



SGPE Summer School: Macroeconomics Lecture 7



Money and inflation (Chapter 7)

Questions:

- What is money?
- What determines demand and supply of money?
- What determines inflation in the long run?
- How high should inflation be?



Money and inflation: Money

What functions does money have?

- Means of payment
- Unit of measurement
- Store of value that does not yield interest

Example: bills and coins



Money and inflation: Money

We assume that in the model:

- Money is a means of payment: the need for money depends upon the volume of transactions
- Money is used as a unit of measurement: prices and wages are set in terms of money
- Money is a store of (form of) savings that generates no interest
- The central bank controls the money supply



Money and inflation: Money

In practice there are several ways of measuring money:

- Monetary base: bills and coins in circulation plus deposits that banks have in the central bank
- M1: bills and coins among the general public plus demand deposits (“immediately available funds”)
- M2: M1 plus deposits on certain conditions (tied for a certain time etc.)
- M3: M2 plus money market fund shares and certain debt securities



Money and inflation: Money

Monetary base is closest to our theoretical concepts :

- All transactions take place with monetary base
- Money is the unit of measurement for wages and prices
- Bills and coins generate no interest and bank funds in the central banks generate lower interest than the market interest rate
- The central banks control the monetary base through market transactions (pure market transactions and repurchase operations)



Money and inflation: Demand for money

What determines the demand for money?

$$M \cdot V = P \cdot Y$$

- M is the supply of money in circulation
- V is the turnover speed of money
- P is the price level
- Y is production



Money and inflation: Demand for money

Alternative 1: Constant V

- Demand for money

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

- Real demand for money

$$\frac{M^d}{P} = \frac{1}{V}Y$$

that is, real demand for money is proportional to real production (income)



Money and inflation: Demand for money

Alternative 2: V is an increasing function of nominal interest rate

- Demand for money $M^d = \frac{1}{V(i)} PY$

- Real demand for money $\frac{M^d}{P} = \frac{Y}{V(i)}$

that is, real demand for money increases with Y and decreases with i



Money and inflation: Money and inflation in the long run

Equilibrium (supply of money = demand for money):

- Real supply of money $\frac{M}{P}$ Demand for money $\frac{Y}{V(i)}$
- In equilibrium: $\frac{M}{P} = \frac{Y}{V(i)}$

What happens if the central bank increases the money supply M ?

- Three alternatives: Y increases ? i decreases? P increases?

It depends on what time perspective we consider.
Short run: prices are rigid. Long run: prices adjust.



Money and inflation: Money and inflation in the long run

Here we consider the long run:

- Production is given by Y^n
- Real interest is given by $r = r^n$, which means that nominal interest is given by $i = r^n + \pi$

Equilibrium condition:
$$\frac{M}{P} = \frac{1}{V(r^n + \pi)} Y^n$$

Determines the price level:
$$P = \frac{MV(r^n + \pi)}{Y^n}$$



Money and inflation: Money and inflation in the long run

Price level:
$$P = \frac{MV(r^n + \pi)}{Y^n}$$

Assume that r^n and p , and thereby V , are constant

Long-term inflation:
$$\pi = \frac{\Delta P}{P} = \frac{\Delta M}{M} - \frac{\Delta Y^n}{Y^n}$$

Conclusion: If the money supply grows faster than equilibrium production, the result is inflation



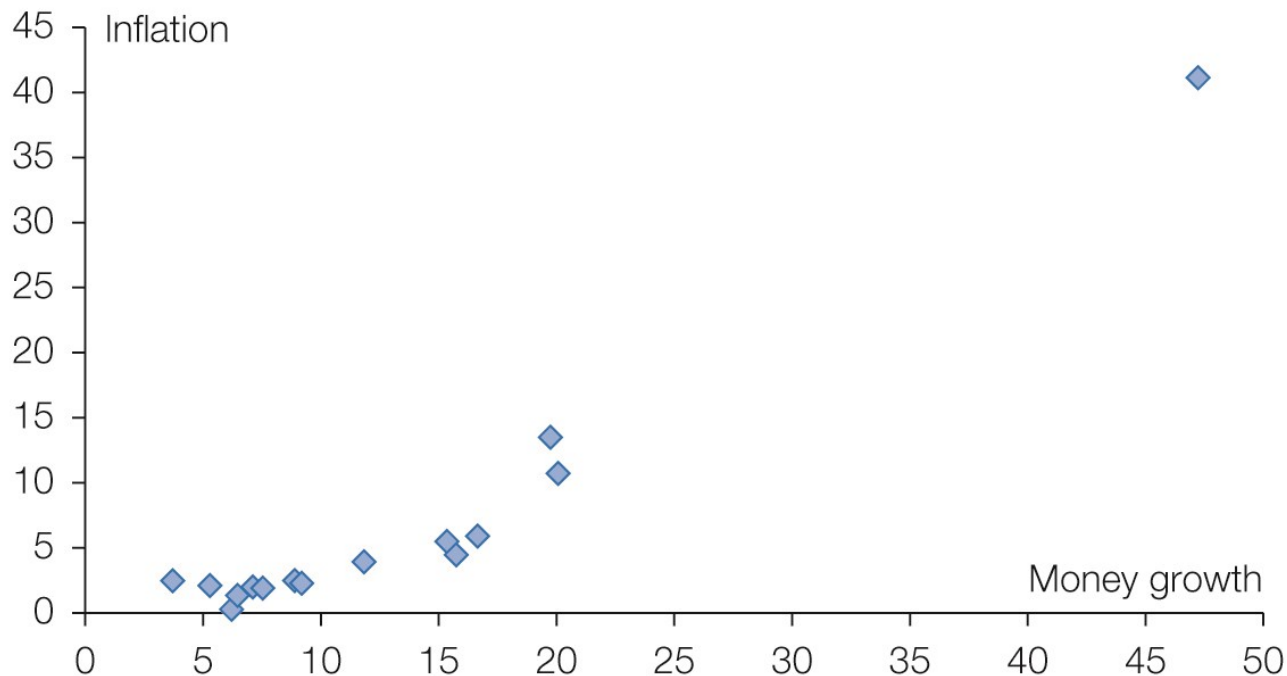
Money and inflation: Money and inflation in the long run

- In the long run, inflation does not affect real variables (the classical dichotomy)
- Higher money supply growth brings higher inflation *ceteris paribus*
- Milton Friedman: ‘Inflation is always and everywhere a monetary phenomenon’
- In the long run, yes!



Money and inflation: Money and inflation in the long run

Fig. 7.1 *Money growth and inflation, 1990–2010, percent*



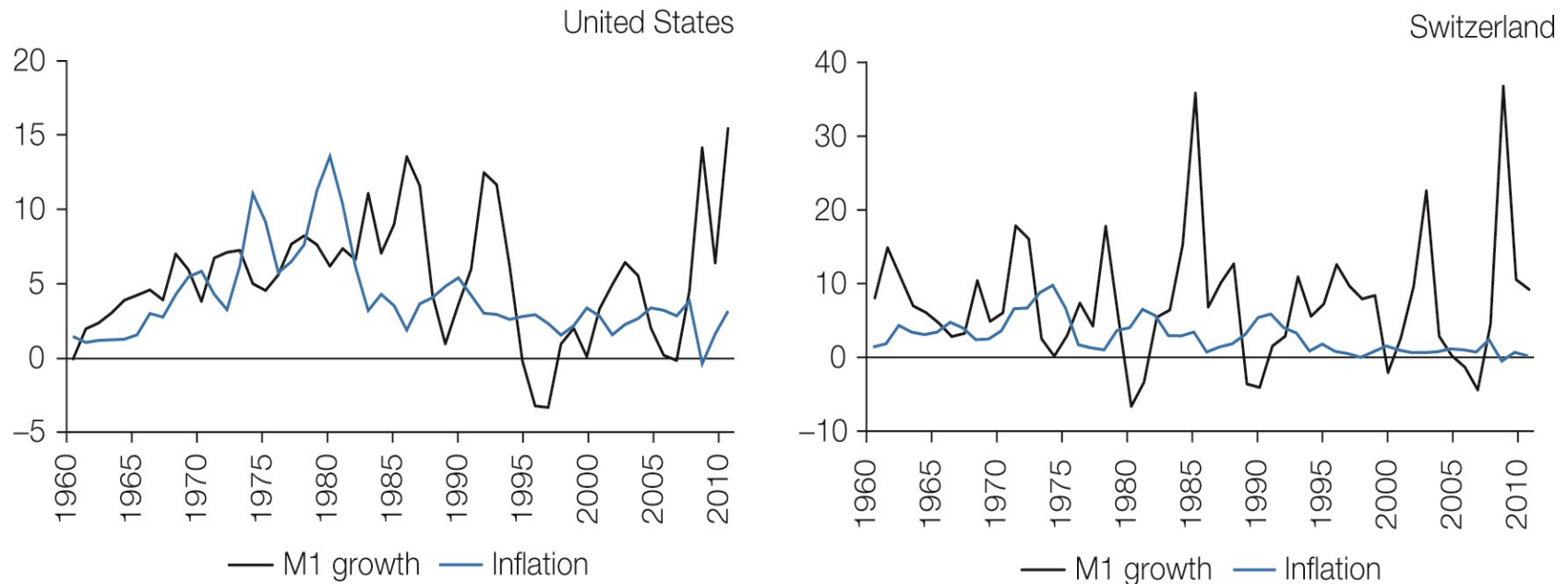
Note: The figure shows yearly M1 growth and consumer price inflation for the OECD countries where data is available.

Source: *OECD Economic Outlook*, OECD, 17 April 2012, <http://www.oecd-ilibrary.org/statistics>.



Money and inflation: Money and inflation in the long run

Fig. 7.2 *Money growth and inflation*



Note: Money growth is measured by the growth rate of M1. Inflation is measured by the growth rate of the consumer price index.
Source: *OECD Economic Outlook*, OECD, 19 April 2012, <http://www.oecd-ilibrary.org/statistics>.



Money and inflation: Money and inflation in the long run

- Very high money supply growth leads to high inflation
– support for the theory
- No correlation when money supply growth is low:
 V is far from constant
- A theory that assumes that V is constant in the short run is not useful for predicting inflation
- But our theory says that *ceteris paribus* increased money supply growth leads to increased inflation



Money and inflation: How high should inflation be?

Problems with too high inflation:

- Menu costs
- More difficult to compare prices when observations quickly become out of date
- Inefficient changes of relative prices when prices change at different times
- Unintended effects on tax and transfer systems
- Wealth redistributions and disruptions of long-term contracts (wages, loans)



Money and inflation: How high should inflation be?

Problems with low inflation:

- Obstructs real wage adjustment if nominal wages are sluggish downwards
- Monetary policy becomes more difficult because the interest rate cannot be lower than zero



Money and inflation: How high should inflation be?

Conclusions:

- Very high inflation leads to substantial losses
- Zero inflation can cause problems
- Some positive rate of inflation is optimal but hard to say exactly what rate
- Most central banks have an inflation targets of 2 or 3 per cent
- What they do to reach this goal is discussed in Chapter 10