

# EE432 Monetary Theory and Policy



Lecture 11 Money Growth and Money Demand

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# Outline

- Why We Care about Monetary Aggregates
- The Quantity Theory and the Velocity of Money
- The Demand for Money

# Chapter 20

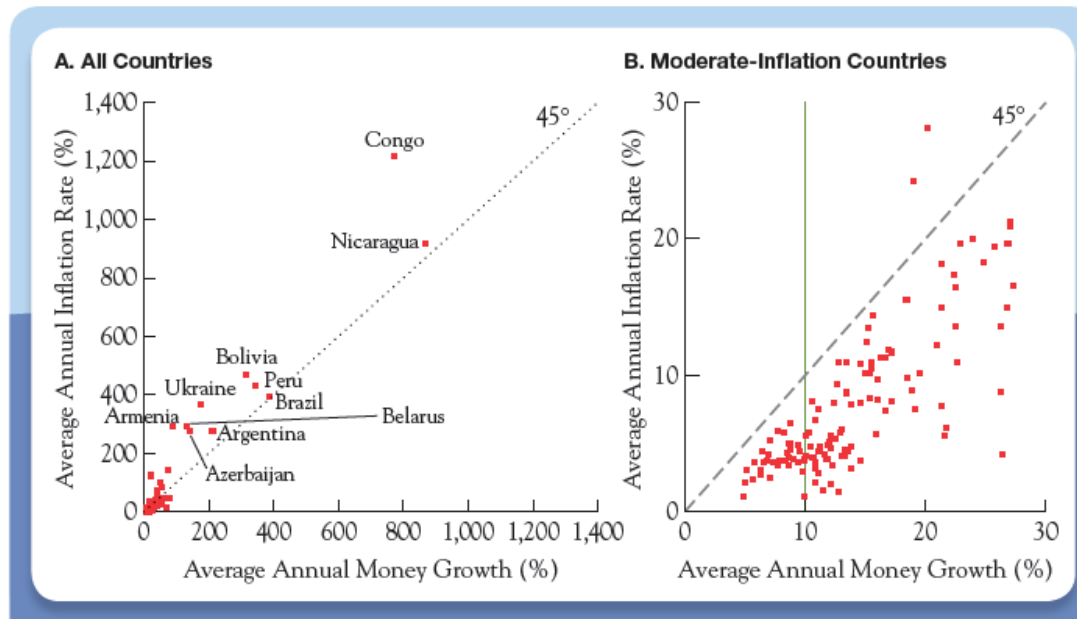


## Money Growth and Money Demand

# Why We Care about Monetary Aggregates

# Why We Care about Monetary Aggregates

Figure 20.1 Inflation Rates and Money Growth

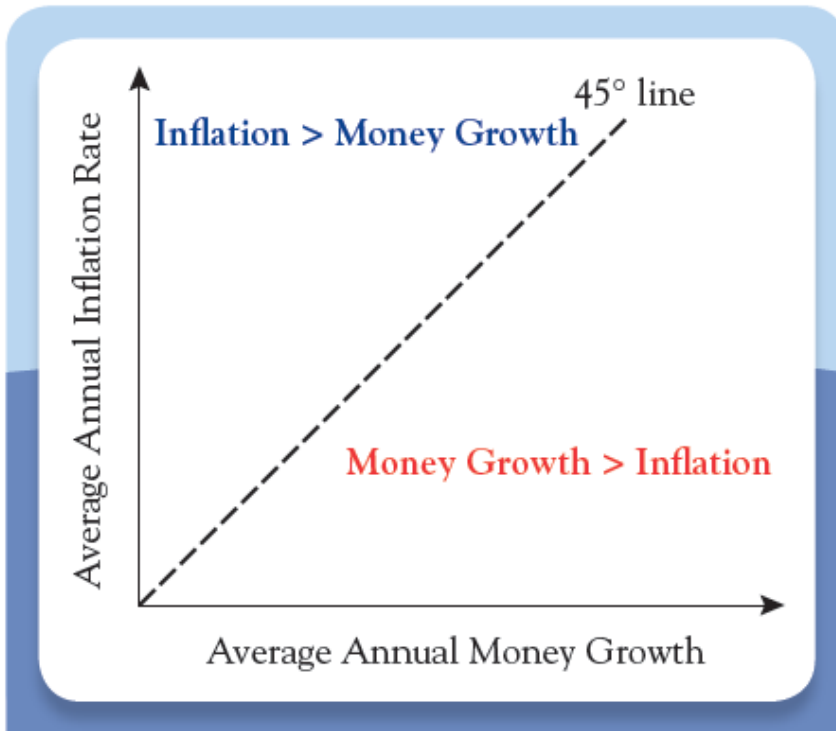


Every country with ***high inflation*** has ***high money growth***. To avoid sustained episodes of high inflation, a **central bank** must be ***concerned*** with **persistent rapid money growth**.

# 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*.

# Why We Care about Monetary Aggregates

- When the **currency** that *people are holding* loses value very rapidly, they will ***spend as quickly as possible*** - the same effect on inflation *as an increase in money growth*.
- By **limiting** the *rate* at which they ***purchase securities***, policymakers can **control** the *rate of M2 grow*.
- It is *impossible* to have ***high, sustained inflation*** without ***monetary accommodation***.

# The Quantity Theory and the Velocity of Money

# The Quantity Theory and the Velocity of Money

- Thinking about the **value or purchasing power** in terms of the ***goods*** needed to get *money to pay* - the ***impact of inflation***.
- Given steady demand, an ***increase*** in the **supply of money** drives the **price of money down**, *requiring more money - inflation*.
- If the central bank **continuously floods** the economy **with large amounts of money**, ***inflation will reach very high levels***.

# 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**.

# The Quantity Theory of Money

- 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*.

# The Facts about Velocity

- 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

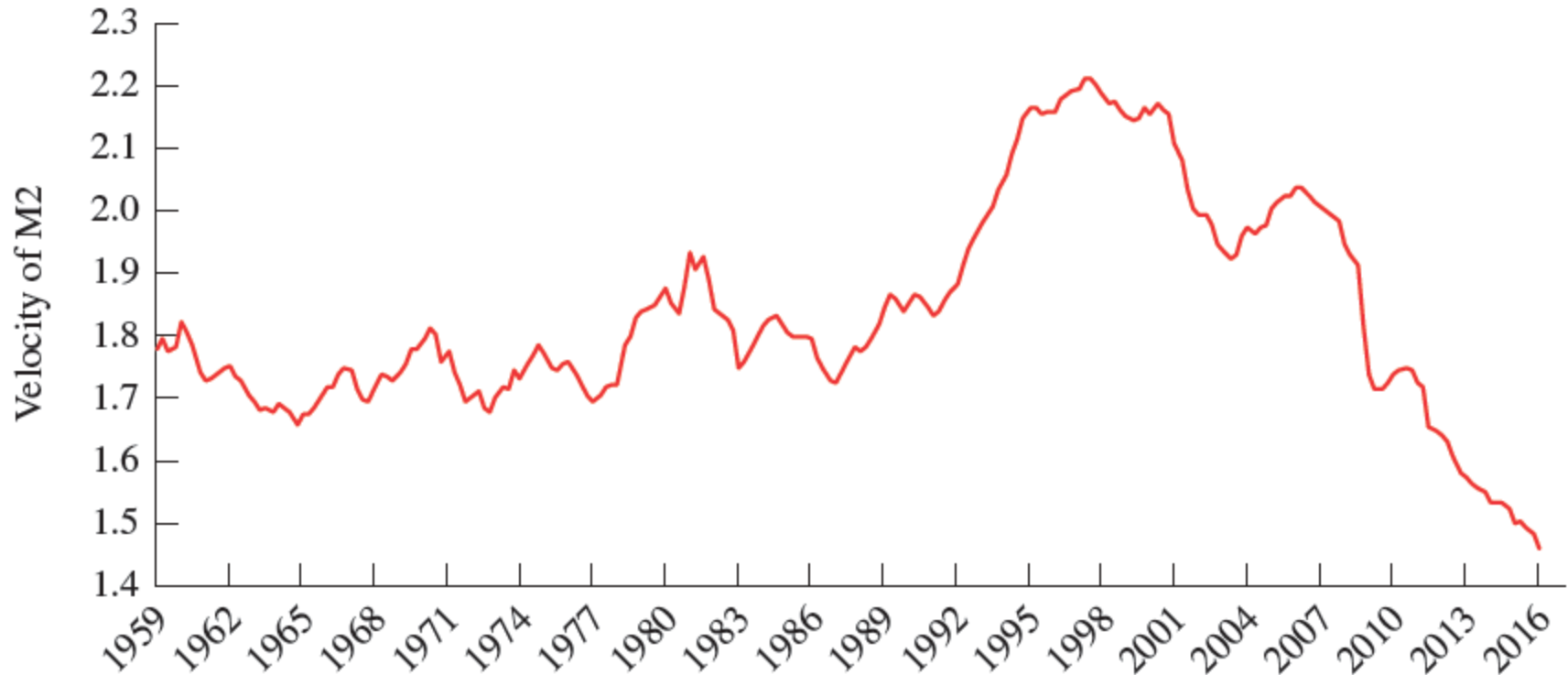
- But Friedman's recommendation that the **central bank** should **keep money growth constant** would ***stabilize inflation only if velocity were constant.***
- In countries with ***high levels of inflation, changes in velocity can probably be ignored.***
- But in countries where **inflation rate is 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 Velocity of M2, 1959-2016

## A. Long-Run Velocity

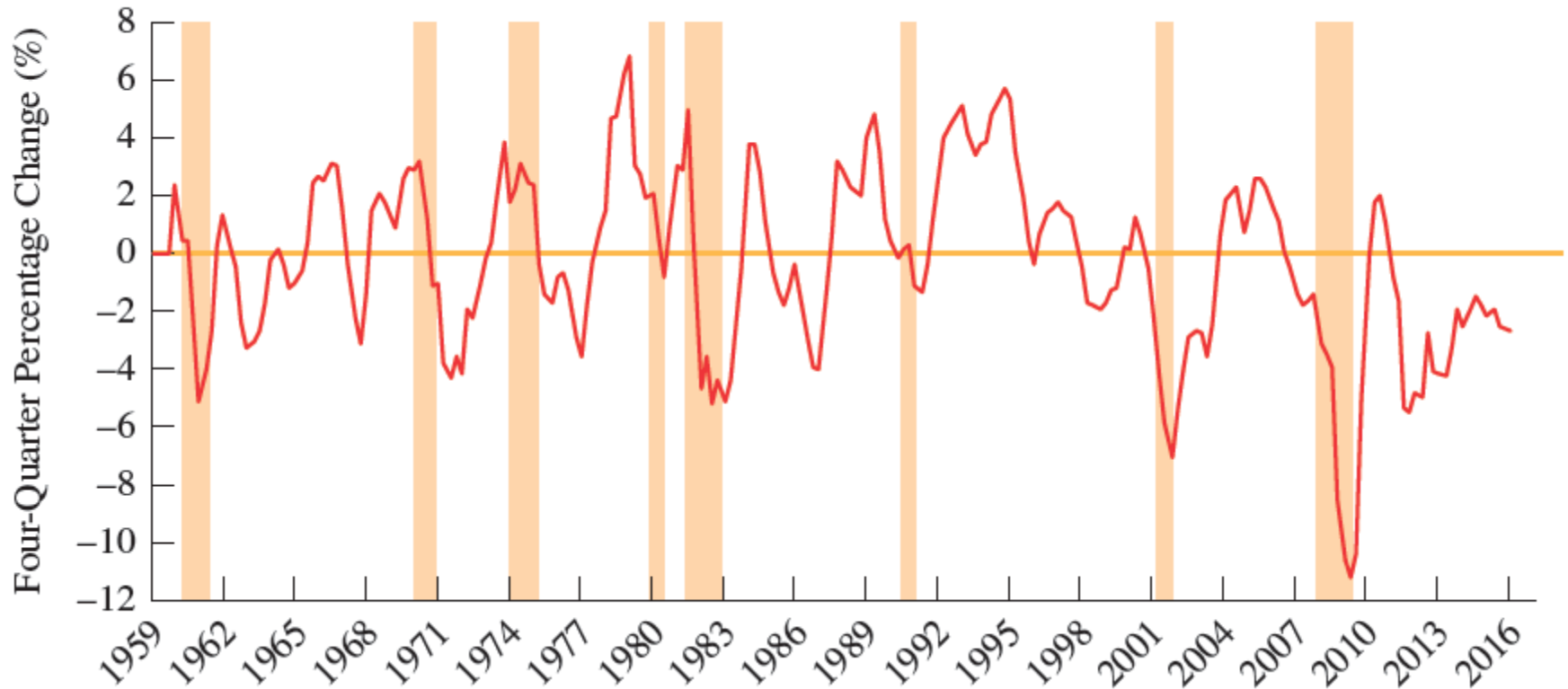


# The Facts about Velocity

- **Central bankers are *concerned about inflation over months and quarters, not years.***
- **The **monetary aggregates**, even broad ones, *can be useful guides to short-term policy only* to the extent that they **signal changes** in **inflation during the periods** monetary policymakers **care about.****

# The Velocity of M2, 1959-2016

## B. Percentage Change in Short-Run Velocity of M2



# 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 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

- Deciding *how much money to hold* depends on the costs and benefits.
- **Benefits:** *Holding money* allows people *to make payments*.
- The cost is based on **opportunity cost**.
  - The *interest* that people lose in not buying an interest-bearing bond is the *opportunity cost of holding money*.

# The Transactions Demand for Money

- For a *given cost of switching*, as the **nominal interest rate rises**, people *reduce their checking account balance*, **shifting funds** into **higher-yield investments**.
- The **higher** the **nominal interest rate**, the **higher** the **opportunity cost of holding money**, the *less money* individuals *will hold* for *transactions*, and the **higher** the **velocity of 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 a *store of value*, money provides *diversification* when **held along with** a wide variety of **other assets**.
- The **demand for bonds** *depends on* several factors including:
  - **Wealth**
  - The **return** *relative to alternative investments*
  - **Expected future interest rates** on *bonds*
  - **Risk** *relative to alternative investments*
  - **Liquidity** *relative to alternative investments*

# 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**.

End of lecture