MAIDEN LANE DIVISION: A Primer on Monetary Policy

This primer reviews important monetary policy concepts and widely used data series that all monetary economists track in order to provide a well-informed policy recommendation. For your reference, terms in **bold** are defined in the *Glossary* at the end of this document.

I. Measuring Economic Activity

Gross Domestic Product (GDP) measures aggregate economic activity, and is defined as the dollar value of output produced in the economy in a given time period. In the US, measures of GDP are produced on a quarterly bases and released in the **National Income and Product Accounts (NIPA)**. Economists and central bankers track the **growth rate** of GDP to gauge how the economy is generally performing. GDP is calculated using three methodologies, but ultimately captures the same value. These methodologies are the value-added approach, the expenditure approach and the income approach. We focus on the latter two, because they provide us with an understanding of fundamental sources of economic activity underlying GDP growth.

In the **expenditure approach**, GDP is measured as the sum of different categories of expenditures or purchases made by agents in the economy. The four main expenditure categories in GDP are consumption (C), investment (I), government spending (G), and net exports (NX).

In the U.S., **consumption** (or more fully, **personal consumption expenditure**) includes all final goods and services purchased by domestic households. Consumption is very important to the economy, accounting for about 70 percent of GDP in most years. It is further broken down into **non-durable goods** consumption (or perishable goods such as food and clothing), and **durable goods** consumption (or goods that last for longer periods of time, such as cars, furniture, and appliances), and **services** (items that are not tangible such as haircuts and hotel, healthcare and education services). In general, economists tend to track durable goods as a measure of how consumers are doing, because the decision to purchase cars and other such durable goods depends on the state of the economy. This is contrast to non-durable goods, which households would like to consume regardless of the state of the economy. Durable goods therefore provide a better reflection of consumer behavior from an economist's perspective.

As the name implies, **investment** includes purchases of investment goods. This is further broken down into **residential investment** (any type of investment in housing or real-estate), **non-residential investment** (investment in equipment and structures), and **inventories** (goods

that are produced during the current time period, but are not sold and are therefore carried over to the next time period and put in storage). Looking at movements in each of these categories allows economists to identify sectors of the economy that are performing well. For example, when there is positive residential investment growth, this can be a signal of increasing household incomes and therefore increasing demand for additional housing. On the other hand, if non-residential investment and inventories are rising, this can be a signal of booming economic activity for firms in the economy.

The last two categories are **government spending** (includes any type of purchase that federal, state and local governments make) and **net exports** (exports minus imports). **Exports** are goods that are produced domestically but purchased by foreigners, while **imports** are goods that are produced abroad but purchased by domestic consumers. Movements in net exports reflect how much of expenditures are paid to domestic producers, relative to foreign producers.

In the second method of calculation, the **income approach**, GDP is measured as the total income of the resources used in production. While in the expenditure approach we think of output from the side of the consumer spending, in the income approach we think of output from the side of the firm's income and revenues. The two main types of resources used to produce goods and services are **employed workers** and **capital** (factories and plants, machines, computers and other equipment). Each of these resources is paid some form of income; in particular, laborers receive **wages**, while capital owners receive **profits** and **rents**. Adding up all these incomes across all goods and services that are produced domestically amounts to GDP. To understand of underlying movements in the macroeconomy, it is often useful to understand movements in total wages and rents. In particular, economists generally track **average hourly earnings** as an indicator of the level of wages in the economy.

It is important to note that calculations using the income and expenditure approaches yield the same measure of GDP. This is because the total quantity of output produced by the economy is ultimately sold, and is therefore received as income by those who produced the good. Consequently, these agents spend this income, which then shows up as an expenditure. This is an important **income-expenditure identity** and is typically expressed as

$$Y = C + I + G + NX.$$

Lastly, in the **value-added approach**, GDP is measured as the value of all final goods and services minus the value of intermediate inputs used in production. The reason that intermediate goods and services are subtracted is to avoid double counting.

II. Real GDP vs. Nominal GDP

Since GDP is measured according to the country's **currency** (chosen unit of money), it is in nominal terms. As such, it is more accurately referred to as **nominal GDP**. This means that nominal GDP reflects both the prices of goods and services, and the quantities of these goods and services. For example, if an economy produced a total of 100 widgets at $1/widget in 2010

and 100 widgets at $2/widget in 2011, then nominal GDP in 2010 is $100 and nominal GDP in 2011 is $200. Nominal GDP reflects both prices and quantities.

It is often useful to compare the level of output across different time periods. Notice that in the example above, real output or the amount of actual widgets produced in the economy remained the same, and only prices increased. To make this distinction, we calculate **real GDP** by dividing nominal GDP by the general price level. In our simple example, real GDP is $100/1 = 100 in 2010, and $200/2 = 100 in 2011. It is now clear that output in the economy has stayed constant. In other words, changes in real GDP reflect changes in actual production and do not incorporate movements in the price level. Because real GDP measures goods and services holding prices fixed, it is a more fundamental reflection of how the economy is doing.

III. Price Indices

A **price index** measures the average price level of goods and services over a period of time. It is used to calculate the **inflation rate**, or the percentage change in the price level. Given a measure of inflation or a measure of the price level, we can then determine how much of GDP growth is nominal and how much of it is real growth.

Common price indices used to calculate inflation are the **GDP implicit price deflator,** the **Personal Consumption Expenditure (PCE) Chain Price Index**, and the **Consumer Price Index (CPI).** The implicit price deflator is defined as GDP Deflator = (Nominal GDP/Real GDP) x 100. Here, the implicit price deflator is normalized to be 100 in the base year that nominal GDP is chosen to equal real GDP. The PCE Index, also referred to as the PCE deflator, is calculated similarly but reflects average price level of goods and services included in personal consumption expenditure part of GDP. Lastly, the CPI is calculated by measuring the average price level of a basket of goods and services typically purchased by US households. While the Fed tracks many different prices indices, they pay closer attention to the inflation rate calculated based on the PCE Index since it is more relevant to households and consumers.

Because both PCE and CPI indices include prices of all types of goods and services, they naturally include the prices of oil (gas) and food. These prices are more volatile relative to the prices of other things consumers purchase, meaning that they experience larger swings and more pronounced movements. Since these prices are also highly subject to unpredictable changes in the weather or to international issues, they do not necessarily reflect domestic activity. In addition, while the Fed is usually not concerned about the price of a single good, the price of oil affects numerous things in the economy. As a result, indices that take out the prices of energy and food are also calculated and inflation rates calculated based on these indices are called **core inflation** rates. In contrast, inflation rates that are based on the overall indices are called **headline or topline inflation** rates.

Economists typically assume that a low and stable rate of inflation at 2 percent supports long-term growth. However, inflation is not always around this level. When there are positive but declining inflation rates, the economy is in a period of **disinflation**. When there are negative

changes in the price level, the economy is in a period of **deflation**. On the flip side, when there are excessive rates of inflation, the economy is in a period of **hyperinflation**.

IV. Employment and the Labor Market

An alternative way of measuring economic activity is by looking at the **labor market**. Economists track the labor market as closely as output since workers play an essential role in the production of output and their income is subsequently used for consumption of this output. We first define basic labor market variables that measure **labor market tightness** (how difficult it is for firms to find the right workers). Within the **total working-age population**, there are those in the **labor force** and those that are **not in the labor force**. The fraction of the total working-age population that is in the labor force is called the **labor force participation rate**.

$$\text{Labor force participation rate} = \frac{\text{Labor force}}{\text{Total working age population}}.$$

Within those in the labor force, there are those who are **employed** (or have worked either full-time or part-time), or those who are **unemployed** (those who were not employed but actively looked for work). The **unemployment rate** is defined as the fraction of the labor force that is unemployed.

$$\text{Unemployment rate} = \frac{\text{Unemployed}}{\text{Labor force}}.$$

The unemployment rate alone does not provide a complete picture of how the labor market is doing. First, in bad economic times, workings may stop looking for jobs even though they are willing to work. These are referred to as **discouraged workers**. Because discouraged workers have left the labor force, they are not included in the calculation of the unemployment rate. In particular, the unemployment rate might fall, which might lead economists to think that aggregate economic activity has improved. A second issue is that unemployed people may have different intensities with which they search for work, which also might change across time periods. Given these issues, economists look at other measures of labor market tightness, including the labor force participation rate and the level of **nonfarm payroll employment**.

V. Business Cycles

The measures of aggregate economic activity described so far fluctuate up and down in unpredictable ways, and it is useful to define benchmark measures around which these fluctuations occur. One of these measures is **potential GDP**, or the level of GDP that is consistent with full employment of resources. To measure potential GDP, economists use data on the total amount of capital in the economy that can be used for producing output, the total number of workers, and a measure of the level of technology in the economy. This provides a

rough estimate of the productive capacity of the country. When real GDP is above potential GDP, then the economy is in an **expansion or boom** phase. Conversely, when real GDP is below potential GDP, then the economy is in a **recession or bust** phase. The difference between real GDP and potential GDP is often referred to as the **output gap**. Movements in the output gap during expansions and recessions are referred to as **business cycles**.

Similarly, it is useful to define a benchmark measure of labor market tightness. Here we define the **natural rate of unemployment**, or the level of employment that is consistent with output growth at its potential growth. It is important to note that full employment does not mean that every worker is working. At any point in time, there will always be people who decide to switch jobs and move across locations. These movements often take time to accomplish. While these people technically do not have jobs, their unemployment is considered to be part of the natural order of things. Given this, the natural rate of unemployment is also called the **full-employment unemployment rate**.

Why is the Fed concerned with business cycles? This is because there is a close relationship between movements in output and employment. When the economy is producing output below its potential capacity during recessions, firms demand less labor, and unemployment typically rises above its natural rate. On other hand, when the economy is producing above capacity during expansions, there is excess demand for labor to sustain the level of production.

In the former case, it is quite easy to understand why the Fed is concerned when unemployment rates are too high. An economy with too many unemployed workers is not a sign of a well-functioning economy. Hence, the Fed wants the economy operating at full potential, which is only achieved at the natural rate of unemployment. This is why the Fed has maximum employment as part of its dual mandate.

But what happens when unemployment is too low? When the economy produces above capacity for longer periods of time, workers are relatively scarce. This causes workers to demand higher wages. As a result the prices of goods tend to rise as well. This observed negative relationship between inflation and unemployment is important in monetary economics and is known as the **Phillips curve.** In other words, decreases in unemployment co-move with higher levels of inflation while increases in unemployment co-move with lower levels of inflation.

This then begs the question, why is the Fed wary of high rates of inflation and why is price stability the other part of the dual mandate of the Fed? An important reason why too much inflation is harmful has something to do with what's called **purchasing power**. This reflects the amount of real goods that nominal income can purchase in a specific time period. For example, think of a worker who earns $10 today and is able to purchase 10 widgets at $1/widget. Suppose there is excessive inflation, and tomorrow, the price of a widget goes up to $10/widget. This same worker can now only purchase 1 widget for consumption. Now think of food and gas those households must buy, instead of widgets. It is clear that too much inflation erodes the purchasing power of households and firms. It is one of the core reasons why stable inflation is the second part of the Fed's dual mandate.

We can now see that there is an apparent tradeoff between inflation unemployment. Specifically, periods of high inflation are usually accompanied by low unemployment rates, and periods of low inflation are usually accompanied by high unemployment rates. The dual mandate means that the Fed is tasked with striking a balance between these two goals.

VI. Inflation Expectations and Economic Outlook

We have seen the role of the price level in the macroeconomy; however, we have not yet seen how this price level is determined in practice. We can think of the prices we observe in day-to-day life generally as the result of a negotiation between buyers and sellers. On one side, firms supply goods and services, while on the other side, consumers demand these goods and services. The result of this negotiation and the price at which they agree to conduct transactions is the price level. Of course, consumers do not typically negotiate the price of every single good they buy. However, they can decide to hold off on purchasing a good if it is too expensive. Firms understand this, and therefore set prices which buyers are willing to pay. In effect, this is a negotiation between buyers and sellers.

We can see that an important part of this price-setting process is some foresight by both buyers who demand goods and services, and corresponding sellers who supply them. In monetary policy, economists have come to understand that agents in the economy, including both households and firms, make predictions about the future before making decisions. For example, households adjust the patterns of their consumption when gas prices are too high and are expected to remain high for the foreseeable future, or may choose to purchase a house when house prices are low and may rise in the foreseeable future. Similarly, workers may demand higher wages when they expect higher prices of goods and services that they need to purchase. On the firm side, businesses set the prices of their goods and services based on what they expect the costs of laborers and the cost of making capital investments will be. Due to these reasons, economists understand that **inflation expectations** play a crucial role in the aggregate economy.

The pricing mechanism that goes through the expectations of households and firms is a powerful mechanism, and is therefore something that the Fed keeps track of closely. Inflation expectations are typically measured using survey data. For example, in the **Survey of Professional Forecasters** conducted by the Federal Reserve Bank of Philadelphia, economists can track inflation expectations for different price indices in the economy.

Along with inflation expectations, households have an outlook about the general economy. This includes issues beyond just the price level. This outlook is referred to as **consumer confidence**. It reflects how consumers feel about the current state of the economy, which of course affects how they make economic decisions. It also reflects how they view their personal financial situations. One of the main economic indicators that tracks consumer confidence is the **University of Michigan Consumer Sentiment Index**.

VII. The Money Supply

We have so far focused on various aspects of the macroeconomy, but we have not yet mentioned anything about money in our discussion of monetary economics. Specifically, what role does **money** play in the economy, and does the Fed have any influence over it?

We first need to understand the concept of money and where it comes from. From a practical perspective, all agents in the economy complete economic transactions using money. While this may sound very simple, this already encompasses several different fundamental purposes of money: as a unit of account, a store of value, and as a store of liquidity (or medium of exchange). Each of these properties is described below.

First, money is a **unit of account**, meaning that the value of all goods and services are commonly denominated by money. In the US, money is denominated in US dollars (also often referred to as the money's currency). By standardizing everything into one unit of account, agents can easily complete transactions. As an example, imagine a **barter** economy where money does not exist. Imagine that there are three goods in this economy: bread, apples and widgets. A person who produces bread, interested in consuming apples, but only meets people who produce widgets or only meets people who have apples but do not want bread may face trouble in terms of consumption. However, if bread, apples and widgets were all denominated in dollars, this person can more easily purchase the goods he wants to consume.

Second, money is used as a **store of value**. When people earn income in the form of money, they might not necessarily want to spend it immediately, and may choose to delay their economic transactions. Money then allows them to store this capacity to purchase goods for a later date.

Lastly, money is a **store of liquidity** or a **medium of exchange**. One of the key features of money is that it is highly liquid, meaning that it is easily transferable between people. In other words, people will always be willing to accept money when selling goods, and people can easily use money when purchasing goods. The property of money that captures this ease-of-use makes it a good store of liquidity. As a result, people are willing to use money as the medium of exchange when making transactions. This is closely related to the benefits of using money described in barter economy above.

Given these three important purposes of money, an appropriate supply of money is then necessary for a well-functioning economy. The natural question then is, how is money related to the economic concepts of output, employment and the price level that we have discussed previously?

The easiest way to understand the role of money in the economy is by first looking at the price level. Imagine the same economy that we have analyzed previously, which produces 10 widgets at $1/widget. We now introduce **money supply** and suppose that there are 10 one-dollar bills available in the economy. This money supply is consistent with the output of 10 widgets and

the price level of 1 in our simple economy. Now suppose that money supply randomly increases tenfold, and there are now 100 one-dollar bills available in the economy. What happens? If at the end of the day, agents were only concerned about how many widgets they consumed, they would not care if the price of each widget was $10, as long as in the aggregate they also earn $100. This is a pretty realistic argument to make. At the end of the day, money is only important to households and firms in as much as it allows them to purchase real goods.

In other words, a scenario where the money supply, total income from selling widgets and total consumption of widgets were all $10 in the aggregate is similar to a scenario where the money supply, total income and total consumption were all equal to $100. This is because real GDP in this economy was simply 10 actual widgets. This important economic concept is known in monetary economics as the **neutrality of money**. This means that in certain types of situations money is neutral, or does not necessarily play a role when we are looking at real output. Of course reality is more complicated than the economy just described. However, understanding the concept of neutrality provides us a benchmark for understanding the nature of these complications.

Although money may be neutral from the perspective of looking at real output, notice the important relationship between money and the price level. In particular, when there is a lot of money supplied in the economy, prices tend to rise as well. This means that there are lot more actual dollars lying around in the economy (but not necessarily real goods or services), and so prices adjust to reflect this additional money.

VIII. Money and Bonds

Before we finally understand monetary policy and the role of the Fed, we discuss one last important aspect of the economy called **bonds**. A bond is a debt contract between a borrower and a lender wherein the borrower receives cash from a lender in the current period and promises to pay the lender back the total amount plus an interest rate in future periods.

It is useful to understand bonds based on both the perspective of the borrower and the lender. First, from the perspective of the lender, it is important to understand that bonds are a type of **asset.** A lender with excess cash may choose to store their income and wealth in a bond. As an asset these bonds provide the lender with a return in the form of the interest rate. When households receive income, they may choose to either spend their income on consumption or they may choose to save it. When saving, households also have several options. Two of the main options that people use are money and bonds. Examples of saving in the form of money are when households place their income in **deposit** or checking accounts, or simply holding cash in their wallets. In addition, households can also choose to hold bonds. This is why bonds are vehicles for saving, and those who hold bonds are considered lenders.

Interest rates are typically positive, meaning that the return that a household receives from saving in the form of bonds is higher than the return from saving in the form of money (in fact, it is typically zero.) However, we have seen in the previous section that money has many

important benefits. Households then try to balance their personal benefit from money relative to the interest rate received on bonds.

Second, from the perspective of the borrower, it is important to note that bonds are a form of **liability**. While a borrower receives cash in the current period, he/she promises and is obligated to pay back the lender the principal amount and the interest rate.

Given these borrower and lender perspectives, it is clear that the level of the interest rate is an important feature of bonds. When interest rates are high, savers get higher returns and are encouraged to save. On the other hand however, borrowers face a higher cost to obtain cash in the current period and are therefore discouraged from borrowing. Similarly when interest rates are low, savers are less inclined to save while borrowers are more encouraged to borrow.

IX. Monetary Policy and the Federal Reserve

We are now ready to tackle monetary policy and the important role that the Fed plays. As a brief introduction, the **Federal Reserve System (the Fed)** is the central banking authority in the US and was established by the Federal Reserve Act in 1913. It is in charge of adjusting the money supply in the economy with the dual mandate of maximum employment and stable inflation rates in mind. The **Federal Open Market Committee (FOMC)** is the main committee that oversees monetary policy decision-making.

The primary way in which the Fed influences the economy is through the relationship between the money supply and interest rates. The process through which these two end up affecting the real economy is known as the **monetary transmission mechanism**. Both are described below.

When the economy is booming, output is above potential, inflation is typically high and unemployment is below the natural rate. During these time periods, the Fed might be concerned that the economy is overheating and that inflation might rise to unsustainable levels. In these times, there is either a strong demand for current consumption or a strong push for firms to produce, both of which push price levels up.

In this case, the Fed wants to encourage people to turn away from consumption and move towards saving. More specifically, the Fed wants to encourage people to hold bonds instead of money. In order for this to happen, it conducts monetary policy so that interest rates adjust upward to make it more attractive for consumers to hold bonds instead of consuming. This is referred to as **tightening** or **contractionary** monetary policy.

The Fed implements contractionary policy by reducing the money supply in the economy. It does so through Open Market Operations (OMO) wherein the Fed sells outstanding bonds to the market. By selling bonds for money, or in other words by exchanging bonds for money, the Fed increases the supply of bonds and reduces the supply of money in the market. At this point, it is useful to recall the relationship between money supply and the price level that was discussed in previous sections. In particular, when money supply is high, prices tend to be high

as well. In the case of booms when the Fed reduces money supply, they aim to reduce the price level back down to more sustainable levels.

Conversely, when the economy is in a recession, output is below potential, inflation is typically below 2 percent and unemployment rates are high. During these times, the Fed is concerned that the economy is underperforming. To encourage the production and consumption of output, the Fed wants to encourage activity in the current period and discourage saving, which pushes the spending of that income towards future periods.

In the case of recessions, the Fed implements monetary policy by purchasing bonds and in exchange for money. By reducing the supply of bonds and increasing the money supply, the Fed aims to raise prices to a level consistent with potential output growth. In the process, as less bonds are available in the market, interest rates must come down to make it less attractive to hold bonds. The adjustment of interest rates downward is referred to as **loosening** or **expansionary** monetary policy.

In practice, the Fed sets a target for the **federal funds rate**, which is the overnight interest rate at which banks lend to each other. It conducts open market operations, meaning it purchases or sells bonds in exchange for money, until the federal funds rate is close to its target rate.

Although the Fed only sets a target for the federal funds rate, it also changes many different interest rates in the economy. This is often referred to as the **interest rate channel** of monetary policy. This is because banks use the federal funds rate as a benchmark when setting rates for other types of financial products. Examples of other interest rates are **mortgage rates**, the **prime rate** (interest rate on high-quality borrowers), and rates on **Treasury notes and bills**. In particular, when the Fed conducts expansionary policy and lowers the target federal funds rate, other interest rates that banks charge to borrowers decrease as well. Recall that expansionary policy is conducted when the economy is underperforming. With lower overall interest rates, the Fed aims to encourage the supply of credit available in the economy. In other words, the Fed would like to make it cheaper for households to and firms to borrow in order to consume and make investments. By doing so, their aim to **stimulate aggregate demand** for output produced in the economy.

As a more concrete example of the transmission mechanism of monetary policy, think of the decision of a household to buy a home. In order to do so, most homebuyers take out a **mortgage** (long-term loan to purchase real estate, usually with a **maturity** of 15 to 30 years). Because these loans are very long-term, the interest rate at which households take out the loan is very important. When the Fed lowers interest rates, mortgage rates will tend to decrease as well, making it more attractive to purchase housing. An increase in housing demand then encourages firms to construct more housing and hire more workers. In addition, sales for firms who perform real estate services or sell furniture also increase. Therefore, when the economy is underperforming, lowering interest rates may help the economy get back to its potential.

A similar transmission mechanism occurs when the Fed conducts contractionary monetary policy. In this case, the Fed sets a higher target for the federal funds rate and conducts open

market operations until this target is reached. Other interest rates in the economy also increase. As a result, borrowing becomes more expensive for both households and firms. This discourages additional investment in the aggregate economy. Recall that the Fed conducts contractionary policy when the economy is overheating, meaning output is above potential, there is excess investment occurring, and the excess activity is causing inflation to rise above sustainable levels. Lowering interest rates aims to counter this activity.

Glossary

Asset: any economic resource that is considered to have positive economic value. This term is typically used in the context of financial instruments such as money and bonds.

Average hourly earnings: nominal measure of earnings of all jobs in the private nonfarm sector of the economy.

Barter: an economy where transactions are in the form of direct exchange of goods and services, without using a medium of exchange like money.

Boom: see *expansion*.

Bonds: financial instrument reflecting indebtedness. The issuer of the bond receives cash in the current period in exchange for the promise of paying back the loan amount plus interest in the future. In effect, the owner of the bond lends money to the issuer in the current period. Alternatively, the owner can be thought of as saving in the form of purchasing bonds.

Business cycles: movements of GDP growth around potential GDP, which are referred to as *recessions* or *expansions*.

Bust: see *recession.*

Capital (also capital goods, real capital, capital stock): durable and non-financial asset that is used in production. This is one of the main factors of production, the other one being human capital (or labor).

Consumer Confidence: economic indicator reflecting how consumers are feeling about the overall state of the economy. This is typically informed by their current employment and financial situations, including their inflation expectations, spending plans, and how they are feeling about the future.

Consumer Price Index (CPI)**:** common measure of the price level. It is measured based on a "market basket" of goods purchased by households. Available as both *headline inflation* and *core inflation*.

Consumption (also PCE): component of GDP that includes what consumers and households purchase. Components of consumption include *durable goods, nondurable goods, and services*.

Contractionary policy: when monetary policy aims to slow down the rate of GDP growth or inflation. In conventional monetary policy, this is performed by the central bank by raising the target federal funds rate. Opposite of *expansionary policy*.

Core inflation: inflation rate calculated based on a price index that excludes food and energy prices.

Currency: system of money (including bank notes and coins) used in a particular country. In the US, the currency used is the US dollar.

Cyclical unemployment: movements of the unemployment rate around the *natural rate of unemployment*, typically coinciding with business cycles.

Deflation: inflation rate that is decreasing.

Deposit account (also savings account, current account, checking account): an account with a banking institution that allows the owner to deposit and withdraw money.

Discouraged workers: workers who want to be employed but have given up searching for jobs.

Disinflation: positive inflation rates that are declining over time.

Durable goods: goods that last for a long time and are not consumed immediately such as household appliances, furniture and cars.

Employed: people who work in exchange for *wages*.

Expansion (also boom): period of positive GDP growth. It is the period in between a trough (low point) and a peak (high point) of a business cycle, as defined by the National Bureau of Economic Research (NBER)**.**

Expansionary policy: when monetary policy aims to stimulate or increase the rate of GDP growth or inflation. In conventional monetary policy, this is performed by the central bank by lowering the target federal funds rate. Opposite of *contractionary policy*.

Expenditure approach: method of measuring GDP which sums all final goods and services purchased agents in the economy (households, firms and government). Components of GDP by expenditure include *consumption*, *investment*, *government spending***,** and *net exports*.

Exports: component of GDP that includes goods and services produced by a country domestically that are purchased by agents in a foreign country.

Federal funds rate (FFR)**:** interest rate rate at which financial institutions borrow and lend in the overnight market

Federal Open Market Committee (FOMC)**:** committee with the Federal Reserve that in charge of overseeing monetary policy by specifying the target federal funds rate. The committee is also in charge of overseeing open market operations to implement this policy.

Federal Reserve System (also the Fed, FRS)**:** central banking system in the US created under the Federal Reserve Act in 1913.

Financial investment: acquisition or purchase of financial assets such as money, bonds and stocks.

Full-employment output: see *potential GDP*.

Full-employment unemployment rate: see *natural rate of unemployment.*

GDP implicit price deflator: measures the price level of all goods included in the calculation of GDP. Specifically, it is defined as GDP Deflator = (Nominal GDP/Real GDP) x 100, where the deflator is set to 100 in a chosen base year.

Government spending: component of GDP that includes spending by federal, state, and local governments.

Gross Domestic Product (GDP): measures aggregate economic activity, output, and production in a given time period. GDP can be expressed in two different ways, either as *nominal GDP* or as *real GDP*.

Growth rate: rate of increase or percentage change, typically referring to economic growth or GDP growth.

Headline inflation (also topline inflation)**:** inflation rate calculated based on a price index that includes all goods (specifically including food and oil prices).

Hyperinflation: period of very high and increasing inflation rates.

Housing: see *residential investment.*

Imports: component of GDP that includes goods and services produced by a foreign country and are purchased domestically. It is important to note that since these are produced abroad, imports are subtracted or carry a negative sign in the calculation of GDP.

Income approach: method of calculating GDP that sums all the incomes to the resources used in the production of the goods and services included in GDP. Broadly, this sums *wages*, *profits* and *rents*.

Income-expenditure identity: states that the calculation of GDP using the income and expenditure approaches must equal each other. In particular, Y = C + I + G + NX. This is because the total quantity of output produced by the economy is ultimately sold and is therefore received as income by those who produced the good, and these agents ultimately spend this this income, which then shows up as an expenditure.

Inflation Expectations: what consumers and businesses think inflation rate will be in the future.

Inflation rate: rate of increase or percentage change in overall prices in the economy, as measured by price indices.

Interest rate: the cost of borrowing and lending. Any contract specifying borrowing and lending has an interest rate, and therefore there numerous interest rates in the economy. However, this term usually refers to a representative interest rate in a particular market or setting. Common interest rates include: *federal funds rate, Treasury bill rate, prime rate, mortgage rate*. Interest rates are in *nominal* terms, unless otherwise specified to be *real interest rates*.

Interest rate channel: transmission mechanism of monetary policy that occurs when changes in the effective federal funds rate controlled by the central bank end up changing interest rates in a variety of other markets in the economy.

Inventories: component of GDP that includes goods that are produced in a particular period but are not sold in the same period. Inventories are included in the calculation of *investment,* and can be thought of as investment goods because they are carried over into the next period.

Investment: component of GDP that includes the purchase of *capital goods* and adds to or takes from the level of capital stock in the economy. Components of investment include *residential investment*, *nonresidential investment*, and *inventories*. Note that investment is not the same as *financial investment*.

Labor force: refers to the people in the economy who are willing to work. This includes *employed* and *unemployed* workers.

Labor force participation rate: total labor force divided by the total population in the economy (over 16, not in the military, and not in prison or a hospital).

Labor market: the interaction of workers and employers in the economy, which includes the process for finding jobs, hiring and firing workers.

Labor market tightness: a measure of how easy or difficult it is for people in the labor force to fill vacant jobs.

Liability: an obligation to make payments in the future.

Loosening of policy: see *expansionary policy.*

Maturity: refers to the date of the final payment of any debt contract, such as a bond or a loan.

Medium of exchange: see *store of liquidity*.

Monetary transmission mechanism: channels through which monetary policy affects the economy. The primary monetary transmission mechanism operates through the *interest rate channel*.

Money supply (also money)**:** total amount of monetary assets available in the economy. The central bank controls the money supply when conducting monetary policy.

Mortgage: loan contract taken out by a household who purchases a house when his/her own funds cannot cover the entire purchase amount, usually from a bank. The term also applies to any economic agent purchasing any form of real estate.

Mortgage rate: interest rate at which the lender or bank will issue a *mortgage* to a household.

National Income and Product Accounts (NIPA): source of economic accounts data in the US, including measures of GDP.

Natural rate of unemployment: unemployment rate in the economy that is consistent with the *potential GDP*. This rate is not zero, since there will always be workers who flow in and out of jobs at any given time in the economy, and are therefore technically unemployed.

Net exports: *exports* minus *imports* of goods and services.

Neutrality of money: concept in monetary economics where movements in the money supply do not have an effect on *real GDP*.

Nominal GDP: the market value of all goods and services produced within a country in a given time period. Nominal GDP growth reflects changes in both prices and quantities, in contrast to *real GDP* growth, which holds prices fixed and therefore reflects changes in quantities only.

Non-durable goods: component of GDP that includes goods that are consumed quickly or immediately, such as food and clothing.

Non-residential investment: component of GDP that includes purchases of firms, such as factories, equipment and technology.

Nonfarm payroll employment: economic indicator from the *labor market* that counts the changes in the number of all *employed* workers in goods, manufacturing or construction companies in the US. This excludes farm workers, household employees or non-profit workers.

Not in the labor force: people in the *total working-age population* who are neither working nor looking for work.

Open Market Operations (OMO): purchases and sales of government bills, notes, and bonds on the open market by the Fed to bring the effective federal funds rate in the market close to the target rate set by monetary policy.

Output gap: difference between *potential GDP* and actual *GDP*, which could be either positive (the economy is producing above capacity) or negative (the economy is producing below capacity).

PCE deflator (also PCEPI, PCE)**:** price index reflecting the average price of level of goods included in the personal consumption expenditure component of GDP. Note that while PCE actually refers to the component of GDP, it is often also used as a shorter term for the PCE deflator (and PCE is referred to simply as consumption). PCE is available as both *headline inflation* and *core inflation*.

Personal consumption expenditure: see *consumption.*

Phillips curve: empirical relationship observed in the data describing the negative relationship between unemployment rates and inflation.

Potential GDP (also potential output, full-employment output): level of GDP that is consistent with the full use of economic resources such as labor, capital and technology in the economy.

Price index: economic indicator that reflects the average price level in the economy, used to calculate the *inflation rate*. The most common price indices are the *PCE deflator* and the *CPI*.

Prime rate: interest rate at which banks lend to favored customers with good credit.

Profits: the difference between revenues and costs in the production of goods and services.

Purchasing power: the amount of goods and services that can be purchased given one unit of a specific *currency*. As an example, tracking how much $100 US dollars can buy in 1990 vs 2000 is a way of tracking purchasing power.

Real GDP: the amount of output produced in a given country over a specified time period, adjusting for changes in prices. It is approximately the difference between nominal GDP growth rate and the inflation rate.

Recession (also bust): period of declining GDP growth. It is the period in between a peak (high point) and a trough (low point) of a business cycle, as defined by the National Bureau of Economic Research (NBER)**.**

Rent (also economic rent)**:** general term for any payment or return to a factor production that is not labor. For example, there are rents to land ownership, rents to capital, or rents to patents or the creation of technology.

Residential investment: investment of households in real estate or *housing*.

Real interest rate: interest rate that the lender receives (or borrower pays) after adjusting for inflation. It is calculated as the *nominal* interest rate minus the *inflation rate*.

Services: non-tangible or non-material items, such as healthcare or education services.

Stimulate aggregate demand: encouraging the demand for goods and services, often by lowering the cost of borrowing as in *expansionary policy*.

Store of liquidity: characteristic of money that makes it highly liquid or easily transferable between people.

Store of value: characteristic of money that allows it to retain or keep value for use in future periods.

Survey of Professional Forecasters: quarterly survey conducted by the Federal Reserve Bank of Philadelphia on forecasts of main macroeconomic indicators.

Tightening: see *contractionary policy.*

Topline inflation: see *headline inflation*.

Total working-age population: adult population between the ages of 15-64. This includes *employed* people, *unemployed* people but searching for work, those *not in the labor force*, and *discouraged workers*.

Treasury bills (also T-bills): debt instruments issued by the US government that have a *maturity* of 1 year or less.

Treasury notes: debt instruments issued by the US government that have a medium-term *maturity* between 1 and 10 years.

Treasury bonds: debt instruments issued by the US government that have a long-term maturity of 20 to 30 years.

Treasury rates: interest rates on short-term government securities, often with a specified maturity. For example the interest rate on *Treasury bills* is referred to as the T-bill rate.

Unemployed: number of people (over the age of 16, not in the military, and not in prison or a hospital) who are actively searching for a job but do not have a job. They are included in the calculation of the *labor force*.

Unemployment Rate: defined as the number of *unemployed* divided by the divided by the total number of people in the *labor force*.

Unit of account: characteristic of money, which means that the economic value of different types of goods and services are measured in a common denomination.

University of Michigan Consumer Sentiment: economic indicator measuring consumer confidence published by the University of Michigan. It reflects how consumers view their own financial situation and the macroeconomy in general.

Value-added approach: method of measuring GDP that sums the total value of all output less the value of the intermediate inputs used in production.

Wages: payment that workers receive for their jobs. The economic indicator measuring the general wage rate in the economy is *average hourly earnings*.

Workers: see *labor force*.