EE432 Monetary Theory and Policy

Mid-semester Exam Recap

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Chapter 5

Understanding Risk

Risk Defining and Measuring

Defining Risk

- **Risk** is "***the possibility of loss***."
- For outcomes of financial and economic decisions

Risk *is a measure of* **uncertainty** *about the* **future payoff** *to an investment,* ***assessed over*** *some* ***time horizon*** *and* ***relative to a benchmark****.*

Measures of Risk

- It seems intuitive that the *wider the range of outcomes*, the *greater the risk*.
- A risk free asset is *an investment whose future value is knows with certainty and whose return is the risk free* rate of return.
  - The payoff you receive is guaranteed and cannot vary.
- **Measuring the spread** allows us to **measure the risk**.

Variance and Standard Deviation

The **variance** is the ***average of the squared deviations of the possible outcomes*** from their ***expected value***, weighted by their *probabilities*.

1. Compute **expected value**.
2. **Subtract expected value** from each of the **possible payoffs** and **square the result**.
3. **Multiply** each **result *times*** the **probability**.
4. **Add up** the results.

Variance and Standard Deviation

- **Standard deviation** is the *(positive)* ***square root of the variance***

  standard deviation = $\sqrt{Variance}$

- The **standard deviation** is more useful because it deals in ***normal units***, not squared units (like dollars-squared).
- We can **calculate standard deviation** into a **percentage of the initial investment**.
- We can ***compare other investments*** to this one.
- *Given* a choice between *two investments with equal expected payoffs*, most will **choose the one with the lower standard deviation**.
  - The *greater the standard deviation*, the *higher the risk*.

Value at Risk

- Sometimes we are *less concerned with spread* than with the **worst possible outcome**
  - Example: We don't want a bank to fail
- **Value at Risk (VaR):** The **worst possible loss** over a ***specific horizon*** at a ***given probability***.
- For example, we can use this to ***assess*** whether a *fixed* or *variable-rate* ***mortgage*** is better.

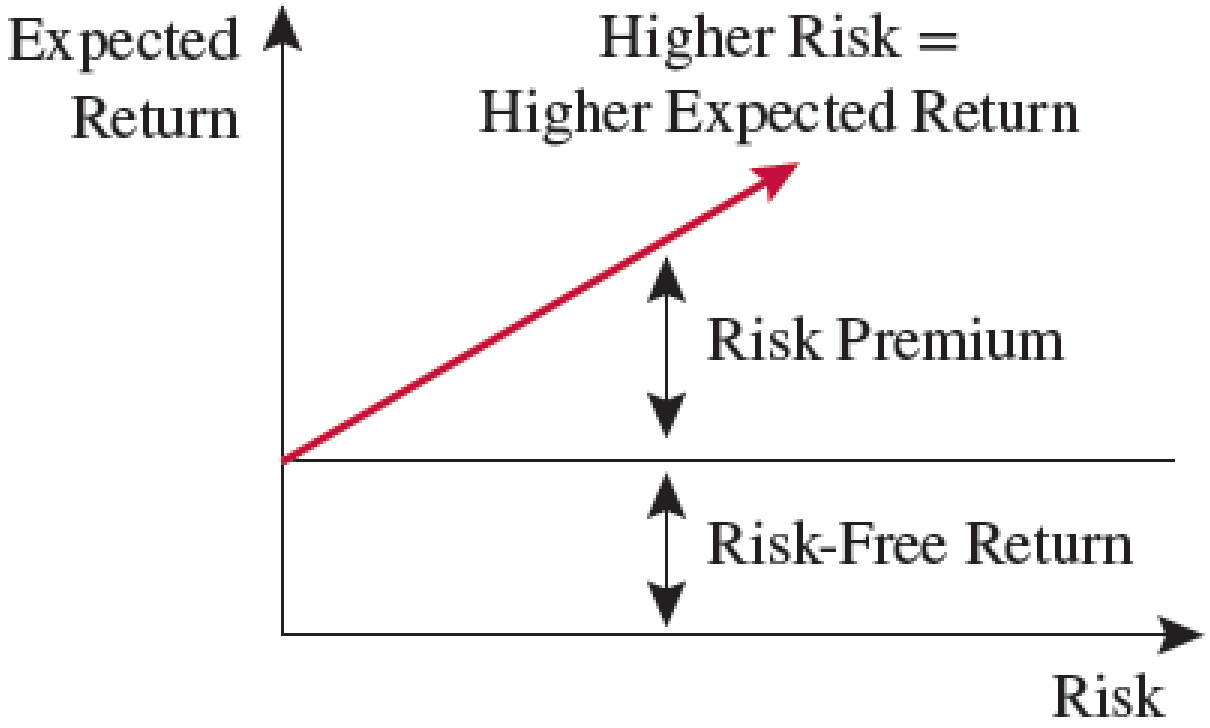
Value at Risk

- For a *mortgage*, the **worst case scenario** means you ***cannot afford your mortgage*** and will ***lose you home***.
  - *Expected value* and *standard deviation* do **not** really ***tell*** you the ***risk*** you face, in this case.
- **VaR** answers the question: ***how much will I lose*** if the *worst possible scenario* occurs?
  - Sometimes *this is the most important question*.

Risk Aversion, the Risk Premium, and the Risk-Return Tradeoff

- Most people do *not* *like* **risk** and will **pay to avoid** it because most of us are ***risk averse***.
  - *Insurance* is a good example of this.
- A ***risk averse*** investor will always *prefer an investment* with **a certain return** to one with the same expected return but *any amount of uncertainty*.
- Therefore, the *riskier an investment*, the ***higher*** *the* ***risk premium***.
  - The ***compensation*** investors ***required to hold*** *the* **risky asset.**

Risk Aversion, the Risk Premium, and the Risk-Return Tradeoff



Source of Risk and Risk Reducing

Sources of Risk: Idiosyncratic and Systematic Risk

All **risks** can be *classified into two groups*:

1. Those *affecting a* ***small number of people*** but no one else:

   Idiosyncratic or *unique* **risks**

2. Those *affecting* ***everyone***:

   Systematic or *economy-wide* **risks**

Sources of Risk: Idiosyncratic and Systematic Risk

Idiosyncratic risks can be classified into two types:

1. A ***risk*** *is* ***bad for one sector*** *of the economy* but good for another.
   - A **rise in oil prices** is ***bad for car industry*** but ***good for the energy industry.***
2. ***Unique risks*** *specific to one person or company* and no one else.

Reducing Risk through Diversification

- Some people take on so much risk that a **single big loss can wipe them out**.
  - Traders call this **"blowing up."**
- Risk can be *reduced through* **diversification**, the principle of ***holding more than one risk*** at a time.
  - This **reduces the idiosyncratic risk** an investor bears.
- One can ***hedge*** risks or ***spread*** them among many investments.

Hedging Risk

- **Hedging** is the strategy of ***reducing idiosyncratic risk*** by ***making two investments*** *with* ***opposing risks***.
  - If one industry is volatile, the payoffs are stable.
- Let's compare three strategies for investing $100:
  - Invest $100 in GE
  - Invest $100 in Texaco
  - And "**hedging**"; **invest half in each company** – ***splitting investment between two stocks*** *with* **different payoff patterns** *to* ***eliminate risk***

Spreading Risk

- You **can't always hedge** as ***investments <u>don't</u> always move in a predictable fashion***.
- The *alternative* is to **<u>spread risk</u>** around.
  - Find investments ***whose payoffs are <u>unrelated</u>***.
- We need to *look at* ***the possibilities, probabilities and associated payoffs*** of ***different investments***.

Spreading Risk

- The **more independent sources of risk** you hold in your portfolio, the **lower your overall risk**.
  - ***Never*** *put* ***all eggs*** *in* **one basket**
- As we add more and more independent sources of risk, the ***standard deviation becomes negligible***.
- **Diversification** through the ***spreading of risk*** is the ***basis for the insurance business***.

Chapter 6

Bonds, Bond Prices, and the Determination of Interest Rates

Risk Structure of Interest Rates

Note: Basic concepts of bond pricing and risk structure of interest rates are taken from Chapter 6

Why Bonds are Risky

- **Default risk** is the change that the ***issuer*** *may not make the* ***promised payment***
- **Inflation risk** occurs when investor ***can't be sure*** of what the ***real value of the payments will be***, even if they are made
- **Interest rate risk** arises from a bondholder's *investment horizon*, which *may be shorter than the maturity of the bond*

Default Risk

- In **determining** what happens to **bond prices** when we consider **default risk**, we can look at an example of a *corporate bond*.
- Assume the *one-year risk-free interest rate is 5 percent.*
- A *company* has *issued a 5 percent coupon bond* with *a face value of $100*.

Default Risk

- If this **bond was risk-free**, the *price of the bond* would be the *present value of the $105* payment.

  Price of risk free bond = ($100 + $5)/$1.05 = $100

- Suppose, however, *there is a 10% probability that the* ***company will go bankrupt*** before paying back the loan.
  - Assume the *outcome is either $105 or $0*.
  - *Expected value equals $94.50*

  Price of bond = $94.50/1.05 = $90

Default Risk

- If the *price of the bond is $90*, what **yield to maturity** does this price imply?

  Promised yield on bond = $105/$90 - 1 = 0.1667

- Since the **default risk premium** is the *promised yield to maturity minus the risk-free rate*:

  = 16.67 percent - 5 percent = 11.67 percent.

- Any **risk premium** will *drive the price below $90* and *push the yield to maturity above 16.67 percent*.
- The **higher the default risk, the higher the yield**.

Inflation Risk

- With few exceptions, ***bonds promise to make fixed-dollar payments***.
- Remember that we care about the ***purchasing power of our*** *money,* not the number of dollars.
  - This means bondholders *care about* the ***real* interest rate.**

Inflation Risk

- Think of the **interest rate** having *three components:*
  1. The **real interest rate**
  2. **Expected inflation**, and
  3. ***Compensation*** for **inflation risk**.
- Example:
  - **Real interest rate** is 3 percent.
  - **Inflation** could be either 1 percent or 3 percent.
  - **Expected inflation** is 2 percent, with a standard deviation of 1.0 percent.

Inflation Risk

- **Nominal interest rate** should equal
  - 3 percent **real interest rate** +
  - 2 percent **expected inflation** +
  - **Compensation for inflation risk**
- The ***greater the inflation risk***, *the* ***larger the compensation for it***.

Interest-Rate Risk

- **Interest-rate risk** arises from the fact that *investors don't know the* ***holding period return*** *of a long-term bond*.
  - The **longer the term of the bond**, the ***larger the price change*** for a given change in the interest rate.
- For investors with *holding periods* ***shorter than the maturity of the bond***, the potential for a *change in interest rates creates risk*.
  - The *more likely* the **interest rates are to change** *during the bondholder's investment horizon*, the **larger the risk of holding a bond**.

Chapter 7

The Risk and Term Structure of Interest Rates

Bond Rating

Ratings and the Risk Structure of Interest Rates

- **Default** is one of the ***most important risks*** a *bondholder faces*.

- **Independent companies (rating agencies)** have arisen to *evaluate the creditworthiness of potential borrowers*.

Bond Ratings

- The best known **bond rating services** are
  - Moody's
  - Standard & Poor's
- They ***monitor*** *the* ***status*** *of individual* ***bond issuers*** and assess the ***likelihood a lender will be repaid*** by the bond issuer.
- A **high rating** suggests that a bond issuer will have **little problem** meeting a ***bond's payment obligations.***

Bond Ratings

- Firms or governments with an *exceptionally strong financial position* carry the ***highest ratings*** and are able to issue the highest-rated bonds, **Triple A**.
- The **top four categories** are considered **investment-grade bonds**.
  - These bonds have a ***very low risk of default***.
  - ***Reserved for*** most government issuers and corporations that are ***among the most financially sound.***

Bond Ratings

- The **distinction** between **investment-grade** and **speculative**, **noninvestment-grade** is important.
  - A number of regulated institutional investors are ***not allowed to invest*** in bonds rated *below investment grade*, which is **Baa** on *Moody's scale* or **BBB** on *Standard and Poor's scale*.

Bond Ratings

- **Speculative grade bonds** are bonds issued by companies and countries that may have *difficulty* meeting their *bond payments* but are *not at risk of immediate default*.
- **Highly speculative bonds** consist of ***debts*** that are in *serious risk of default*.
- All bonds with grades ***below investment grade*** are often referred to as **junk bonds** or ***high-yield bonds***.

Bond Ratings

- Types of **junk bonds**:
  - ***Fallen angels*** are bonds that were *once investment-grade*, but their *issuers fell on hard times*.
  - Bonds issued by *issuers* about which *there is little known.*
- Material changes in a *firm's or government's financial conditions* precipitate changes in its debt ratings.
  - **Ratings downgrade** - *lower* an issuer's bond *rating*.
  - **Ratings upgrade** - *upgrade* an issuer's bond *rating*.

The Impact of Ratings on Yields

- **Bond ratings** are designed to ***reflect default risk.***
- The **lower the rating**
  - The *higher the risk of default*.
  - The *lower* its *price* and the *higher* its *yield*.
- To understand quantitative ratings, it is easier to **compare them to a benchmark**.

The Impact of Ratings on Yields

- **U.S. Treasury issues** are viewed as having *little default risk*, so they are used as **benchmark bonds**.
- **Yields** on other bonds are ***measured*** in terms of the **spread over Treasuries**.
- **Bond yield** is the sum of two parts:

  = U.S. **Treasury yield** + **Default risk premium**

The Impact of Ratings on Yields

- If bond ratings properly reflect risk, then the **lower the rating**, ***the higher the default-risk premium***.
- *When Treasury yields move*, all *other yields move with them*.

Term Structure of Interest Rates

Term Structure of Interest Rates

- Why do **bonds** with the *same default rate* but *different maturity dates* have ***different yields?***
  - **Long-term bonds** are like a *composite of a series of short-term bonds.*
  - Their **yield** depends on *what people expect to happen in the future.*

Term Structure of Interest Rates

- The *relationship among bonds with the same risk characteristics* but *different maturities* is called the **term structure of interest rates**.
- Comparing 3-month and 10-year Treasury yields we can see:
  1. ***Interest rates of different maturities*** tend to ***move together***.
  2. ***Yields on short-term bonds*** are **more volatile** than yields on long-term bonds.
  3. ***Long-term yields*** tend to **be higher** than short-term yields.

The Expectations Hypothesis

- The **expectations hypothesis** of the term structure focuses on the ***risk-free interest rate***.
- The risk-free interest rate can be computed, assuming there is *not uncertainty about the future.*

The Expectations Hypothesis

- If *there is no uncertainty*, then an investor will be *indifferent* between **holding a two-year bond** or a **series of two one-year bonds**.
  - Certainty means that the **bonds of different maturities** are **perfect substitutes** *for each other*.
- The **expectations hypothesis** implied that the ***current two-year interest rate*** *should* ***equal*** *the* ***average of current one-year rate*** and the ***one-year interest rate one year in the future***.

The Expectations Hypothesis

- When *interest rates are expected to rise*, **long-term interest rate** *will be higher than* **short-term interest rates.**
  - The **yield curve** which **plots *the yield to maturity*** on the *vertical axis* and the ***time to maturity*** on the *horizontal axis*, will slope up.
- This also means:
  - If **interest rates are expected to fall**, the *yield curve will slope down.*
  - If **expected to stay the same**, the *yield curve will be flat.*

The Expectations Hypothesis

- If *bonds of different maturities* are **perfect substitutes for each other**, then we can construct *investment strategies* that must have the *same yields*.
  1. **Invest in a <u>two-year bond</u>** and *hold it to maturity*
  2. **Invest in two <u>one-year bonds</u>**, *one today and one when the first matures.*

The Expectations Hypothesis

- The **expectations hypothesis** tells us investors will be indifferent between the two options.
- This means they must have the same return:

$$(1 + i_{2t})(1 + i_{2t}) = (1 + i_{1t})(1 + i^{e}_{1t+1})$$

- We can now write the ***two-year interest rate*** as the ***average of the current and future expected one-year interest rates***:

$$i_{2t} = \frac{i_{1t} + i^{e}_{1t+1}}{2}$$

The Expectations Hypothesis

- We can *generalize* this: a **bond with *n* years to maturity** is the ***average*** **of *n* expected future one-year interest rates**:

$$i_{nt} = \frac{i_{1t} + i^{e}_{1t+1} + i^{e}_{1t+2} + \ldots + i^{e}_{1t+n-1}}{n}$$

The Expectations Hypothesis

Does this **hypothesis** *explain* the *three observations* we started with?

1. **Interest rates of different maturities** will ***move together.***
   - We can see *this holds from the previous equation*.
2. **Yields on short-term bonds will be more volatile** than yields on long-term bonds.
   - **Long-term rates** are ***averages of short-term rates***, so *changing one short-term rate* has little effect on the *long term rate*.

The Liquidity Premium Theory

- **Risk** is the key to understanding the *upward slope of the yield curve.*
- *Bondholders face* both **inflation** and **interest-rate risk.**
  - The ***longer the term of the bond***, the ***greater both types of risk.***
- Computing **real return** from nominal return requires a **forecast of *expected* future inflation**.
  - *A bond's **inflation risk increases** with its **time to maturity***.

The Liquidity Premium Theory

- **Interest-rate risk** arises from the **mismatch** between the *investor's investment horizon* and a *bond's time to maturity.*
  - If a bondholder plans to *sell a bond prior to maturity*, changes in the interest rate generate *capital gains or losses*.
  - The **longer the term of the bond**, *the greater the price changes for a given change in interest rates* and the **larger the potential for capital losses**.
- Investors require *compensation for the increase in risk* they take for buying longer term bonds.

The Liquidity Premium Theory

- We can think about **bond yields** as having two parts:
  - One that is **risk free**: explained by the *expectations hypothesis.*
  - One that is a **risk premium**: explained by *inflation and interest-rate risk.*
- Together this forms the **liquidity premium theory** of the term structure of interest rates.

$$i_{nt} = rp_n + \frac{i_{1t} + i^e_{1t+1} + i^e_{1t+2} + \ldots + i^e_{1t+n-1}}{n}$$

Chapter 11

The Economics of Financial Intermediation

Information Asymmetries and Information Costs

Information Asymmetries and Information Costs

Asymmetric information poses two important **obstacles** to the *smooth* **flow of funds** from *savers to investors*:

1. **Adverse selection** *arises before the transaction occurs*.
   - Lenders need to know **how to distinguish *good credit risks*** from ***bad***.
2. **Moral hazard** occurs *after the transaction.*
   - Will borrowers **use the money as they claim**?

Adverse Selection

- **Used cars** and the **market for lemons;** *a lemon is a vehicle (often new) that turns out to have several manufacturing defects*:
  - Used car buyers ***can't tell good cars from bad.***
  - **Buyers** will at most **pay the expected value of good and bad cars**.
  - **Sellers** know if they have a good car, so they ***won't accept less than the true value***.
  - **If buyers** are only **willing to pay average value**, *good car sellers will* withdraw *cars from the market.*
  - Then the market has *only the bad cars*.

Adverse Selection in Financial Markets

- **If you can't tell *good from bad* companies**
  - **Stocks** of good companies are ***undervalued***, and
  - **Owners** will ***not want to sell*** them.
- **If you can't tell *good from bad* bonds**
  - Owners of good companies will **have to sell bonds for too low a price**, so
  - **Good bonds** *won't be sold want to do* it.

Disclosure of Information

- An obvious way **to solve the *hidden attributes* problem** is *to* ***provide more information***.
- In most advanced economies, *public companies* are **required to disclose** voluminous amounts of **information**.
  - For example, in the *Securities and Exchange Commission (SEC) requires firms* to **produce public financial statements** that are prepared according to standard accounting practices.

Disclosure of Information

- In a limited sense, **there is *private information* collected and sold to investors**.
  - *Research services* like Moody's , *collect information directly from firms* and *produce evaluations*.
  - *To be credible*, *companies cannot pay* for this research, so **investors have to pay**.

Collateral and Net Worth

- **Collateral** is something of value *pledged or* ***guaranteed by a borrower*** to the lender *in the event of the borrower's default*.
  - It is said to *back* or *secure* a loan.
- **Unsecured loans**, like *credit cards,* are **loans** made **without collateral**.
  - Because of this they generally have ***very high interest rates.***

Collateral and Net Worth

- The **net worth** is the owner's stake in a firm;
  - *the value* of the **firm's assets *minus*** the value of its **liabilities**.
    - **Net worth** *serves the same purpose as* ***collateral***
    - ***If a firm defaults*** on a loan, the **lender** can **make a claim** against the ***firm's net worth***.
- **Most small business owners** must ***put up their homes and other property*** *as* **collateral** for their business loans.

Moral Hazard: Problem and Solutions

- **Moral hazard** arises when
  - we ***cannot observe people's actions*** and therefore ***cannot judge whether a poor outcome*** *was* ***intentional*** or *just a result of bad luck*.
  - the ***borrower knows more than the lender*** about ***the way borrowed funds will be used*** *and the effort that will go into a project.*

Moral Hazard in Equity Finance

- If you buy stock in a company, *how* do you know *your money will be used* in the way that is *best for* you, the *stockholder*?
- It is more likely that the ***managers will use the funds in a way that is most advantageous to themselves***, not you.
- The ***separation*** *of your* ***ownership*** *from their* ***control*** creates what is called a ***principal-agent problem***.

Solving the Moral Hazard Problem in Equity Financing

- The attempts to align managers' interests with those of stockholders were **giving stock options** *as incentives to managers* that provided lucrative payoffs ***if a firm's stock price rose above a certain level***.
- When the ***managers are the owners***, ***moral hazard*** *in equity finance* ***disappears***.

Moral Hazard in Debt Finance

- **Debt contracts** allow **owners** to ***keep all the profits in excess of the loan payments***, they **encourage risk taking**.
- **Lenders** need to find ways to ***make sure borrowers don't take too many risks***.
- People with **risky projects** are ***attracted to debt finance*** because they ***get the full benefit of the upside***, while the **downside is limited to their collateral**.

Solving the Moral Hazard Problem in Debt Finance

- **Legal contracts** can ***solve the moral hazard problem*** inherent in debt finance.
  - The firm may **have to maintain a certain level of net worth**, a **minimum credit rating**, or a **minimum bank balance** or **home insurance and fire insurance** for mortgages.

Financial Intermediaries and Information Costs

- To *reduce information costs* and *minimize the effects of adverse selection* and *moral hazard*, intermediaries should:
  - **Screen loan applicants,** and
  - **Monitor borrowers**

Screening and Certifying to Reduce Adverse Selection

- The **lender *analyzes credit information*** from **credit score.**
- Every time someone requests a credit score, they **have to pay**, *eliminating the free rider problem.*
- **Banks can collect information on a borrower** that goes beyond their credit report and loan application.

Monitoring to Reduce Moral Hazard

- Intermediaries **monitor firms** that *issue bonds and stocks* to reduce moral hazard.
  - *Many hold significant number of shares* in individual firms.
  - They ***may place a representative*** on the company's ***board of directors***.

Monitoring to Reduce Moral Hazard

- For **new companies**, a financial intermediary called a ***venture capital firm*** does the monitoring.
  - They **specialize in investing in *risky new ventures*** in return for a ***stake in the ownership*** and a ***share of the profits***.
    - *Stake is the share of financial involvement that you risk on (for example, investment or competition)*
  - They *keep a close watch on the managers' actions*.
- The threat of a takeover helps to **persuade managers to act** in the ***interest of the stock and bondholders***.

Chapter 12

Depository Institutions: Banks and Bank Management

Bank Capital and Profitability

- **Net worth** is referred to as **bank capital, or *equity capital*.**
- Capital is the **cushion** banks have ***against a sudden drop*** in the **value of their assets** or an **unexpected withdrawal of liabilities**.
  - It *provides some insurance against insolvency*.

Bank Capital and Profitability

- An important component of bank capital is **loan loss reserves**:
  - **Loan loss reserves** are an ***amount the bank sets aside*** to **cover potential losses** from ***defaulted loans***.
- At some point the *bank gives up hope a loan will be repaid* and it is ***written off***, or erased from the bank's balance sheet.
- At this point, the ***loan loss reserve*** is ***reduced*** by the ***amount of*** *the loan that has* ***defaulted***.

Bank Capital and Profitability

There are several measures of **bank profitability**.

1. **Return on assets (ROA)**
   - **ROA** is the ***bank's net profit left after taxes*** divided by *the* ***bank's total assets***.

$$ROA = \frac{\text{Net profit after taxes}}{\text{Total bank assets}}$$

   - It is a measure of ***how efficiently*** **a particular banks** ***uses its assets***.

Bank Capital and Profitability

2. The **bank's *return to its owners*** is measured by the **return on equity (ROE).**
   - This is the ***bank's net profit after taxes*** divided by ***the bank's capital***.

$$ROE = \frac{\text{Net profit after taxes}}{\text{Capital}}$$

Bank Capital and Profitability

- **ROA and ROE** are *related to leverage.*

$$\text{Leverage} = \frac{\text{Bank Assets}}{\text{Bank Capital}}$$

- One measure of **leverage** is the *ratio of banks **assets** to bank **capital**.*
- Multiplying **ROA** *by asset to capital ratio* gives **ROE**.

$$ROE = \frac{\text{Net profit after taxes}}{\text{Bank Capital}}$$

$$ROA \times \frac{\text{Bank Assets}}{\text{Bank Capital}} = \frac{\text{Net profit after taxes}}{\text{Total bank assets}} \times \frac{\text{Bank Assets}}{\text{Bank Capital}}$$

$$= \frac{\text{Net profit after taxes}}{\text{Bank capital}} = ROE$$

Bank Capital and Profitability

3. The final measure of bank profitability is ***net interest income*.**
   - This is related to the fact that ***banks pay interest on their liabilities*** and ***receive interest on their assets.***
   - *Net interest income* is the **difference** between
     - **Securities and loans generate *interest income***
     - **Deposits and bank borrowing generate *interest expenses***

Bank Capital and Profitability

- **Net interest income** can also be expressed as
  - the ***difference*** between the ***interest income*** *generated by banks or other financial institutions* and the *amount of* ***interest paid out*** *to their lenders, relative to the amount of their interest-earning assets:* **net interest margin**.
  - This is the bank's **interest rate spread** - the *weighted average* ***difference*** between the ***interest rate received on assets*** and the ***interest rate paid for liabilities.***

Bank Risk

Liquidity Risk

- **Liquidity risk** is the *risk of a **sudden** demand for **liquid funds***.
- Banks face liquidity risk on **both sides of their balance sheets**.
  - **Deposit withdrawal** is a liability-side risk.
  - **Lines of credit** are an asset-side risk.
- *Even if* a bank has a *positive net worth*, ***illiquidity** can still drive it out of business*.

Liquidity Risk

- *In the past*, the common way to *manage liquidity risk* was to **hold excess reserves**.
  - This is a **passive way** to manage liquidity risk.
  - Holding excess reserves is **expensive**, because it means *forgoing higher rates of interest* than can be *earned with loans or securities*.
- There are two other ways to manage liquidity risk.
  - The bank can **adjust** its ***assets*** or its ***liabilities***.

Liquidity Risk

On the **asset side** a bank has several options.

1. The easiest option is to ***sell a portion of its securities portfolio***.
   - Most **treasuries** can be ***sold quickly*** at relatively low cost.
   - Banks that are particularly concerned about liquidity risk ***can structure their securities holdings*** to *facilitate such sales.*

Liquidity Risk

2. A second possibility is for the bank to **sell some of its loans** to another banks.
   - Banks generally make sure that a *portion of the loans they hold* are ***marketable*** for this purpose.
3. Another way is to **refuse to renew a customer loan** that has come due.
   - However this is bad for business.
     - The bank can **lose a good customer.**
     - Reducing assets **lowers profitability**.

Liquidity Risk

Bankers prefer to ***use*** **liability management** to address liquidity risk.

1. Banks can **borrow to meet any shortfall** either *from the central bank* or *from another bank*.
2. The bank can **attract additional deposits**.

Credit Risk

- **Credit risk** is the ***risk*** *that a* ***bank's loans*** *will* ***not*** *be* ***repaid****.*
- Banks use a variety of tools *to manage credit risk:*
  1. **Diversification**, where banks ***make a variety of different loans to spread the risk***.
  2. **Credit risk analysis,** where the bank ***examines the borrower's credit history*** to determine the *appropriate interest rate to charge*.

Credit Risk

- **Diversification** can be *difficult* for banks, especially *if they focus on a certain type of lending.*
  - If a bank lends in only **one geographic area** or **one industry,** it is *exposed to economic downturns* that are ***local or industry-specific***.
- **Credit risk analysis** uses a *combination* of *statistical models* and *information* that is ***specific to the loan applicant***
  - The result is an **assessment of the likelihood** that a **particular borrower will default**.

Interest-Rate Risk

- A ***bank's liabilities*** *tend to be* ***short-term***, while ***assets tend to be long term***.
  - The **mismatch** between the two sides of the balance sheet create **interest-rate risk**.
- When **interest rates rise**, banks face the risk that the ***value of their assets*** will *fall more than the value of their liabilities*, **reducing the bank's capital.**
- **Rising interest rates *reduce revenues relative to expenses,*** directly *lowering a bank's profits*.

Interest-Rate Risk

- The term ***interest-rate sensitive*** means that a *change in interest rates* will *change the revenue produced by an asset.*
- For a bank **to make a profit**, the ***interest rate on its liabilities*** must be **lower** than the ***interest rate on its assets***.
  - The difference in the two rates is the bank's **net interest margin.**
- *When a* ***bank's liabilities*** *are* ***more interest-rate sensitive*** *than its assets*, an **increase in interest rates** will **cut into the bank's profits**.

Interest-Rate Risk

- To manage interest-rate risk is to *determine how sensitive the bank's balance sheet is to a change in interest rates.*
- **Managers** *must compute* an **estimate of the *change in the bank's profit* for each one-percentage-point change in the interest rate**.
- This procedure is called ***gap analysis***.

Interest-Rate Risk

Bank managers can *use a number of tools to manage interest-rate risk.*

1. They can **match the interest-rate sensitivity of assets *with*** that of **liabilities**.
2. Alternatives include the **use of derivatives**, *specifically interest-rate swaps*.

Outline

- The Sources and Consequences of Runs, Panics, and Crises
- The Government Safety Net
- Regulation and Supervision of the Financial System
- Macro-Prudential Regulation

Chapter 14

Regulating the Financial System

The Government Safety Net

Problems Created by the Government Safety Net

- Government officials are worried about the **largest institutions** because they can ***pose a threat to the entire financial system*** if they fail.
- Some intermediaries are treated as ***too big to fail*** or ***too interconnected to fail***.
  - ***too complex to shut down***
  - ***too big to resolve***
  - special legal definition to such a firm: **systemically important financial institution (SIFI).**

Problems Created by the Government Safety Net

- Whenever the government ***provides a safety net <u>without charging an appropriate fee in advance of the protection</u>***, they create an **incentive** for financial institutions **to take risks** that can **threaten the system as a whole**.
- It compounds the problem of **<u>moral hazard</u>**.

Government Deposit Insurance

- When a **banks fails**, the **Government Deposit Insurance** resolves the insolvency either by ***(i) closing the institution*** or ***(ii) finding a buyer***.
- **Closing the bank** is called the ***payoff method***.
  - ***pay all the bank's depositors***, then ***sell all the bank's assets.***
- The more commonly applied, is called the ***purchase-and-assumption method***.
  - ***finds a firm willing to take over*** the failed bank.

Government Deposit Insurance

- Depositors ***prefer*** the *purchase-and-assumption method.*
  - The transition is typically ***seamless***.
  - ***No depositors suffer a loss***.
- Deposit insurance *clearly helped* to **prevent runs** on commercial banks.
- Nonetheless, most economic historians *believe government insurance* ***led to rise in risk***.

Government Deposit Insurance

- Insurance *only* *covers* ***depository institutions***.
- However, as the system developed, **shadow banks** *gained importance*.
  - They face the *risk of runs* by their *short-term creditors*
  - Nonetheless, these nonbanks ***lack the benefits of deposit insurance.***

Problems Created by the Government Safety Net

- In the aftermath of the crisis, *limiting the unintended consequences* of the ***government safety net*** is the *leading problem facing regulators*.
  - Some argue that **too big to fail institutions** are *just too big* and *need to be broken up*.
  - This does *not eliminate the bad incentives from deposit insurance* and *government guarantees to smaller institutions*.

Problems Created by the Government Safety Net

- The conflict between crisis prevention and crisis mitigation exemplifies the problem of ***time consistency***.
  - *In good times*, governments and central banks say ***they will not bail out financial intermediaries***
  - The intermediaries know that *in a time of crisis*, policymakers will have an ***incentive to bail them out***.
  - Promises in the good times ***lack credibility***.

Regulation and Supervision of the Financial System

Regulation and Supervision of the Financial System

- Government officials employ *three strategies to ensure that the* ***risks created by the safety net*** *are* ***contained***.
  - ***Regulation*** establishes a *set of specific rules for intermediaries to follow*.
  - ***Supervision*** provides *general oversight of financial institutions.*
  - ***Examination*** of an *institution's books by specialists* provides *detailed information on the firms' operation*.

Regulation and Supervision of the Financial System

Regulatory requirements designed to **minimize the cost of failures** to the public:

1. *New banks must obtain* a **charter (license)**.
2. Once open, **regulations**
   - **Restricts competition**
   - Specifies what **assets the bank cannot hold**
   - Requires the bank to **hold a minimum level of capital**
   - Makes **public information** about the bank's balance sheet

Restrictions on Competition

- ***Bank mergers require government approval***.
- One long-standing goal of financial regulators has been *to* ***prevent*** *banks from growing* ***too big and too powerful***.
- Before *granting a merger, officials must be convinced* on two points.
  1. The new bank must **not constitute a monopoly**.
  2. The *small bank's customers* must be ***well served by the merger***.

Restrictions on Competition

- *Competition* ***reduces the prices*** customers must pay.
- **Lower interest margins** and **reduced fee income** cause bankers to ***look for other ways to turn a profit.***
  - Some may be temped to assume ***more risk*** than advisable**, to increase leverage, or to rely excessively on short term funding**.
- Thus, government officials can explicitly **restrict competition.**

Asset Holding Restrictions and Minimum Capital Requirements

- One way to prevent bankers from exploiting their safety net is **to restrict banks' balance sheets.**
- **Minimum capital requirements** complement those limitations on bank assets.
- Capital requirements take two basic forms:
  1. Most banks are required to keep their ***ratio of capital to assets above some minimum level***, regardless of the structure of their balance sheets.
  2. Banks are required to ***hold capital*** in proportion to the ***riskiness of their operations***.

Supervision and Examination

- The government *enforces banking rules and regulations* through an elaborate **oversight** process called **supervision**.
  - This relies on a combination of **monitoring** and **inspection**.
  - It is done both **remotely** and through **on-site examination**.

Supervision and Examination

- The most important part of bank examination is the **evaluation of past-due loans**.
- The examiner's job is to make sure that ***when borrowers stop making payments***, ***loans are written off*** and the ***bank's balance sheet properly reflects the losses***.

Macro-Prudential Regulation

Micro-Prudential Versus Macro-Prudential Regulation

- The government official's job is *not to stabilize the profits of an* ***individual bank*** or *insurance company.*
- The regulator's goal should be to **prevent large-scale catastrophes.**

Micro-Prudential Versus Macro-Prudential Regulation

- Regulators are ***broadening*** *their focus* ***beyond micro-prudential oversight*** to encompass ***macro-prudential regulation***.
- Micro-prudential regulation aims at **limiting the risks *within* intermediaries** in order to ***reduce the possibility of an individual institution's failure***.

Micro-Prudential Versus Macro-Prudential Regulation

- *Micro-prudential* oversight is *insufficient to prevent* ***systemic risks***.
- **Macro-prudential regulation** treats ***systemic risk*** *taking by an intermediary* as a kind of ***pollution*** that **spills over** *to other financial institutions and markets*.

Micro-Prudential Versus Macro-Prudential Regulation

- **Common Exposure**
  - When ***many institutions*** have an ***exposure to the same specific risk factor***, it can make the **system vulnerable** *to a shock to that factor*.
  - Intermediaries may be ***directly*** **exposed** to a *fragile institution through financial contracts*.

Micro-Prudential Versus Macro-Prudential Regulation

- **Common Exposure**
  - They may be **exposed *indirectly*** and unknowingly *through their counterparties*, who are themselves *directly exposed to a fragile institution*.
  - *All institutions may be vulnerable* to the same underlying risks.

Micro-Prudential Versus Macro-Prudential Regulation

- **Pro-Cyclicality**
  - *Financial activity* is prone to *vicious cycles.*
  - The **interaction** between **financial** and **economic** activity can be ***mutually reinforcing*** leading to ***unsustainable booms and busts***.

Micro-Prudential Versus Macro-Prudential Regulation

- **Macro-Prudential Policy**
  - This aims to **make intermediaries** bear, or ***internalize***, **the costs that <u>their behavior imposes on others</u>**.
  - *To be effective in <u>limiting systemic threats</u>*, a **<u>systemic capital surcharge</u>** probably would be disproportionately ***larger for firms that contribute the most to systemic risk***
  - Intermediaries would have an *incentive to limit the systemic risks* they create.

Micro-Prudential Versus Macro-Prudential Regulation

- Macro-Prudential regulators *could also make capital requirements vary* with the business cycle.
- In **good times**, **capital requirements would rise *above the long-run average*** to create a ***capital buffer*** *against adverse shocks* and to *discourage euphoria*.

Micro-Prudential Versus Macro-Prudential Regulation

- Regulators could *require banks* to buy **catastrophe insurance**.
- Could also have banks issue so-called **contingent convertible bonds** that *convert to equity in the event of a capital shortfall*.

Micro-Prudential Versus Macro-Prudential Regulation

Ultimately, addressing *systemic risk* will require a *broad framework* of **macro-prudential supervision** that includes

1. **Rules and mechanisms** that ***promote better risk management*** on the part of intermediaries, and
2. **Reforms** that ***reduce the vulnerability of the financial system*** to the liquidation of any single financial firm.

Chapter 15

Central Banks in the World Today

Creating a Successful Central Bank

Meeting the Challenge: Creating a Successful Central Bank

- To be successful, a central bank must:
  1. Be **independent** of political pressure.
  2. Be **accountable** to the public and **transparent** in communicating its policy actions.
  3. *Operate* within an *explicit framework* that *clearly states its* **goals** *and* makes clear the **trade-offs** among them.
  4. Make **decisions by committee**.

The Need for Independence

- **Independence** has two operational components:
  1. **Monetary policymakers** must be *free to control their own budgets*.
  2. The bank's policies **must not be** ***reversible by people outside*** the central bank.
  - cannot be overridden by politicians.

The Need for Accountability and Transparency

1. **Politicians** would ***establish a set of goals***.
2. The **policymakers** would *publicly report their progress* in *pursuing those goals*.
   - **Explicit goals** foster ***accountability*** and *disclosure requirements* create ***transparency***.
   - Legislatures usually *grant central banks* **instrument independence, not goal independence**

The Need for Accountability and Transparency

- Today **every central bank** *announces its policy actions almost immediately*.
- **Central bank statements** are far *more informative*.
- The economy and financial **markets should respond to information** that everyone received, *not to speculation* about what policymakers are doing.
- **Transparency** can help *counter the uncertainties and anxieties*.

The Policy Framework, Policy Tradeoffs, and Credibility

- To meet their objectives, **central bankers must** be **independent**, **accountable**, and **good communicators.**
- Central bankers face the **tradeoff** *between* ***inflation, growth and financial stability*** on a daily basis.
- Because policy goals often conflict, **central bankers *must make their priorities clear***.
- This ***limits the discretionary authority*** of the central bankers.

The Policy Framework, Policy Tradeoffs, and Credibility

- Finally, *a well designed policy framework* helps policy makers **establish credibility**.
  - To ***do what they say*** *they are going to do*.
- **Expected inflation** *creates inflation*.
  - Successful monetary policy, then, requires that **inflation expectations** be *kept under control*.

End of lecture