

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

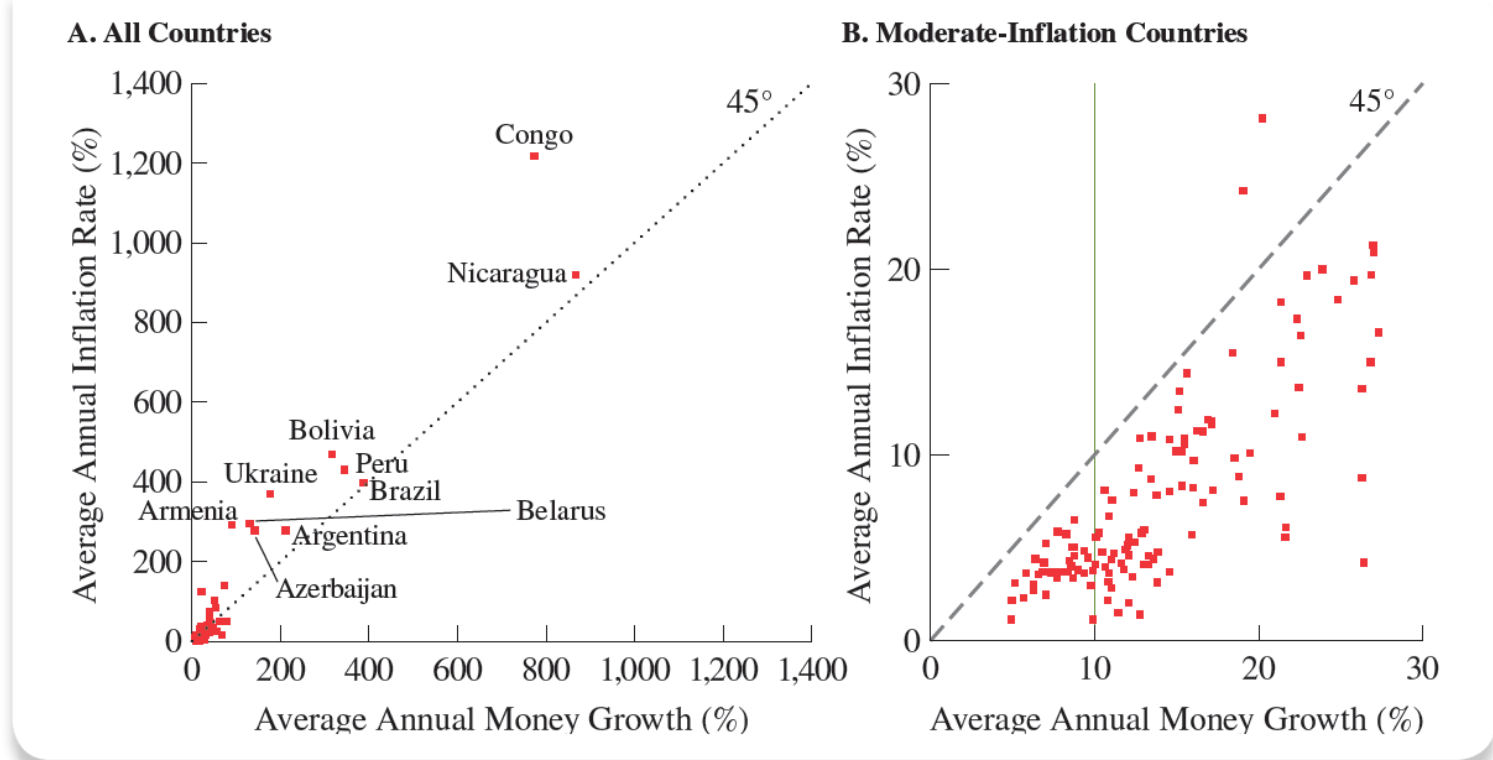
Money Growth, Money Demand, and Modern Monetary Policy

Why We Care about Monetary Aggregates

Why We Care about Monetary Aggregates

Figure 20.1

Inflation Rates and Money Growth



Inflation was computed from each country's analog to the consumer price index; money is the rough equivalent of M2. Data are for the 30 years beginning in 1980.

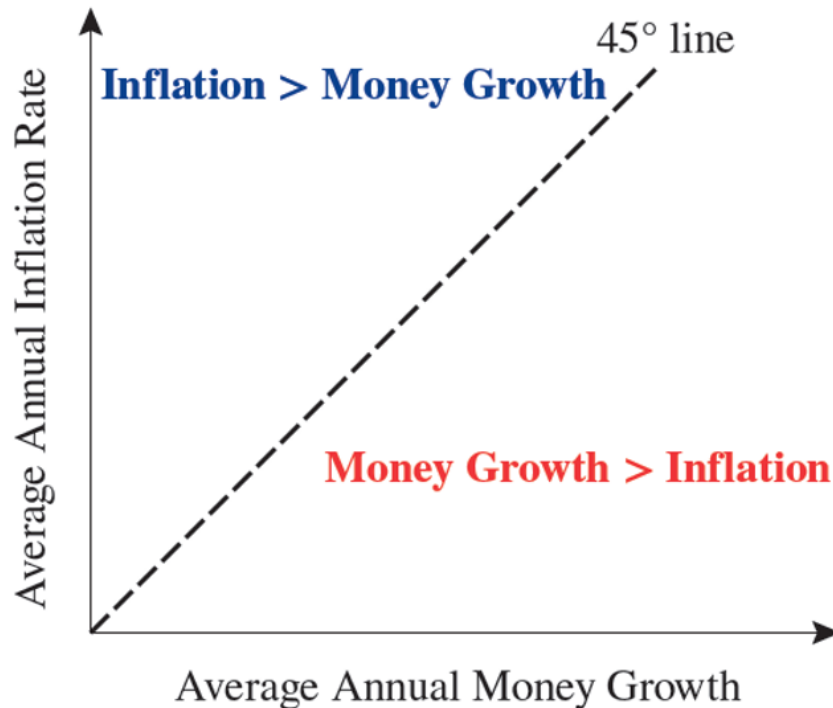
SOURCE: These figures are based on data from the International Monetary Fund's International Financial Statistics.

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.

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

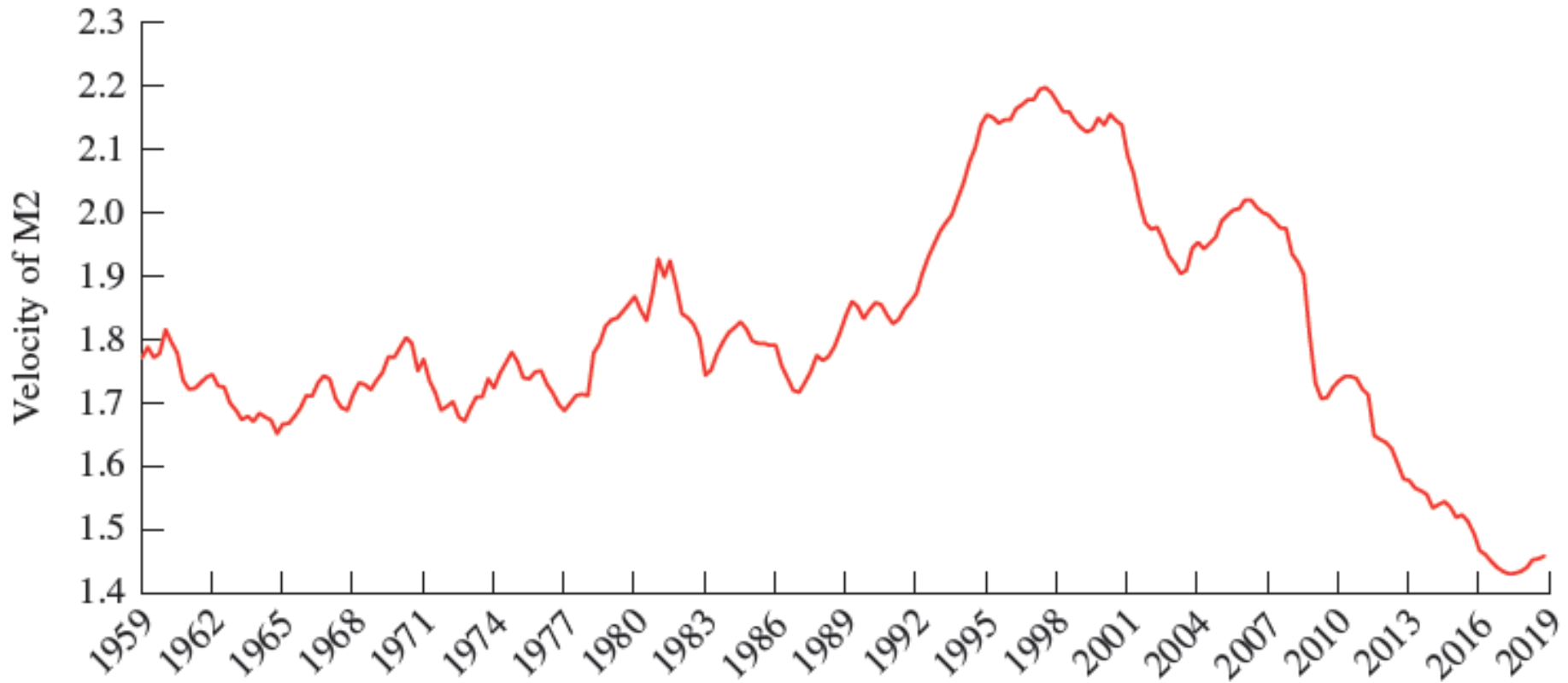
- But Friedman's recommendation that the **central bank** should **keep money growth constant** would ***stabilize inflation only if velocity were constant.***
- In countries with ***high levels of inflation, changes in velocity can probably be ignored.***
- But in countries where **inflation rate is 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, 1959-2019

A. Long-Run Velocity

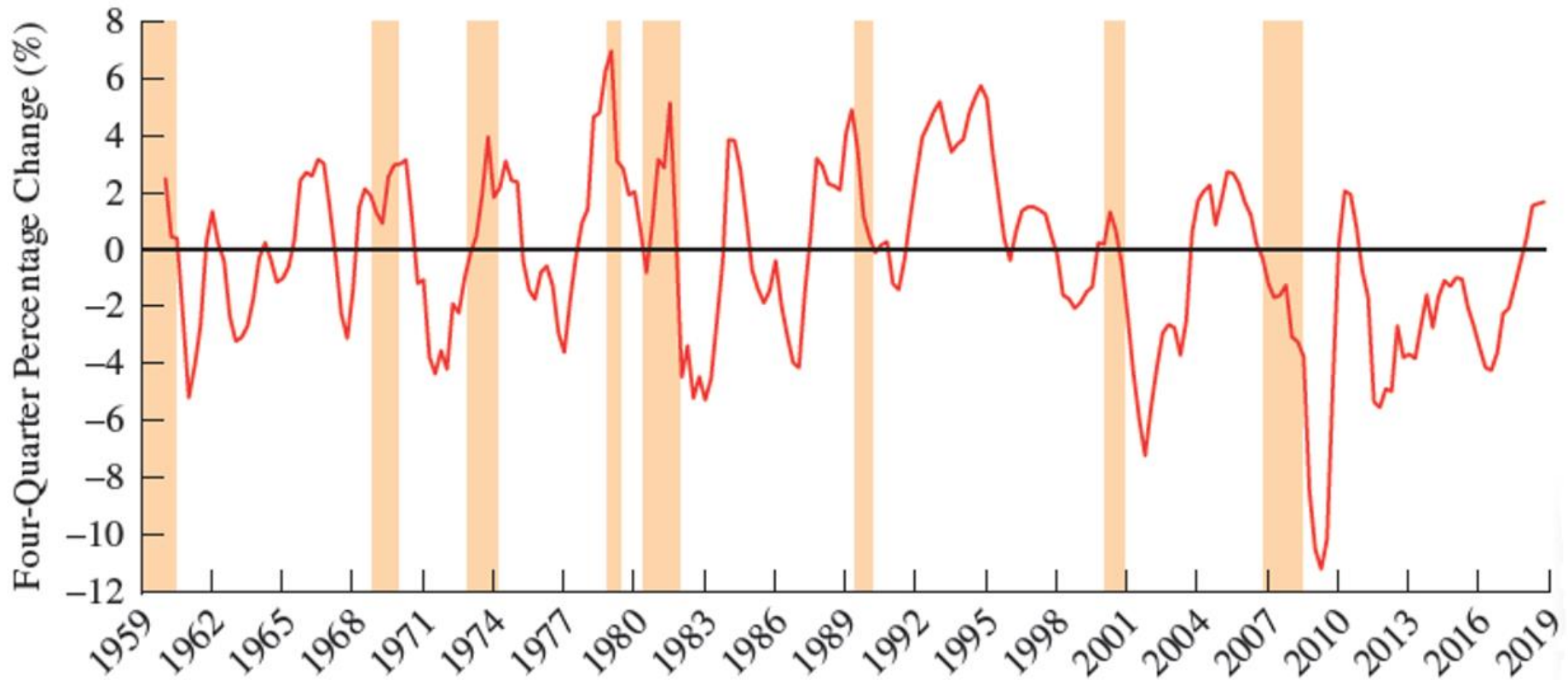


The Facts about Velocity

- 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, 1959-2019

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*
 - **Risk** *relative to alternative investments*
 - **Liquidity** *relative to alternative investments*

End of lecture