UNIT-II

The Classical School – Adam smith – Division of Labour -Theory of Value – Ricardo theory of Rent – Comparative Cost Theory – Stationary State – Malthus Theory of Population and Theoryof Gluts.

UNIT-II

Classical School

The Classical school, which is regarded as the first school of economic thought, is associated with the 18th Century Scottish economist Adam Smith, and those British economists that followed, such as Robert Malthus and David Ricardo.

The main idea of the Classical school was that markets work best when they are left alone, and that there is nothing but the smallest role for government. The approach is firmly one of laissez-faire and a strong belief in the efficiency of free markets to generate **economic development**. Markets should be left to work because the **price mechanism** acts as a powerful 'invisible hand' to allocate resources to where they are best employed.

In terms of explaining *value*, the focus of classical thinking was that it was determined mainly by scarcity and costs of production.

In terms of the macro-economy, the Classical economists assumed that the economy would always **return to the full-employment** level of real output through an automatic self-adjustment mechanism.

Adam Smith
1723-1790

With ***The Wealth of Nations*** Adam Smith installed himself as the leading expositor of economic thought. Currents of Adam Smith run through the works published by **DAVID RICARDO** and **KARL MARX** in the nineteenth century, and by **JOHN MAYNARD KEYNES** and **MILTON FRIEDMAN** in the twentieth.

Adam Smith was born in a small village in Kirkcaldy, Scotland, where his widowed mother raised him. At age fourteen, as was the usual practice, he entered the University of Glasgow on scholarship. He later attended Balliol College at Oxford, graduating with an extensive knowledge of European literature and an enduring contempt for English schools.

He returned home, and after delivering a series of well-received lectures was made first chair of logic (1751), then chair of moral philosophy (1752), at Glasgow University.

He left academia in 1764 to tutor the young duke of Buccleuch. For more than two years they traveled throughout France and into Switzerland, an experience that brought Smith into contact with his contemporaries Voltaire, Jean-Jacques Rousseau, **FRANÇOIS QUESNAY**, and Anne-Robert-Jacques Turgot. With the life pension he had earned in the service of the duke, Smith retired to his birthplace of Kirkcaldy to write *The Wealth of Nations.* It was published in 1776, the same year the American Declaration of Independence was signed and in which

his close friend **DAVID HUME** died. In 1778 he was appointed commissioner of customs. In this job he helped enforce laws against smuggling. In *The Wealth of Nations,* he had defended smuggling as a legitimate activity in the face of "unnatural" legislation. Adam Smith never married. He died in Edinburgh on July 19, 1790.

Today Smith's reputation rests on his explanation of how rational self-interest in a free-market economy leads to economic well-being. It may surprise those who would discount Smith as an advocate of ruthless individualism that his first major work concentrates on ethics and **CHARITY**. In fact, while chair at the University of Glasgow, Smith's lecture subjects, in order of preference, were natural theology, ethics, jurisprudence, and economics, according to John Millar, Smith's pupil at the time. In ***The Theory of Moral Sentiments***, Smith wrote: "How selfish soever man may be supposed, there are evidently some principles in his nature which interest him in the fortune of others and render their happiness necessary to him though he derives nothing from it except the pleasure of seeing it."[1]

At the same time, Smith had a benign view of self-interest, denying that self-love "was a principle which could never be virtuous in any degree."[2] Smith argued that life would be tough if our "affections, which, by the very nature of our being, ought frequently to influence our conduct, could upon no occasion appear virtuous, or deserve esteem and commendation from anybody."[3]

Smith did not view sympathy and self-interest as antithetical; they were complementary. "Man has almost constant occasion for the help of his brethren, and it is in vain for him to expect it from their benevolence only," he explained in *The Wealth of Nations*.[4]

Charity, while a virtuous act, cannot alone provide the essentials for living. Self-interest is the mechanism that can remedy this shortcoming. Said Smith: "It is not from the benevolence of the butcher, the brewer, or the baker, that we can expect our dinner, but from their regard to their own interest" (ibid.).

Someone earning money by his own labor benefits himself. Unknowingly, he also benefits society, because to earn income on his labor in a competitive market, he must produce something others value. In Adam Smith's lasting imagery, "By directing that industry in such a manner as its produce may be of greatest value, he intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention."[5]

The Wealth of Nations, published as a five-book series, sought to reveal the nature and cause of a nation's prosperity. Smith saw the main cause of prosperity as increasing division of labor. Using the famous example of pins, Smith asserted that ten workers could produce 48,000 pins per day if each of eighteen specialized tasks was assigned to particular workers. Average **PRODUCTIVITY**: 4,800 pins per worker per day. But absent the division of labor, a worker would be lucky to produce even one pin per day.

Just how individuals can best apply their own labor or any other resource is a central subject in the first book of the series. Smith claimed that an individual would invest a resource—for example, land or labor—so as to earn the highest possible return on it. Consequently, all uses of the resource must yield an equal rate of return (adjusted for the relative riskiness of each enterprise). Otherwise reallocation would result. **GEORGE STIGLER** called this idea the central proposition of economic theory. Not surprisingly, and consistent with another Stigler claim that the originator of an idea in economics almost never gets the credit, Smith's idea was not original. The French economist **TURGOT** had made the same point in 1766.

Smith used this insight on equality of returns to explain why wage rates differed. Wage rates would be higher, he argued, for trades that were more difficult to learn, because people would not be willing to learn them if they were not compensated by a higher wage. His thought gave rise to the modern notion of **HUMAN CAPITAL**. Similarly, wage rates would also be higher for those who engaged in dirty or unsafe occupations (see **Job Safety**), such as coal mining and butchering; and for those, like the hangman, who performed odious jobs. In short, differences in work were compensated by differences in pay. Modern economists call Smith's insight the theory of compensating wage differentials.

Smith vehemently opposed **MERCANTILISM**—the practice of artificially maintaining a trade surplus on the erroneous belief that doing so increased wealth. The primary advantage of trade, he argued, was that it opened up new markets for surplus goods and also provided some commodities from abroad at a lower cost than at home. With that, Smith launched a succession of free-trade economists and paved the way for David Ricardo's and **JOHN STUART MILL**'s theories of **COMPARATIVE ADVANTAGE** a generation later.

Adam Smith has sometimes been caricatured as someone who saw no role for government in economic life. In fact, he believed that government had an important role to play. Like most modern believers in free markets, Smith believed that the government should enforce contracts and grant patents and copyrights to encourage inventions and new ideas. He also thought that the government should provide public works, such as roads and bridges, that, he assumed, would not be worthwhile for individuals to provide. Interestingly, though, he wanted the users of such public works to pay in proportion to their use.

Many people believe that Smith favored retaliatory tariffs. A retaliatory tariff is one levied by, say, the government of country A against imports from country B to retaliate for tariffs levied by the government of country B against imports from country A. It is true that Smith thought they might be justified, but he was fairly skeptical. He argued that causing additional harm to one's own citizens is a high price to pay that tends not to compensate those who were harmed by the foreign tariff while also hurting innocent others who had no role in formulating the tariff policy.

Smith's writings are both an inquiry into the science of economics and a policy guide for realizing the wealth of nations. Smith believed that economic development was best fostered in an environment of free **COMPETITION** that operated in accordance with universal "natural laws." Because Smith's was the most systematic and comprehensive study of economics up until that time, his economic thinking became the basis for classical economics. And because

more of his ideas have lasted than those of any other economist, some regard Adam Smith as the alpha and the omega of economic science.

Division of labour

Division of labour, the separation of a work process into a number of tasks, with each task performed by a separate person or group of persons. It is most often applied to systems of mass production and is one of the basic organizing principles of the assembly line. Breaking down work into simple repetitive tasks eliminates unnecessary motion and limits the handling of different tools and parts. The consequent reduction in production time and the ability to replace craftsmen with lower-paid unskilled workers result in lower production costs and a less expensive final product. Contrary to popular belief, however, division of labour does not necessarily lead to a decrease in skills—known as proletarianization—among the working population. The Scottish economist Adam Smith saw this splitting of tasks as a key to economic progress by providing a cheaper and more efficient means of producing goods.

Labor Theory Of Value

The labor theory of value (LTV) was an early attempt by economists to explain why goods were exchanged for certain relative prices on the market. It suggested that the value of a commodity was determined by and could be measured objectively by the average number of labor hours necessary to produce it. In the labor theory of value, the amount of labor that goes into producing an economic good is the source of that good's value. The best-known advocates of the labor theory were Adam Smith, David Ricardo, and Karl Marx. Since the 19th century, the labor theory of value has fallen out of favor among most mainstream economists.

The labor theory of value suggested that two commodities will trade for the same price if they embody the same amount of labor time, or else they will exchange at a ratio fixed by the relative differences in the two labor times. For instance, if it takes 20 hours to hunt a deer and 10 hours to trap a beaver, then the exchange ratio would be two beavers for one deer.

The labor theory of value was first conceived by ancient Greek and medieval philosophers. Later, in developing their labor theory of value, both Smith (in *The Wealth of Nations*) and Ricardo began by imagining a hypothetical "rude and early state" of humanity consisting of simple commodity production. This was not meant to be an accurate or historical reality; it was a thought experiment to derive the more developed version of the theory. In this early state, there are only self-producers in the economy who all own their own materials, equipment, and tools needed to produce. There are no class distinctions between capitalist, laborer, and landlord, so the concept of capital as we know it has not come into play yet.

They took the simplified example of a two-commodity world consisting of beaver and deer. If it is more profitable to produce deer than beaver, there would be a migration of people into deer production and out of beaver production. The supply of deer will increase in kind, causing the incomes in deer production to drop—with a simultaneous rise in beaver incomes as fewer choose that employment. It is important to understand that the incomes of the self-producers are regulated by the quantity of labor embodied in the production, often expressed as labor time. Smith wrote that labor was the original exchange money for all commodities, and therefore the more labor employed in production, the greater the value of that item in exchange with other items on a relative basis.

While Smith described the concept and underlying principle of the LTV, Ricardo was interested in how those relative prices between commodities are governed. Take again the example of beaver and deer production. If it takes 20 labor hours to produce one beaver and 10 labor hours to produce one deer, then one beaver would exchange for two deer, both equal to 20 units of labor time. The cost of production not only involves the direct costs of going out and hunting but also the indirect costs in the production of the necessary implements—the trap to catch the beaver or the bow and arrow to hunt the deer. The total quantity of labor time is vertically integrated—including both direct and indirect labor time. So, if it requires 12 hours to make a beaver trap and eight hours to catch the beaver, that equals 20 total hours of labor time.

Here is an example where beaver production, initially, is more profitable than that of deer:

	Labor Time Needed	Income/hr. ($)	Income for 20 hrs. of Work	Cost of Production
Beavers	Trap(12) + Hunt(8) = 20	$11/hr.	$220	$220.00
Deer	Bow & Arrow(4) + Hunt(6) = 10	$9/hr.	$180	$90.00

Because it's more profitable to produce beaver, people will move out of deer production and choose instead to produce beaver, creating a process of equilibration. The labor time embodied indicates that there should be an equilibrium ratio of 2:1. So now the income of beaver producers will tend to drop to $10 an hour while the income of deer producers will tend to rise to $10 an hour as the cost of production drops in beaver and rises in deer, bringing back the 2:1 ratio so that the new costs of production would be $200 and $100. This is the natural price of the commodities; it was brought back in line due to the arbitrage opportunity that presented itself in having the income of beaver producers at $11, causing the profit rate to exceed the natural exchange ratio of 2:1.

	Labor Time Needed	Income/hr. ($)	Income for 20 hrs. of Work	Cost of Production
Beavers	Trap(12) + Hunt(8) = 20	$10/hr.	$200	$200
Deer	Bow & Arrow(4) + Hunt(6) = 10	$10/hr.	$200	$100

Although the market price may fluctuate often due to supply and demand at any given moment, the natural price acts as a center of gravity, consistently attracting the prices to it—if the market price overshoots the natural price, people will be incentivized to sell more of it, while if the market price underestimates the natural price, the incentive is to buy more of it. Over time, this

competition will tend to bring relative prices back into line with the natural price. This means that the labor that is used to produce economic goods is what determines their value and their market prices because it determines the natural price.

RICARDIAN THEORY OF RENT

Introduction to the Ricardian Theory of Rent:

David Ricardo, an English classical economist, propounded a theory to explain the origin and nature of economic rent. He defined rent as **"that portion of the produce of the earth which is paid to the landlord for the use of the original and indestructible powers of the soil."** In his theory, rent is nothing but the producer's surplus or differential gain and it is found in land only.

At the time of Ricardo land was primarily used for agriculture; now it is mainly used for residences, offices and stores. But the most important full of land is the same even today: the supply of land and be increased by paying a higher price or its supply diminished by offering a lower price.

The price of using a piece of land for a period of time is called its rent, or more specifically, pure economic rent. In our daily usage the term 'rent' refers to the price paid per unit of time (month, year, etc.) for the service of durable goods like a machine, or a car or a building. This is known as contract (commercial) rent.

But in economics, the term has a specific meaning. Economic rent is a surplus income — excess of total payments to a factor of production (land, labour or capital) over and above its minimum supply price or opportunity cost (i.e., what is required to bring the particular factor into production).

As early as 1817 David Ricardo applied the idea of rent to agricultural land only. The notion of paying rent applies to land is fixed in supply. In Fig. 2 s the downward sloping derived demand curve for land intersects completely inelastic supply and at E to determine rent per acre, i.e., the price that has to be paid for using the service of land for a specific period. So, scarcity of land as a factor of production gives rise to rent. If rent rose above the equilibrium level, the amount of land demanded by all the farmers would be less than the existing amount that would be supplied.

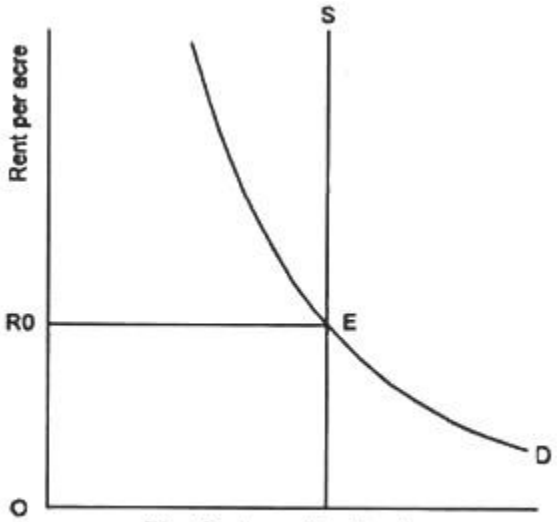

Fig. 2 : Scarcity Rent

Since some landowners would not be able to rent their land at all, they would have to offer their land for the less price and thus bid down its rent. In a like manner, the rent could not remain below the equilibrium level for long. If it did, bidding of unsatisfied farms would drive the price of land back toward the equilibrium level.

Only at a competitive price where the total amount of land demanded exactly equals the fixed supply will the market be in equilibrium. As Paul Samuelson has put it, **"Rent is the payment for the use of factory of production that are fixed in supply. Because the supply of land is inelastic, land will always risk for whatever a competition gives it. Thus, the value of the land derives entirely from the value of the product, and not vice versa".**
The notion of rent applies to any factor of production that is fixed in supply. For example, Leonardo Da Vinci's portrait of Mona Lisa is unique; if one weds it for an exhibition, one would be paying rent for its temporary use. He classified lands into different categories and argued that lands were cultivated in descending order of fertility.

Initially, the more productive (fertile) land was cultivated and, as the demand for corn (wheat) grew, less fertile (inferior grades of) land were brought under cultivation. He assumed constancy of labour costs and return on capital. The price of corn was equal to the cost of production on the marginal (high cost) land.

Since land was not homogeneous, a surplus was earned on superior land over the marginal land due to differences in fertility. This surplus was called economic rent. According to Ricardo, **"rent is that portion of the produce of the earth which is paid to the landlord for using the original and indestructible powers of the soil."**

Some assumptions are implied in the Ricardian Theory of Rent. These are:

(a) Rent of land arises due to the differences in the fertility or situation of the different plots of land. It arises owing to the original and indestructible powers of the soil.

(b) Ricardo assumes the operation of the law of diminishing marginal returns in the case of cultivation of land. As the different plots of land differ in fertility, the produce from the inferior plots of land diminishes though the total cost of production in each plot of land is the same.

(c) Ricardo considers the supply of land from the standpoint of the society as a whole.

(d) In the Ricardian theory it is assumed that land, being a gift of nature, has no supply price and no cost of production. So, rent is not a part of cost, and being so it does not and cannot enter into cost and price.

Explanation and Illustration of the Ricardian Theory of Rent:

According to Ricardo, rent of land arises because the different plots of land have different degree of productive powers; some lands are highly fertile and some lands are less fertile. So, there are different grades of land. The difference between the produce of the superior lands and that of the inferior lands is rent, what is called differential rent.

Similarly, there may be differences in the situation of the different plots of land. Lands favourably situated (say, near the market) have greater advantages than those which are not so situated (say, far away from the market). The surplus enjoyed by the former over the later is also differential rent or situation rent.

Let us illustrate these two cases of differential rent:

(a) Differential Kent on account of differences in the fertility of land:

Ricardo assumes that the different grades of land are cultivated gradually in descending order — the first grade land being cultivated at first, then the second grade land, after that the third grade and so on. With the increase in population and with the consequent increase in the demand for agricultural produce, inferior grade of lands are cultivated, creating a surplus or rent for the superior land areas.

This point is illustration in the following table:

Table 1 : Output, Cost and Surplus Rent				
Grade of Land (of same size)	Total Produce and its Value	Cost of Production	Rent	Status of Land
1st	100 kg. x Rs 2 = Rs 200	Rs. 100	Rs. 100	Intra-marginal Land
2nd	75 kg. x Rs 2 = Rs 150	Rs. 100	Rs. 50	Intra-marginal Land
3rd	50 kg. x Rs 2 = Rs 100	Rs. 100	Nil	Marginal or No-rent Land

The table shows the position of 3 different plots of land of equal size. Let us assume that the order of cultivation reaches the 3rd stage when all the 3 plots of land of different grades are cultivated and the market price has come to the level of Rs. 2 per kg. of rice. The first grade land, being the most fertile, produces 100 kg., the 2nd grade land produces 75 kg, and the third grade land, being the least fertile, produces only 50 kg, with the same cost in each case.

Theory of Comparative Cost

Comparative advantage was first described by David Ricardo in his 1817 book "On the Principles of Political Economy and Taxation" He used an example involving England and Portugal. Ricardo noted Portugal could produce both wine and cloth with less labour than England.

However, England was relatively better at producing cloth. Therefore, it made sense for England to export cloth and import wine from Portugal.

Example of Comparative Advantage

- Assume two countries, UK and India
- They both produce textiles and books.
- Their relative production levels are shown in the table below.

Output without trade

	Textiles	Books
UK	1	4
India	2	3
Total	**3**	**7**

-
-
-
- For the UK to produce 1 unit of textiles it has an opportunity cost of 4 books.
- However for India to produce 1 unit of textiles it has an opportunity cost of 1.5 books
- Therefore India has a comparative advantage in producing textiles because it has a lower opportunity cost.
- The UK has a comparative advantage in producing books. This is because it has a lower opportunity cost of 0.25 (1/4) compared to India's 0.66 (2/3)

Specialisation and trade

- If each country now specializes in one good then, assuming constant returns to scale, output will double.

Output after trade

	Textiles	Books
UK	0	8
India	4	0
TOTAL	**4**	**8**

- Therefore the total output of both goods has increased – illustrating the potential gains from exploiting comparative advantage.
- By trading the surplus books and textiles, India and UK can enjoy higher quantities of the goods.

There are many examples of comparative advantage in the real world e.g. Saudi Arabia and oil, New Zealand and butter, USA and Soya beans, Japan and cars e.t.c.

Criticisms of Comparative advantage

- **Cost of trade**. To export goods to India imposes transport costs.
- **External costs of trade**. Exporting goods leads to increased pollution from 'air-freight' and can contribute to environmental costs not included in models which only include private costs and benefits.
- **Diminishing returns/diseconomies of scale**. Specialisation means a country will increase the output of one particular good. However, for some industries increasing output may lead to diminishing returns. For example, if Portugal has a comparative advantage in wine, it may run out of suitable land for growing grapes. A contemporary

example is Mongolia. Mongolia was believed to have a comparative advantage in cattle farming. However, according to Erik Reinert opening of markets to international competition in 1991 led to an increased size of animal herds, but this led to over-grazing and loss of grazing land. [Reinert, E (2004) "Globalization and economic development: an Alternative Perspective", *Edward Elgar* pub. p 158.]

- **Static comparative advantage**. A developing economy, in sub-Saharan-Africa, may have a comparative advantage in producing primary products (metals, agriculture), but these products have a low-income elasticity of demand, and it can hold back an economy from diversifying into more profitable industries, such as manufacturing.
- **Dutch disease**. Dutch disease is a phenomenon where countries specialise in producing primary products (oil/natural gas) but doing this can harm the long-term performance of the economy. In the 1970s, the Netherlands specialised in producing natural gas, but this led to the neglect of manufacturing and when the gas industry declined, the economy was left behind its near neighbours.
- **Trade – not a Pareto improvement**. Trade can lead to an increase in net economic welfare. However, it doesn't mean that everyone will become better off. Some workers in uncompetitive industries may lose out and struggle to gain employment in new industries.
- **Gravity theory**. Proposed by Jan Tinbergen, in 1962, this states that international trade is influenced by two factors – the relative size of economies and economic distance. The model suggests that countries of similar size will be attracted to trade with each other. Economic distance depends on geographical distance and trade barriers. The implication is that countries economically close and of similar size will engage in similar levels of bilateral trade. It also suggests trade is more likely between countries which are geographically close.
- Complexity of global trade. Models of comparative advantage usually focus on two countries and two goods, but in the real world, there are multiple goods and countries. Increasingly there is growing demand for a variety of goods and choice – rather than competing on simple price.

STATIONARY STATE

Classical political economy, from William Petty, the Physiocrats, Adam Smith, and David Ricardo, to John Stuart Mill and Karl Marx, analyzed the dynamics of capitalist economies and investigated the sources of economic growth and development. In this analysis, a *progressive* or *advancing* state is one in which capital accumulation is proceeding, whether smoothly or erratically—in other words, it is a condition of positive economic growth, usually associated with high and rising profits and wages. An economic system experiencing negative growth is said to be in a *declining* state. Thomas Malthus and Ricardo focused much attention on various scenarios associated with decline—leading Thomas Carlyle to dub political economy "the dismal science"—while Marx made prognostications about its inevitability. A *stationary* state is one in which growth is neither positive nor negative. Until John Stuart Mill, the stationary state was, like the declining state, considered unwelcome, and growth was thought to benefit all three great classes of society: capitalists, landlords, and workers.

In his *Principles of Political Economy* (1848), Mill for the first time raised the possibility that the stationary state could be desirable (and economic growth undesirable). In addition, whereas in all the earlier classical authors the system's movements were seen as governed by internal "laws of motion" that, while they could be identified and interpreted, *could not be altered*, in Mill, for the first time, the possibility that human intervention into the system could affect its outcomes was contemplated. Marx, of course, also put forward the idea that people make their own history (though "not exactly as they please"), but for Marx capitalism must grow ("Accumulate or die!"), and his analysis also viewed capitalism as incapable of being reformed, so change meant a transition to socialism. Strictly speaking, outcomes could be influenced by human interference even in Ricardo, where, for example, repeal of the corn laws could allow cheaper corn to be imported, supporting profits that otherwise were being squeezed by the artificially high price of corn—but this is a case not of affecting the laws themselves, but of clearing the way for the "laws of motion" to operate to their fullest.

In *Principles*, Mill begins by affirming that the laws of production are, like the laws of physics, unalterable (although some might be guided within strict limits), but then suggests that the laws of distribution are capable of being guided by human institutions. For Mill, distribution is governed by the laws and customs of society. The nature of distribution varies from society to society and is subject to historical change. Like his predecessors in Classical political economy, Mill saw a tendency toward a falling rate of profit that would lead to a stationary state. However, whereas the earlier writers associated the stationary state with gloom and poverty, Mill saw it as the blissful final result of economic progress. Mill also considered the idea that a society could *choose* to adopt a stationary state, rather than wait for a stationary state to be imposed on it.

In the ideal stationary state, society would have achieved a sufficiently high level of wealth accumulation. Workers would be educated to realize the negative effects of population growth, and they would control their numbers voluntarily. As population growth reached a stationary stage, there would be no tendency for wages to fall and no reason for further growth in production. Mill was sure to note that a "stationary condition of capital and population implies no stationary state of human improvement" (Mill [1848] 1987, p. 751), thus making the distinction between quantitative growth and qualitative development. He also pointed out that his analysis applied only to the presently industrialized nations, and that what would later be called "developing" countries have not yet reached the level of economic well-being necessary to turn to zero growth.

Recently, ecologically oriented economists have cited Mill and put forward their vision of a *steady-state economy*, which is more or less the same idea conceived by Mill (see, for example, Daly's notion of "an economy with constant stocks of people and artifacts" [1978, p. 17]). This is somewhat confusing, because in traditional growth theory the term *steady-state* refers not to zero growth, but to proportional growth. Frank Knight (1921) noted, for example, that John Bates Clark's "static state," which is an abstraction for methodological purposes, is not the same as the classical authors' stationary state. Ludwig von Mises also expressed the sentiment that "[t]he idea of a stationary state is an aid to theoretical speculation. In the world of reality there is no stationary state, for the conditions under which economic activity takes place are subject to perpetual alterations which it is beyond human capacity to limit" ([1922] 1951, p. 196]). In neoclassical economics, the term *steady-state* is used to indicate not a state of zero

growth, but rather a kind of equilibrium growth, as in the "golden rule," in which the propensity to save is such that per capita consumption is equalized across generations. This is obviously not what the classical economists meant by the stationary state.

Malthusian Theory of Population

1. Population and Food Supply

Thomas Malthus theorized that populations grew in **geometric progression**. A geometric progression is a sequence of numbers where each term after the first is found by multiplying the previous one by a fixed, non-zero number called the common ratio. For example, in the sequence 2, 10, 50, 250, 1250, the common ratio is 5.
Additionally, he stated that food production increases in **arithmetic progression**. An arithmetic progression is a sequence of numbers such that the difference between the consecutive terms is constant. For example, in series 2, 5, 8, 11, 14, 17, the common difference of 3. He derived this conclusion due to the **Law of Diminishing Returns**.
From this, we can conclude that populations will grow faster than the supply of food. This exponential population growth will lead to a shortage of food.

2. Population Control

Malthus then argued that because there will be a higher population than the availability of food, many people will die from the shortage of food. He theorized that this correction would take place in the form of Positive Checks (or Natural Checks) and Preventative Checks. These checks would lead to the Malthusian catastrophe, which would bring the population level back to a 'sustainable level.'

A. Positive Checks or Natural Checks

He believed that natural forces would correct the imbalance between food supply and population growth in the form of natural disasters such as floods and earthquakes and human-made actions such as wars and famines.

B. Preventative Checks

To correct the imbalance, Malthus also suggested using preventative measures to control the growth of the population. These measures include family planning, late marriages, and celibacy.

Malthusian Trap

The Malthusian Trap (or "Malthusian Population Trap") is the idea that higher levels of food production created by more advanced agricultural techniques create higher population levels, which then lead to food shortages because the higher population needs to live on land that would have previously used to grow crops.

Even as technological advancement would normally lead to per capita income gains, theorizes Malthus, these gains are not achieved because in practice the advancement also creates population growth. Once the population exceeds what food supplies can support, this supposedly creates a Malthusian crisis with widespread famine as well as rampant disease. This ends up decreasing the population to earlier levels.

The reality, however, has been that population growth has not itself created the crisis that Malthus predicted. We will discuss the ways in which the Malthusian Trap has been disproven in the following section.

Criticisms of the Malthusian Theory of Population

1. Population Growth

The gloom and doom forecasts put forward by Malthus have not played out. In Western Europe, populations have grown (not at the rate Malthus predicted) and food production has also risen because of technological advancements.

2. Food Production

Thanks to many technological advancements, food production has dramatically increased over the past century. Often, the food production rate has grown higher than the population growth rate. For example, during the 1930s in the US, 25% of the population worked in the agricultural sector while the total **GDP** was less than $100 billion. Today, less than 2% of the population works in the agricultural sector, while the total GDP is over $14 trillion.

3. Global Trade

The limited availability of land at the time was the basis for Malthus' theory on food production constraints. However, thanks to globalization, we can trade goods and services for food, which increases the amount of food a country can consume.

4. Calculations

Malthus did not provide calculations for the geometric growth of populations and the arithmetic growth of food. Since then, experts have pointed out that the growth rates are not consistent with Malthus' predictions.