

Macroeconomics

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Macroeconomics is the study of the entire economy in terms of the total amount of goods and services produced, total income earned, the level of employment of productive resources, and the general behavior of prices. Macroeconomics can be used to analyze how best to influence policy goals such as economic growth, price stability, full employment and the attainment of a sustainable balance of payments.

Origins of Macroeconomic thought

Until the 1930s most economic analysis concentrated on individual firms and industries. With the Great Depression of the 1930s, however, and the development of the concept of national income and product statistics, the field of macroeconomics began to expand. Particularly influential were the ideas of John Maynard Keynes, who used the concept of aggregate demand to explain fluctuations in output and unemployment. Keynesian economics is based on his ideas.

One of the challenges of economics has been a struggle to reconcile macroeconomic and microeconomic models. Starting in the 1950s, macroeconomists developed micro-based models of macroeconomic behavior (such as the consumption function). Dutch economist Jan Tinbergen developed the first comprehensive national macroeconomic model, which he first built for the Netherlands and later applied to the United States and the United Kingdom after World War II. The first global macroeconomic model, Wharton Econometric Forecasting Associates LINK project, was initiated by Lawrence Klein and was mentioned in his citation for the Bank of Sweden Prize in Economic Sciences in Memory of Alfred Nobel in 1980.

Theorists such as Robert Lucas Jr suggested (in the 1970s) that at least some traditional Keynesian macroeconomic models were questionable as they were not derived from assumptions about individual behavior. However, New Keynesian macroeconomics has generally presented microeconomic models to shore up their macroeconomic theorizing.

Today the main schools of macroeconomic thought are as follows:

- Keynesian economics, which focuses on aggregate demand to explain levels of unemployment and the business cycle. That is, business cycle fluctuations should be reduced through fiscal policy (the government spends more or less depending on the situation) and monetary policy. Early Keynesian macroeconomics was "activist," calling for regular use of policy to stabilize the capitalist economy, while some Keynesians called for the use of incomes policies.
- Monetarism, led by Milton Friedman, which holds that inflation is always and everywhere a monetary phenomenon. It rejects fiscal policy because it leads to "crowding out" of the private sector. Further, it does not wish to combat inflation or deflation by means of active demand management as in Keynesian economics, but by means of monetary policy rules, such as keeping the rate of growth of the money supply constant over time.
- Post-Keynesian economics represents a dissent from mainstream Keynesian economics, emphasizing the role of uncertainty and the historical process in macroeconomics.
- New classical economics, which explores the implications of rational expectations. Their original theoretical impetus was the charge that Keynesian economics lacks microeconomic foundations -- i.e. its assertions are not founded in basic economic theory. This school emerged during the 1970s. This school asserts that does not make sense to claim that the economy at any time might be "out-of-equilibrium". Fluctuations in aggregate variables follow from the individuals in the society continuously re-optimizing as new information of the state of the world is revealed.

- New Keynesian economics, which developed partly in response to new classical economics. It strives to provide microeconomic foundations to Keynesian economics by showing how imperfect markets can justify demand management.
- Supply-side economics, which delineates quite clearly the roles of monetary policy and fiscal policy. The focus for monetary policy should be purely on the price of money as determined by the supply of money and the demand for money. It advocates a monetary policy that directly targets the value of money and does not target interest rates at all. Typically the value of money is measured by reference to gold or some other reference. The focus of fiscal policy is to raise revenue for worthy government investments with a clear recognition of the impact that taxation has on domestic trade.
- Austrian macroeconomics presents another laissez-faire school of macroeconomics. It focuses on the business cycle that arises from government or central-bank interference that leads to deviations from the natural rate of interest.

It is important to understand that these schools of thought are not always in direct competition with one another – even though they sometimes reach differing conclusions. Macroeconomics is an ever evolving area of research. The goal of economic research is not to be "right," but rather to be accurate. It is likely that none of the current schools of economic thought perfectly capture the workings of the economy. They do, however, each contribute a small piece of the overall puzzle. As one learns more about each school of thought, it is possible to combine aspects of each in order to reach an informed synthesis.

NATIONAL INCOME ACCOUNTING

A variety of **measures of national income and output** are used in [economics](#) to estimate total economic activity in a country or region, including [gross domestic product \(GDP\)](#), gross national product (**GNP**), and [net national income \(NNI\)](#).

There are three main ways of calculating these numbers; the **output approach**, the **income approach** and the **expenditure approach**. In theory, the three must yield the same, because total expenditures on goods and services (GNE) must equal the total income paid to the producers ([GNI](#)), and that must also equal the total value of the output of goods and services (GNP).

However, in practice minor differences are obtained from the various methods for several reasons, including changes in inventory levels and errors in the statistics. This is because goods in inventory have been produced (therefore included in GNP), but not yet sold (therefore not yet included in GNE). Similar timing issues can also cause a slight discrepancy between the value of goods produced (GNP) and the payments to the factors that produced the goods, particularly if inputs are purchased on credit, and also because wages are collected often after a period of production.

GDP vs. GNP

Gross domestic product (**GDP**) is defined as the "value of all final goods and services produced in a country in one year". On the other hand, Gross National Product (**GNP**) is defined as the "value of all goods and services produced in a country in one year, plus income earned by its citizens abroad, minus income earned by foreigners in the country". The key difference between the two is that GDP is the total output of a region, e.g. France, and GNP is the total output of all nationals of a region, e.g. French.

To give an example of the difference between GDP and GNP, and also income, using United States.

Period Ending	2003
Gross national product	11,059.3
Net U.S. income receipts from rest of the world	55.2
U.S. income receipts	329.1
U.S. income payments	273.9
Gross domestic product	11,004.1
Private consumption of fixed capital	1,135.9
Government consumption of fixed capital	218.1
Statistical discrepancy	25.6
National Income	9,679.7

GNP is less used than in the past, as many countries have many citizens working abroad. Because of this, GDP is becoming a more popular measure nowadays.

Concepts related to GDP

A number of ratios are derived from GDP. These include:

- **NDP**: Net domestic product is defined as "gross domestic product (GDP) minus depreciation of capital", similar to NNP.
- **GDP per capita**: Gross domestic product per capita is the mean value of the output produced per person, which is also the mean income.

These terms often use "expenditure", or "income" instead of "product". These are still the same, as for all goods that are produced, an amount of money equal to the value of the goods produced is spent on purchasing the goods, and the money spent purchasing the goods is paid to the workers as income. Therefore, production, expenditures, and income are all equal.

Also, "domestic" is often substituted with "national", as explained in GDP vs. GNP.

The output approach

The **output approach** focuses on finding the total output of a nation by directly finding the total value of all goods and services a nation produces.

Because of the complication of the multiple stages in the production of a good or service, only the final value of a good or service is included in total output. This avoids an issue often called '[double counting](#)', wherein the total value of a good is included several times in national output, by counting it repeatedly in several stages of production. In the example of meat production, the value of the good from the farm may be \$10, then \$30 from the butchers, and then \$60 from the supermarket. The value that should be included in final national output should be \$60, not the sum of all those numbers, \$100. The [values added](#) at each stage of production over the previous stage are respectively \$10, \$20, and \$30. Their sum gives an alternative way of calculating the value of final output.

The method of calculating national income by output, value added method:

GDP(gross domestic product) at market price = value of output in an economy in a particular year - intermediate consumption

The income approach

The **income approach** focuses on finding the total output of a nation by finding the total income of a nation. This is acceptable, because all money spent on the production of a good - the total value of the good - is paid to workers as income.

The main types of income that are included in this measurement are rent (the money paid to owners of land), salaries and wages (the money paid to workers who are involved in the production process, and those who provide the natural resources), interest (the money paid for the use of man-made resources, such as machines used in production), and profit (the money gained by the entrepreneur - the businessman who combines these resources to produce a good or service).

The equation for measurement of National Income by Income Method:

NDP at factor cost = compensation of employee + operating surplus + mixed income of self employee

The expenditure approach

The **expenditure approach** is the most popular national output accounting method. It focuses on finding the total output of a nation by finding the total amount of money spent. This too is acceptable, because like income, the total value of all goods is equal to the total amount of money spent on goods. The basic formula for domestic output combines all the different areas in which money is spent within the region, and then combining them to find the total output.

$$\mathbf{GDP = C + I + G + (X - M)}$$

Where:

C = Household consumption expenditures / Personal consumption expenditures

I = Gross private domestic investment

G = Government consumption and gross investment expenditures

X = Gross exports of goods and services

M = Gross imports of goods and services

Note: **(X - M)** is often written as N_x , which stands for "Net Exports"

National income and welfare

GDP per capita (per person) is often used as a measure of a person's [welfare](#). Countries with higher GDP may be more likely to also score highly on other measures of welfare, such as [life expectancy](#). However, there are serious limitations to the usefulness of GDP as a measure of welfare:

- Measures of GDP typically exclude unpaid economic activity, most importantly domestic work such as childcare. This leads to distortions; for example, a paid nanny's income contributes to GDP, but an unpaid parent's time spent caring for children will not, even though they are both carrying out the same economic activity.
- GDP takes no account of the inputs used to produce the output. For example, if everyone worked for twice the number of hours, then GDP might roughly double, but this does not necessarily mean that workers are better off as they would have less leisure time. Similarly, the impact of economic activity on the environment is not measured in calculating GDP.
- Comparison of GDP from one country to another may be distorted by movements in exchange rates. Measuring national income at [purchasing power parity](#) may overcome this problem at the risk of overvaluing basic goods and services, for example subsistence farming.
- GDP does not measure factors that affect quality of life, such as the quality of the environment (as distinct from the input value) and security from crime. This leads to distortions - for example, spending on cleaning up an oil spill is included in GDP, but the negative impact of the spill on well-being (e.g. loss of clean beaches) is not measured.
- GDP is the mean (average) wealth rather than median (middle-point) wealth. Countries with a skewed income distribution may have a relatively high per-capita GDP while the majority of its citizens have a relatively low level of income, due to concentration of wealth in the hands of a small fraction of the population. See [Gini coefficient](#).

IS-LM Model

The **IS/LM model** is a macroeconomic tool that demonstrates the relationship between interest rates and real output in the goods and services market and the money market. The intersection of the IS and LM curves is the "General Equilibrium" where there is simultaneous equilibrium in all the markets of the economy. IS/LM stands for Investment Saving / Liquidity preference Money supply.

History

The **IS/LM** model was born at the Econometric Conference held in Oxford during September, 1936. Roy Harrod, John R. Hicks, and James Meade all presented papers describing mathematical models attempting to summarize John Maynard Keynes' *General Theory of Employment, Interest, and Money*. Hicks, who had seen a draft of Harrod's paper, invented the **IS/LM** model (originally using LL, not LM). He later presented it in "Mr. Keynes and the Classics: A Suggested Interpretation".

Hicks later agreed that the model missed important points from the Keynesian theory, criticizing it as having very limited use beyond "a classroom gadget", and criticizing equilibrium methods generally: "When one turns to questions of policy, looking towards the future instead of the past, the use of equilibrium methods is still more suspect." The first problem was that it presents the real and monetary sectors as separate, something Keynes attempted to transcend. In addition, an equilibrium model ignores uncertainty – and that liquidity preference only makes sense in the presence of uncertainty "For there is no sense in liquidity, unless expectations are uncertain." A shift in the **IS** or **LM** curve will cause change in expectations, causing the other curve to shift. Most modern macroeconomists see the **IS/LM** model as being at best a first approximation for understanding the real world.

Although disputed in some circles and accepted to be imperfect, the model is widely used and seen as useful in gaining an understanding of macroeconomic theory. It is used in the popular U.S. college macroeconomics textbook by Gregory Mankiw, and many others.

Formulation

The model is presented as a graph of two intersecting lines in the first quadrant.

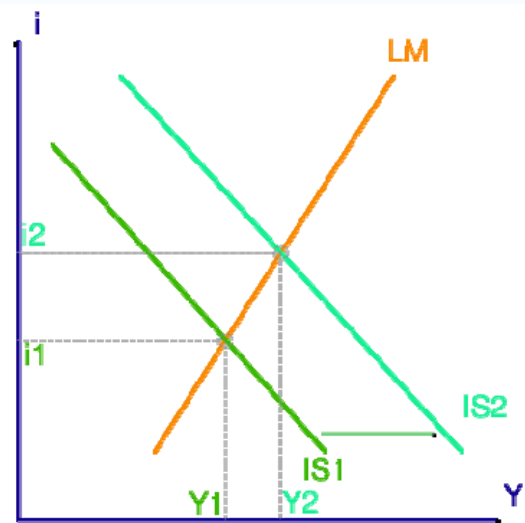
The horizontal axis represents national income or real gross domestic product and is labelled **Y**. The vertical axis represents the nominal interest rate, ***i***.

The point where these schedules intersect represents a short-run equilibrium in the real and monetary sectors (though not necessarily in other sectors, such as labor markets): both product markets and money markets are in equilibrium. This equilibrium yields a unique combination of interest rates and real GDP.

IS schedule

The **IS** schedule is drawn as a downward-sloping curve with interest rates as a function of GDP (**Y**). The initials **IS** stand for "Investment and Saving equilibrium" but since 1937 have been used to represent the locus of all equilibria where total spending (consumer spending + planned private investment + government purchases + net exports) equals an economy's total output (equivalent to real income, **Y**, or GDP). To keep the link with the historical meaning, the **IS** curve can represent the equilibria where total private investment equals total saving, where the latter equals consumer saving *plus* government saving (the budget surplus) *plus* foreign saving (the trade surplus). Either way, in equilibrium, all spending is desired or planned; there is no unplanned inventory accumulation (i.e., no general glut of goods and services). The level of real GDP (**Y**) is determined along this line for each interest rate.

Thus the **IS** schedule is a locus of points of equilibrium in the "real" (non-financial) economy. Given expectations about returns on fixed investment, every level of interest rate (**i**) will generate a certain level of planned fixed investment and other interest-sensitive spending: lower interest rates encourage higher fixed investment and the like. Income is at the equilibrium level for a given interest rate when the saving that consumers choose to do, out of this income equals investment (or, more generally, when "leakages" from the circular flow equal "injections"). A higher level of income is needed to generate a higher level of saving (or leakages) at a given interest rate. Alternatively, the multiplier effect of an increase in fixed investment raises real GDP. Both ways explain the downward slope of the **IS** schedule. In sum, this line represents the line of causation from falling interest rates to rising planned fixed investment (etc.) to rising national income and output.



In a closed economy, the **IS** curve is defined as: $Y = C(Y - T) + I(r) + G$, where **Y** represents income, $C(Y - T)$ represents consumer spending as a function of disposable income (income, **Y**, minus taxes, **T**), $I(r)$ represents investment as a function of the real interest rate, and **G** represents government spending. In this equation, the level of **G** (government spending) and **T** (taxes) are presumed to be exogenous, meaning that they are taken as a given. To adapt this model to an open economy, a term for net exports (exports, **X**, minus imports, **M**) would need to be added to the **IS** equation. An economy with more imports than exports would have a negative net exports number.

LM Schedule

The **LM** schedule is an upward-sloping curve representing the role of finance and money. The initials **LM** stand for "Liquidity preference and Money supply equilibrium". As such, the LM function is the equilibrium point between the liquidity preference function and the money supply function (as determined by banks and central banks).

The liquidity preference function is simply the willingness to hold cash balances instead of securities. For this function, the interest rate (the vertical) is plotted against the quantity of cash balances (or liquidity, on the horizontal). The liquidity preference function is downward sloping. Two basic elements determine the

quantity of cash balances demanded (liquidity preference) - and therefore the position and slope of the function:

- 1) Transactions demand for money: this includes both a) the willingness to hold cash for everyday transactions as well as b) as a precautionary measure - in case of emergencies. Transactions demand is positively related to real GDP (represented by Y). This is simply explained - as GDP increases, so does spending and therefore transactions. As GDP is considered exogenous to the liquidity preference function, changes in GDP shift the curve. For example, an increase in GDP will, ceteris paribus (all else equal), move the entire liquidity function rightward in proportion to the GDP increase.
- 2) Speculative demand for money: this is the willingness to hold cash as an asset for speculative purposes. Speculative demand is inversely related to the interest rate. As the interest rate rises, the opportunity cost of holding cash increases - the incentive will be to move into securities. As will expectations based on current interest rate trends contributes to the inverse relationship. As the interest rate rises above its historical value, the expectation is for the interest rate to drop. Thus the incentive is to move out of securities and into cash.

The money supply function for this situation is plotted on the same graph as the liquidity preference function. Money supply is determined by the central bank decisions and willingness of commercial banks to loan money. Though the money supply is related indirectly to interest rates, in the short run, money supply in effect is perfectly inelastic with respect to nominal interest rates. Thus the money supply function is represented as a vertical line - it is a constant, independent of the interest rate GDP and other factors.

Mathematically, the **LM** curve is defined as $M / P = L(r, Y)$, where the supply of money is represented as the real money balance M/P (as opposed to the nominal balance M), with P representing the price level, equals the demand for money L , which is some function of the interest rate and the level of income.

Holding all variables constant, the intersection point between the liquidity preference and money supply functions constitute a single point on the LM curve. Recalling that for the LM curve, interest rate is plotted against the real GDP whereas the liquidity preference and money supply functions plot interest rates against quantity of cash balances), that an increase in GDP shifts the liquidity preference function rightward and that the money supply is constant, independent of GDP - the shape of the LM function becomes clear. As GDP increases, the negatively sloped liquidity preference function shifts rightward. Money supply, and therefore cash balances, are constant and thus, the interest rate increases. It is easy to see therefore, that the LM function is positively sloped.

Shifts

One hypothesis is that a government's deficit spending ("fiscal policy") has an effect similar to that of a lower saving rate or increased private fixed investment, increasing the amount of aggregate demand for national income at each individual interest rate. An increased deficit by the national government shifts the **IS** curve to the right. This raises the equilibrium interest rate (from i_1 to i_2) and national income (from Y_1 to Y_2), as shown in the graph above.

From the point of view of quantity theory of money, fiscal actions that leave the money supply unchanged can only shift aggregate demand if they receive support from the monetary sector. In this case, the velocity or demand of money determines aggregate demand. If the velocity of money remains unchanged at the initial level of output, so does aggregate demand. Essentially, the monetary sector is the source of any shift that occurs. From the monetarist perspective, money velocity is stable, but, from a Keynesian

point of view, an increase in aggregate demand can increase the velocity of money and lead to higher output.

The graph indicates one of the major criticisms of deficit spending as a way to stimulate the economy: rising interest rates lead to crowding out – i.e., discouragement – of private fixed investment, which in turn may hurt long-term growth of the supply side (potential output). Keynesians respond that deficit spending may actually "crowd in" (encourage) private fixed investment via the accelerator effect, which helps long-term growth. Further, if government deficits are spent on productive public investment (e.g., infrastructure or public health) that directly and eventually raises potential output. Whether a stimulus crowds out or in depends on the shape of the LM curve. A shift in the IS curve along a relatively flat LM curve can increase output substantially with little change in the interest rate. On the other hand, an upward shift in the IS curve along a vertical LM curve will lead to higher interest rates, but no change in output (This case represents the Treasury View).

The **IS/LM** model also allows for the role of monetary policy. If the money supply is increased, that shifts the **LM** curve to the right, lowering interest rates and raising equilibrium national income.

Usually the model is used to study the short run when prices are fixed or sticky and no inflation is taken into consideration. To include these and other crucial issues, several further diagrams are needed or the equations behind the curves need to be modified.