Monetary and Fiscal Policy

Abstract

Keywords
Keyword1 — Keyword2 — Keyword3

12a	Calculate and interpret price, income and cross-price elasticities of demand and describe factors that affect each measure
12b	Compare substitution and income effects
12c	Distinguish between normal goods and inferior goods
12d	Describe the phenomenon of diminishing marginal returns
12e	Determine and interpret breakeven and shutdown points of production
12f	Describe how economies of scale and diseconomies of scale affect costs

Contents

1. Monetary Policy

1.1 Functions of money

By definition, money has three important perpetual functions:

- it acts as **medium of exchange**
- it provides individuals with a way of storing wealth (**store of value**)
- provides society with a convenient **measure of value**

A medium of exchange is any asset that can be used to purchase goods and services and repay debts. Money can thus eliminate the debilitating *double coincidence of wants* of *barter economies* - where both economical agents in a transaction are required to want what the other is selling - or the *divisibility issue* arising from indivisible goods.
For money to act as a medium of exchange is must:

- be readily accepted - money as **legal tender** - money is acknowledged by law as a rightful compensation for goods and debts (pretty much everything and everyone has to accept money for trade when offered)
- have a known value. The acceptance and universality of money depends on whether individuals and institutions can rely on its value (confidence it wont depreciate, transparency of prices)
- be easily divided
- have high value relative to its weight (for a matter of practical convenience)
- be difficult to counterfeit

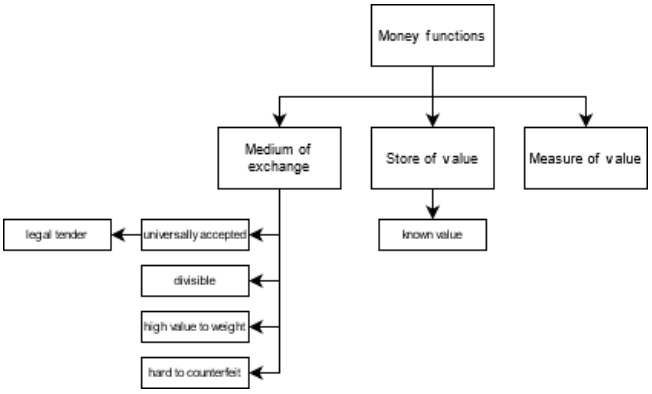

Figure 1. Functions of money

1.2 History of money creation

The historical process of money began when precious metals like gold and silver were used as means of exchange due to their natural value (not so much value in use but value store of wealth). They were much more convenient to carry around than physical products although not necessarily a safe way to conduct business.

The banking process first began with blacksmiths, were individuals would leave their excess wealth as gold and silver and in return received a **promissory note** - a right from ownership. This was the first ever transaction recorded between a banking institution and an individual: the individual would leave their assets (now a liability in banking balance sheet) and in return they would receive a legal right over such liability (a receipt of how much they had deposited).

These depository receipts represented a promise to pay a certain amount of gold on demand. Soon after, the paper money became a proxy of the precious metals they accounted for and eventually these receipts were openly traded rather than there being the physical transfer of gold.

In addition, blacksmiths understood customers wouldn't withdrawal all their money and began to lend customers money to others on the assumption that not all customers would want all of the money back at one instance. Therefore, they only kept a **fractional reserve requirement** to assure the liquidity of the blacksmith and that all demand for physical money was met. In return, blacksmiths would provide an hefty margin of interest to depositors.

The **money multiplier** is the amount of money that the banking system creates through the practice of fractional reserve system. Money multiplier represents the maximum expansion of money.

$$Money_M = \frac{1}{reserverequirement} \tag{1}$$

1.3 Definitions of money: What is money?

Money has different definitions but one that is generally accepted is that money is defined as a medium of exchange that can be used in the purchase of goods and services, therefore notes, coins, personal cheques, deposits and savings accounts.

There are different measures of money in modern economies. Generally speaking, money can be divided into **narrow money** and **broad money**.

Narrow money is referred to notes and coins in circulation plus any other very highly liquid assets. Broad money includes narrow money plus a range of other liquid assets than can be used to make purchases.

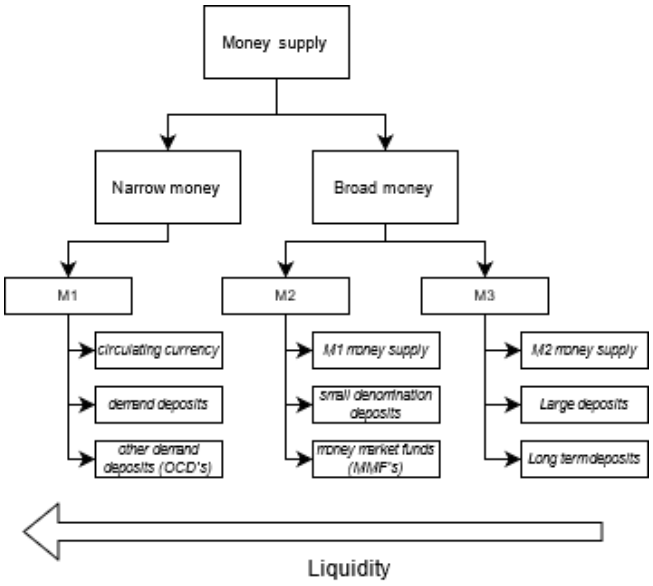

Figure 2. Money supply

- **M0 (monetary base/narrow money)**: includes (a) total physical currency circulating in the public, (b) the currency physically held in the vaults of commercial banks and (c) the commercial bank reserves held in central bank
- **M1** (US's narrow money): (1)consists of currency outside the US Treasury, Federal Reserve Banks, and vaults of commercial banks - circulating currency (2) demand deposits at commercial banks (excluding those held by government, foreign banks and official institutions) (3) other credit deposits (OCD's)
- **M2 (broad money)**: (1) M1 money (2) small (under 100k) denomination time deposits except IRA (individual retirement accounts), (3) money market funds (MMF's)
- **M3** (no longer published by US FED): M2 plus large (over 100k) and long term deposits

1.4 The Quantity Theory of Money

$$M \cdot V = P \cdot Y \tag{2}$$

The quantity of money is an accounting identity which states that, *over a given time, the amount of money used (M) multiplied by the number of times a currency is transacted or velocity of money (V) equals the monetary value (P) of total*

output (Y).

Money Neutrality

This equation is used to explain money neutrality. If money neutrality holds, an increase in money supply has no effects on real output (Y) nor in the speed of money (V) because real output is independent of money supply.
An economy's capacity to produce goods and services depends on the availability of real things, notably, natural resources, capital, labor and increasing the money supply wont increase the availability of real things.
Money neutrality is the concept that changes in the stock of money affects only nominal variables in an economy such as nominal wages, prices and exchange rates and has no effect on real variables such as real output, employment and consumption. Money neutrality is an important concept of the classical economics and it's related to the *classical dichotomy* between real and nominal variables.
The **monetarists** believe otherwise, that there is interdependence between nominal and real variables such that managing the supply of money can influence real variables such as consumption, unemployment and output.

1.5 The Fisher Effect

The Fisher Effect is directly tied to the concept of money neutrality. It states that interest rates reflect at all time the expectations towards inflation. Nominal interest rates can be decomposed into real interest rates plus expected rate of inflation.

$$R_{nom} = R_{real} + R_{inflation} \tag{3}$$

According money neutrality, money supply shouldn't affect real interest rates, just nominal interest rates because it only affects the inflation adjustment and inflation expectations.
Essentially, Fisher states that embedded in every nominal interest rate is the expectation of future inflation. Hence, if inflation is expected to soar, interest rates are expected to rise.
In addition, we can account for the **risk premium** which values the volatility and uncertainty about economical variables such as unexpected inflation and real economic growth.

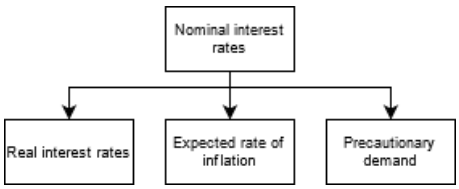

Figure 3. Decomposition of nominal interest rates and the *Fisher Effect*

Demand for Money

There are essentially three basic reasons for holding money:

- transactions & **transaction money balance**: money balances that are held to finance transactions
- precautionary savings & **precautionary money balances**: savings held to provide a buffer and protection against unforeseen events - *rainy day funds*
- **speculative demand for money**: money held with the intent to possess the liquidity to invest in potential opportunities, such as invest in financial instruments or real assets when prices fall. Speculative demand tends to decrease as interest rates increase, because the opportunity cost of holding cash is higher.

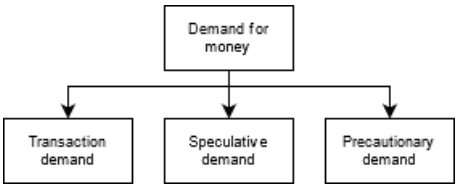

Figure 4. Demand for money

Supply and demand for money

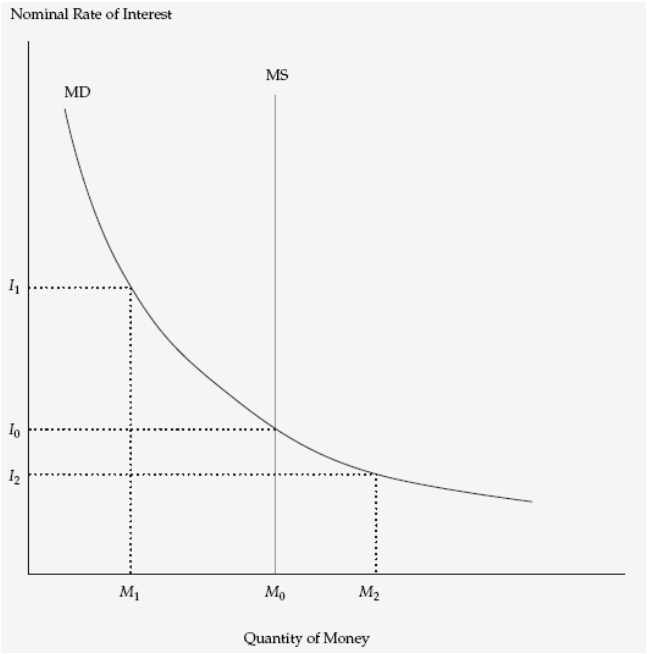

Figure 5. Supply and demand curves

There are a few assumptions made: (a) the supply demand is fixed at one time (b) the demand curve for money is downward slopping because as interest rates increase, the speculative demand for money falls.
I_0 is considered to be the equilibrium interest rate - the interest rate at which demand for money equals money supply. If the interest rate of similar securities rise to I_1, economic agents would invest their excess supply of money $(M_0 - M_1)$ into

bond markets, reducing their yields (by increasing the price), forcing bond yields to meet interest rates.
If bond yields were (I_2), investors would most likely liquidate ($M_2 - M_0$) worth of bonds, until bond yields equals interest rates.
The same happens when there is a shock on money supply. If money supply increases to M_2, the implied interest rates will be lower because there is less scarcity of money - the increase in money makes it plentiful and less valuable, decreasing the interest rates and increasing the price levels of bonds.

The Roles of Central Banks

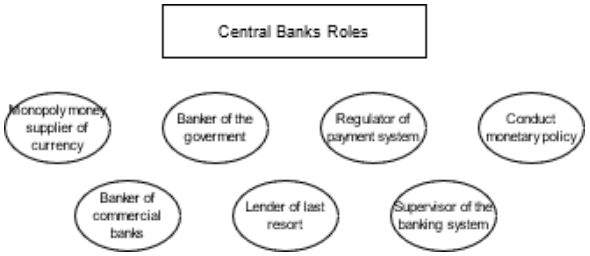

Figure 6. Overview of the roles of central banks

Monopolistic supplier of currency

Central banks are the sole suppliers and guardians of their fiat currency. They are in charge to maintain the confidence in their currencies by assuring the functions of money hold such as (1) money provides a good store of value (2) is a legal tender (3) so that people have confidence in the central institutions and in the currency.

Lender of last resort and banker of banks

Because central banks have the ability to print money they can provide funds to any bank for free (although they generally don't lend for free as they require collateral), in theory. Therefore, central banks can provide liquidity necessary to banks facing damaging shortages and help ensure its continuity and the deposits of its clients, preventing further damage.
Central banks are responsible for providing liquidity to banks under its jurisdiction to avoid major economical backlash (banks declare bankruptcy and aren't able to return client deposits).

Banker to the government

Central banks are the government banks as they can also provide liquidity to the government by buying government securities (literally printing money for the government at the cost of inflation). It's a way of financing national governments.

Oversee the payment system

The central bank is responsible to set the standards and regulations which influence millions of day-to-day transactions. The central bank ensures the system functions properly and implements new more robust procedures whenever its possible. They also coordinate international payments with other central banks.

Managing foreign currency reserves and gold reserves

Managing foreign currency reserves affect national exchange rates.

Flexibilization of monetary policies and policy targets

Arguably the highest profile role of central banks is the implementation of monetary policies directed toward influencing the quantity of money and credit in an economy.

Objective of Monetary Policies

Figure 7. Objectives of monetary policies

The overarching objective which is transcendent to all central banks is **price stability**. The primary goal of monetary policies is to assure the properties of the currency itself. Price stability is the core value of a currency, preventing economic agents to lose purchasing power and deter effects of inflation or foreign devaluation.

1.6 The Costs of Inflation

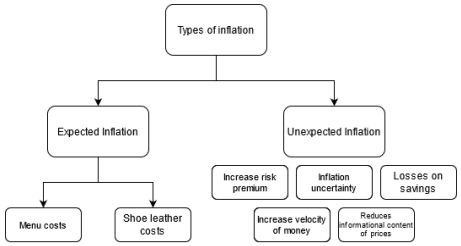

Figure 8. Overview

There is an important differentiation of inflation with regards to economical agents expectations. Expected inflation is the level of inflation clearly expected in the future while unexpected inflation is defined as the level of inflation experience below or above the expected value.

Expected Inflation

The costs of expected inflation are shallow and mostly concern the update of advertised prices of goods and services - **menu costs**. There are also the **shoe leather costs** which imply that people facing the devaluation of money are naturally expected to hold less cash and therefore burn their shoes by making frequents bank trips to withdrawal cash.
In a world where most prices including asset prices, retirement funds and pensions are perfectly indexed to inflation and

adjusted accordingly, expected inflation is not so detrimental afterall.

Unexpected Inflation

Arguably unexpected inflation is the most detrimental for society. Inflation when not fully anticipated creates shifts in wealth and erodes social welfare. When inflation is higher than anticipated, borrowers benefit at the cost of lenders because the real value of their borrowing declines. If inflation is lower, then lenders benefit from borrowers as the real payment of debt rises. Furthermore, if inflation is uncertain and volatile, lenders will increase the premium for inflation uncertainty. Higher premiums increase are friction that increase the borrowing costs, reducing investment and economical activity. In the supply side, manufacturers more wrongly assume market prices. Suppose the price of product A increases 10%, the manufacturer might think this was due to decrease competition or increase demand and will try to adjust the production accordingly. This can lead to production and inventory decisions which can be very costly if done incorrectly. Also, if inflation is very volatile it becomes hard to predict price levels reducing the informational value of prices.

1.7 Monetary Policy Tools

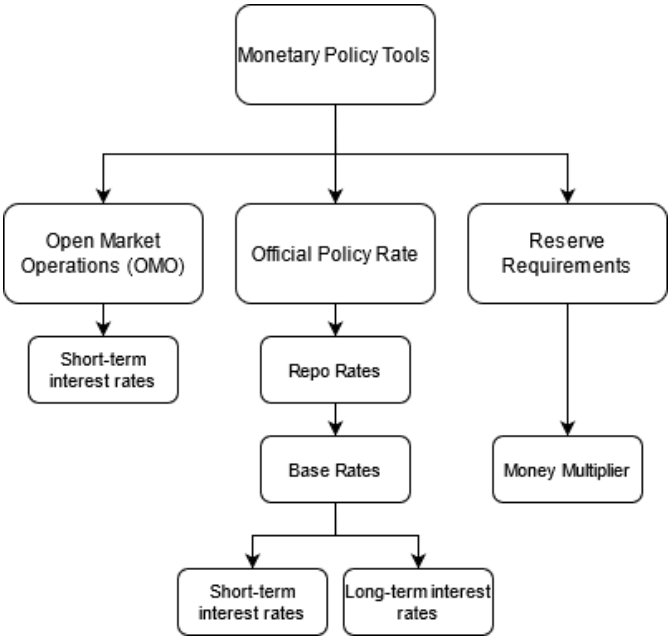

Figure 9. Overview

Open Market Operations It involves the purchase and sale of government bonds from or to commercial banks or designated market makers. These operations are carried by removing or providing liquidity to markets by buying or selling bonds and thus manipulate the short-term interest rates and the money supply in economy.
By buying treasury from commercial banks, central banks increase the reserves of commercial banks which can consequently increase lending via the money multiplier. Ensuring a bigger reserve increases the potential money and broad money through the fractional system. They can also sell securities to commercial banks, decreasing reserves and decreasing liquidity and lending.

Central Bank Policy Rate The **official interest rate** (or **policy rate**) expresses the central bank's intention of committing to short term and long term interest rates - this is the rate the central bank is willing to lend other banks (**federal funds rate** in US).
This policy is implemented through short-term collateralize lending rates known as **repo rates**. The **repurchase agreements** are agreements in which central banks compromise to buy securities (usually government bonds) from commercial banks with the intention to sell them back some time in the future. This operation provides liquidity to commercial banks while central banks profit the repo rate. The reverse repurchase agreements are the opposite.
If the central bank announces an increase in its official interest rate, commercial banks increase its **base rate** at the same time. The base rate is the commercial bank's reference rate on which it lends money to all its customers. Therefore, the central banks policy rates effectively manipulate commercial banks base rates.

Reserve Requirements The reserve requirements tool works mostly by controlling the supply of money through the money multiplier. Increasing the reserve requirements can be disruptive because it may cause banks who are short in reserves to cease its lending activities which naturally can have adverse consequences in commercial banks operations.

1.8 Transmission mechanisms

The **monetary transmission mechanisms** are the processes whereby the central bank's official interest rate gets transmitted through the economy and ultimately effects price levels (inflation).

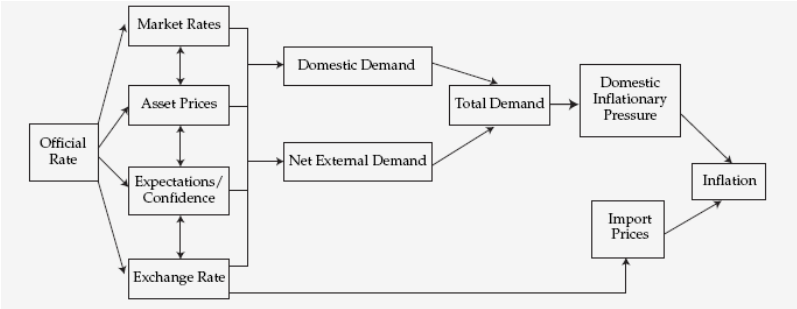

Figure 10. Overview

Suppose central banks announces the increase of the official interest rates. Such policy has direct effect in 4 interrelated channels:

- banks lending rates or base rates, which should adjust in response to the increase in the official rate

- The increase of short-term interest rates can induce assets such as bonds to fall as the discount rate for future cash-flows rises. Investors will demand a bigger return rate, depressing bond prices.
- Expectations and confidence: because interest rates affect everything from the consumption of households in durable goods and real estate and business investments, consumption and borrowing may decrease as result
- Exchange rate: rise in interest rates result in the rise of a countries exchange rate.

Inflation targeting policies

One of the best ways to assure and maintain *price stability* is to target a certain level of inflation while monitoring wide and real economic variables. The inflation-targeting framework was firstly developed by New Zealand in 1988. Afterwards, there was a progressive adoption by other central banks.
Inflation targeting framework relies on three fundamental requirements: **central bank independence**, **credibility** and **transparency**.

Central Bank Independence

Credibility The credibility aspects is probably the most important one in order to restrain inflation. Given that high inflation reduces the real value of debt, heavily indebted governments would have incentives to run increase inflation endangering the price stability and confidence in the currency. This, in turn, would shake investors and economical agents, and expectations of unprecedented inflation would settle in economical contracts such as wages, lending, contributing for further inflation. The target rate of low inflation would therefore be ineffective in economies where central agencies aren't credible.

Transparency One way of central banks to establish credibility is through being transparent with its decision making. These quarterly assessment of domestic economies are called **inflation reports** and provide a general view over a broad range of indicators that they watch when they come to their interest rate decisions.

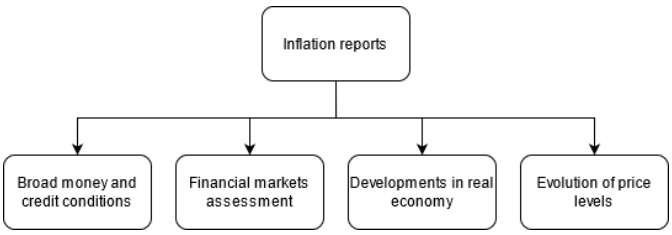

Figure 11. Overview

Monetary Policies in Developing Countries

Developing economies face significant impediments to the success of these operations, including:

- absence of a sufficiently liquid government bond market and developed interbank market
- rapidly changing economy, making it hard to understand the neutral rate
- poor track record in controlling inflation
- unwillingness of governments to grant genuine independence to central banks

1.9 Exchange Rate Targeting

When Central Banks target fixed exchange rates, interest rates and conditions of economical variables must adapt to accommodate this target.

1.10 Contractionary and Expansionary Monetary Policies and Neutral Rate

Contractionary policies are designed to reduce the growth of money supply and cool off the economy. When economic activity leads to an increase in inflation, central banks might want to increase interest rates and reduce liquidity in markets. Conversely, when economy is weakening, growth and inflation are stagnating, central banks may increase liquidity and cut interest rates - such policy is said to be **expansionary**.
The neutral rate, however, is the rate which is neither contractionary nor expansionary. The neutral rate is comprised of two main components: (i) the real trend rate of sustainable growth and (ii) long-run expected inflation.

$$Neutral rate = Trend growth + Inflation target \quad (4)$$

- If Policy rate $>$ Neutral rate - policy is said to be contractionary
- If Policy rate $<$ Neutral rate - policy is said to be expansionary

Its worth of notice that inflation targets also depend on the inflation source. If inflation is due to high demand, maybe is a good policy to skim credit in order to reduce consumption and investment. If inflation is due to a supply shock, increasing rates would be harmful making a bad situation worse.

1.11 Limitations of Monetary Policies

There maybe occasions when the will of the monetary authority isnt transmitted seamlessly across the economy.
In scenarios of **liquidity traps**, consumer preference for liquidity (preference for holding cash) in nearly infinite: increasing the monetary base has no effect on the economy as consumers are willing to hold the additional money so that the real economic activity is unaffected - there is an excess liquidity. Liquidity traps are often associated with **deflation**. In a deflationary scenario, consumers are encouraged to put off consumption because this persistent anti consuming behavior leads to the fall in prices. Additional income is no longer effective because income effect in consumption is almost null.

An unconventional approach to this is the **quantitative easing** policy where central banks directly buy securities such as government bonds, mortgage bonds, corporate bonds, etc, decreasing bonds yields and kickstarting lending directly.
Central banks are, after all, similar to any other bank. They can buy any securities they wont but generally prioritized investment grade bonds because eventually if it accumulates bad assets and creates substantial losses, it could face the end of consumer confidence in the institution and its currency.

2. Fiscal Policy

Fiscal policies often target a number of aspects of the economy:

- Overall level of aggregate demand in an economy
- Distribution of income and wealth among different segments of the population
- Allocation of resources between different sectors and economic agents (increase social welfare through a more efficient allocation)

2.1 Fiscal Policy and Aggregate Demand

Keynesians believe fiscal policies have powerful effects on aggregate demand, output and employment when the economy is below full employment or potential output. **Monetarists** believe that fiscal changes only have temporary effects on the economy and that monetary policies are more effective in the long term.
Examples of expansionary policies are:

- Cuts in income taxes and consequent raise of the disposable income
- Cut in indirect taxes, raising the real income of consumers
- Cuts in corporate business profits
- New public investment such as infrastructure, social goods and social welfare

A key concept of fiscal policies are **budget surpluses** and **budget deficits**. Contractionary fiscal policies create a budget surplus while expansionary fiscal policies give rise to fiscal deficits.
Fiscal budget varies in a countercyclic way. When economies slow and unemployment rises, the government spending in social insurance and unemployment benefits will also increase, compensating the aggregate demand. This is known as the **automatic stabilizer** effect. The budget is said to be balanced when revenues equals spending.

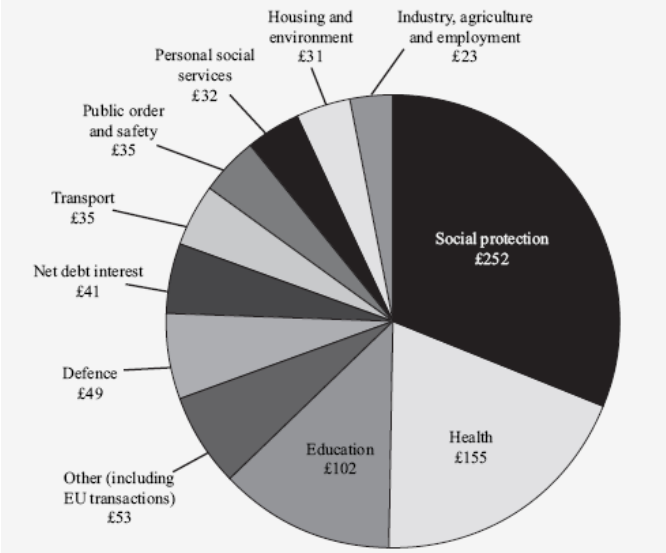

Figure 12. How government spending is distributed

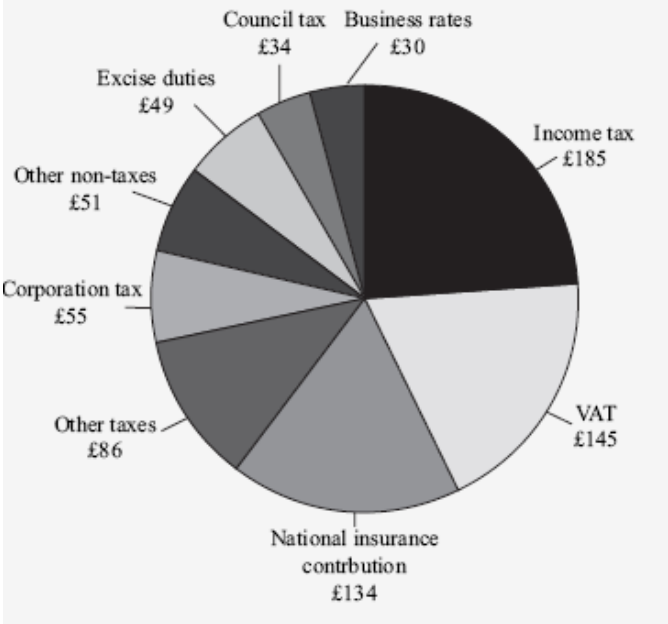

Figure 13. How government revenues are collected

Deficits and national debts

Government debts arise from the accumulation of deficits over time. Government deficits are financed through the emission of debt which is then sold to the private sector and foreign entities. The private sector finance governments through lending, often via private pension and insurance funds portfolio investments.
Ultimately, governments can't run an infinite amount of debt. Oftentimes, the metric for the size of governments debts is the **debt to GDP ratio**. An additional indicator for the solvency of countries is the **ratio of interest payments to GDP**.

	1995	2000	2005	2008	2010	2015
Australia	3.5	1.7	1.0	−0.5	0.0	0.3
Germany	2.9	2.7	2.4	2.3	2.1	0.9
Japan	1.3	1.5	0.8	0.3	0.6	0.4
United Kingdom	3.1	2.4	1.8	1.7	2.6	2.0
United States	3.5	2.5	1.8	2.6	2.9	2.8
OECD	3.6	2.5	1.8	1.9	2.1	1.9

Figure 14. Example of some countries ratio of net debt interest payments as percentage of GDP

How far is too far? How much debt can governments effectively run? The most important issue about government debts and their creditors is whether the additional spending leads to economic growth and thus higher tax revenues to pay the interest on the debt used to finance the extra investment. Economies tend to grow overtime and so do tax revenues. This is the most important ability of governments to service growing debts at constant tax rate. While the growth of the economy outpaces the growth of debt, governments will have no trouble to return their interest and principal payments. However, if the surge in debt is higher and creditors require a real interest rate on debt bigger than the rate of economical growth, national debt becomes encumbering because the debt burden (real interest time debt) grows faster than the economy itself.
Some economies in developed countries may chose to commit to high inflation rates to wash way national debt in domestic currency, mostly affecting the domestic private sector. This can make investors lose confidence in the government and central banks, which in turn may escalate financing costs even more making the situation more unstable and ultimately leading to countries defaulting on sovereign debt.

What matters then? Is the ratio of national debt relative to GDP important?
Arguments against being concerned about the size of debt to GDP ratio:

- The scale of the problem might be overstated if debt is fundamentally owed to the domestic private sector.
- A proportion of the money borrowed may have been already used for capital investment projects increasing current and future output and tax revenues (if applied correctly)
- Deficits may have no net impact because the private sector may act to offset fiscal deficits by increasing saving in anticipation of future increased taxes (**Ricardian equivalence** argument)

Arguments in favor of being concerned about the size of debt to GDP ratio:

- High level of debt to GDP require higher tax rates which may lead to disincentives in economic activity (less propensity to work and entrepreneurial activity)
- If debt runs too high for a long time markets may lose confidence in governments forcing them to outright print money to finance deficit.
- Government borrowing may divert private sector investment (**crowding out** effect). The limited amount of savings are spent financing government deficits instead of private investment leading to an increase higher interest rates and lower private sector investment.

It's also important to emphasize government debts have different **short and long-run effects**.

2.2 Fiscal Policy Tools

Government spending takes a variety of forms:

- **Transfer payments**: welfare payments destined to the private sector, such as social security payments, pensions, housing benefits, tax credits and supplemental income for poor families, unemployment benefits, etc. When it comes to private firms, they can also benefit from production benefits or subsidies, tax credits, etc. Transfer payments have two grand objectives (i) increase social welfare through wealth redistribution (ii) increase social welfare through ensuring markets work efficiently
- **Govern spending:** the overall level of expenditure on goods, services such as education and health. These are recurring expenses.
- **Capital Expenditure:** includes the spending on infrastructure such as roads, hospitals, schools, adding up to the national capital stock.

Why or how is government spending justified?

- To tackle social issues and social dysfunctions such as inequality
- To provide access to services that benefit all citizens equally such as defense, health
- To provide infrastructure investment and help country's economic growth
- To guarantee a minimum level of income for poor people and general wealth distribution
- To help target the economic objectives such as low inflation and high employment
- To subsidize certain investments such as capital intensive investments (national airliners) and high risk new products (alternative energy sources)

Where does the money come from?

- **Direct taxes** are levied directly on income and corporate profits

- **Indirect taxes** are taxes on spending on a variety of goods. Examples of such taxes is the special case of taxation in demerit goods (alcohol and tobacco) which oftentimes have higher taxation because of moral, social health issues. Fuel is another example where governments apply an increased taxation with the intent to deter environmental harm.

Characteristics of taxes

Economists consider tax policies have these four fundamental desirable attributes:

- **Simplicity**: this refers to the ease of compliance by the taxpayer and enforcement by the revenue authorities - the final liability should be certain and not easily deflected (manipulated)
- **Efficiency**: Taxation should be as efficient as possible, interfering as little as possible in the choices of individuals. Taxes naturally affect behavior and markets, and should, in general, discourage work and investment as little as possible. (The special taxation of demerit goods incurs a philosophical dilemma because these fiscal policies directly promote or discourage the consumption of certain harmful goods)
- **Fairness**: the concept of fairness is subjective as everyone should pay the same amount of taxes (*horizontal taxation*) or richer people should pay more taxes (*vertical taxation*)
- **Revenue sufficiency**: tax policies should increase government revenue. If tax policies cannibalize own revenue base, such as increasing income tax rates reduces labor incentive, the policy is viewed as inefficient. A certain level of increase in income taxes can be offset by a decrease in output

2.3 Advantages and Disadvantages of Different fiscal policies

Advantages:

- Indirect taxes can be adjusted immediately at no expense.

Disadvantages:

- Direct taxes are more difficult to change without considerable notice, often with many months of delay. Direct tax adjustments require considerable change in the internal structure of tax collection, including payroll computer systems
- Capital spending plans take long to formulate and implement. There is a delay between planning, obtaining legal permissions and implementation - this is a valid criticism against fiscal stimulus.

2.4 The Fiscal Multiplier

The **Fiscal Multiplier** (Exogenous spending multiplier) is the ratio of change of national income arising from the change in government spending (autonomous spending). It tells us how much output is sensible to an increase in government spending.

The recipients of the increase in government spending will save a proportion of $1 - MPC = MPS$, that is ignoring additional taxes. This process continues on and on with money circulating in the economy - the fiscal multiplier is the geometric series with sum $\frac{1}{(1-MPC)}$.

Considering the effect of taxes, the fiscal multiplier is finally:

$$Fiscal_{multiplier} = \frac{1}{[1 - c(1-t)]} \tag{5}$$

References

[cfa, 2019] 2019. *CFA program curriculum*. CFA Institute.