EE432 Monetary Theory and Policy

Recap II

Dr. Chamadanai Marknual
Faculty of Economics, Thammasat University
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Chapter 15

Central Banks in the World Today

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*.

Chapter 17

The Central Bank Balance Sheet and the Money Supply Process

The Central Bank's Balance Sheet

Figure 17.1 The Central Bank's Balance Sheet

	Assets	Liabilities
Government's bank	Securities Foreign exchange reserves	Currency Government's account
Bankers' bank	Loans	Accounts of the commercial banks (reserves)

The Central Bank's Balance Sheet

- The *central bank's balance sheet* shows three ***basic assets***:
  - **Securities,**
  - **Foreign exchange reserves, and**
  - **Loans.**
- The **securities** and **foreign exchange reserves** are needed so that the central bank can *perform its role* as the *government's bank*.
- The **loans** are a *service to commercial banks*.

Changing the Size and Composition of the Balance Sheet

- The *central bank can simply* **buy** *things* and then **create liabilities** *to pay for them*, which **increase the size** of its **balance sheet** as much as it wants.

1. **Open Market Operation**
   - *Buying or selling a security* initiated by the central bank.
2. **Foreign Exchange Intervention**
   - *Buy or sell foreign exchange reserves* initiated by the central bank.
3. **Extend a discount loan,** initiated by commercial banks.
4. *Decision by an individual* to ***withdraw cash*** *from their banks*

Open Market Operations

- When the central bank buys or sells securities in financial markets, it engages in open market operations.

Figure 17.2 Balance Sheet Changes after the Federal Reserve Purchases a U.S. Treasury Bond

A. Federal Reserve's Balance Sheet

Assets		Liabilities	
Securities (U.S. Treasury bond)	+$1 billion	Reserves	+$1 billion

B. Banking System's Balance Sheet

Assets		Liabilities
Reserves	+$1 billion	
Securities (U.S. Treasury bond)	–$1 billion	

Foreign Exchange Intervention

- If the **central bank** *buy* ***German government bonds*** *(securities)* from **commercial banks**.
- The **payment** is *credited directly* to the ***reserve account*** of the *commercial bank* from which the bonds were bought.

Figure 17.3 Balance Sheet Changes after the Federal Reserve Purchases a German Government Bond

A. Federal Reserve's Balance Sheet

Assets		Liabilities	
Foreign exchange reserves (German government bonds in euros)	+$1 billion	Reserves	+$1 billion

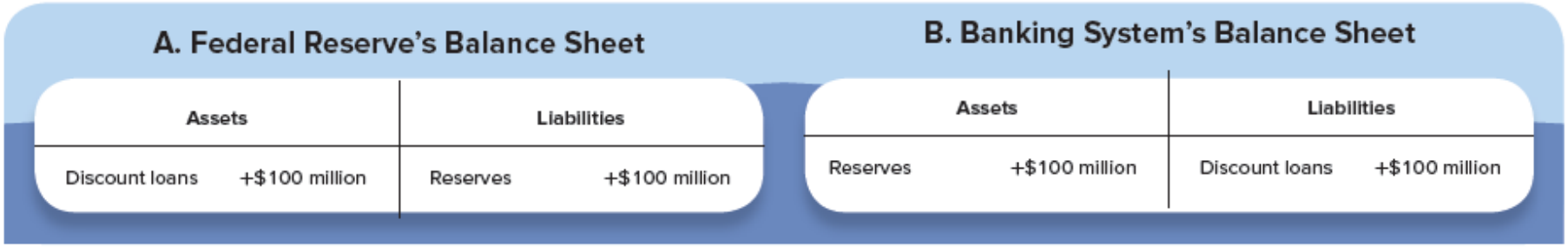
B. Banking System's Balance Sheet

Assets		Liabilities	
Reserves	+$1 billion		
Securities (German government bonds)	–$1 billion		

Discount Loans

- Commercial banks ask for loans

Figure 17.4 Balance Sheet Changes after the Federal Reserve Makes a Discount Loan



A. Federal Reserve's Balance Sheet

Assets		Liabilities	
Discount loans	+$100 million	Reserves	+$100 million

B. Banking System's Balance Sheet

Assets		Liabilities	
Reserves	+$100 million	Discount loans	+$100 million

- For the commercial bank, it is a **liability** *matched by* an **increase in** the level of its **reserve account**.
- For the central bank, the **loan** is **an asset** that is created in exchange for *a credit to the commercial bank reserve account*, and **expands the monetary base**.

Deposit Expansion in a System of Banks

- We can *derive* a formula for the **deposit expansion multiplier**
- Let's being by *assuming* there is *only one bank and everyone must use it*.
- The **level of reserves**, then, is just the **required reserve ratio** r_D *times* its **deposits**.
- If **required reserves** are RR and **deposits** are D, then the **level of reserves** can be *expressed as*:

$$RR = r_D D.$$

Deposit Expansion in a System of Banks

- Any **change in deposits** creates a corresponding **change in reserves**:

$$\Delta RR = r_D \Delta D$$

- The **change in deposits** is:

$$\Delta D = \frac{1}{r_D} \Delta RR$$

- For *each dollar increase in reserves, deposits increase* by $(1/r_D)$.

The Arithmetic of the Money Multiplier

- The ***money multiplier*** shows how the **quantity of money** is ***related to the monetary base***.
- If we label the **quantity of money *M*** and the **monetary base *MB***, the **money multiplier *m*** is defined as:

$$M = m \times MB$$

The Arithmetic of the Money Multiplier

- We will start with the following relationships:
  - **Money** equals **currency, *C***, plus **checkable deposits, *D***,
  - The **monetary base *MB*** equals **currency** plus **reserves in the banking system** *R*, and
  - **Reserves** equal **required reserves *RR*** plus **excess reserves *ER***.

$$M = C + D$$

$$MB = C + R$$

$$R = RR + ER$$

The Arithmetic of the Money Multiplier

- We know that **banks** holdings of ***required reserves*** *depends on* the **required reserve ratio r_D.**
- The amount of **excess reserve** a bank holds *depends on* the ***costs and benefits of holding them***.
  - The *higher the interest rate* on loans, the *lower banks' excess reserves*, and
  - The *greater* banks' *concern* over the *possibility of deposit withdrawals*, the *higher their excess reserves.*

The Arithmetic of the Money Multiplier

- Labeling the **excess reserve-to-deposit ratio {*ER/D*}**, we can rewrite the reserve equation as:

$$R = RR + ER$$
$$= r_D D + \{ER/D\}D$$
$$= (r_D + \{ER/D\})D$$

- Banks ***hold reserves*** as a ***proportion of their deposits.***

The Arithmetic of the Money Multiplier

- The **currency-to-deposit ratio, {*C/D*},** is the *fraction of deposits that people hold as currency.*

$$C = \{C/D\}D$$

- The **decision of how much currency to hold** depends on the costs and benefits as well.
  - The **cost of currency** is the *interest it would earn on deposit*.
  - The **benefit** is its *lower risk and greater liquidity*.

The Arithmetic of the Money Multiplier

- Putting this all together, we can see to following.

$$MB = C + R$$
$$= \{C/D\}D + (r_D + \{ER/D\})D$$
$$= (\{C/D\} + r_D + \{ER/D\})D$$

- The **monetary base** has three uses:
  - **Required reserves**
  - **Excess Reserves**
  - **Cash in the hands** of the nonbank public

The Arithmetic of the Money Multiplier

- We can do the same with the **equation for money**.

$$M = C + D$$
$$= \{C/D\}D + D$$
$$= (\{C/D\} + 1)D$$

The Arithmetic of the Money Multiplier

- We can use the **equation for *MB*** to ***solve for deposits***:

$$D = \frac{1}{\{\mathrm{C/D}\} + \mathrm{r_D} + \{\mathrm{ER/D}\}} \times MB$$

- And **substituting D** into the **money equation**:

$$M = \frac{\{C/D\} + 1}{\{\mathrm{C/D}\} + \mathrm{r_D} + \{\mathrm{ER/D}\}} \times MB$$

The Arithmetic of the Money Multiplier

The **quantity of money** in the economy *depends on:*

1. The **monetary base**, which is controlled by Fed,
2. The **reserve requirement**,
3. The ***bank's desire to hold excess reserves***, and
4. The nonbank **public's demand for currency**.

Chapter 18

Monetary Policy: Stabilizing the Domestic Economy

The Federal Reserve's Conventional Policy Toolbox

The Fed has **four** leading ***conventional monetary policy tools***, also known as *policy instruments*:

1. The **target federal funds rate range**
2. The **interest rate on excess reserves (IOER rate)**
3. The **discount rate**
4. The **reserve requirement**

The Federal Reserve's Conventional Policy Toolbox

- An important **supplementary tool** for monetary policy used by the Fed: ***overnight reverse repo (ON RRP) rate***.
  - Serves to ***keep the market federal funds rate*** *close to the IOER rate*
  - Can be **used to set a floor** *under* ***the market federal funds rate***

The Target Federal Fund Rate

- Prior to the financial crisis, the **target federal fund rate** *was* the ***FOMC's primary policy instrument***.
- The **federal funds rate** is the ***rate*** *at which* ***banks lend reserves*** *to each other* ***overnight***.
  - It is ***determined in the market*** and *not controlled by the Fed*.
- The ***target*** **federal funds rate** are **set by the FOMC,** and the **market federal funds rate**, *at which* **transactions between banks** take place.

The Interest on Excess Reserves

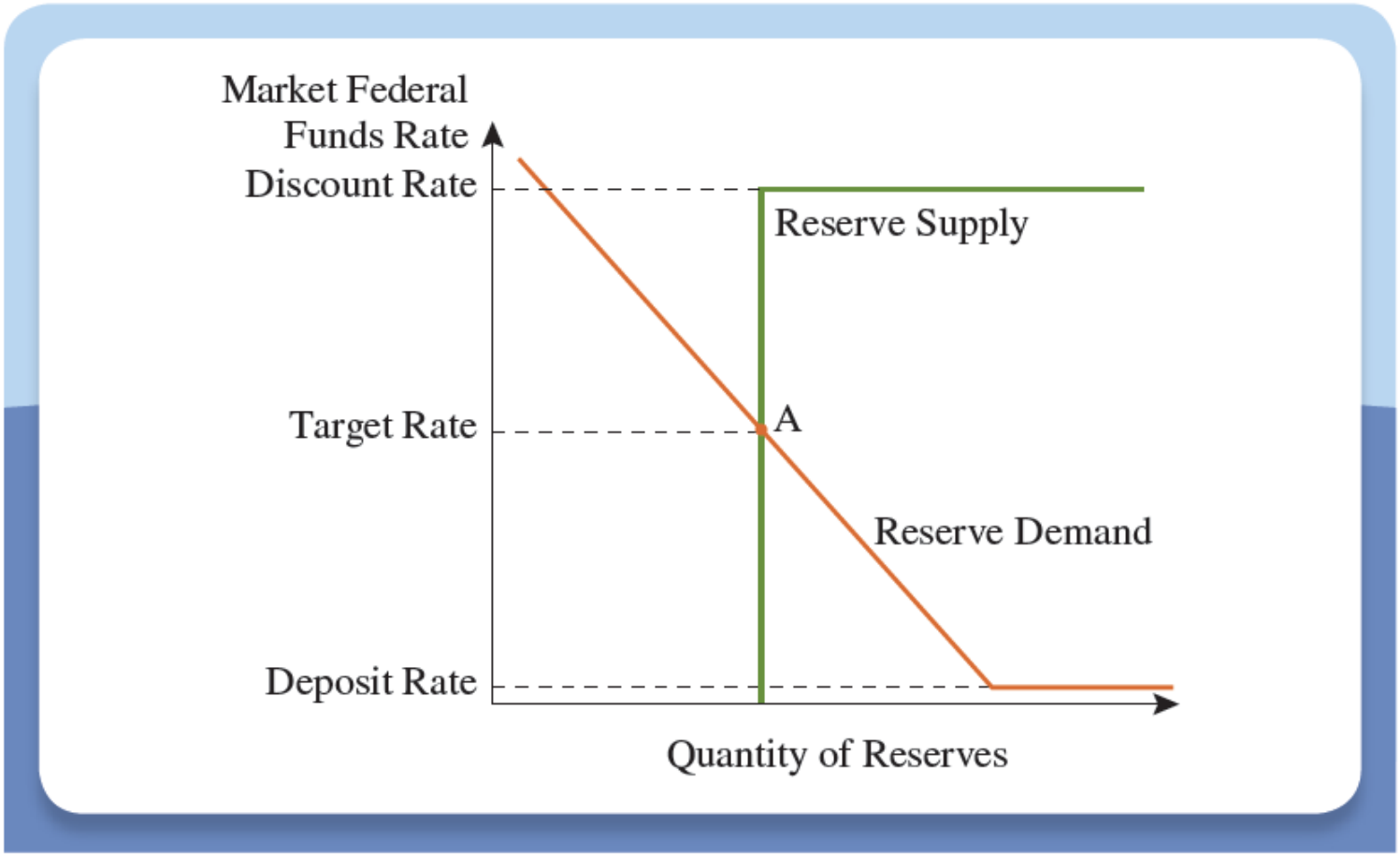
- *Discrepancies* between ***actual*** and ***desired*** **reserves** gave *rise to* ***a market for reserves***.
  - Some banks can ***lend out excess reserves***.
  - Some banks will ***borrow to cover a shortfall***.
- *Without this* market, *banks would need to* ***hold substantial*** quantities of ***excess reserves*** as insurance *against shortfalls*.

The Target Federal Fund Rate and the Interest on Excess Reserves

- As the market ***federal funds rate rises***, **banks demand *fewer reserves***
- The **Fed** continues to be the *monopoly* ***supplier of aggregate bank reserves***.
- By **buying or selling securities** in the market through an ***open market operation (OMO)***, the **Fed** could ***increase or decrease the supply of reserves*** in order to ***lower or raise the market federal funds rate***.

The Target Federal Fund Rate and the Interest on Excess Reserves

Figure 18.2 The Market for Bank Reserves prior to September 2008

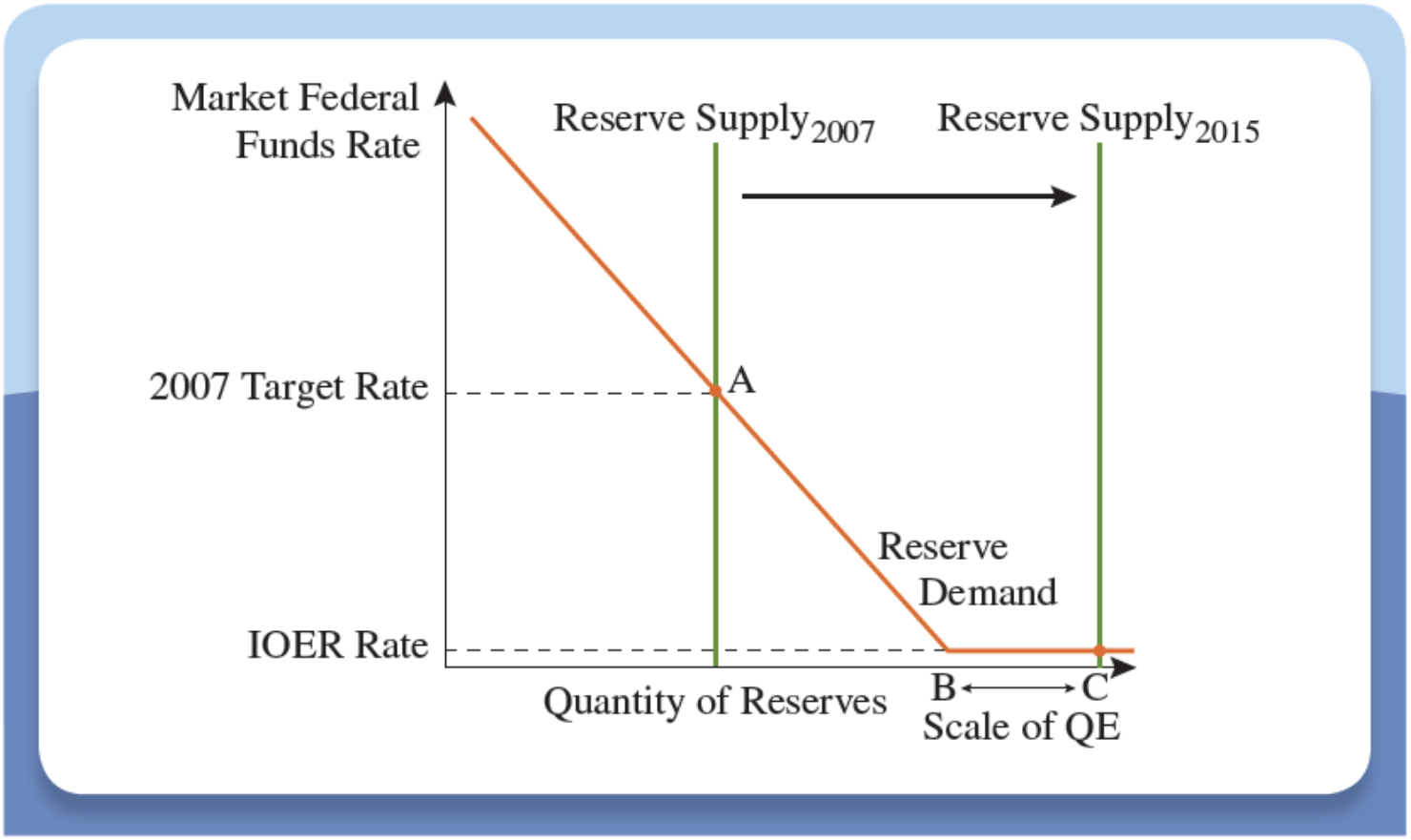


The Target Federal Fund Rate and the Interest on Excess Reserves

- *During the financial crisis*, the **Fed** *lowered its policy target close to zero*, and engaged in **quantitative easing** making ***large-scale asset purchases*** to *increase the supply of reserves* far beyond the level needed to ***keep the federal funds rate near zero***.
  - Policymakers began **specifying a target range**, *instead, of a target level for the federal funds rate*
  - The **IOER rate** forms the **upper limit** of *the target of the target range*

The Target Federal Fund Rate and the Interest on Excess Reserves

Figure 18.3 The Market for Reserves with Quantitative Easing (QE) after September 2008

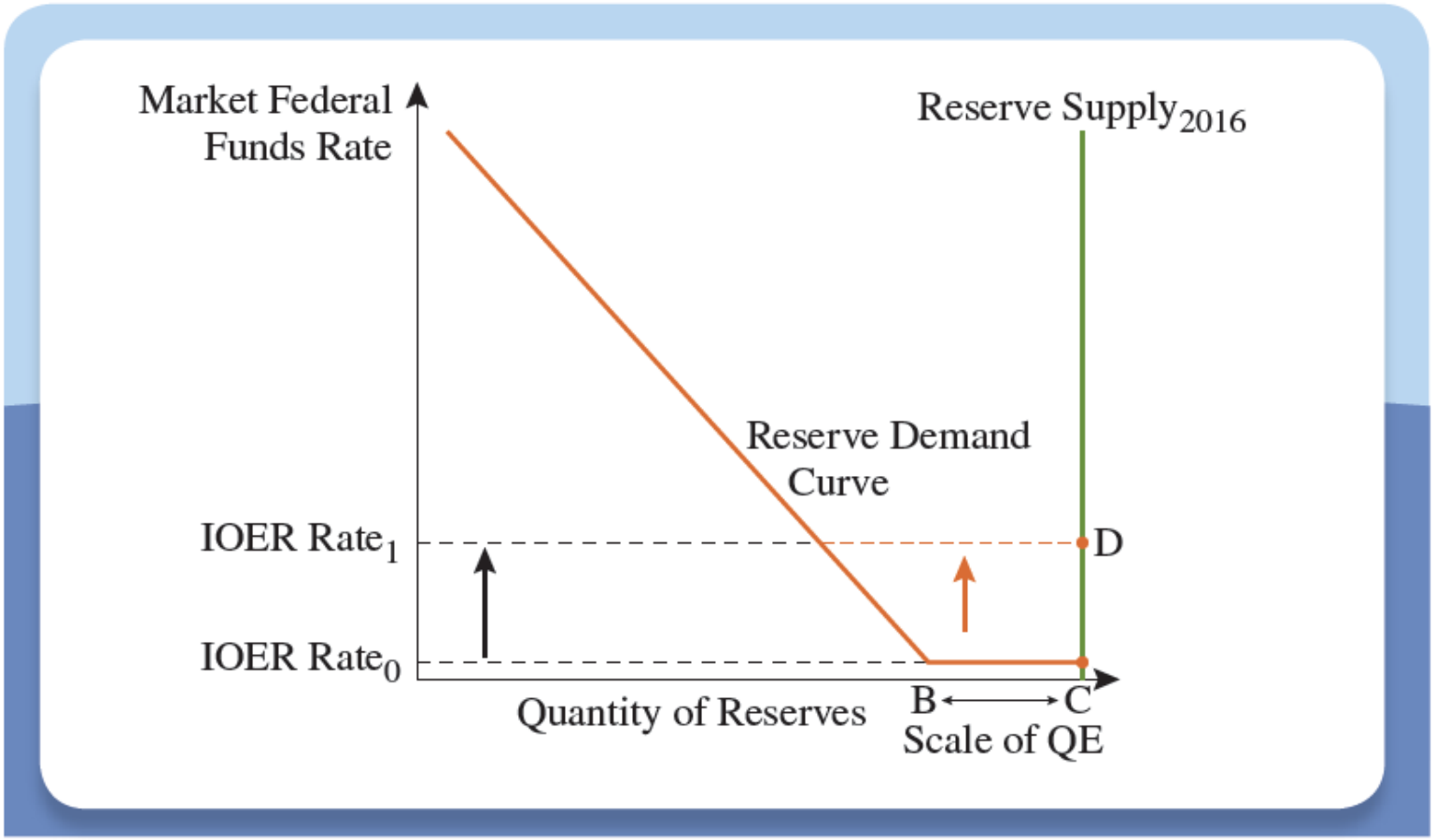


The Target Federal Fund Rate and the Interest on Excess Reserves

- **Tightening monetary policy** through the ***IOER rate***
  - If there is an **increase** in the *target range for the federal funds rate*, the Fed will **raise the IOER rate**; ***raising*** *the* ***minimum rate*** at which *banks are* ***willing to lend***
  - *Allows the FOMC* to ***raise interest rates***, **tightening financial conditions**, ***without*** ***altering the supply of reserves***

The Target Federal Fund Rate and the Interest on Excess Reserves

Figure 18.4 Tightening Monetary Policy by Increasing the IOER Rate



Discount Lending, the Lender of Last Resort, and Crisis Management

- By ***controlling*** the **quantity of loans** it makes, a *central bank can control*:
  - The **size of reserves**
  - The **size of the monetary base**
  - **Interest rates**
- *Today*, **lending** by the Federal Reserve Banks **to commercial banks**, called **discount lending**, is *usually small* aside from crisis periods.

Discount Lending, the Lender of Last Resort, and Crisis Management

- **Discount lending** is the Fed's primary tool for:
  - Ensuring **short-term financial stability**
  - **Eliminating bank panics**
  - **Preventing the sudden collapse** of institutions that are experiencing financial difficulties
- The central bank is the **lender of last resort**:
  - *Making loans to banks* when *no one else* will or can.

Inflation Targeting

- **Inflation targeting** focuses on the objective of ***low and stable inflation***
- It is a monetary policy strategy that involves ***public announcement*** of a **numerical inflation target** and underscores the central bank's *commitment* to *price stability*.
- When the ***target is credible***, ***inflation will be low***

Inflation Targeting

- **Long-term expectations** of *low* ***inflation*** act to ***anchor*** *low long-term* ***interest rates*** and *promote* ***economic growth***.
- ***Hierarchical mandate*** in which **price stability comes first** and everything else comes second
  - The ECB, Australia, Chile, South Africa, United Kingdom, and dozens of other countries
- ***Dual mandate*** in which the **goal of price stability and maximum employment** are **equal**
  - The Fed

Inflation Targeting

- *Increases policymakers* ***accountability*** and helps *establish their* ***credibility***
- The result is *not just lower and* ***more stable inflation***, but usually *higher and* ***more stable economic growth***

A Guide to Central Bank Interest Rates: The Taylor Rule

- The FOMC sets a **target range for the federal funds rate** and **the day on which to make the changes.**
- The **Taylor Rule** *tracks the actual behavior of the target federal funds rate* and relates it to the *real interest rate, inflation, and output*.

Target fed funds rate =

Natural rate of interest + Current inflation + ½ (Inflation gap) + ½ (Output gap)

A Guide to Central Bank Interest Rates: The Taylor Rule

- The **natural rate of interest** is the *real short-term interest rate* that *prevails* when the *economy is using resources normally*.
  - Taylor **originally used 2 percent**, which is *close to the average real short-term rate*

A Guide to Central Bank Interest Rates: The Taylor Rule

- The **inflation gap** is *current inflation* minus an *inflation target* (both measured as percentages)
  - When *inflation exceeds the target level*, the **inflation gap** is *positive*
- The **output gap** is the percentage *deviation of current output (real GDP)* from *potential output*
  - When *current output is above potential output*, the **output gap** is *positive*

A Guide to Central Bank Interest Rates: The Taylor Rule

- When **inflation rises above its target level**,
  - The response is to ***raise interest rates***.
- When **output falls below the target level**,
  - The response is to ***lower interest rates***.
- If *inflation is currently on target* and there is *no output gap*,
  - The ***target federal funds rate*** should be set at the **natural rate of interest** plus **target inflation**.

A Guide to Central Bank Interest Rates: The Taylor Rule

- The Taylor rule has some interesting properties.
  - The **increase in current inflation** feeds *one for one into the* ***target federal funds rate***; however,
  - The **increase in the inflation gap** is *halved*.
- *A* ***1 percentage point increase in the inflation rate*** *raises the* ***target federal funds rate 1½ percentage points.***

A Guide to Central Bank Interest Rates: The Taylor Rule

- The *implementation* of the **Taylor rule** requires four inputs:
  - The **natural rate of interest**
  - A measure of **inflation**
  - A measure of the **inflation gap**
  - A measure of the **output gap**

Unconventional Policy Tools

- There are two circumstances when **unconventional policy** tools can *play a useful stabilization role:*
  1. When **lowering the target interest-rate to zero** is **not sufficient** to ***stimulate the economy***
  2. When an **impaired financial system** *prevents conventional interest-rate policy* from supporting economic growth

Unconventional Policy Tools

There are *three categories of* ***unconventional policy*** approaches:

1. **Forward guidance**
   - This is when the *central bank* ***communicates intentions*** regarding the *future path of monetary policy.*
2. **Quantitative easing (QE)**
   - When the *central bank* ***supplies aggregate reserves*** *beyond the quantity needed to lower the policy rate to its target,* usually zero or lower.

Unconventional Policy Tools

3. **Targeted asset purchases (TAP)**
   - When the central bank alters the ***mix of assets it holds*** *on its balance sheet* in order *to* *change their relative prices* in a way that ***stimulates economic activity.***

Forward Guidance

- The *simplest unconventional approach* is for the *central bank to provide* ***forward guidance - guidance today*** about ***policy target rates in the future***
- They might express the ***intent to keep the policy target low*** *for an extended period of time.*
  - This could have a *specific termination date*, or *duration* could be dependent on some future change in economic conditions.

Forward Guidance

- To **stimulate economic activity**, *forward guidance* aims at **lowering the long-term interest rates** that affect private spending.
- **To be effective, forward guidance** *needs to be* ***credible*** *and* ***time consistent***

Forward Guidance

- *Although forward guidance can be effective*, it is **difficult to anticipate** and difficult to ***reach consensus on the desirable policy path*** and to *communicate these policy intentions simply*
- The potential for disturbing side effects, including **asset price bubbles**

Quantitative Easing

- **QE** occurs when the central **bank *expands the supply of aggregate reserves*** *beyond* the level that would be *needed to maintain its policy rate target*.
  - The central bank **buys assets**, thereby **expanding its overall balance sheet.**
- At a **market federal funds rate** equal to the ***interest on excess reserves***, an **addition to aggregate reserves** no longer reduces the funds rate
  - The Fed can **add limitlessly to reserves** without affecting the market federal funds rate.

Quantitative Easing

- It is **difficult to predict the effects of QE**.
- Fed policymakers argue their *balance sheet expansion* ***helped to lower long-term interest rates***, but there is *disagreement on the impacts*.
- An *increase in the supply of reserves (QE)* may simply lead banks to **hold more** of them *rather than provide additional loans*.

Quantitative Easing

- One mechanism is that *QE can add credibility to a policymaker's promise to keep interest rates low.*
- Announcements of an expansion of aggregate reserves (QE) could ***lower bond yields*** by *extending the time horizon* over which **bondholders expect a zero policy rate**.
  - QE may *reinforce the impact of* ***forward guidance***

Quantitative Easing

- A problem with QE is that *central banks* **do not know *how much is needed to be effective***.
- **QE** can be ***powerful tool*** *for central bankers to* ***prevent a sustained deflation***, especially *when conventional policy tools have been exhausted.*

Targeted Asset Purchases

- ***Targeted asset purchases (TAP)*** shift the *composition of the balance sheet* ***toward selected assets*** in order to **boost their relative price and stimulate economic activity**.
- In the *absence of private demand for the risky asset*, the **central bank's purchase makes credit available** where none existed.

Making an Effective Exit

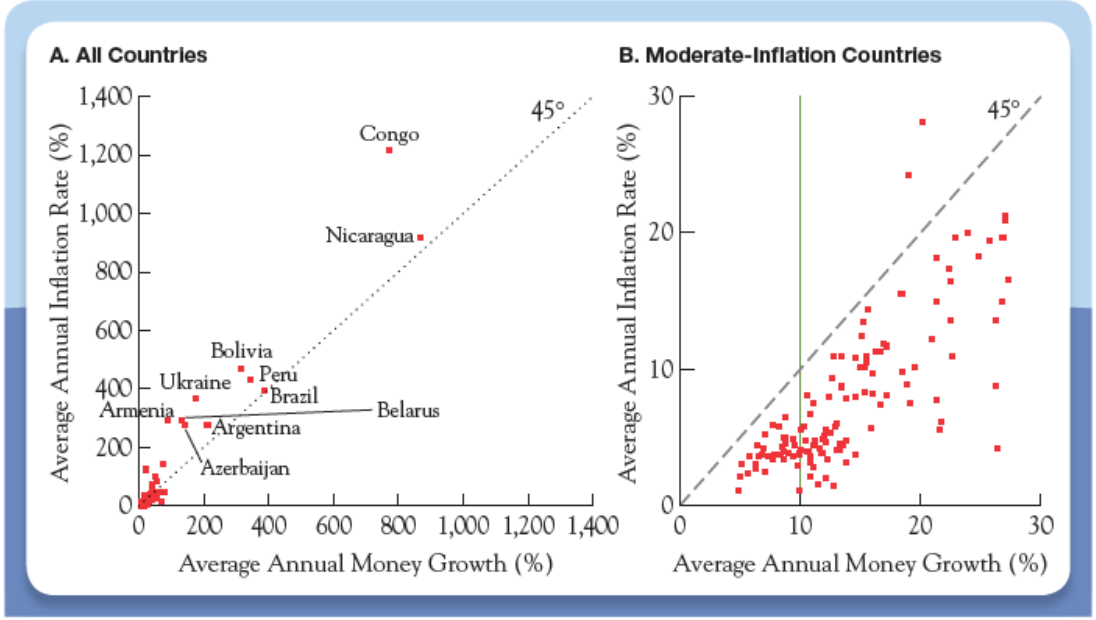
- What happens **when QE and TAP have vastly expanded the amount of reserves and assets** on the central bank's balance sheet?
  - The central bank ***may need to sell a large volume of assets*** to *reduce reserve supply* sufficiently ***to raise the policy rate target.***
- ***But****, QE and TAP assets are typically* ***more difficult to sell****.*
- A central bank *may be unable to sell assets and withdraw reserves from the banking system rapidly* enough *to hike the policy interest rate* when it desires.

Chapter 20

Money Growth and Money Demand

Why We Care about Monetary Aggregates

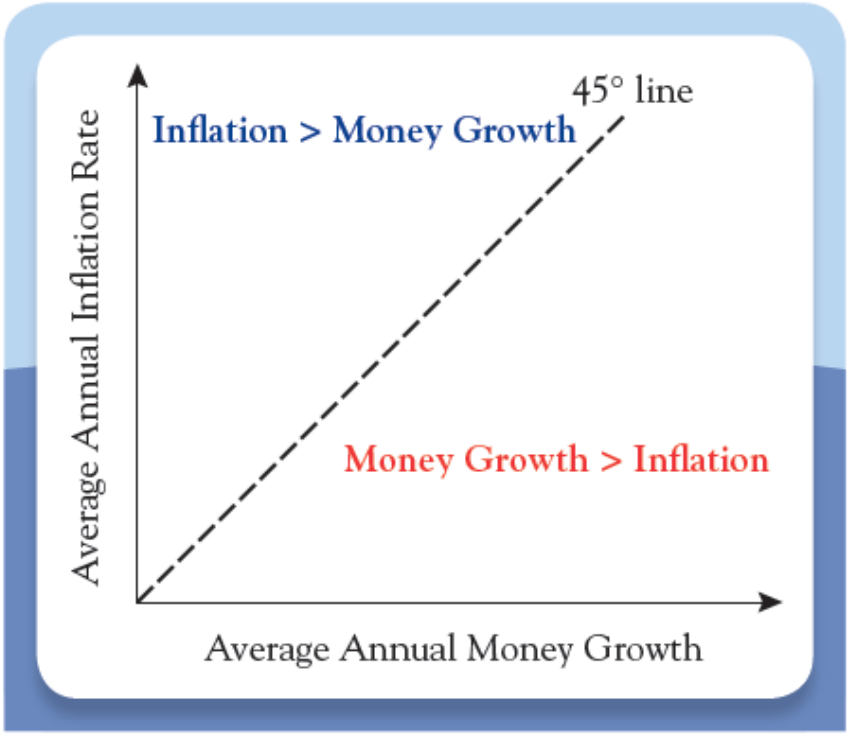
Figure 20.1 Inflation Rates and Money Growth



Every country with ***high inflation*** has ***high money growth***. To avoid sustained episodes of high inflation, a **central bank** must be ***concerned*** with **persistent rapid money growth**.

Why We Care about Monetary Aggregates

Figure 20.2 Money Growth and Inflation



In general, **countries with very high inflation** tend to ***lie above the line*** and *countries with moderate to low inflation* tend to *fall below* it.

Velocity and the Equation of Exchange

- The *number of dollars used* is the **quantity of money** in the economy: **M**
- The *number of times each dollar is used* is called the **velocity of money: V**
- **MV** represents the ***value of transactions***.

Velocity and the Equation of Exchange

- Everyone **purchases** *counted in* **nominal GDP** requires the **use of money**.

$$(\text{Quantity of Money}) \times (\text{Velocity of money}) = \text{Nominal GDP}$$

- ***M*** is the **quantity of money**, ***V*** is the **velocity** and **nominal GDP** can be:
  - The ***price level***, ***P*** times the ***quantity of real output***, ***Y***.

Velocity and the Equation of Exchange

- We can ***rewrite*** the previous equation as:

$$MV = PY$$

- This is called the **equation of exchange**, and tells us that the ***quantity of money*** *multiplied by its* ***velocity*** *equals the level of* ***nominal GDP***.

Velocity and the Equation of Exchange

- We can ***rewrite*** the equation to allow *for the percentage change in each factor*.

$$MV = PY$$

$$\%\Delta M + \%\Delta V = \%\Delta P + \%\Delta Y$$

- ***Money growth*** *plus* ***velocity growth*** *equals* ***inflation*** *plus* ***real growth***.

The Quantity Theory of Money

- Suppose that there are ***no important changes*** occur in **payment methods** or the ***cost of holding money***.
  - If the **interest rate is fixed** and there is ***no financial innovation***, then **velocity will be constant**.
- Also assumed that **real output** is *determined* solely *by* **economic resources** and **production technology**, so it too is **fixed in the short run**.

The Quantity Theory of Money

- *Irving Fisher* concluded that **money growth *translates directly into* inflation**, an assertion that is termed the **quantity theory of money**.
- We can ***reinterpret*** the *quantity theory of money* to describe the **equilibrium** between ***money demand*** and ***money supply***.
  - **Money demanded (M^d)** equals the **total value of transactions *divided*** by the **velocity of money (V).**

The Quantity Theory of Money

- For the economy as a whole, **the demand for money** equals **nominal GDP *divided*** by **velocity**:

$$M^d = \frac{1}{V} PY$$

- The **supply of money (M^S)** is *determined* by the ***central bank*** and the ***behavior of the banking system***.
- *Assuming* ***velocity*** and ***real output*** are **constant**, we can conclude that ***money growth*** equals ***inflation***.

The Quantity Theory of Money

The **quantity theory of money** *accounts for* some important characteristics:

1. It *tells us* why **high inflation** and **high money growth** go together.
2. It explains the tendency for ***moderate- and low-inflation countries*** to fall *below* the **45-degree line**.

The Quantity Theory of Money

- **Money growth** tends to be ***higher*** than **inflation** in those countries because they are ***experiencing*** **real growth**.
- If **velocity** is constant, then **money growth** equals the ***sum*** of **inflation** and **real growth**.
- At a *given level of money growth*, the **higher** the level of **real growth**, the ***lower*** the level of ***inflation***.
- In **countries *that are growing***, **inflation** will be ***lower than*** **money growth**, causing their *economies to fall below the 45-degree line*.

The Facts about Velocity

- If the **velocity of money** is ***constant***, it means the **trend in real growth** is *determined by* the **structure of the economy** and the **rate of technological process.**
  - This means countries **could control inflation** *directly by* **limiting money growth**.
- This logic led *Milton Freidman* to conclude that **central banks** should ***simply set money growth*** at a **constant rate**.
  - **M1 and M2 *should grow*** at a **rate** equal to the ***rate of real growth*** plus the ***desired level of inflation***.

The Facts about Velocity

- To make the rule viable, he **suggested *changes in regulations*** that would:
  - **Limit banks' discretion** in ***creating money***, and
  - ***Tighten the relationship*** *between* the **monetary aggregates** and the **monetary base**, **reducing fluctuations** in the **money multiplier**.
- *For example, an* ***increase in the reserve requirement*** *or* ***restrictions on the number and types of loans banks could make****.*

The Facts about Velocity

- But Friedman's recommendation that the **central bank** should **keep money growth constant** would ***stabilize inflation*** *only if* ***velocity were constant***.
- In countries with ***high levels of inflation***, ***changes in velocity*** *can probably be* ***ignored***.
- But in countries where *inflation rate is below 10% per year*, **changes in velocity** could have a ***significant impact*** on the ***relationship*** between **money growth** and **inflation**.

The Facts about Velocity

- Historical data seem consistent with Fisher's conclusion: *in the **long run**, the **velocity of money is stable**, so that* **controlling inflation** *means **controlling the growth of the money aggregates**.*

The Facts about Velocity

- Notice the **increase in velocity** in the *late 1970s and early 1980s*.
- This was a period of both **high nominal interest rates** and **significant financial innovations**.
- Together these ***reduced*** *the* **amount of money individuals held** for a given level of transactions, ***raising*** the **velocity of money**.

The Facts about Velocity

- These data clearly suggest that **fluctuations** in the ***velocity of money*** are *tied to* **changes in people's desire to hold money**.
- Policymakers *must understand* the **demand for money.**

The Transactions Demand for Money

- The **quantity of money** people ***hold for transactions purposes*** depends on their
  - Nominal **income**,
  - The **cost of holding money**
  - The availability of **substitutes**
- The **higher people's nominal income**, the ***more*** they ***will spend***, *needing more money*.

The Transactions Demand for Money

- At **high** levels of **inflation**, ***money is losing value*** *very quickly*.
- People respond to the **high cost of holding money** by *keeping it as little as possible.*
  - They therefore ***purchase durable goods*** that have *zero real return* - ***better than negative return on currency***.
- This **relationship** explains why **inflation** *tends to* **exceed money growth** in *high-inflation countries*

The Transactions Demand for Money

- The anxious spending ***drives up*** the **velocity of money.**
- Because *high inflation* brings an *increase in velocity*, ***inflation*** must be higher than ***money growth*** in those countries.

The Transactions Demand for Money

- The **transactions demand for money** is *affected* by ***technology***.
- **Financial innovation** allows people to ***limit*** *the amount of* ***money they hold***.
- This ***lowers*** the **money holdings** at a given level of income.
  - This increases the **velocity** of your money.

The Transactions Demand for Money

- We all **hold money** to ***insure*** ourselves ***against*** **unexpected expenses**.
- We call this the **precautionary demand for money**
- The *higher* the level of ***uncertainty*** about the future, the **higher the demand for money** and the *lower the velocity of money* will be.

The Portfolio Demand for Money

- As **wealth *rises***, the *quantity of all these investments*, including **money**, ***rises*** with it.
- A ***decline*** in **bond yields** will ***increase*** the portfolio **demand for money**.
- When **interest rates rise**, ***bond prices drop*** and bondholders *suffer a capital loss*.
  - **bonds will become less attractive** than *money*.
- When **interest rates are expected to rise**, ***money demand goes up.***

The Portfolio Demand for Money

- If a **sudden decrease in the liquidity of stocks**, **bonds**, or **other assets** occurred, we would expect to see an **increase** *in the* **demand for money.**

Chapter 23

Modern Monetary Policy and the Challenges Facing Central Bankers

The Traditional Channels: Interest Rates and Exchange Rates

- **Easing of monetary policy** - a *decrease* in the *target nominal interest rate*, which ***lowers the real interest rate*** - leads to a **depreciation of the dollar.**
- The ***less valuable dollar***:
  - **Drives up** the **cost of imported goods** and services, reducing imports from abroad, and
  - **Makes export goods** and services **cheaper**, so foreigners will buy more of them.

The Traditional Channels: Interest Rates and Exchange Rates

- The **interest-rate channel** is ***not*** very ***powerful***.
- Data suggest that the **investment** component of total spending is **not sensitive to interest rates**.
- While a ***small change in the interest rate*** does change the cost of external financing, it does **not** have much **effect on investment decisions**.

The Traditional Channels: Interest Rates and Exchange Rates

- The **impact of *short-term* interest rates** on ***household decisions*** is **modest**.
- The problems is that *people's decisions to purchase cars or houses* depend on ***longer-term* interest rates** rather than the *short-run target rate.*
- *Household consumption decisions* will only *change* to the extent that the **target interest rate *affects* long-term interest rates**.

The Traditional Channels: Interest Rates and Exchange Rates

- The **policy-controlled interest rate** is just *one of many factors* that *shift the demand and supply* for the dollar on ***foreign exchange markets***.
- The **traditional channels** of ***monetary policy transmission*** are **not** very **powerful**.
- Yet, evidence shows that **monetary policy** is **effective**.
- **Something else** must be ***amplifying*** the **impact of monetary policy changes** on ***real economic activity.***

Bank-Lending and Balance-Sheet Channels

- **Banks** are *essential* to the ***operation of a modern industrial economy***.
- **Banks** are also the **channel** through which ***monetary policy is transmitted*** to the economy.
- To understand monetary policy changes completely, we ***look at*** the **impact** of **policy changes** on **banks and bank lending**.

Banks and Bank Lending

- ***Borrowers*** do not have *access to capital market financing* - ***must go through banks***.
- When ***banks stop lending***, **borrowers** simply can **not obtain financing**.
- By ***altering*** the **supply of funds *to the banking system***, policymakers ***can affect*** **banks' ability** and **willingness to lend**.
  - The **bank-lending channel** of ***monetary policy transmission***.

Banks and Bank Lending

- An **open market purchase** has a ***direct impact*** on the **supply of loans**.
- **Financial regulators** can ***also*** influence **bank-lending practices**.
- **Changes in financial regulations**, will have an ***impact*** on the ***amount of bank lending***.
- **Credit conditions** typically ***tighten*** in *recessions* and ease in booms.

Firms' Balance Sheets and Household Net Worth

- The **balance-sheet channel** of *monetary policy transmission* works because ***monetary policy*** has the **direct influence** on the **net worth of potential borrowers**.
  - An *easing of monetary policy* **improves *firms' and households'* balance sheets**, *increasing* their ***net worth*** and *reducing* their ***credit risk premium***.
  - ***Increases*** in ***net worth*** *reduce* the problems of *moral hazard* and *adverse selection*.
    - This *lowers* information *costs of lending* and ***allows borrowers*** to ***obtain financing*** *more easily*.

Firms' Balance Sheets and Household Net Worth

How does ***monetary policy expansion*** *improve* borrowers' ***net worth***?

1. ***Expansionary policy*** *drives up* ***asset prices***, *increasing* the *value of firms* and the *wealth* of *households*.
2. ***Lower interest rates*** *reduce* the ***burden of repayment*** of *current loans of borrowers*.

Firms' Balance Sheets and Household Net Worth

- At **lower interest rates**, a person with *a variable rate loan* ***enjoys*** **lower interest payments.**
  - The ***percentage of person's income*** that is ***devoted to loan payments*** will be **lower**.
  - *As **interest rates fall**, the **supply of loans increases**.*
- **Information services** are central to ***banks' role*** in the *financial system*.
  - They help to *address the problems* of **adverse selection** and **moral hazard**.

Firms' Balance Sheets and Household Net Worth

- **Inferior information** leads to an ***increase*** *in* ***adverse selection***.
- This then:
  - ***Reduces bank lending***,
  - ***Lowers investment***, *and ultimately*
  - ***Depresses the quality of aggregate output demanded***.

Firms' Balance Sheets and Household Net Worth

- The **channels of monetary policy transmission** depend on the ***structure of the financial system.***
- ***If banks*** are ***unimportant sources of funds*** for firms and individuals, ***the bank-lending channel*** is **not** ***tremendously important***.
- Though ***technology*** *has made the processing of increasing amount of* ***information*** *easier* and *cheaper*, it seems **unlikely to solve** the problems of **adverse selection** and **moral hazard**.

Asset-Price Channels: Wealth and Investment

- When the **interest rate *moves*, *so do* stock prices.**
  - This ***relationship*** is *referred to* the ***asset-price channel*** of **monetary policy transmission**.
- The **lower the interest rate**, the *higher the present value* is and the **higher the stock price**.

Asset-Price Channels: Wealth and Investment

- When ***policymakers*** *reduce their interest-rate target,* it drives the **mortgage rate *down***.
  - ***Higher demand*** for ***residential housing,*** *driving up* the ***prices of existing homes***.
- **Stock and property prices** affect both *individual* ***consumption*** *and business* ***investment***.
  - ***Higher stock*** and ***real estate prices*** mean an ***increase in wealth***.
  - *An increase in wealth means* ***higher consumption***.

Asset-Price Channels: Wealth and Investment

- As **stock prices *rise***, firms find it ***easier to raise funds*** by **issuing new shares**.
- As financing become *less expensive,* **more investments *become profitable***.

Financial Crisis and the Transmission of Monetary Policy

- The ***crisis of 2007-2009*** *intensified* fundamental problems of **asymmetric information** that *affect* the **provision of credit** in a modern economy.
- The ***widespread losses*** at intermediaries and the ***heightened uncertainty*** *about* the *damage suffered* by ***specific intermediaries*** **reduced confidence.**

Financial Crisis and the Transmission of Monetary Policy

- Funding **liquidity *dried up***.
- *Households' and nonfinancial firms'* **net worth *fell*** substantially, ***reducing*** their ***ability to borrow,*** *so* they ***cut spending***.
- The result of all this was a **destabilizing feedback loop** between ***worsening economic prospects*** and the ***deterioration of financial conditions*** that *influence spending*.

Financial Crisis and the Transmission of Monetary Policy

- When the **policy transmission mechanism** is **obstructed**, ***central banks cannot*** assume that a ***cut in their target policy rate*** will ***ease the financial conditions*** that influence the economy.
- ***Central banks*** must always take into account the **workings of the monetary policy transmission mechanism** in order to ***achieve*** their goals of ***economic and price stability***.

Booms and Busts in Property and Equity Prices

- **Bubbles** are damaging because the **wealth effects** they create *cause* **consumption** *to* ***surge*** and ***then contract*** just as rapidly.
  - Bubbles are identified after the fact by a **sharp rise** then a **sharp decline** in ***prices***.
- The **collapse of the Internet bubble** in the **1990s** had a *relatively* ***minor impact*** because intermediaries faced ***limited credit exposure*** and ***remained well capitalized***.
- While the ***loss of capital*** in the financial system ***in 2007-2009*** could have ***led to catastrophe*** without *extraordinary government actions*.

Booms and Busts in Property and Equity Prices

- Proponents of a *policy of "leaning against bubbles"* say that ***stabilizing inflation and real growth*** means **raising interest rates** to ***discourage bubbles*** from developing.
- ***Opponents of this interventionist*** view claim that **bubbles** are **too difficult to identify *when they are developing.***
  - Central banks should **wait *until the bubble bursts*** and ***only then react aggressively to limit the fallout*** on the economy by cleaning up the mess.

Booms and Busts in Property and Equity Prices

- Today, the ***proper policy toolkit*** for *addressing bubbles* is not *interest rates* but the **macroprudential regulatory** approach
- According to this view, **bubbles** are a ***major threat.***
  - The best result would be to ***adjust regulatory rules*** to **inhibit *intermediaries*** from *extending* such ***risky credit*** in economic booms.

Booms and Busts in Property and Equity Prices

- This approach *still depends on* the **foresight and judgment of regulators** to limit the ***buildup of an asset price bubble***.
- Using **interest rates** to **combat *asset price bubbles*** now is *more likely* to be viewed as a ***backup*** approach for *extreme circumstances*.

Deflation and the Effective Lower Interest-Rate Bound

- **Nominal interest rates** can **not** be ***deeply negative***.
  - There is an ***effective lower bound (ELB)*** that is **below zero** due to transactions costs
  - Investors can ***always hold cash***, so ***bonds must have yields*** above the ELB to attract bondholders.
- Such risk which policymakers have ***no scope to lower rates further***, **has concerned central banks** *since Japan's experience in the 1990s*.

Deflation and the Effective Lower Interest-Rate Bound

- Think about the *consequences of a shock* that ***depresses aggregate expenditure***.
  - The **dynamic aggregate demand curve** shifts to the ***left***.
  - **Real output *falls below* potential** - a *recessionary output gap* putting ***downward pressure*** on **inflation**.
  - **Monetary policymakers** would normally react by ***cutting interest rates***.
  - This would *increase spending*, ***raise*** **real output**, and ***eliminate*** the **output gap**.

Deflation and the Effective Lower Interest-Rate Bound

- What if, when the shock occurs, **inflation is zero** and the **policy interest rate** that central bankers control is **at the ELB**?
  - The **decline in aggregate demand** still *drives* ***real output*** *below* ***potential output***.
  - There is ***downward pressure on inflation***.
  - But when **inflation *falls***, it drops ***below zero*** so that, on average, ***prices are falling***.
- This result is **deflation**.

Deflation and the Effective Lower Interest-Rate Bound

- When there is a **recessionary output gap**, **current inflation** is ***below*** *expected inflation* and **expected inflation *falls***, which drives deflation down even more.
- Because the **nominal interest rate** is at the **ELB**, policymakers cannot counter the ***worsening deflation*** by ***lowering*** it.
  - The **real interest rate *rises***, *reducing spending*, shifting the **AD curve** to the ***left***.
    - This **expands** the **recessionary output gap**.
- The result is ***deflationary spiral*** in which *deflation grows* worse and worse.

Deflation and the Effective Lower Interest-Rate Bound

- **Deflation** makes it *more difficult* for businesses to ***obtain financing for new projects***.
  - **Without investment** there is ***no growth***.
- **Deflation**, therefore, **increases** the ***real value*** of a **firm's liabilities** without affecting the real value of its assets.

Deflation and the Effective Lower Interest-Rate Bound

Policymakers can minimize the chances of this sort of catastrophe:

1. They can ***set*** their **inflation** objective with the ***perils of deflation*** *in mind*
2. They can ***act boldly*** when there is ***even an indication of deflation***
3. They can ***utilize*** **unconventional policy tools**

Deflation and the Effective Lower Interest-Rate Bound

- ***Reducing*** the **interest rate *significantly*** and ***rapidly*** *when faced with* the ***possibility of hitting the ELB*** is "**acting preemptively**"
- Central bankers can use ***unconventional policy tools*** that *include*:
  - **Forward guidance**
  - **Quantitative easing**
  - **Targeted asset purchases**

Deflation and the Effective Lower Interest-Rate Bound

- Central bankers are *very reluctant to use* ***unconventional policy tools***
  - Continued uncertainty about ***how and why they work*** and ***how to apply them effectively***
  - ***Policy exit*** may be difficult

End of lecture