

INVESTMENTS IN EDUCATION DEVELOPMENT

Course: Economics I (macroeconomics)

Study text

7th Chapter

Money and money market

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7 Money and money market

In this chapter we will discuss the definition of money, their forms and functions. Money has an important role in the economy and money is also an important term in economic theory. In macroeconomics the definition of money supply is becoming one of the most difficult questions that we pay attention. We will explain the changes of the money supply, the demand for money and the various monetary aggregates. Last, the equation of exchange will be interpreted by, and the quantity theory of money and its neutrality will be explained.

7.1 Definition of money

There are a number of narrower or wider definitions of money. The general definition of money states that money means everything that is universally accepted as a means of realizing the exchange. Using money you can make payments for goods and services.

There are two basic approaches to money: functional (theoretical) and empirical.

- 1. **The functional approach** is based on the idea that money is a special type of assets that are used as a means of payment. This approach emphasizes the function of money as a medium of exchange.
- 2. An empirical approach seeks to explain the concept of money in relation to changes in economic activity. Changes in the rate of growth of the money supply affect macroeconomic variables, such as unemployment, real income and the general price level. Money is an empirical perspective composed of those selected items that are considered by monetary institutions as the most useful in their efforts to influence macroeconomic variables.

7.2 Origin and development of money

Imagine first that the money would not exist. How do we look after ourselves? For what we want, we would offer some goods or services, an exchange would take place only in the event that our goods or services demanded by someone else. In other words - we would be involved in primitive barter – in exchange of one commodity for another, without using of money. Barter trade was widely used even in the colonial era, and still cannot be considered only as a historical phenomenon surpassed (in some countries of the world it exists today and people can return to it in countries suffering of hyperinflation, during it money lose their ability to perform their functions).

Because of barter was problematic, commodity money - cattle, fur, cloth, mussels, beer, wine, tobacco grain, cocoa beans, fish or even stone discs and salt sticks began to use. It was still a barter trade, but with elements of the monetary system. Disadvantages persisted. It was a heavy divisibility of such "money" and a problem was sometimes with durability.

Commodity money was replaced by coins in the 7th-6th century BC. Coins facilitate trading significantly. The transition to the coins began by traders when silver, gold or copper ingots were indicated by the weight value, and later by various shapes and symbols. The moment when metal ingots were guaranteed by the sovereign, we began to talk about coins. The first Czech silver coins (dinars) had minted around the year 970 by monarch Boleslav I.

In the 17th century the prominent banks began to issue banknotes. Banknotes had a paper form and substance of the promise that their payee to be paid a certain sum expressed as the quantity of the precious metal. Soon the paper money became a separate exchange form (e.g. in China since the 9th century AD).

Money was created to facilitate barter. Exchange was divided into two separate acts - sale and purchase. Noble metals, especially gold and silver, were spread as means of exchange. The reason was their ease of transportation, uniform quality, non-perishable, and the difficulty of perfect divisibility. The most widespread was gold, which is still used as currency and as a means of wealth accumulation. First, the value of the noble metal contained in the coins was equal to their nominal value. The banknotes were linked to gold.

This type of treatment is called monetary gold currency or gold standard. His modifications have become the gold standard bullion and gold exchange standard. Standard golden ingot meant that banknotes and fiduciary coins were only marginally exchangeable for gold, in the form of gold ingots. Standard of gold exchange was the modification when gold could be got through the exchange of national currency for currency convertible into gold (dollar). Both modifications meant that monetary gold reserves were no longer dependent on the volume of money supply. The process of demonetization of gold was completed in 1971, when the convertibility of American dollar into gold was abolished.

7.3 Functions of money

Historical perspective emphasizes the fundamental characteristics of money. Money is what meets the following three functions:

- 1. **Money as a medium of exchange**. This function is the most important. Money mediates purchases and sales. Money is the best means of exchange, there are no complications associated with barter. Money develops the exchange and specialization of activities is also developing.
- 2. **Money as a unit of account.** The money is used for the valuation of a wide variety of goods and production resources. Money helps us to make rational decisions, e.g., consumers can compare prices of goods and services. Money also allows calculating the debt, taxes or national product.
- 3. **Money as a store of value.** People usually do not spend the whole income, they also create savings. Money is kept for future purchases. Money transfers

the same value in the future if its purchasing power is holding (in case of stable price level). Money under the pillow is immediately available for potential purchases, because the money is described as the most liquid form of assets. And other assets can meet this function – e.g. paintings, jewelry, stamps or land. These assets are not undermined by inflation, unlike money.

7.4 Components of money supply

Today, money is uncovered, forced. Money is accepted because it is legally prescribed means of exchange.

Basic forms of current money are:

- coins,
- bank notes,
- **deposit money** (also referred to as **bank**, **giro**, **accountant or fictitious**).

Coins and banknotes are designated as **cash**. The largest portion of the money is the last group - deposit money. That means money in bank accounts. Current bank accounts now perform the same function as the cash market.

A narrower definition of money supply includes notes and coins in circulation (currency) and deposits on demand (demand deposits). Demand deposits are money accessible with the launching of a check or using an ATM.

A broader definition of money supply includes in addition to currency and deposits quasi-money (near-money). According to the Czech National Bank methodology quasi money includes time deposits, i.e. residents deposited in accounts with fixed notice period for the banking system, promissory notes and other bonds, i.e. residents deposits in the form of listed securities, and deposits in foreign currency - total foreign currency deposits of residents deposited in the banking system.

Monetary aggregates are used to measure the money supply. They are usually measured by the central bank and the bank oversees its pace to grow. It defines the size of the money supply so - money that economic operators actually hold and that affects the behavior of market actors as well as the course of economic events.

By tracking range of monetary aggregates and interest rates, monetary policy may respond quickly and appropriately to adverse economic events.

Monetary aggregates are commonly referred to M0, M1, M2, M3 (L). Breakdown of monetary aggregates is not the same in all countries. The content of aggregates determines the degree of monetary assets liquidity.

The Czech Republic compiles harmonized balance sheet of the MFI sector in accordance with Regulation of the European Central Bank (ECB) and methodology to non-euro area countries. Monetary aggregates are distinguished as following:

- *"Narrow" money (M1)* includes currency, i.e. banknotes and coins in circulation, as well as balances that can immediately be converted into currency or used for cashless payments.
- *"Medium" money (M2)* comprises M1, deposits with a maturity of up to 2 years and deposits redeemable at notice up to 3 months. Depending on the liquidity these deposits can be converted into components of narrow money, but in some cases there can be some limitations, e.g. the need to give notice, arrears, penalties or fees.
- *"Wide" money (M3)* comprises M2 and marketable instruments issued by the MFI sector, certain money market instruments, mainly shares/units of money market funds, money market paper and repos (loans granted by the transfer of securities).

Table 7.1 shows the classification of different forms of money into the respective monetary aggregates (marked X). The monetary aggregate M1 consists of currency in circulation and overnight deposits. Moreover, aggregate M2 includes deposits with an agreed maturity of up to 2 years and deposits redeemable at notice up to 3 months. The monetary aggregate M3 includes all listed items.

Eurozone monetary aggregates	M1	M2	M3
Currency in circulation	X	X	X
Overnight deposits	X	X	X
Deposits with agreed maturity up to 2 years		X	X
Deposits redeemable at notice up to 3 months		X	X
Repos			X
Shares/units of money market funds and money market paper			X
Debt securities up to 2 years			X

Table 7.1 Monetary aggregates of the EU

Source: The Czech National Bank, available at WWW: < http://www.cnb.cz>.

7.5 Money market

The money market is simply a place where it money supply interferes with the demand for money.

Money supply (S_M) consists of currency in circulation and demand deposits. Money supply is the amount of money that banking system offers at the price of money - interest rate. It is true that the amount of money offered increases with rising interest rates, but the sensitivity of the offered amount of money on the interest rate change is low to zero. Supplied amount of money equals to the amount of money economic operators actually hold.

Money demand (D_M) represents the amount of money that households and firms are willing to hold at the certain price of money - interest rate. It is true that with rising interest rate decreases quantity demande, since interest rate is the cost of holding money. If we keep the money, we lose interest rate that we would get if we put money into other assets or investments. Also, inflation is the cost of holding money, as declining purchasing power of money. The demand for money, however, may not equal the amount of money offered, as economic entities in a given time may wish to larger or smaller amounts of money at a given interest rate.

Demanded amount of money at a given interest rate (cost of money) increases (decreases) if:

- real product increases (decreases);
- price level increases (decreases).

Money demand curve shifts to the right when real product or price level increases and vice versa. Demand for money is also affected by news of payment (e.g. internet banking), where you need a smaller amount of cash.

Liquidity preference theory (money is the most liquid asset) answers the question, what are the motives of money holdings. The following are known:

- transaction motive money is held in order to perform the transactions. This motive is apparent from the function of money as a means of transaction;
- 2. *precautionary motive* money is kept in case of unexpected adverse events (e.g. illness) or because of a bargain purchase;
- 3. **speculative motive** money is held for the purchase of securities when their price drops. It is expected that their price will rise again. This motive is related to the function of money as a store of value.

Fig. 7.1 illustrates demand for money, defined by J. M. Keynes, who in addition to transactional and precautionary motive formulated also speculative motive. Thus, money demand depends on the interest rate.



Keynesian money demand function: transaction and speculative motive

The blue arrows show that decreasing interest rate (shift from i_1 to i_2) cause declining cost of holding money and increases the money holdings (a shift from L_1 to L_2). Shift in money demand (shift the entire curve) right up may be caused by the growth of real income (Y_r) or rise in the price level (P). Notice that when the interest rate i_1 showed an increase in money holdings and a demand for money has shifted to the right. The size of the letter *h* determines the slope of the demand for money (pictured as a straight line). At zero *h* a demand for money would be drawn vertically and it would mean that the amount of money demanded is completely independent on the interest rate.

Demand for money and money supply are shown in Fig. 7.2. The horizontal axix represents amount of money (M) and the vertical axis represents the size of the interest rate. The demand for money (D_M) is decreasing and shows an inverse relationship between the amount of money demanded and the interest rate. Money Supply (S_M) is shown as a vertical line. We assume the Central Bank controls the size of the money supply in the economy. Vertical money supply is also characteristic for the short run when the sensitivity of the money supply on the size of the interest rate is zero.



Money market equilibrium is at point E, where the supplied amount of money (M_2) equals demanded. In case of the nominal interest rate i_1 there would be excess supply. People would have started to buy other financial assets and it would cause rise in prices of these assets and decrease in interest rates to the level of i_2 . In case of the nominal interest rate i_3 there would be excess demand and people would start to sell their financial assets, which would cause a decline in financial asset prices and rise in interest rates to the level of i_2 . There is an inverse relationship between the price of a financial asset and the interest rate.

For example, the rate of return on a bond is calculated as a percentage of coupon interest payments and bond prices. Increasing (decreasing) the price of financial assets represents a decrease (increase) in income from financial assets or a decrease (increase) in interest rates. If the interest rate market cleans up the money market, the equilibrium (point E) will occur.

7.6 Equation of exchange

Money supply represents the size of the money supply in the economy. The problem is the determination of such amount of money, which mediates the exchange of all goods making up the product at given prices. However, one monetary unit for the given time can convey more exchanges of goods.

Classical theory of money that considered money only as a means of transaction and is based on this equation of exchange:

$$P \cdot Y_r = M \cdot V$$

$$P = average price level;$$

 $Y_r = real product;$
 $M = moninal money supply;$
 $V = velocity of money.$

This equation expresses the relationship between the amount of money, real output, price level and the velocity of money. Turnover rate of the monetary unit says how many transactions one monetary unit is able to carry out.

$$V = \frac{P \cdot Y_r}{M}$$

And money supply can be expressed as:

$$M = \frac{P \cdot Y_r}{V}$$

As can be seen, the amount of money in the economy is directly proportionally dependent on the nominal size of the product $(P.Y_r)$ and inversely dependent on the velocity of money (V). If classical and neo-classical economists assumed that the velocity of money is determined by the unit of payment practices and technologies paying in society, then it is stable quantity. If the economy is on the level of potential output, the volume of transactions (sales) is given a constant and hence it is inferred that **the price level is directly proportional to the money supply in the economy.**

In other words, changes in the quantity of money in the economy cause only changes in the price level. We talk about the neutrality of money, where money is neutral in the sense that they do not affect real variables - real output and real wages. In this way **the quantity theory of money** was formulated.

As an author the classical transaction variants of the quantity theory of money is considered an American economist *Irving Fisher* (1867 - 1947) who began with a simple analysis that each transaction has both the buyer and also the seller, then the value (volume) of all sales in the economy equals the value of all purchases (AS = AD). As the predecessor of the quantity theory of money is considered *David Hume* (1711 - 1776), who opined that the increase in the money supply would always reflect into price increases.

Later there was a reformulation of the quantity theory of money. The economic stream *monetarism* is based on the view that the value of money, while turnover rate varies, but in a predictable way, and therefore it can be considered stable. The assumption is also stable money demand and economic output, which corresponds to the potential product. Equation of exchange has the following syntax:

 $M = k \cdot P \cdot Y_r$

M = money supply;

k = Cambridge coefficient, it is the inverse of the velocity of money: k = 1/V; V = velocity of money units;

 $Y_r = real product.$

According to monetarists, increase in money supply will affect the nominal product $(P.Y_r)$. In the short run a real product may increase but in the long increasing money supply will affect only nominal variables.

Factors that influence the velocity of money, respectively the Cambridge coefficient - its inverse value, include:

- the size of the interest rate;
- expected inflation;
- the frequency of payment of wages, new technology payment.

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