Welfare and Social Welfare Maximization: A Review

[1]Idisi P.O, [2]Ogwu I.J, [3]Allah-kayi A, M.

Department of Agricultural Economics, Faculty of Agriculture, University Of Abuja, PMB 117 Abuja, Nigeria.

Email:ieshaa2k@gmail.com

Abstract: Welfare Economics is concerned with allocative and social efficiency which is the evaluation of alternative economic situations from the point of view of the society's well being. This review attempts to look at the various criteria of social welfare that have been suggested by economists at different times, these include; Growth of GNP as a Criterion of Welfare, Bentham's Criterion, a Cardinalist Criterion, the Pareto-Optimality Criterion, the Kaldor-Hicks 'Compensation Criterion' and the Bergson Criterion: the Social Welfare Function

Keywords: Welfare, Well-Being, Equilibrium, Utility, Exchange, Economy, Production.

I. INTRODUCTION

Broadly, Welfare is the level of prosperity and standard of living of either an individual or a group of persons. It is a government support for the citizens and residents of society. Welfare attempts to provide poor people with minimal level of well-being, usually either a free or subsidised supply of certain goods and social services such as healthcare, education, and vocational training. In the field of economics, it specifically refers to utility gained through the achievement of material goods and services. In other words, it refers to that part of social welfare that can be fulfilled through economic activity (Samuelson, Paul A, 2004) To evaluate alternative economic situations, we need some criterion of social well-being or welfare. Various criteria of social welfare have been suggested by economists at different times, these include, *Growth of GNP as a Criterion of Welfare, Bentham's Criterion, A Cardinalist Criterion, The Pareto-Optimality Criterion, The Kaldor-Hicks 'Compensation Criterion' and The Bergson Criterion: The Social Welfare Function.*

II. ECONOMIC WELFARE.

Economic welfare is the level of prosperity and quality of living standards in an economy. Economic welfare can be measured through a variety of factors such as GDP and other indicators which reflect welfare of the population (such as literacy, number of doctors, and levels of pollution e.t.c). Economic welfare is a general concept which doesn't lend to easy definition. Basically, it refers to how well people are doing. Economic welfare is usually measured in terms of real income/real GDP. An increase in real output and real incomes suggests people are better off and therefore there is an increase in economic welfare. However, economic welfare will be concerned with more than just levels of income. For example, people's living standards are also influenced by factors such as levels of health care, and environmental factors, such as congestion and pollution. These quality of life factors are important in determining economic welfare.
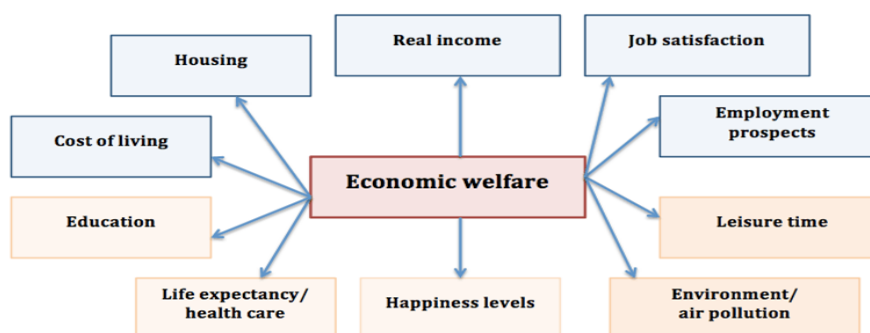

Fig.1: Factors influencing Economic Welfare

1. Real income – influencing potential consumption

2. Employment prospects – unemployment significant cost

3. Job satisfaction – satisfaction at work as important as income and wage

4. Housing – High income but unaffordable housing diminishes economic welfare. Good, cheap housing essential to economic welfare

5. Education – opportunities to study through lifetime, influence welfare

6. Life expectancy and quality of life – access to healthcare, also are lifestyles healthy, e.g. levels of obesity/smoking rates

7. Happiness levels – normative judgements on whether people are happy.

8. Environment – economic growth can cause increased pollution, which damages health and living standards.

9. Leisure time – high wages due to working very long hours diminishes economic welfare. Leisure has economic value.

A. *Measure Of Economic Welfare (MEW)*

This was developed in 1972 as an alternative to Gross domestic Product (GDP). It was developed by William Nordhaus and James Tobin. It adjusts the measure of total national output, to include only items that help improve economic well-being. In addition to GNP the MEW includes: The value of leisure time enjoyed by citizens, Value of unpaid work and Economic output in the underground economy (not measured by official GDP statistics). The MEW also excludes factors which reduce economic welfare, such as Environmental damage. It is also known as net economic welfare (NEW) (Samuelson and Nordhaus, 1992).

B. *Index Of Human Development Index (HDI)*

A related concept is that of Human development index (HDI). This is a measure which seeks to look at the available choices that people have. It is a composite indicator comprised of 3 basic factors affecting living standards – income, life expectancy and education. The three components are Real GDI per Capita, adjusted for the local cost of living (PPP), Life expectancy and Education – levels of literacy.The highest human development is given a value of 1. Low levels of Human development are given a value close to 0.

C. *Well-Being Index.*

This is a measure of economic well-being and life satisfaction, created by the ONS. It looks at health, relationships, education and skills, what we do, where we live, our finances and the environment. It includes positive data but also includes surveys and questionnaires – it also uses quite a new methodology and is experimental in terms of economic data.

III. CRITERIA OF SOCIAL WELFARE.

To evaluate alternative economic situations, we need some criterion of social well-being or welfare. The measurement requires some ethical standard and interpersonal comparisons, both of which involve subjective value judgements. Various criteria of social welfare have been suggested by economists at different times, these include:

A. *Growth of GNP as A Criterion of Welfare.*

Adam Smith implicitly accepted the growth of the wealth of a society, that is, the growth of the gross national product as a welfare criterion. He believed that economic growth resulted in the increase of social welfare because growth increased employment and goods available for consumption to the community. The growth criterion implies acceptance of the status quo of income distribution as ethical or just. Furthermore, growth may lead to a reduction in social welfare, depending on who avails mostly from it. The growth criterion highlights the importance of efficiency in social welfare; given that social welfare depends on the amount of goods and services (as well as their distribution) efficiency is a necessary prerequisite for the maximization of social welfare. However, efficiency is not a sufficient to guarantee the maximization of social welfare, as it does not dispose the need of having an ethical standard of comparing alternative economic states.

B. Bentham's Criterion.

Jeremy Bentham, an English Economist argued that welfare is improved when the greatest good is secured for the greatest number. This implies that the total welfare is the sum of the utilities of individuals of the society. The application of this criterion to economics has serious short comings, as it is an interpersonal comparison of the deservingness of members of the society. The criterion also cannot be applied to compare situations where the greatest good and greatest numbers do not exist simultaneously.

C. A Cardinalist Criterion.

Several economists proposed the use of the law of diminishing marginal utility as criterion of welfare. This criterion assumes that all individuals have identical utility functions for money, so that with an equal income distribution, all would have the same marginal utility of money. This assumption is too strong. Individuals differ in their attitudes towards money, as redistribution of income towards more equality might reduce total welfare. Opponents of this approach pointed out also that welfare effects of an equal distribution of income cannot be examined in isolation from the effects on resources allocation and incentives for work of the various individuals. An equal income distribution may induce some people to work less, thus leading to a reduction in total GDP. Similarly, equal incomes in all employment may lead to an allocation of resources which produces smaller total output. Income equality results in Pareto inefficiency in the use of resources and a reduction in social welfare.

D. The Pareto-Optimality Criterion.

This criterion refers to economic efficiency which can be objectively measured. It is called Pareto criterion after the famous Italian economist Vilfredo Pareto (1848-1923). According to this criterion, any change that makes at least one individual better-off and no one worse-off is an improvement in social welfare. Conversely, a change that makes no one better-off and at least one worse-off is a decrease in social welfare. For the attainment of a Pareto efficient situation in an economy three marginal conditions must be satisfied:

a) Efficiency in exchange: Efficiency of distribution of commodities among consumers.

b) Efficiency of production: Efficiency of the allocation of factors among firms.

c) Efficiency in product mix, or composition of output: Distribution of commodities among commodities.

This criterion however does not evaluate a change that makes some individuals better-off and others worse-off. Furthermore, it does not guarantee the maximization of social welfare.

E. The Kaldor-Hicks 'Compensation Criterion'.

Nicholas Kaldor and John Hicks suggested the following approach to establish 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, Kaldor-Hicks criterion states that a change constitutes an improvement in social welfare if those whose benefit from it could compensate those who are hurt and still be left with some net gain. This criterion evaluates alternative situations on bases of monetary valuations of different persons. It assumes that the marginal utility of money is the same for all the individuals in a society, however, given that income distribution is unequal in real world, this assumption does not hold. It also ignores the existing income distribution

F. The Bergson Criterion: The Social Welfare Function.

The various criteria discussed so far discussed show that when a change in the economy benefits some individuals and hurts others, it is impossible to evaluate without making some value judgement about the deservingness of the different individuals or groups. Bergson suggested the use of an explicit set of value judgements in the form of a social welfare function. A social welfare function is analogous to the individual consumer's utility function. It provides a ranking of alternative states (situations, configuration) in which different individuals enjoy different utility levels. If the economy consists of two individuals the social welfare function could be presented by a set of social indifference contours (in

utility space) like the ones shown in figure 4. Each curve is the locus of combinations of utilities of A and B which yield the same level of social welfare.
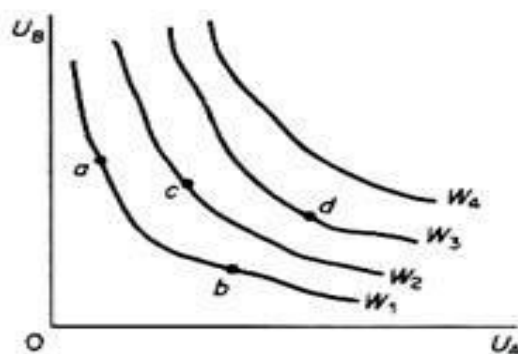

Fig. 2: Bergson's Welfare contours

The further to the right a social indifference contour is, the higher the level of social welfare will be. With such a set of social indifference contours alternative states in the economy can be unambiguously evaluated. For example a change which would move the society from point b to point c (or d) increases the social welfare. A change moving the society from a to b leaves the level of social welfare unaltered. The problem with the social welfare function is that there is no easy method of constructing it. Its existence is axiomatically assumed in welfare economics

IV. MAXIMISATION OF SOCIAL WELFARE

Professor Bator in his paper "The Simple Analytics of Welfare Maximisation" has presented a more thorough and systematic analysis of the problem of social welfare maximisation. It is a summary of the static long-run general equilibrium conditions of a perfectly competitive economy. It combines the Pareto optimality conditions with the social welfare function and provides a determinate and unique solution to the problem of maximisation of social welfare.

A. *Assumptions of Maximisation of Social Welfare:*

The analysis of maximisation of social welfare is based on the following assumptions:

1. There are two homogeneous and perfectly divisible inputs, labour (L) and capital (K). The two are supplied in fixed quantities.

2. Only two homogeneous goods, X and Y are produced in the economy. The production function for each good is given and does not change. Each production function is smooth, shows constant returns to scale and diminishing marginal rate of technical substitution along any isoquant which means that the isoquants are convex to the origin.

3. There are two individuals, A and B, in the economy. Each has a set of smooth indifference curves convex to the origin which reflect consistent ordinal preference functions.

4. There is a social welfare function that is based on the positions of A and B in their own preference scale, i.e. $W = W$ (W_A, W_B). It presents a unique preference ordering of all possible situations.

Given these assumptions, the problem is to determine the welfare maximising values of:

(i) The input of labour into the production of X and Y,

(ii) The input of capital into the production of X and Y;

(iii) The total amount of X and Y produced; and

(iv) The distribution of X and Y between the two individuals A and B. These steps are analysed as under:

B. *From the Production Function to the Production Possibility Curve:*

The box diagram Fig.3 explains the general equilibrium of production. There are fixed amounts of two inputs, labour (L) and capital (K), available to the economy for the production of two goods X and Y. O_x is the origin of input labour which is measured along the horizontal axis, and O_y of input capital which is measured along the vertical axis. The horizontal

Page | 336

sides of the two axes, O_x and O represent good X and the vertical sides good Y. The production function for each good is given by smooth isoquants which are characterised by constant returns to scale and diminishing marginal rates of technical substitution (MRTS). These isoquants are X_1, X_2 and X_3 for good X for which O_x is the origin, and Y_1, Y_2 and Y_3 for good for which O_x is the origin. At points P_1 Q_1 and R_1 an isoquant of good X is tangent to an isoquant of good Y, and so satisfies the condition $MRTS_{LK} - {}_y MRTS_{LK}$. By joining these tangency points leads to the production contract curve $O_x P_1 Q_1 R_1 O_y$ in input space. The various points on this contract curve are of efficiency locus where an increase in the production of X implies a necessary reduction in the output of Y.

From this production contract curve, we can trace the production possibility curve or transformation curve in the output space from the input space. The production possibility curve associated with the contract curve $O_x P_1 Q_1 R_1 O_x$ of Fig.3 is plotted as TC in Fig.4 This curve shows the various combinations of X and Y can be produced with fixed amounts of labour and capital. Consider point P_1 on the contract curve and input space of Fig. 3. If the isoquant Y_3 represents 600 units of input Y, and X_1. 100 units of X they are mapped in the output space as point P in Fig,4. Similarly points Q_1 and R_1, of Fig.3 are traced in the output space as points Q and R respectively in Fig.4.
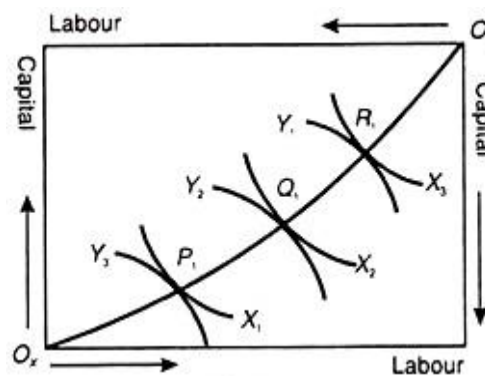

Fig. 3

By joining points P, Q and R, we derive the production possibility curve TC for good X and Y. With given amounts of labour and capital and fixed technology the economy cannot attain any point above the TC curve. Nor can it have a point inside the TC curve for that will mean underutilization of the two factor endowments. The economy must, therefore, be on the TC curve to maximise the community welfare. Further, the slope of any point on the production possibility curve of Figure 6 reflects the marginal rate of transformation (MRT) of X into Y. In other words, it indicates by how much the output of Y must be reduced by transferring enough capital and labour to produce one more unit of X.

C. From the Production Possibility Curve to the Grand Utility Possibility Curve:

The next step is to specify general equilibrium of exchange in the economy consisting of two individuals A and B and two goods X and Y. For this purpose, we derive the grand utility possibility curve from the production possibility curve. This is done by mapping the consumption contract curve from the output space of the production possibility curve TC of Fig.4 in to a utility space.
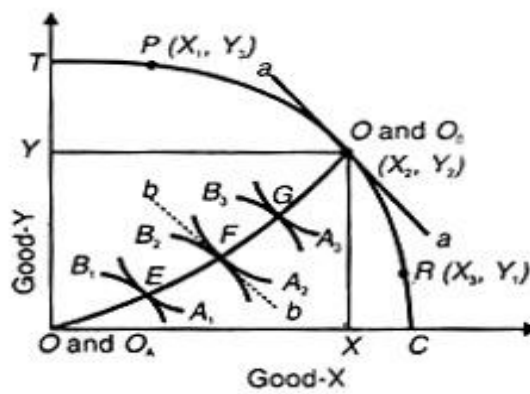

Fig.4

Select any point Q on the transformation curve TC in Fig.4 so that the total outputs of X and Y are OX and OY respectively. These outputs of X and Y determine the volume of the two goods available to A and B. These outputs, in turn, determine the dimensions of an Edge worth box diagram for exchange. Drop perpendiculars X and Y from Q on the two axis. Now O becomes the origin of consumer A. Let it be O_A. Similarly, point Q becomes the origin of consumer B. Let it be O_B. Since each individual has a well-defined preference function, indifference curves of A and B are drawn in the exchange box. Curves A_1, A_2 and A_3 represent A's preference field, and B_1 B_2 and B_3 are B's. The locus of tangencies of the indifference curves of A and B are E, F and G By joining these points, we get a consumption contract curve $O_A EFG O_B$. This curve is the locus of the various points of tangencies which shows the various positions of exchange that equalize the marginal rates of substitution of point of the consumption contract curve satisfies the optimum conditions of exchange. But a movement along the contract curve makes one individual better off than the other. Thus each point on the contract curve is a Pareto optimality point. By observing the utility levels for A and B at each point on the contract curve Fig. 4 we can derive the utility possibility curve or frontier relative to the output point Q on the transformation curve TC. The utility curve relative to Q is plotted as $U_1 U_2$ in Fig.5.
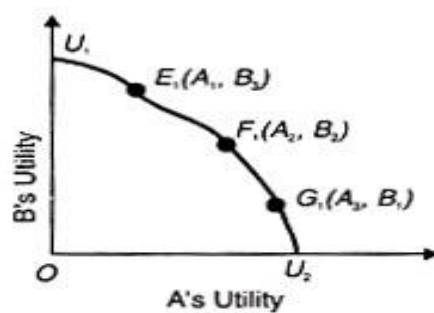

Fig. 5

Point E on this curve corresponds to point E on A_1 B_3 curves in Fig.4. Point E can be arrived at in this way. If the utility of curve A_1 is 100 units and of B curve 450 units with the horizontal axis referring to A's utility and the vertical axis B's utility, we get point E_1 .Point F_1 corresponds to point F on A_2, B_2 curves, and G_1, corresponds to point G on A_3 B_1, curves. By joining these points, we get the utility possibility curve $U_1 U_2$ as shown in Fig.5. This curve is the locus of points of maximum utility for A for any other level of utility for B. The condition for welfare maximisation also requires the general Utility equilibrium of exchange and production simultaneously. This condition implies that the marginal rate of substitution of X and Y must equal the marginal rate of transformation between the two. There is, however, one point out of the many points on the utility possibility curve that satisfies this condition. It is point F, on the U_1, U_2 curve in Fig.5 which corresponds to point F on the contract curve in Fig.4. It is found out by drawing a tangent *aa* at Q on the TC curve in Fig.4 . The slope of this tangent at Q represents the marginal rate of transformation between X and Y. The slope of the tangent bb at F in the box diagram represents the marginal rate of substitution for X and y by individuals A and B. Since the two tangents *aa* and *bb* are parallel to each other, point F in Fig. 4 and point F_1 in Fig.6 satisfy the condition of simultaneous general equilibrium of exchange and production, i.e. $_A MRS_{xy} = _B MRS_{xy} = MRT_{xy}$. By taking any other point P or R on the production possibility curve TC of Fig.4, we can construct another Edge worth box diagram and consumption contract curve. From this another utility possibility curve can be drawn and another point of Pareto optimum in exchange and production can be found. Let such a utility possibility curve be $U_S U_4$ with the corresponding point A, as shown in Fig.6
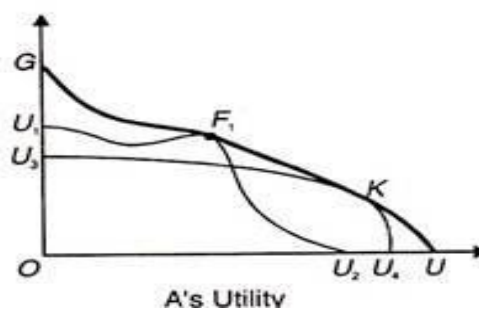

Fig.6

The utility possibility curve U.U, of Fig. 6 with the Pareto optimum point F, is also drawn in this figure. By joining these points F, and K, we derive GU as the grand utility possibility curve. The grand utility possibility curve is the locus of Pareto optimum points of exchange and production.

D.   *From the Grand Utility Possibility Curve to the Point of Constrained Bliss:*

In order to find out which of the Paretian optimum points on the grand utility possibility curve represents the maximum social welfare, we have to draw a social welfare function. Fig. 7 shows W W$_1$ and W as three social welfare functions or social-indifference curves of the society. Each social welfare function shows the various combinations of A's utility and B's utility which give the same level of satisfaction. But a movement along a social welfare function makes one individual better off and the other worse off. Thus a social welfare function involves interpersonal comparisons of utility. Assuming that W, W, and W$_2$ are the social welfare curves which exist for the society, social welfare will be maximised where the grand utility possibility curve is tangent to a social welfare curve, In Fig.7, F is the point of maximum social welfare as determined by that tangency of W, curve and GU curve. This is known as the point of "constrained bliss" because a movement away from point F along the GU curve will reduce total social welfare.
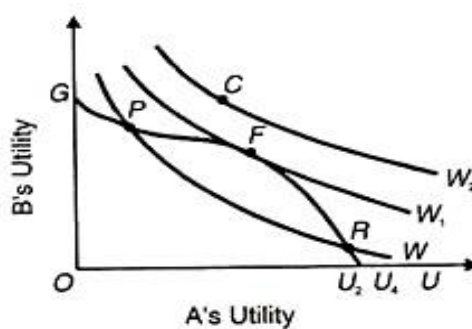

Fig.7

Take point P or R on the grand possibility curve GU. They represent a lower level of welfare because they are on the lower social welfare curve W. All points which are below the point of constrained bliss F are of non-Pareto optimality. And all points above this point such as C on the W curve are beyond the reach of the society because of given factor endowment and technology. Thus point F is of maximum social welfare where the general equilibrium conditions of production and exchange are simultaneously satisfied.

V.   CONCLUSION

Social welfare maximization is the the static long-run general equilibrium conditions of a perfectly competitive economy. It combines the Pareto optimality conditions with the social welfare function and provides a determinate and unique solution to the problem of maximisation of social welfare. The condition for social welfare maximization requires general utility equlibruim of exchange and production simultaneously.

REFERENCES

[1]   A. Koutsoyiannis, Modern Economics. Macmillan Press;1979 , pp.524-540

[2]   Francis M. Bator, The Simple Analytics of Welfare Maximization. The American Economic Review, Vol. 47, No. 1 (Mar., 1957), pp. 22-59 Published by: American Economic Association Stable URL: http://www.jstor.org/stable/1812285 Accessed: 16/05/2018.

[3]   Hueting, R. (2011): The future of the environmentally sustainable national income. Ökologisches Wirtschaften, 4/2011, 30-35.

[4]   Samuelson, Paul A.; William D. Nordhaus (2004). Economics. McGraw-Hill.

[5]   https://www.economicshelp.org/blog/1041/economics/economic-welfare/

[6]   https://en.wikipedia.org/wiki/Welfare_definition_of_economics.

[7]   https://www.economicsdiscussions.net