General Equilibrium – Walrasian Model

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M.A. Economics (Semester -2)

CC-7 Module 3(Equilibrium Analysis)

General Equlibirum

Partial Equilibrium analysis studies a particular segment of the economy in isolation of what was happening in other segments, under the ceteris paribus assumption.

Under partial equilibrium the utility maximising behaviour of the household is studied on the assumption that its income is given. However income depends on the number of labour force and on other factors of production that the consumer owns and on their prices. Likewise the production decision of a firm is studied on the assumption that state of technology and commodity prices are given.

However, the fundamental feature of any economic system is the interdependence among its constituent parts. The markets of all commodities and all productive factors are interrelated and the prices in all markets are simultaneously determined. Consumer's demands for various goods and services depend on their tastes and incomes. In turn consumer's incomes depend on the amount of resources they own and factor prices. Factor prices depend on the demand and supply of various inputs. The demand for factors by firms depends not only on the state of technology but also on the demands for the final goods they produce. The demand for these goods depends on consumer income which depend on demand for the factor of production.

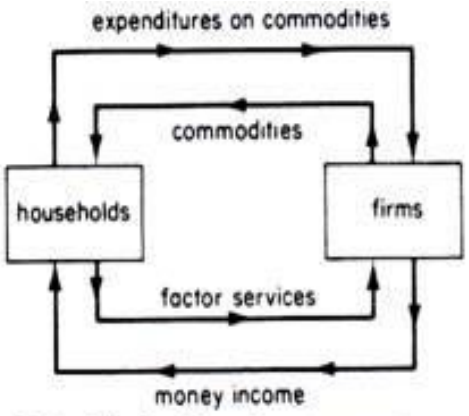

Figure 22.1 Circular flows in a two-sector economy

The economic activity in the system takes the form of two flows between the consumer sector and the business sector: a real flow and a monetary flow.

Real flow : It is the exchange of goods for the services of factors of production: firms produce and offer final goods to the household sector and consumers offer to firms the services of factors which they own.

Monetary flow: The consumers receive income payments from the firm for offering factor services. These incomes are spent by consumers for the acquisition of the finished goods produced by the business sector. The expenditure of firms become the money income of the household. Similarly the expenditures of households become the receipts of firms, which they once again pay the households for the factor services which they supply.

The interdependence of markets are concealed by partial equilibrium analysis. The problem is to determine whether the independent, self-interest motivated behaviour of economic decision makers is consistent with each individual agent's attaining equilibrium. General Equilibrium deals with the problem of whether the independent action by each decision-maker leads to a position in which equilibrium is reached by all.

A general equilibrium is defined as a state in which all markets and all decision-making units are in simultaneous equilibrium. A general equilibrium is said to exist if each market is cleared at a positive price with each consumer maximising satisfaction and each firm maximising profit.

Walrasian Model

French economist Leon Walras (1834-1910) developed the most ambitious general equilibrium model. Walras explained that all prices and all quantities are simultaneously determined through interaction with each other. He used a system of simultaneous equation to explain the interaction of buyers and sellers in all markets.

According to him each consumer have a set of equations consisting of two subsets : one his demand for different commodities and two his supply of factor inputs. Similarly business firms have two subsets : one their supply of finished goods and two their demand for factor inputs.

The 1st task in establishing the existence of a general equilibrium is that there must be in the system as many independent equations as the number of unknowns.

It is assumed that each firm produces one commodity and each consumer purchases some amount of both the commodities. It is assumed that both the consumer owns some part of both the factors. In this simple model we the following 'unknown'.

Quantities demanded of X and Y by consumers 2 x 2 = 4

Quantities supplied of K and L by consumers 2 x 2 = 4

Quantities demanded of K and L by firms	2 x 2 = 4
Quantities of Y and X supplied by firms	2
Price of commodities Y and X	2
Price of factors K and L	2
Total number of 'unknowns'	18

To find out these unknowns we have the following number of equations:

Demand functions of consumers	2 x 2 = 4
Supply functions of factors	2 x 2 = 4
Demand functions for factors	2 x 2 = 4
Supply functions of commodities	2
Clearing- the- market of commodities	2
Clearing-the-market of factors	2
Total number of equations	18

Even if there is equality of independent equations and unknowns there is no guarantee that a general equilibrium solution exists. The proof of the existence of general equilibrium solution is difficult. Leon Walras was never able to prove the existence of general equilibrium.

Three problems arise in connection with general equilibrium:

1) Does a general equilibrium solution exist? (Existence problem)

2) If an equilibrium solution exists, is it unique? (Uniqueness problem)

3) If an equilibrium solution exists, is it stable? (Stability problem)

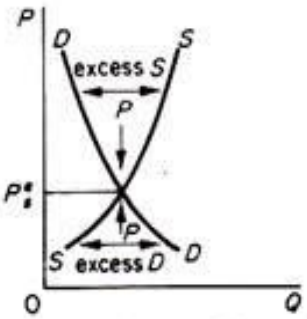

Figure 22.2 Unique, stable equilibrium

The equilibrium is stable if the demand function cuts the supply function from above. In this case an excess demand drives price up, while an excess supply (excess negative demand) drives the price down.

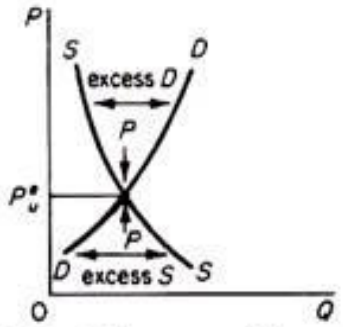

Figure 22.3 Unique, unstable equilibrium

The equilibrium is unstable if the demand function cuts the supply function from below. In this case an excess demand drives the price down, and an excess supply drives the price up.

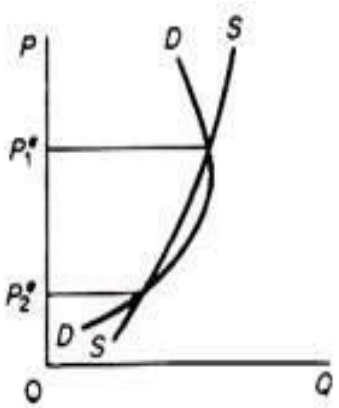

Figure 22.4 Multiple equilibria

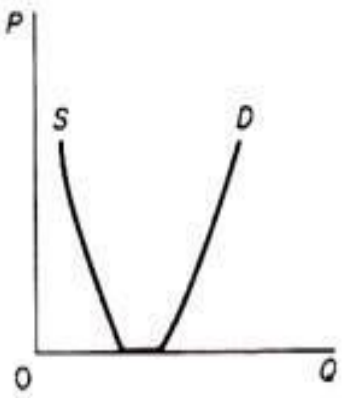

Figure 22.5 No equilibrium exists

In figure 22.4 we depict the case of multiple equilibria. It is obvious that at P^e_1 there is a stable equilibrium, while at P^e_2 the equilibrium is unstable. Finally in figure 22.5 an equilibrium (at a positive price) does not exist.

From the redrawn diagrams (in conjunction with the corresponding ones 22.2-22.5) we can draw the following conclusions:

1. The excess demand function, $E_{\{P)}$, intersects the vertical (price)-axis when there is an equilibrium, that is, when the excess demand is zero. If $Q_D = Q_s$, then $E_{(P)} = 0$.
2. There are as many equilibria as the number of times that the excess demand curve $E_{(P)}$ intersects the vertical price-axis (figure 22.8).
3. The equilibrium is stable if the slope of the excess demand curve is negative at the point of its intersection with the price-axis (figure 22.6).

4. The equilibrium is unstable if the slope of the excess demand curve is positive at the point of its intersection with the price-axis (figure 22.7).

5. If the excess demand function does not intersect the vertical axis at any one price, an equilibrium does not exist (figure 22.9).

The above analysis of the existence, stability and uniqueness in terms of excess demand functions can be extended to general equilibrium analysis.

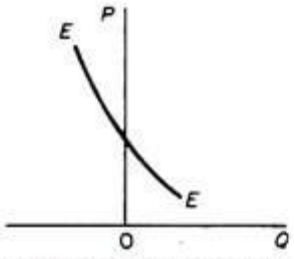

Figure 22.6 Stable equilibrium: slope of $E_{(P)} < 0$

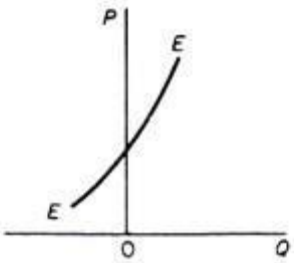

Figure 22.7 Unstable equilibrium: slope of $E_{(P)} > 0$

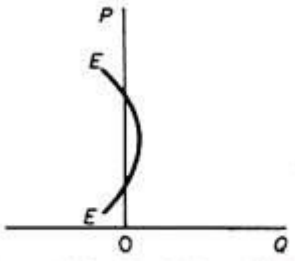

Figure 22.8 Multiple equilibria

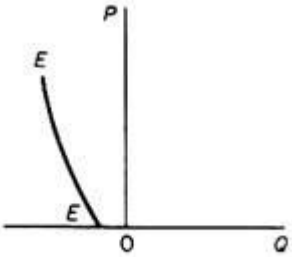

Figure 22.9 No equilibrium exists

Conclusion

Our current state of knowledge does not enable us to be sure of the existence of a general equilibrium in the real world, which is dominated by oligopolistic firms and production process which are characterised by indivisibilities. However, the proof of the existence of general equilibrium for a perfectly competitive economy is very important, because a perfectly competitive system has certain ideal properties : it results in an efficient allocation of resources .