types of bonds.

Spread or quality swap - exchange of two bonds with unequal risk. Motivated by an abnormally low or high price of either or both bonds.

Portfolio shift - sell low yielding securities and replace with high yielding securities. Deduct capital losses on low yielding securities from taxes. Key is to compare net profits on these two bond strategies over time and choose higher profit strategy.

Foreign Exchange Activities

- Different countries use different monetary units and traders must be able to convert one into another.
 - Foreign exchange markets are where monetary units are traded.
- Foreign exchange refers to currency other than the monetary unit of the home country.
- Exchange rate is the price of one currency in terms of another currency.
- Foreign Exchange Risk:
 - Current and potential risk to earnings and stockholders' equity arising from changes in foreign exchange rates.
 - Evidenced when changing exchange rates affect cash inflows than cash outflows associated with these currencies.
 - Changes in values of foreign currency positions (buying and selling foreign currencies for their own account) due to changing foreign exchange rates indicates price risk.

Foreign Exchange Activities

– Foreign Exchange Risk:

- Bank's net balance sheet exposure in currency j ($NEXP_j$) is the amount of assets minus the amount of liabilities denominated in currency j :

$$NEXP_j = A_j - L_j \quad \text{where: } A_j = \text{assets denominated in currency } j, \\ L_j = \text{liabilities denominated in currency } j$$

- If $NEXP_j > 0$, the bank is long on currency j and if $NEXP_j < 0$, the bank is short on currency j .
- Gain or loss on a position is indicated by:
 $NEXP_j \times \Delta$ spot exchange rate

Evaluating investment risk

– Security-specific risk

– Default risk and credit ratings by rating agencies:

Investment grade bonds (top 4 credit ratings)

Junk bonds (lower rated bonds)

Estimates of the probability of default

Bondholder losses in default not captured by credit ratings

Bond prices inversely related to default risk

Yield spreads between low- and high-quality bonds can vary with economic conditions

– Price risk related to changes in interest rates:

$$\Delta P = -D \times B \times \Delta i / (1 + i)$$

where Δ = change, D = duration, B = price of bond before change in interest rates, and i = interest rate.

Example: given a \$1,000 bond with a 5-year duration and an expected increase in interest rates from 5% to 7%, we have

$$\Delta P = -5 \times \$1,000 \times (0.02/1.05) = \$95$$

New price of this bond is \$905.

Evaluating investment risk

- Security-specific risk

- Yield curve and changes in its level and shape over the business cycle.

- Expectations theory of the yield curve:

$$(1 + {}_0R_2)^2 = (1 + {}_0R_1) (1 + {}_1r_2)$$

where ${}_0R_2$ = the 2-year (spot) rate, ${}_0R_1$ = the 1-year (spot) rate, and ${}_1r_2$ = the 1-year (future implicit) rate.

Example: given ${}_0R_2 = 10\%$ and ${}_0R_1 = 9\%$, we have

$$(1 + .10)^2 = (1 + .09) (1 + {}_1r_2)$$

$$(1 + {}_1r_2) = 1.11 \text{ such that } {}_1r_2 = 0.11 \text{ or } 11\%$$

Assumes that investors are risk-neutral and seek to maximize returns.
Empirical studies have found that implicit future rates are biased upward.

Evaluating investment risk

- Security-specific risk

- Liquidity premium theory:

- Long-term interest rates contain a premium for price risk.

- Need to subtract this premium from long-term rates to adjust the expectations formula and get unbiased estimated of implicit future rates

- (e.g., if the liquidity premium equals 0.5%, and ${}_0R_2 = 10\%$, then use ${}_0R_2 = 9.5\%$ is the formula for the expectations theory).

- Segmented markets theory

- Money and capital markets are separate in many ways with different supply and demand factors affecting changes in interest rates in these markets.

- Preferred-habitat theory

- Takes into account all three yield curve theories.

Evaluating investment risk

- Security-specific risk

- Value-at-risk (VaR)

The maximum amount that could be lost in investment activities in a specified period of time.

Example: based on an historical distribution of interest rates, the probability of a 50 basis point increase in interest rates in a 10-day holding period is 5%. If a bank held \$1 billion of securities with average duration of 3 years, and interest rates are currently 6%, the maximum possible loss in one-out-of-20 holding periods is

$$\Delta P = -3 \times \$1\text{billion} \times (0.0050/1.06) = -\$15.6 \text{ million}$$

Note: Banks need to calculate VAR under alternative interest rate conditions (or forecasts). These *stress tests* consider the sensitivity of VAR to different assumptions about interest rates. Also, bank management can use derivatives securities to hedge rate movements and thereby better control large VARs.

Evaluating investment risk

- Security-specific risk

- Marketability risk

- Selling securities quickly without capital loss.

- Call risk

- Bonds that can be redeemed by the borrowing firm prior to maturity.

- Call deferment period must expire.

- Also, bond's price must be greater than or equal to the call price.

- Call risk related to reinvestment risk, as bonds are typically called during low interest rate periods.

- Call premium paid as compensation for reinvestment risk.

Evaluating investment risk

- Portfolio risk
 - Diversification reduces the variability of returns on assets.
 - Securities can reduce portfolio risk when combined with loans (e.g., loan losses during a recession and associated low interest rates can be partially offset with increasing capital gains on securities as rates declined).
- Inflation risk
 - Unanticipated increases in inflation can cause losses in the securities portfolio.
 - Historic lows in inflation rates in the 1990s and 2000s has been cited as a factor in explaining the strong capital gains in securities markets (especially the stock market).