(c) Efficiency in the composition of output (product-mix)

The third possible way of increasing social welfare is a change in the product-mix. To define the third marginal condition of a Pareto-optimal state in an economy we will use the production possibility curve, which we derived in Chapter 22. Recall that the slope of the *PPC* is called the 'marginal rate of (product) transformation' $(MRPT_{x,y})$, and it shows the amount of Y that must be sacrificed in order to obtain an additional unit of X. In other words the *MRPT* is the rate at which a good can be transformed into another.

The marginal condition for a Pareto-optimal or -efficient composition of output requires that the MRPT between any two commodities be equal to the MRS between the same two goods:

$$MRPT_{x,y} = MRS^{A}_{x,y} = MRS^{B}_{x,y}$$

Since the MRPT shows the rate at which a good can be transformed into another (on the production side), and the MRS shows the rate at which consumers are willing to exchange a good for another, the rates must be equal for a Pareto-optimal situation to be attained. Suppose that these rates are unequal. For example assume

$$MRPT_{x, y} = \frac{2Y}{1X}$$
 and $MRS_{x, y} = \frac{1Y}{1X}$

that is,

$$MRPT_{x,y} > MRS_{x,y}$$

The above inequality shows that the economy can produce two units of Y by sacrificing one unit of X, while the consumers are willing to exchange one unit of Y for one unit of X. Clearly the economy produces too much of X and too little of Y relatively to the tastes of consumers. Welfare therefore can be increased by increasing the production of Y and decreasing the production of X. (This example was presented in more detail in Chapter 22, page 503.)

In summary. A Pareto-optimal state in the economy can be attained if the following three marginal conditions are fulfilled:

1. The $MRS_{x,y}$ between any two goods be equal for all consumers.

2. The $MRTS_{L,K}$ between any two inputs be equal in the production of all commodities.

3. The $MRPT_{x,y}$ be equal to the $MRS_{x,y}$ for any two goods.

A situation may be Pareto-optimal without maximising social welfare. However, welfare maximisation is attained only at a situation that is Pareto-optimal. In other words, Pareto optimality is a necessary but not sufficient condition for welfare maxiWelfare Economics

misation. All points on the PPC are Pareto-optimal. The choice among these alternative Pareto-optimal states requires some measure or criterion of social welfare. In a subsequent section we will use one such criterion, namely Bergson's social welfare function.

5. THE KALDOR-HICKS 'COMPENSATION CRITERION'

Nicholas Kaldor¹ and John Hicks² suggested the following approach to establishing a welfare criterion.

Assume that a change in the economy is being considered, which will benefit some ('gainers') and hurt others ('losers'). One can ask the 'gainers' how much money they would be prepared to pay in order to have the change, and the 'losers' how much money they would be prepared to pay in order to prevent the change. If the amount of money of the 'gainers' is greater than the amount of the 'losers', the change constitutes an improvement in social welfare, because the 'gainers' could compensate the 'losers' and still have some 'net gain'. Thus, the Kaldor-Hicks 'compensation criterion' states that a change constitutes an improvement in social welfare an improvement in social welfare.

The Kaldor-Hicks criterion evaluates alternative situations on the basis of monetary valuations of different persons. Thus it implicitly assumes that the marginal utility of money is the same for all the individuals in the society. Given that the income distribution is unequal in the real world, this assumption is absurd. Assume, for example, that the economy consists of two individuals, A, who is a millionaire, and B, who has an income of £4000. Suppose that the change (being considered by the government) will benefit A, who is willing to pay £2000 for this change to happen, while it will hurt B, who is prepared to pay £1000 to prevent the change. According to the Kaldor-Hicks criterion the change will increase the social welfare (since the 'net gain' to A, after he compensates B, is £1000). However, the gain of £2000 gives very little additional utility to millionaire A, while the 'loss' of £1000 will decrease a lot the well-being of B, who has a much greater marginal utility of money than A. Thus the total welfare will be reduced if the change takes place. Only if the marginal utility of money is equal for all the individuals would the Kaldor-Hicks criterion be a 'correct' welfare measure. This criterion ignores the existing income distribution. In fact this criterion makes implicit interpersonal comparisons, since it assumes that the same amounts of money have the same utility for individuals with different incomes.

Noncept & PPF PPF - Production possibility frontier or PPC - Production possibility care The PPC shows the various combinations of given anount of resources and technology. PPC is derived from the Edgeworth contract rurve of production. From each point of the Edgeworth contract reuve of production are can read off (find) the maximum obtainable quantity of one commodily, given the quantity of the other. For example point a in fig (2) shows that given the quantity of X is X3, the maximum quantity of y that can be produced (with the given factors k and D is Y3. The X3. 73 combination is presented by point a' infig(3).

y C tig(3) Production possibility: curve Similarly point b of Edgeworth contract cure shows that given X4, the maximum amount of y that can produced is Y2. point 6 in The ppc is mapping of bim Edgewooth box. (from the factor space to the production space) In summary, the PPC of an economy is the locus of all Pareto-efficient outputs, given the resource endoewments (R and I) on

the state of lechnology. This curve shows the maximum quantity of a good obtainable, given The quantity of the other good. At any point on the curve all factors are optimally (officiently) employed. Any point inside the answe is technically inefficient, implying unemployed resources. My point above the ævere is mattaindele unless additional resources or a new technology or both are found. The PPC is also called the product Transformation curve because it shows how a commodity is Fransformed into another, by transferring some factors from the production one commodily to the other. The negative of the stope of PPC is called the marginal rate of product transformation, MRPTx, y and it shows the amount of y that must be sacrificed in order to obtain an additional unit of X. The economic meaning of the transformation aurre is the sate at which a commodily can be transformed into another.