

Fundamentals

Economics is the study of how individuals, institutions, and society choose to deal with **scarcity**. Without scarcity, there would be no need for the study of economics. Economics can be divided into two macro-categories.

- **Microeconomics:** focuses its attention on the decision-making of individuals and businesses. A key-word in micro-economics is **market**. Whenever and wherever buyers and sellers come together to exchange resources, good, or services, a market is created.
- **Macroeconomics:** studies how entire nations deal with scarcity. In particular, they analyze the systems created by nations and answer questions like *why does unemployment exist?* or *What impact does a given tax policy have on the economy?*

Economics relies on assumptions. The main ones are:

1. The ceteris paribus assumption. If an economist says *if I change A like this then B changes like that*, what she really means is *if I change A like this then B changes like that, assuming nothing else changes*.
2. People are rational and behave rationally.
3. People are selfish and self-interested.

Those assumptions are subject to criticism and debate, and an important argument is that they ignore human psychology. Some people argue that instead of being abstract like mathematics, economics should be a little more messy, complex, and organic, like biology.

Historical Considerations

For as long as there have been people, there has been trade. At first, trade was a simple matter (I give you A in exchange of B). Over time, trade expanded as people

were exposed to new goods, and developed a taste for them. The growth in trade led to the emergence of the merchant class, and the era of mercantilism.

Mercantilism (17-18th century) founded on the idea that a country is better off if the **value of exports is greater than the value of imports**. Under mercantilism, the more gold a country amassed, the wealthier it became. The obvious flaw in this approach is that if every country is playing the game of exporting more than what it is importing, then someone is going to lose. In order to maintain their export advantage, countries enacted law and taxes that distorted the flow of goods, thereby creating a win-lose condition that harmed more than it helped.

Free trade: the ideas of the Scottish philosopher Adam Smith, collected in the famous book *The Wealth of Nations* were influential in bringing an end to mercantilism. He argued that if a **country traded its best products, then society would be better off, even if this means importing manufacture goods from people in other countries**. One crucial argument in this theory is **comparative advantage**. A nation should produce the goods that maximize their comparative advantage. For instance, the comparative advantage for producing clothes in the US is smaller than the one in Bangladesh, even if Americans would have an absolute advantage in producing T-Shirts. The reason is that if Americans would invest 100 in producing T-Shirts, they would lose 100 in more remunerative fields like technology. On the other hand, if Bangladesh would invest 100 in producing T-Shirts, they would be better off considering opportunity cost.

When trade is both voluntary and free (aka *free trade*), both the buyer and the seller benefit, and hence wealth increases. Prior to World War II, trade agreements were mostly bilateral, and nations drifted towards isolationism and protectionism. After the Bretton Woods conference, countries worked to address the economic issues that were often cause of international conflicts. The IMF and the World Bank were born. In 1947 they formed the GATT (later WTO) to remove barriers to trade. As a result, international trade has continued to expand, and many nations have reaped the benefits. There are still, of course, barriers to free trade: tariffs (tax on import/export of certain products), quotas (i.e. a limit to the

number of imported goods), and embargoes.

There are different **economic systems**. They can be determined by the answers to three basic questions: 1. *What to produce?*, 2. *How to produce it?*, 3. *Whom to produce it for?*. Some main paradigms are:

- **Traditional economies:** predefined roles (women gather, men hunt, old, weak, and children are taken care of by society), continuity favored over innovation, no private property.
- **Command economies:** more involved societies where a leader (or a small group of leaders) takes care of decision making, and the other execute. Examples include ancient Egyptians and dictatorships (North Korea, Russia, ...).
- **Market economies:** no centralized decision making, individuals trying to satisfy their own self-interest answer the questions of what, how, and for whom to produce.

There are only very few traditional/ command economies, and pure market economies are non-existent. Modern economies are a mix of command economies and market economies. On one side of the spectrum we find the **socialist model**, on the other one the **capitalism**. Note that, however, even economies known to be capitalist still have government interventions, and so both extremes are practically non-existent.

Money and Banking

Before money was invented, barter was common. However, barter is not very efficient, and this pushed the development of money. **Money** is a medium of exchange that is also able to **store** value and serves as **standard of value**. The evolution of money includes fundamental steps such as commodity money (e.g. gold), representative money (which could be traded for the commodity money but was more practical), and inconvertible fiat money (e.g. the Swiss Franc). Inconvertible fiat can be considered money because the government says it and the people agree. A key actor in that contract is the central bank, which control its availability so that it does not become too plentiful or too scarce. It is crucial that

the government does not overprint money, otherwise the money will lose value resulting in inflation. Note that this was less of a concern when money was representative of a gold standard, because the government was only allowed to print as much money as the gold it had backed up. Overprinting and counterfeiting pose a serious threat to any money supply. To measure **money supply**, two primary measures are used:

- The **M1** is composed of checking account balances, cash, and coins circulating in the economy.
- The **M2** is composed of everything in the M1 plus all saving account balances, certificates of deposit, and money on deposit in foreign banks.

The M1 is mainly used as a medium of exchange, whereas the M2 is used as a store of value. An increase of the ratio of M1 to M2 indicates inflation, while a decrease indicates that the economy is headed toward recession. Money's value is affected by time: a dollar today is worth more than a dollar tomorrow. For this reason (inflation) and the opportunity cost, every loan must be paid back with interests.

Banks serve a variety of functions in the economy:

- Safe places for people to store their wealth.
- Facilitate trade by providing alternative methods of payment.
- Bring together savers and borrowers.

Banks profit mainly in three ways:

- The **spread**, or the difference between the interest rate they pay for deposits and the interest rate they receive on the loans they make.
- They earn **interest on the securities** they hold.
- They earn **fees** for customer services, such as checking accounts, financial counseling, loan servicing and the sales of other financial products (e.g., insurance and mutual funds).

An important equation in this context states that Assets (what the bank has) = Liabilities (what the bank owes, e.g. deposits) + Stockholder's Equity (i.e. bank's financial capital). Reserves are funds that are either available for lending (excess reserves) or held against checkable deposits (required reserves).

Markets

A market is a place that **brings together buyers and sellers**. Markets exist whenever and wherever buyer and seller interact, be it a physical location, via mail, or over the internet. Typical conditions for an efficient market include a **large number** of buyers and sellers acting **independently** according to their own **self-interest**, **perfect information** about what is being traded, and **freedom** of entry and exit to and from the market. A large number of participants in the market ensures that no one has too much influence over the prices. In efficient markets, there is no room for arbitrage (i.e. buying low in one place and selling high in another). Competitive markets (i.e. many buyers and sellers, everyone acting independently and according to their own self-interest, perfect information, freedom to entry and exit the market, and first that are unable to influence price much by selling at "market price") are preferable to other types of market. They are allocatively efficient, meaning that consumers get most benefit at the lowest price without creating any loss for producers. Moreover, perfect competition is also productively efficient, as firms will tend to produce at the lowest total cost per unit. We now take a look at the laws of the market (see also **law of demand** and **law of supply** in the last section). Let's start with the intuitive view.

Intuition

Consumers seek to maximize their utility subject to their budget constraint.

When supply meets demand, a price is born. In an efficient market, prices are a function of the supply and demand for the good or service. The pitting of consumers trying to maximize their utility against producers trying to maximize their profits is what determines the price. A market is said to be in equilibrium when at the

prevailing price there is neither a surplus nor a shortage of the good or service. This is also called market-clearing price. This is the most desirable outcome because it allows for consumers to maximize utility while also allowing producers to maximize profits. When market price is greater than equilibrium price, there is a surplus. If the market price is too low, then a shortage might result, possibly ending up bidding up the price until equilibrium is reached.

Change in either demand or supply will cause change in both price and quantity. Supply is influenced by:

- Nature: for instance excellent weather conditions can influence the supply of corn.
- Resource prices, for instance the price of land, seed, fertilizer, or pesticide.
- The presence of more or less competition. As the popularity of a product rises, more and more producers enter the market, hence production increases.
- The profitability of related goods and services also affects the supply of a good like coffee. For example, coffee-growing land is also favorable for growing cocoa. If the profits are greater in the cocoa market than in the coffee market, over time more effort will be pulled from coffee production to cocoa production.
- Government policies, e.g. tobacco industry.
- Technology and the availability of physical capital.

On the other hand, demand is influenced by knowledge (e.g. if you know Nutella is contaminated you avoid buying it), advertising, the price of related goods, and changes in consumers' income.

Firms change their production based on changes in the market. It is not always easy to make this decision. For instance, if a hardware company receives two big orders, is it an anomaly or a change in the market? If a company wants to change the production, in the short term only the labour can be changed (e.g. if you are a restaurant owner and expect a lot of people next week you can increase the number of workers), in the long term

also other factors (e.g. add a new kitchen). A firm's short-run production decisions are based on the firm's production function. A production function shows how a firm's output changes as it makes changes to a single input, like labor. The production function is divided into three stages:

1. When firms **experience increasing returns**, they hire more workers. Each additional worker contributes more to output than the previous worker (where the additional contribution of output from each worker is referred to as marginal product). In this stage, both output and marginal product are increasing.
2. When firms **experience diminishing returns**, firms continue hiring more workers and the output still increases, but the additional contribution of each worker decreases.
3. When firms experience **negative returns**, adding workers results in both output and marginal product decrease.

To maximize profits, often the best strategy is reducing costs, since it is easier than increasing the revenues. Costs are divided into different categories:

- Fixed costs, or overhead. Examples include rent, taxes, management salaries, and depreciation.
- Variable costs, that change with the level of a firm's output.

Note that, over the long run, all costs are variable and the distinction between fixed and variable costs disappears with the passage of time. This is the intuitive way to look at markets. We now present a toy simplified scenario to show how this can be translated mathematically.

Mathematical modeling

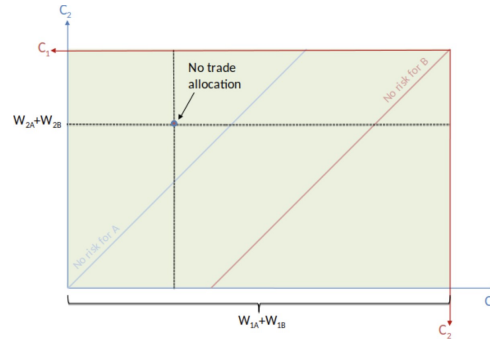
We start by a simple example with two agent A and B . Ex-post, there are two state of the world:

- In state $\omega = 1$, agents get income w_A^1 and w_B^1 .
- In state $\omega = 2$, agents get income w_A^2 and w_B^2 .

We denote with $c_A^1, c_A^2, c_B^1, c_B^2$ the consumptions of the agents in their respective state. The goal of the agent is getting a high consumption. Note, however, that since we assume that no value can be created out of nothing, it must hold that:

$$\begin{aligned} c_A^1 + c_B^1 &= w_A^1 + w_B^1 \\ c_A^2 + c_B^2 &= w_A^2 + w_B^2 \end{aligned}$$

Of course, the two agents can decide to not trade. The no-trade situation corresponds to $c_i^1 = w_i^1$ and $c_i^2 = w_i^2$ for $i \in \{A, B\}$. The situation can be represented graphically with an edgeworth box.



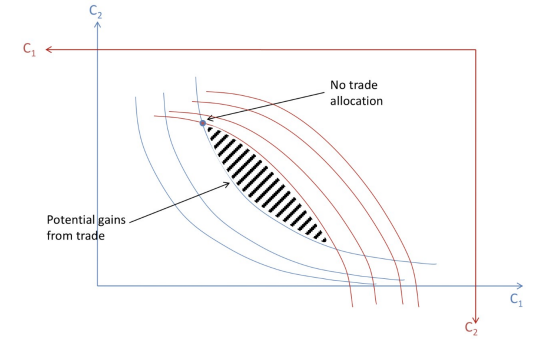
In the above picture, we observe the following.

- The no-line risks are where the consumption for a given agent is equal in both states.
- The lengths of the axis are $w_A^1 + w_B^1$ and $w_A^2 + w_B^2$ respectively.

Let's assume that agents $i = A, B$ aim to maximize a utility function $U_i : \mathbb{R}_+^2 \rightarrow \mathbb{R}$ such that

$$U_i(c_i^1, c_i^2) = \pi_1 u_i(c_i^1) + \pi_2 u_i(c_i^2)$$

where π_1 and π_2 are respectively the probability of occurrence of state 1 and 2, $u_i : \mathbb{R}_+ \rightarrow \mathbb{R}$ is a function called the utility index. Of course, for each agent, there are multiple c_i^1, c_i^2 with the same value of the utility function (which is, in general, non-injective). As shown in the figure below, from the no-trade situation, there might be consumptions where each agent has higher income compared to the no-trade situation.



Among the possible allocations, particularly interesting are the Pareto-optimal ones. An allocation is Pareto-optimal if and only if there is no alternative feasible outcome at which every individual in the economy is at least as well off and some individual is strictly better off. Graphically, Pareto-optimal allocations are the one where indifferent curves of agents A and B are tangents. Note that there may be many Pareto-optimal allocations, and agents may have different preferences about which is the most interesting one. The contract-curve is the part of the Pareto set for which both agents do at least as well as their initial endowments. This point is very important because both agents gain from the trade, and the outcome is Pareto-optimal. Let's not take a closer look to the concept of market equilibrium. The setting is that agents, ex-ante, trade assets on the market. The market equilibrium is obtained when asset prices are such that individual strategies are globally compatible, i.e. demand is equal to supply. We denote with Z_α^i (with $\alpha \in \{A, B\}$ and $i \in \{1, 2\}$) the quantities of the respective asset bought/ sold by the agent. We assume that ex-ante agents has no wealth. This justifies the constraint $p_1 z_i^1 + p_2 z_i^2 = 0$. Ex-post, on state j , the agent consumes $w_i^j + z_i^j$. Agent i solves the following:

$$\max_{z_i^1, z_i^2} U_i(w_i^1 + z_i^1, w_i^2 + z_i^2) \quad \text{subject to } p_1 z_i^1 + p_2 z_i^2 = 0$$

We say that a market is balanced if the following conditions (known as market clearing conditions) are satisfied:

$$\begin{aligned} z_A^1 + z_B^1 &= 0 \\ z_A^2 + z_B^2 &= 0 \end{aligned}$$

If we can solve the optimization problem for the individual's demand with demands/ supplies that satisfy the market clearing conditions, we have a market equilibrium. If a market equilibrium exists, prices are determined up to a multiplicative scalar. Market equilibrium satisfy the following properties:

- The market equilibrium generates a Pareto-optimal allocation.
- Market equilibrium allocations are comonotone. This is also the case for all Pareto-optimal allocations.

Perfect Competition

First, the assumptions:

- Consumers and producers have perfect knowledge of the market, and they make rational decisions.
- Consumers try to maximize their utility respecting the budget constraint, and producers try to maximize profit.
- Business can enter and exit the market without barriers.
- All producers make outputs that are identical and all of them have input (e.g. labor) that are the same.
- Lots of producers are competing in the same market, meaning that no producer has pricing power.

For an industry, the short run is the period of time in which firms are unable to enter or exit the market because they are only able to vary their labor and not their fixed capital. In the long run, however, firms are able to enter the market in presence of economic profits and to exist in response to losses.

Economists classify markets according to their level of competition. On the one end of the spectrum lie perfectly competitive (albeit fictional) markets. On the other end of the spectrum lies monopoly. In between structures like monopolistic competition (very similar to perfect

competition, but with product differentiation, for instance the fast food market) and oligopoly (markets with only a few big players that have price power, for instance the car industry).

Financial Markets

Financial markets serve a very basic purpose: to **connect the people who have money with the people who want money**. To understand it better, let's start from a model. In the model, there is an hypothetical market referred to as the loanable funds market. It exists to bring together savers and borrowers. The real interest occurs at the point where the amount saved equals the amount borrowed. According to the law of supply, producers are only willing to offer more if they can collect a higher price. In the loanable funds market, the price is the real interest rate. Savers, the producers of loanable funds, respond to the price by offering more funds as the rate increases and less as the rate decreases. Borrowers act as consumer of loanable funds, and their behaviour is explained by the law of demand. When the interest rate is high, they are less willing and able to borrow, and when interest rates are low, they are more willing and able to borrow.

Keynes's liquidity preference theory attacks the problem from a different angle. Instead of looking at saving and borrowing behaviour as the determinant of interest rates, Keynes taught that short-term interest rates are a function of consumers' liquidity preference or inclination for holding cash. At high nominal interest rates, people would rather hold interest-bearing non-cash assets like bonds, but as interest rates fall, people are more willing to hold cash as an asset because they are not sacrificing much interest to do so.

The bond market: for long-term financing, governments and firms are able to borrow in the bond market. When investors buy bonds, they are lending money to sellers with the expectation that they will be repaid their principal plus interest. For bond issuers, the bond market provides an efficient means of borrowing large sums of money. For the buyer, bonds provide a relatively secure financial investment that provides interest income. However, bonds are not without their downsides, in particular:

- The possibility that governments or firms may fail to pay back their borrowed money, and hence all bondholders face investment risk.
- If the rate of inflation increases during the life of a bond, the investor's return is offset by the inflation.
- If interest rates increase during the life of a bond, the value of the bond decreases until its effective yield equals the new higher interest rate. For bondholders, this means that they might lose principal if they try to sell it before maturity.
- If interest rates decline during the life of a bond, the issuer may find it beneficial to retire or call the old bonds and refinance at the new lower interest rate. For bondholders, this means that they lose out on earning the higher interest they would have had when the bond matured.

Prospective investors rely on rating agencies (e.g. Moody's Standard & Poors, Fitch, ...) to determine the quality of the bonds. As a bond's rating falls, the issuer must reward the investor with a higher interest rate to compensate for the additional risk. However, consumers should not entirely rely on bond ratings. Serious questions have arisen from the 2008 financial crisis about the rating process. During that time, many bonds were so quickly downgraded that investors who believed they were holding prime-rated bonds discovered that they had junk bonds within a short period of time.

The stock market: unlike bond markets, where investors are making loans to governments and firms, the stock market is where investors are able to purchase ownership in firms represented by shares of stock. Companies that are privately held don't issue stock for public purchase. Instead, they keep the shares among a small group of owners, often the founders. But for companies that want or need outside investment, trading on one of the stock exchanges is a good way to do this:

- Firms are able to raise the money they need for capital investment by issuing stock in an initial public offering (IPO).
- Investors purchase the stock with the expectation that it will either pay dividends or earn capital

gains. Investors warn dividends when a company divides a portion of the profits among all of the owners according to the number of shares each owns.

- Stock earns capital gains when it is sold at a higher price than for what it was purchased.

The majority of stock purchases and sales occur in the secondary market. The only time the firm receives money in a stock purchase is through an IPO or when the firm sells stock that it had repurchased earlier.

Companies issue two types of stock:

- Common stock that provides investors with partial ownership of a firm and also grants them the right to vote for the firm's leadership.
- Preferred stock that also allows ownership claim on a firm, but does not allow for voting privileges.

Options: instead of having the stock/ bond/ financial asset, you can have an option for it. Options include long calls (you can decide at/ before maturity whether you want to buy the asset for a pre-determined price, right that comes at a cost), short calls (you get paid, but at/ before maturity you have to sell the asset if it increases its value above a certain threshold), long puts (you can sell at a certain price at/ before maturity, and you have to pay a fee for the service), and short puts (you have to buy at a certain price at/ before maturity if the long position desires, and you get a compensation for it).

Funds: collect money of investors and allocate in different ways: stocks, bonds, raw material, real estate, start-ups (venture capitals), stakes in private companies (private equity), non-traditional risky assets (hedge funds).... Funds differ not just in where they allocate the money, but also in the minimum investment needed to entry, whether they pay dividends or not, how much they cost (since they are managed by experts you pay a fee to make them pick a suitable portfolio), when you can collect the money.. Index funds and ETFs (that replicate other funds, such as *S&P500*) are special kind of funds that invest passively and hence are cheaper, and they proved to perform very well.

Ultimately, the function of these various markets is to allow savers to connect with borrowers. Businesses seeking

to expand their capital investment look to the bond market and stock market as a source of needed funds. Firms are very conscious of their operating cost, so finding the appropriate combination of stock and bond financing, or capital structure, with which to finance investment is important both to the business and the economy as a whole. We conclude with a way of looking at the effects of interest rates and expected rates of return on a business. Imagine that the expected rate of return is the pressure applied to a car's gas pedal and the interest rate is the pressure applied to the brake pedal. Increase profit opportunities are represented by pressing down on the gas pedal and decreased profit opportunities are represented by letting your foot off the gas pedal. Similarly, increased interest rates are represented by pressing down on the brake pedal, lower interest rates are represented by putting less pressure on the brake pedal, and zero interest rate is analogous to not putting any pressure on the brake pedal. If interest rates are low and expected profits are high, the business moves forward with investment and grows. If, however, the interest rate is higher than the expected rate of return, firms are stationary. In the end, increases in the expected rate of return will accelerate investment while increases in interest rate will slow investment or even bring it to a complete stop.

Primer on Macroeconomics

Net exports, or the balance of trade, is equal to the value of all exports minus the value of all imports. Countries like the US import more than what they export; China, Germany, and Japan export more than what they import. It's interesting to note, however, that the US are still the world's larger exporter. This adds a layer of indirection in the equation of supply and demand: one must take into account foreign exchange (which, conversely, is also influenced by import/ export, for instance if a good from country *X* is highly demanded, the value of the corresponding currency increases).

What is better, a weak dollar or a strong dollar? It depends. Importers benefit from a strong dollar because it makes foreign goods relatively cheap. Exporters benefit from a weak dollar because it makes US goods relatively cheap.

Central banks maintain reserves of foreign currency. The purpose is to provide a stabilizing influence in the foreign exchange market. If a balance of payments deficit occurs, the central bank reduces its foreign reserves to zero out the balance. In the case of a balance of payment surplus, they acquire additional foreign reserves to zero out the balance.

The circular flow model shows the relationship between households, firms, governments, and the foreign sector as they all interact in product, factor (e.g. labor), and financial markets. These markets are highly interrelated.

- The **private sector** is the union of households and businesses in an economy. Households buy goods and services from firms in the product market. There are two sets of flows between households and firms: product and services in the product market; land, labor, capital, and the entrepreneurship in the factor market.
- The **public sector** includes the government intervention, from local to federal. The public factor interacts with households by purchasing some of the factors of production in exchange for the factor payments.
- **Foreign sector:** domestic economy does not exist in isolation; markets interact between countries through import/ export, foreign factor payments, foreign transfers, and foreign investment.
- **Financial intermediaries** (banks, insurance companies, stock exchanges) allow transactions to happen. The financial sector is all about making it easy for people to spend money.

The gross domestic product (GDP) is a means of measuring economic output, and it is used as an overall indicator of economic performance. GDP measures the total value of all final production that occurs within a country during the course of a year, the annual spending on new domestic production, and income earned from domestic production. To better understand GDP, let's consider the following example. Assume a simple economy made up of Frank and Louise. Lately Frank has been complaining about the cold water, so he offers Louise 1\$ to

knit a blanket. Louise jumps the opportunity to make a buck and commences knitting a new blanket. Upon completion, Louise exchanges the blanket for the dollar. In this example, \$ was the value of the economy's spending, income, and output. If we use the current prices, then we use the term nominal GDP. If inflation is taken into account, then we use the term real GDP. The ratio between nominal and real GDP is the inflation rate. From year to year the GDP may go up and down overall, but the trend is upward. Since 1960, the US real GDP has increased by more than 10 trillion dollars.

The series of expansions and contractions is referred to as the **business cycle**. During periods of expansion, spending increases to the point where the economy exceeds its long-run production capacity. Contractions occur as total spending decreases and excess productive capacity remains. Economists generally point out four stages in the business cycle:

- Expansion, which occurs when the GDP grows month-over-month, and unemployment declines.
- Peak, which occurs when real GDP spending is at its highest, the period just before unemployment begins to rise and other indicators fall.
- Contraction, which occurs when GDP slows or declines. A **recession** is specifically defined as two consecutive quarters of declining real GDP.
- Trough, which is the period between contraction and expansion as GDP begins to recover.

Economists disagree, however, on the reason of why the economy fluctuates as it does. Friedman's argues it is because of poor management of money supply. Keynes explains the business cycle as being caused by "animal spirit", i.e. human's emotions when it comes to invest. Other theories point to spending changes based on the economy's current status.

We now take a closer look to some macroeconomics topics that have a major impact in people's lives:

- **Unemployment**, i.e. the phenomenon for which people don't have a job even if they actively searched for work in the last four weeks. Note that this definition is broad and does not include a number

of edge cases (e.g. people who have a part-time job even if they need a full-time job to provide for their families, or people who have given up the job search in frustration). The BLS publishes several other "unemployment" categories in addition to the official unemployment rate.

- **Inflation**: is used to indicate a general increase in prices or a decrease in money's purchasing power. The most often cited measure of inflation is the change in the consumer price index (CPI). The CPI measures the average cost of food, clothing, shelter, energy, and healthcare that the average urban consumer buys. This list is continuously updated over time and the ratio between two time points is an estimate of the inflation. There are two types of inflation: **demand-pull** and **cost-push**. Demand-pull inflation occurs when aggregate demand is greater than aggregate supply. Since it is fueled by income, to stop it the efforts should be put into reducing consumers' income or giving consumers more incentive to save than to spend. Cost-push inflation occurs when the price of inputs increases, and it is associated with decreased GDP. Winners of inflation are borrowers (the money borrowed had more value than the money being repaid) and producers (they sell at higher prices but the wages remain more or less stable). Losers are lenders and savers.
- **Deflation**: occurs when the average price level is declining and money's purchasing power is increasing. The problem with deflation is that it creates a perverse set of incentives in the economy: consumers delay their purchase, leading to manufacturing grinds to halt and widespread unemployment. The unemployment then reinforces the deflation as demand decreases, and producers respond similarly by delaying investment.
- **Aggregate demand (AD)** is the demand for all domestic production in a country. Instead of just households, AD comes from all sectors of the economy. Furthermore, AD relates the price level to the amount of real GDP instead of price to quantity. The relationship between the price level and the

amount of real GDP is inverse, because as the price level rises, money loses purchasing power; fewer people demand exports; and corresponding higher interest rates discourage investment and consumption. As the price level decreases, purchasing power increases, exports become more affordable to foreigners, and the corresponding lower interest rates encourage investment and consumption.

- **Aggregate supply** is the supply of the entire domestic production. In the short run, the amount of GDP supplied is directly related to the price level, but in the long run the amount of real GDP producers collectively supply is independent of the price level.

Keynes' view: during the Depression, Keynes wrote *The General Theory of Employment, Interest, and Money*, where he challenged the status-quo in terms of what the government should do in a recession. Given a recession, the Keynesian response is to increase government spending and to reduce income taxes in order to spur aggregate demand and return the economy to full employment. This means that government must be willing to run deficits in order to carry out the policy. Keynes observed that individuals have a marginal propensity to consume and save. In other words, if you give people a dollar, they are inclined to spend some of it and save some of it. If government spent money on public works, the contractors and employees would then turn around and spend a portion of the resulting income and save the rest. This process would continue and lead to a multiplier effect throughout the economy. In a recession scenario, this is useful because returning the economy can be done relatively cheaply (to increase the GDP by one trillion, less than a trillion must be spent). For example, if Americans have a propensity to consume 0.8 of their income, then an increase in government spending on infrastructure of \$50 billion will result in \$50 billion in government spending and then \$50 billion of new consumer spending, followed by \$32 billion and so on until eventually total spending equals \$400 billion. This is because the initial government spending kicks off a continuing cycle of consumption and income. The higher the marginal propensity to consume, the higher the multiplier effect. Keynes also advocated that government spending is mo-

re efficient than cutting taxes. Keynes' theory is also related to the inflation-unemployment trade-off, i.e. the fact that low unemployment can be sustained by larger wage inflation. The idea works something like: to reduce unemployment, wage inflation rate should increased.

Definitions

- **Absolute advantage:** being more efficient, or able to produce more with the same amount of resources. See comparative advantage.
- **Accounting vs Economics:** to the accountant, total costs are the sum of all of the explicit fixed and variable costs of reduction, and profits are equal to total revenue minus total cost. If a business generates 100 in revenue (i.e. through sales) and has cost equal to 20, then profits are equal to 80. The focus will be maximizing revenue and reducing cost of production to increase profits. To the economist, however, total cost is equal of all of the explicit fixed and variable costs *plus* opportunity cost. Opportunity cost is implicit and is more difficult to assess. To the economist, profits are equal to total revenue minus total cost including the opportunity cost. The advantage of the economist's point of view is that it gives a clearer picture not just of whether the business is profitable but whether it is the best use of resources.
- **Allocation:** getting the right resources to the right people. Allocation efficiency occurs when marginal benefit equals marginal cost.
- **Bond:** a security that is a promise from a borrower to pay a lender on a specified date with interest.
- **Capital:** not only money, but all of the tools, factories, and equipment used in the production process. Capital is the product of investment.
- **Capitalization of a stock:** sum of all the stocks of the company. If we divide this number by the stock price, we get the number of stocks of the company.

- **Cartel:** a group of producers that agree to cooperate instead of compete with each other. Cartels seek higher profits for their members by collectively reducing production in order to increase prices. An example is OPEC. This is in general bad news for the consumers, only alleviated by the fact that members of a cartel have incentive to cheat a little bit to achieve competitive advantage.
- **Conjoint analysis:** a statistical approach to measuring consumer demand for specific product features. For example, imagine you work at Apple Inc. and you want to know what part of the iPhone you should improve; battery life, screen size or camera. A conjoint analysis will let you know which improvement customers care about more and will be worth the company's time and money.
- **Comparative advantage:** unlike absolute advantage, it takes into account the opportunity cost. Even if you have the absolute advantage (you are more efficient in producing a good *A*), you might not necessarily have the comparative advantage. Instead of producing *A* you could instead produce good *B* and be better off.
- **Complements and Substitutes:** related goods are classified as either complements or substitutes. Complements are goods used in conjunction with other goods, and substitutes are goods used in lieu of each other. See also cross-price elasticity.
- **Cross-price elasticity:** determining whether goods are substitutes or complements is not a matter of opinion. Economists calculate cross-price elasticity to determine whether goods are complements or substitutes by dividing the percentage change in the quantity demanded of one good by the percentage change in the price of another good. If cross-price elasticity is less than zero, good are complements (if I increase the price of Raclette, the demand of Paprika decreases), if it is greater than zero goods are substitutes (if I increase the price of chicken, the demand for turkey also increases).
- **Demand:** willingness and ability to buy something.

- **Depreciation:** as capital ages, its value declines because it breaks down and eventually needs replacement.
- **Diminishing marginal utility:** at first doing something (e.g. eating) makes you happy, but after a while you have been eating you are not as happy as when you started.
- **Factors of production (\simeq resources):** union of land, labor, capital, and entrepreneurship.
- **Flat tax:** tax that taxes all households at the same rate, regardless of the level of income.
- **Forex:** a portmanteau of foreign currency and exchange. Foreign exchange is the process of changing one currency into another for a variety of reasons, usually for commerce, trading, or tourism.
- **Gross income product (GDP):** measure of economic performance considering economy's spending, income, and output.
- **Gross national product (GNP):** while GDP measures all new production that is done *in* a country during a year, GNP measures all new production done *by* a country in a year. Toyotas made in Texas are part of US GDP, but not GNP.
- **Inflation:** a rise in prices, which can be translated as the decline of purchasing power over time. The rate at which purchasing power drops can be reflected in the average price increase of a basket of selected goods and services over some period of time. The rise in prices, which is often expressed as a percentage, means that a unit of currency effectively buys less than it did in prior periods. The major cause of inflation is the excess of money in circulation (a lot of money implies that money has less value, hence price increase).
- **Interest rate:** can be seen as *the price of money*. How much do I need to pay back to the bank after a loan? Or how much does the bank pay me to deposit the bank there? The difference between these two prices (aka the spread) is one way banks use to make money.

- **Investment:** borrowing in order to purchase physical capital. In the context of stocks and bonds, then investment is understood to mean pretty much the same thing as saving. Savers engage in financial investment, which provides the funds for borrowers to engage in capital investment.
- **Keynes' marginal value theory:** the same product or good has different value in different situations (e.g. water at home vs in the desert).
- **Labor:** people, together with their skills and abilities. Labor is divided into unskilled (no training, serve hamburgers), skilled (paid for what they can do), and professional (paid for what they know).
- **Land:** all natural resources.
- **Law of demand:** the quantity purchased varies inversely with price. In other words, the higher the price, the lower the quantity demanded. The reasons are:
 - Diminishing marginal utility: the more you consume of an item, the smaller its marginal utility. For this reason, the only way you will buy more of an item is if the price is lower. You consume until the marginal benefit (utility) equals the marginal cost (price).
 - Income effect: as the price of a good drops, your purchasing power increases.
 - Substitution effect: at the same price, you substitute relatively less expensive items for relatively more expensive items. If you have items *A* and *B*, where usually *B* is more expensive but now it's on sale at the same price of *A*, you might opt for item *B*.
- **Law of supply:** as the price of a good or service increases, the quantity of goods or services that suppliers offer will increase, and vice versa.
- **Marginal analysis:** the process of assessing the marginal **cost** (the cost to consume/ produce the resource you are analyzing) and the marginal **benefit** (the utility you gain from your purchase, for instance in terms of happiness). If the marginal

benefit outweighs the marginal cost, you should probably do it. Otherwise not. A trick to estimate the marginal benefit is asking the question *how much money shall my friend give me, such that I would rather take the money than doing my purchase?* This theory was developed by Keynes.

- **Marginal cost of production:** the additional cost of producing one more item.
- **Monetary policy:** efforts by the central bank of a country to stabilize prices, promote full employment, and encourage long-run economic growth through controlling the money supply and interest rates.
- **Monetizing the debt:** the process by which the central bank buys new government debt, thus increasing the supply of money in circulation. When debt is monetized, the government is able to spend without raising taxes. The downside of it is that it's extremely inflationary.
- **Monopoly:** only one seller for a product.
- **Monopsony:** only one buyer for a product.
- **Opportunity cost:** when you consider a choice of how to allocate your resources, you should take the opportunity cost (or implicit cost) into account. For instance, if you decide to go to watch an NBA game at the arena, you should not just consider the costs of attending the game (ticket, subway, drinks, ...) but also the resources you could have made in the same time (e.g. the money you could have made working).
- **Porter's five forces:** coined by Harvard Business School Professor Michael Porter, is a business framework that attempts to open the door to deeper analysis of the competitor landscape. The five forces are: threat of new entrants; threat of substitute products or services; bargaining power of suppliers; bargaining power of customers; jockeying for position among current competitors. These concepts allow companies to look at their industry holistically and understand where they fit into the competitive landscape.

- **Productivity:** the amount of output produced with a given amount of resources.
- **Say's law:** the theory sustaining that supply creates its own demand and, as a result, surpluses and gluts could not be sustained in a market economy.
- **Spread:** difference between two related economic quantities. For instance, difference between interest rates in Italy and Germany (assuming that the Germany economy is solid, a high spread indicates that the Italian economy is less robust).
- **Stock options** are a type of derivative that allow for the purchase of shares of a stock at a predetermined price. Companies often issue stock options to employees as a reward for performance. The recipients can either sell their option contract on the options exchange or wait and exercise their option when the share price of the stock increases.
- **S&P 500:** a stock market index tracking the stock performance of 500 large companies listed on stock exchanges in the United States.