UNIT 8 PUBLIC CHOICE THEORY

Structure

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8.0 OBJECTIVES

After reading this unit, you will be able to:

- specify the domain of public choice theory;
- outline the issues involved in allocating resources for production in public sector;
- show how preference for public goods is balanced with the utility levels for different classes of people;
- explain the concept of 'majority voting' in collective decision making;
- describe the implications of 'median voter theorem' on the utility and cost functions;
- distinguish between the concepts of profit-seeking and rent-seeking;
- compare the output decisions of different type of producers in situations of alternative organisational control; and
- write a note on how corruption is detrimental to the economy.

8.1 INTRODUCTION

The public choice theory emerged from the study of taxation and public spending. It developed in the fifties and received extensive attention in 1986 when James Buchanan was awarded the Nobel Prize in economics. His colleague Gordon Tullock was another leading architect of the public choice theory. A public choice

theorist uses the same tool as used by economists in analysing market behaviour and applies it to people's actions in collective decision making. Economic agents in the private market are assumed to be self-seeking. Although people are concerned about some actions of other economic agents, the primary motive of each economic agent (employer, employee or consumer) is to maximise private interest. Public choice theorists argue that though people (voters, politicians, lobbyists or bureaucrats) acting in the marketplace have some concern for others, their primary objective is to maximise their self-interest. Public economics emphasise the role of government in case of market failure. However, public choice theorists point out that there are instances when the government also fail and because of this the government intervention does not provide the desired effect. Public choice economists analyse the behaviour of the politicians who are supposed to protect public interests when they decide on how to use public resources. The taxpayers primarily provide these resources (by following regulations and taxes) irrespective of whether they want to willingly provide them or not. Since there is no direct reward for saving the taxpayer's money, the incentive for good management in public interest is weak. In contrast, there are special interest groups who provide campaign funds to politicians. Politicians heed may the voice of such interest groups for getting their support to fulfil their aim of getting re-elected.

8.2 MECHANISM FOR ALLOCATING RESOURCES

Expenditures on private goods are determined by price mechanism but expenditures on public goods are determined through political process. The efficient allocation of resources in private good production is achieved through price mechanism and the produced goods are also distributed among consumers through price mechanism. The equilibrium in the private market is determined at a point where demand intersects supply. The first fundamental theorem of welfare economics ensures that competitive market mechanism results in efficient resource allocation.

The allocation of resources in public sector is different from that of private sector. Citizens vote for elected representatives and the elected representatives, in turn, vote for a public budget which is spent by many public agencies. Thus, there is a considerable difference in the nature of spending of a private agent and how the government spends public funds. A member of assembly or parliament, when he votes or spends public funds, is supposed to reflect the views of his constituents, not just his own views. In deciding where to spend the money allocated to his constituency or department, he must ascertain the views of his constituents. Since these views may differ, he must decide on weights to be given to the positions adopted by different constituents.

An individual may express his/her preference for one private good versus another either by buying it or not buying it. But there is no practical way by which a person can compare a public good with another. By voting a party, a voter can express his/her view towards more or less of a public good to be provided. Unless and until there is a trade-off between two goods, it is challenging to get them to think hard about their choices. Again, free-riding problem restricts individuals in revealing their preferences regarding public goods truthfully. Usually, as long as the individual does not have to pay for the public good, individual likes more of the public good. However, if the preference for the public good is related to the amount the individual has to pay for the good, then, usually the individual reveals less than what he/she prefers. The critical difference between public and private

resource allocation is that in case of private good the decision maker knows his preferences, but for a public good, the decision maker has to ascertain the preferences of those on whose behalf he is making a decision.

A public good is a good of collective consumption. As different individuals have different preference for a public good, decision making for collective consumption of a public good is not so easy. Demand for public good differs in terms of preference, income and taxes. Wealthier individuals consume more public and private goods, but if more provision of public good increases the tax liability of the rich people, then they would want a lower level of public expenditure.

8.2.1 Resources for Public Goods

Suppose there are N people and each pays same amount to finance public expenditure/good regardless of income. If G is the level of expenditure on public good then each pays G/N. Thus, in case of uniform taxation, price paid for the public good is $1/N$. But with proportional taxes, if 't' is the tax rate and $\bar{Y}$ is the average income, then total tax collection is: $tN\bar{Y}$. Thus, under a balanced budget:

$$G = tN\bar{Y} \tag{8.1}$$

Thus, the tax rate is:

$$t = \frac{G}{N\bar{Y}} \tag{8.2}$$

The tax payment of an individual with income Y_i is therefore:

$$tY_i = \frac{GY_i}{N\bar{Y}} \tag{8.3}$$

If government expenditure increases by one rupee, then tax payment of an individual will increase by $\frac{Y_i}{N\bar{Y}}$. Thus, the individual with average income $\bar{Y}$ faces the 'tax-price' equal to $1/N$ while the individuals with above/below average income faces higher/lower tax-price respectively.

A progressive tax system is one in which tax payments increase more than proportionately with income; it is regressive if it increases less than proportionately. In case of the progressive tax system, tax-price is greater than $\frac{Y_i}{N\bar{Y}}$ for the high-income group and less than $\frac{Y_i}{N\bar{Y}}$ for a low-income group. Thus, an individual's preferred level of public good can be illustrated as in Fig. 18.1.

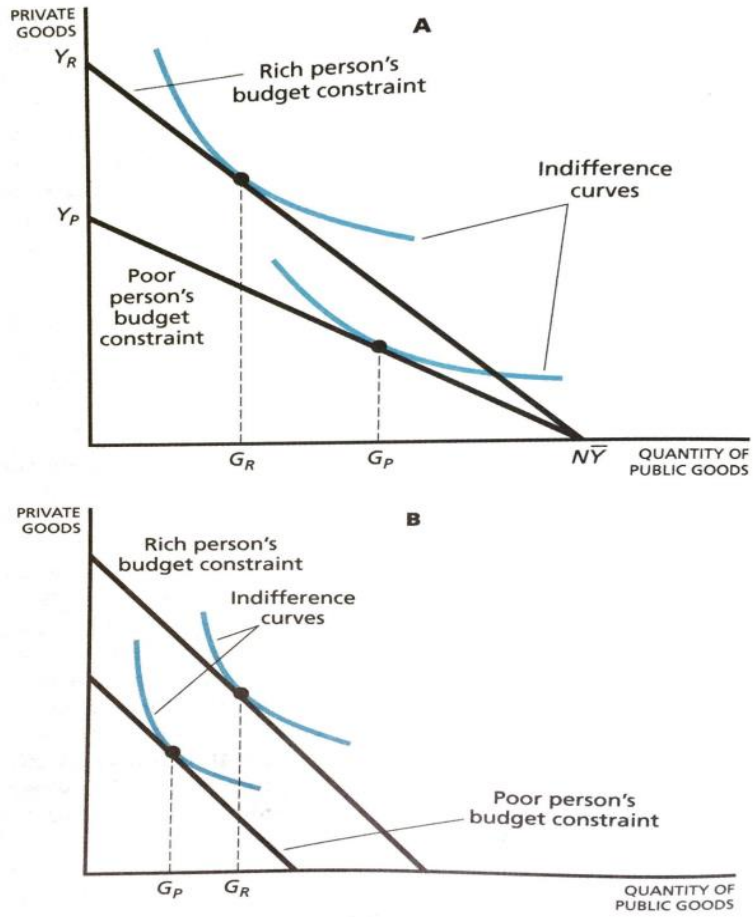

Fig. 8.1: Preferred Level of Public Good

Source: Stiglitz, J.E. (1999), p-161.

Utility depends on the level of public expenditure and in case of an individual, utility is maximised at a point where the indifference curve is tangent to the budget constraint. Larger the gap between actual expenditure and preferred expenditure, lower is the level of utility. Fig. 8.2 depicts utility as a function of public expenditure for three different classes of people: the poor, the middle and the rich. Suppose, they reach their maximum utility at G^p, G^m and G^r respectively. Since utility varies with the actual level of public expenditure, the rich prefer the highest level of public expenditure followed by the middle and then by the poor.

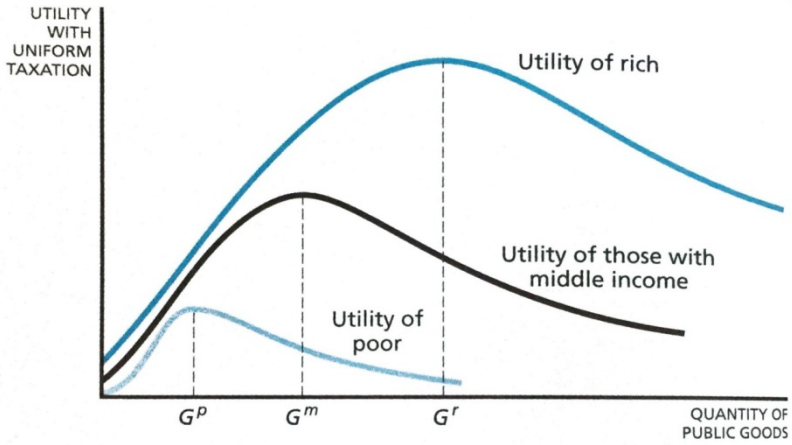

Fig. 8.2: Utility Levels for Different Class of People

Source: Stiglitz, J.E. (1999), p-161.

In a private market, whoever pays the price for the good will get the good. There

is thus no need to balance the claims and interest of one group against those of others. The problem of reconciling the decisions however arise when there is a need for collective decision. While in a dictatorship, the dictator's preference dominate, there is no such easy resolution in a democracy. This leads us to the consideration of voting methods for collective decision making.

Check Your Progress 1 [answer within the space given in about 50-100 words]

1) Define a public good. Why is it difficult to decide on public spending for a public good?

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2) With required notations, indicate the expressions for balanced budget and tax rate for a uniform tax and a proportionate tax policy.

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3) How is utility linked to the gap between 'actual expenditure' and 'preferred expenditure'?

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8.3 COLLECTIVE DECISION MAKING

Collective decision-making rule helps us in deciding which good is to be provided in the public sector and what taxes to be imposed. Such a decision affects the individual's welfare (W) which depends on the distribution of utilities in the community. This, in turn, depends on the allocation of resources, goods and services. How much goods and services to be produced depends on the allocation of factors while how much goods should be consumed depends on the relative price of the goods. Different individuals have different views on the best or most equitable distribution with there being no logical basis by which one should give more weight to one individual's preference over another. The collective choice theory provides a basis of aggregating welfare functions of all individuals into a social welfare function.

8.3.1 Majority Voting

Voting is an example of common choice. It is the process through which a group (or collective) reaches a decision. A significant issue of collective choice is 'stability' by which is meant the tendency of the decision-making process to eventually reach a settled conclusion not fluctuating between alternatives. The role of 'stability' can be understood by the fractured verdicts thrown up by our electoral system when no single party gets a clear majority. A coalition may provide a stable government which is but a collective choice (from among the several choices) expressed by electing leaders with diverse opinions for common in social goal. So it is stable but not necessarily desirable for all the same way since stability is forcing some of the participants to remain with unwanted choices.

An intermediate result of the theory of social choice is provided by the Arrow's Impossibility Theorem. The theorem says that there is no way to devise a collective decision-making process that satisfies a few common sense requirements and works in all circumstances. If there are only two options, majority voting works just fine, but with more than two we can get into trouble. The situation is like a two party system throwing up a decisive winner and a multi-party system in which too many parties have to come together with a common minimum programme to form a coalition. To illustrate this, we can consider three voters and three preferences with every voter having a preference over three options which are transitive. Preferences of the voters are shown in Table 8.1.

Table 8.1: Illustration of Majority Voting with Three Preferences

Voter 1	Voter 2	Voter 3
a	c	b
b	a	c
c	b	a

If we use majority rule to select one of the options, we see that two out of three voters prefer 'a' to 'b' while two out of three prefer 'b' to 'c' and two out of three prefer 'c' to 'a'. At the collective level, there is a cycle in preference and thus no decision is possible. Such preferences are said to be 'intransitive', meaning that the preference for 'a' over 'b' and for 'b' over 'c' does not imply 'a' is preferred to 'c'. The generation of social intransitivity based on individual transitivity is called the Condorcet Paradox.

When there are only two options, majority rule is a compelling and straightforward method for social choice. When there are more than two options to be considered at a time, we can still apply the principle of majority voting by using binary agendas which allows us to reduce the problem of choosing among many options to a sequence of votes each of which is binary. The most famous pair-wise voting method is called the Condorcet method. It consists of a complete round-robin of majority votes, posing each option against all others. The option which defeats all others in pair-wise majority voting is called a Condorcet winner (named after Condorcet who suggested that such an option should be declared the winner).

8.3.2 Median Voter Theorem

The existence of a Condorcet winner requires very special configurations of individual preferences. For instance, if the preferences throw up a Condorcet paradox, there will be no Condorcet winner. A natural question to ask therefore is: under what conditions does a Condorcet winner exist? The 'median voting theorem' gives us an answer to this. The theorem states that a 'majority rule voting' system will select the outcome most preferred by the median voter under two assumptions (or conditions). One is that voters can place all election alternatives in a one-dimensional spectrum and, two, the voters' preferences are single-peaked (i.e. voters have one alternative that they favour more than any other). In one of its other version, an additional assumption of 'single crossing preference' is also made. Both the conditions give the same conclusion that the median position is a Condercet winner.

As an example of single-peaked preferences, consider a population of consumers who are located at equally-spaced positions along a straight road where a bus stop is to be located. It is assumed that all consumers would prefer this to be located as close as possible to their location. The location of the bus stop is to be determined by majority voting. When there is an odd number of house owners, the answer to this question is clear-cut i.e. since given any pair of alternatives, the households will vote for that which is closest to their location, the location that is the closest choice for the most number of voters will receive majority votes. But if we consider a voting process in which votes are taken over every possible pair of alternatives, depending on the number of alternatives, there would be many rounds of voting and the process will rapidly become impractical. But if we put aside this difficulty, it can be seen that this process will lead to the intermediate outcome being the chosen alternative. Expressed differently, the location preferred by the median voter (i.e. the voter in the centre) will be chosen where at least half the population will also vote for (or prefer). In other words, if the number of voters are in odd numbers, and the policy space is one-dimensional (i.e. voters can clearly place political candidates on a left to right continuum which is the same as saying 'options can be put in a transitive order'), and so long as the voters have single-peaked preferences, then the median of the distribution of voters' preferred options is a Condorcet winner.

Although a robust result, the Median Voter Theorem have significant drawbacks. The first is that the application of the theorem requires an odd number of voters as this ensures that there is a majority for the median. When there is an even number of voters, there will be a tie between the two central voters with the theorem being silent on which of these locations will eventually be chosen even though there is a median tendency. The second and most significant drawback is that the theorem is applicable only when the decision over which voting is taking place has a single dimension (i.e. one dimensional).

In the single crossing version of the median voter theorem, we not only assume that the policy space is transitively ordered (from left to right) but also assume that voters too are transitively ordered (from left to right) of the political spectrum. This assumption is known as the single crossing assumption i.e. half of the voters are to the left of the median voter and the other half is to his right. Suppose there is an odd number of voters and that the policy space is one-dimensional. According to the single crossing property, for any two options 'a' and 'b', with a < b, if a median voter prefers 'a', then all the voters to the left of him should prefer 'a', and all the voter to the right of him must prefer 'b'. Similarly, if a

median voter prefers 'b' then all the voters to the right of him should prefer 'b'. So there is always a majority of the voters who agree with the median voter and the option chosen by the median voter is Condorcet winner. Thus, single-peaked or unique crossing preference both give us the same result that median voter's preferred option is Condorcet winner.

Could the majority voting rule be cost-effective? Buchanan and Tullock (1965) in the Calculus of Consent considered the costs associated with different voting rules. Assume that the total number of individuals in the community is N_{max}. The simple majority voting rule is that 50 percent of N_{max} plus 1 is the number required to win the election. Let the costs of voting be represented by E and D as in Fig. 8.3. Members of the minority group (by the support of whom, the party with the highest votes can reach the majority mark) represent the 'external cost' of winning the majority. This is dependent on the decisions (sacrifices or costs) of the majority group since the minority group may disagree with the majority group. It is, therefore, clear that the external cost falls with the rise in the size of the necessary majority i.e. at N_{max} the external cost is zero with D as the cost of decision making. The decision-making cost is lower if any one person can take the decision and as the proportion of persons required to agree on any issue increases, the cost of finding agreement between the winning majority would increase.

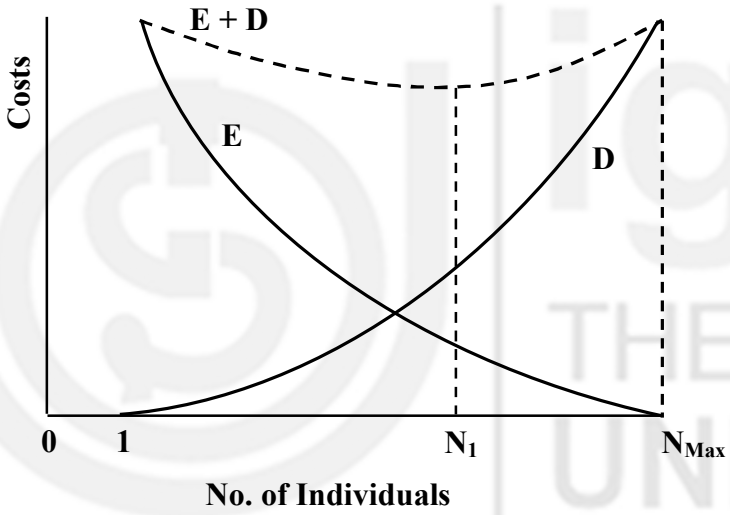

Fig. 8.3: Cost of Majority Voting Rule

Source: Cullis J and Jones P, 1998, p-82.

Since the sum of costs is E+D, the minimum total cost is not necessarily reached at the point of intersection of E and D as it also depends on their rate of change. At the minimum point of E+D curve, the absolute slope of E and D are equal. In other words, the minimum cost is reached at N_1. However, there is no guarantee that the minimum point will always be at N_1 in which case it may imply a minority win. This means, for some issues, it may be easier to achieve consensus than in others with some decisions involving higher or lower costs.

Check Your Progress 2 [answer within the space given in about 50-100 words]

1) What does stability mean in 'majority voting'?

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2) What is meant by 'Condorcet Paradox'?

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3) What is 'single crossing assumption' in the context of median voter theorem?

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8.4 GOVERNMENT FAILURE

Buchanan (1962) argues that while democracy is best for promoting individual and market freedoms, it may not necessarily be a very efficient system. The basic idea of democracy is that people vote for electing their representatives by secret ballot with the political party that wins a majority forming a government. Arrow's impossibility theorem shows that there is no voting rule which always satisfies the desirable properties of the social choice mechanism. Further, every government faces political pressures from 'special interest groups' who try to use the political process for their use. For instance, if one firm is not economically competitive in a market, then the firm can use their elected representative to change the rules in their favour which in turn, becomes the source of 'rent seeking'. The economic costs of favouring a particular interest group are usually higher than the benefit of the particular interest group making it socially undesirable.

Political process suffers from a lack of information. When we buy some consumable good from the market, we expect complete information on that product so as to be able to compare it with other products in the market. If the manufacturer cheats on the quality of the product, then the products may be returned to the seller. In case of voting, on the other hand, we lack information to judge the contestants on their merits. In the absence of real information, citizens are compelled to rely on their gut feeling while voting for their representatives. Candidates also don't disclose much information. We are aware from sub-section 8.3.2 that a median voter votes for the winner. But the median voter theorem works best when the voter range is uni-dimensional with a central peak. But in practice, the political spectrum has many dimensions with multiple peaks. Thus, voting results are based on a small number of voters in the middle who maintain the decisive balance. The election processes are not geared to elect only those politicians who are good leaders or ethical or intelligent.

Public officials manage the everyday tasks of the government with usually political appointees occupying the top level of bureaucracies. Thus, political leaders may change but public officials continue to maintain the consistency in administration. Such officials in the bureaucracy develop working relations with industrialists whom these officials are supposed to regulate. Often, instead of regulating industries, the bureaucrats end up promoting the interests of the industries rather than the general public.

8.4.1 Rent Seeking

Rent seeking is the act of seizing an income flow rather than creating it. It is a behaviour which extracts valuable resources for unproductive purpose forcing the government into inefficient decisions. The idea behind the act of rent-seeking can be illustrated with the following two situations:

- Suppose a firm is doing some research to invent a new product. If the research is successful, it will provide the firm with some monopoly power. This prompts bureaucracy to extract a rent from this firm.

- Suppose a firm introduces a new product in the domestic market but a similar kind of product already exists in the international market. Now, the firm hires lawyers to lobby the government to prevent imports of the overseas product. If it is successful, it will enjoy a monopoly position. Such an act reduces overall welfare amounting to a rent seeking behaviour by the firm through the legal route.

The primary difference between these two situations is that the first one is the one needs appreciation while the second needs to be restricted. In the first case, the firm is allocating resources for innovation. If the research is successful, then the welfare of the consumers will increase. In the second case, welfare of the consumers would be reduced if the lawyers succeed in winning the case for the firm. In other words, it would restrict competition and consumers will pay higher price in the market.

Profit-seeking is the expenditure of resources to create a profitable position that is ultimately beneficial to the society. At the core of profit seeking is the research which drives progress in the economy. Rent seeking, on the other hand, is the expenditure of resources to create a profitable opportunity that ultimately damages the society. Scientists and engineers employed in research do productive work because when research is successful, economy's output also would rise. On the other hand, rent-seeking always reduces total output because resources engaged in rent-seeking could be applied to alternative productive uses. In rent-seeking, resources are wasted in the lobbying process. The application of rent-seeking idea shows that the losses caused by distortions are potentially much more than the standard measure of ‘deadweight loss’. Policymakers have an incentive to create distortions which they do in order to receive benefits from rent-seeking. This leads to a perspective that policy is driven not by what is good for the economy but by what is good for the decision maker i.e. by a politics corrupted by self-interest.

8.4.2 Bureaucracy

Bureaucracy is an essential feature of an economic system. It is defined as a class of authorities comprising of different divisions, departments, branches and offices responsible for the services provided by the government. The traditional view of bureaucrats is that they are motivated solely by the desire to serve the common good without political or personal bias. The theory of bureaucracy however starts

with the assumption that the maximisation of their private utility is what motivates the bureaucrats. According to Niskanen's theory, a bureaucrat's utility is a function of his pay, his subordinates and their pay, public image, bonuses related to the office and the power or position enjoyed. Since budget size directly increases the utility of the bureaucrats, they try to maximise the size of the budget of their department or office. Unlike producers, bureaucrats are free from competition and therefore enjoy monopoly power. A monopolist chooses the output level so as to maximise his profit. A bureaucrat receives a fixed grant from the superior public administration (e.g. the ministry) and in exchange for the budget, the bureaucrat provides some quantity of output as services. This can therefore be presented graphically as in Fig. 8.4. In this, we make a comparison of output decisions between different producer entities like a private sector monopolist, private non-profit organisation and a public sector authority. We assume that a public good (G) is produced with each producer facing the same demand and production functions and the same prices for 'factors of production'. This makes each entity to face the same 'long-run average cost' (LRAC) curve. We further assume that there are constant returns to scale i.e. LRAC = LRMC. The demand curve is D, which represents the demand curve of the median voter, and the marginal revenue curve is MR. The following observations can now be made for each producer.

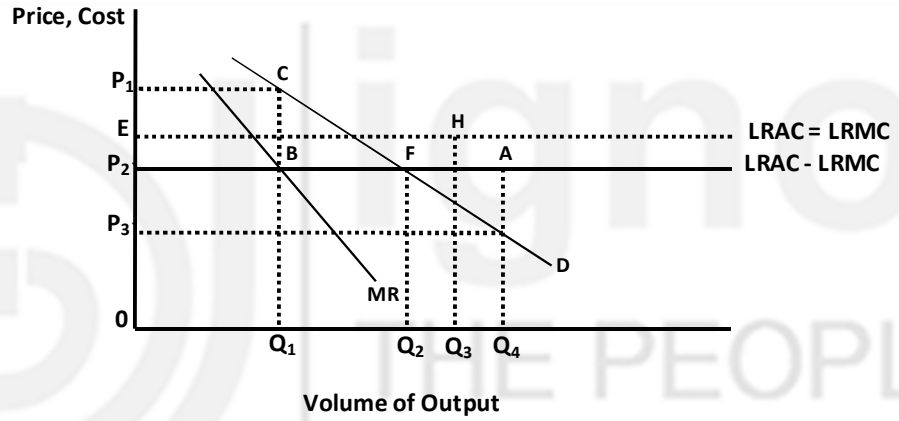

Fig. 8.4: Comparison of Output Decisions

Source: Brown and Jackson, 1982.

I) **Monopolist:** The output will be produced at the intersection of MR and the MC with Q_1 as the level of public good provided at a price of P_1.

II) **Private Non-profit Organisation:** Here, Q_2 level of public good will be produced at price P_2.

III) **Public Sector:** Here, the government transfers a fixed amount as budget to produce and supply the public good. If government transfers OP_2AQ_3 then Q_3 amount of public good will be produced. Since, $Q_3 > Q_2 > Q_1$, the output is higher than what the median voter demands. In other words, the public authority provides more output than a median voter is willing to consume. Therefore, if OP_2 is a long-run Pareto efficient price, a monopolist does not supply a sufficient quantity of the good, while a bureaucrat (assuming a fixed budget) offers too much of it. If the budget transferred to the bureaucrats is OP_2FQ_2, then the bureaucrat's output is the same as that of non-profit making organisation. We note that in case of a monopoly, the welfare loss of the consumer equals CBF while in case of a public authority it equals FAG.

The above picture presented for bureaucracy is dependent on the size of the budget provided. The budgeting process evokes the question of whether it is more or less than optimal? For a utility-maximising bureaucrat, it is advantageous to maximise the size of his budget while for a politician who answers to the voter, a budget should be large enough to satisfy the voter's demand. Thus, the relationship between the bureaucrat and the politician is similar to a bilateral monopoly relationship where the final result depends on the distribution of power and influence between the two parties to the trade. Elected politicians formally ask for a budget but their request is to a large extent dependent on the information provided to them by the bureaucrats. It is thus the authority (bureaucracy) which asks for a budget through the elected representatives. Sponsors (external donors or fund providers), on the other hand, strive to strike a balance between maximising the quantity of output with the quality of service. Bureaucrats, however, wish to maximise the size of their budget since this provides them with the resources to maximise their utility. This can be formally presented as follows.

Let 'y' denote the output of the bureau and B(y) be its budget and C(y) the cost function for producing the output. Both the budget and the cost increase with increased production of output (the latter incrementally in its 'marginal cost'). We, therefore, have:

$$B'(y) > 0 \quad \text{and} \quad B''(y) < 0 \tag{8.4}$$

$$C'(y) > 0 \quad \text{and} \quad C''(y) > 0 \tag{8.5}$$

We assume that the budget received from the government is sufficient to cover the costs of production. The objective of the bureaucrats is to choose the level of output so as to maximise the budget subject to the condition that the budget is sufficient to cover costs. Hence, the Lagrange function is expressed as:

$$L = B(y) + \lambda [B(y) - C(y)] \tag{8.6}$$

where λ is the Lagrangian multiplier on the constraint that the budget equals cost. The first order condition from which the optimum output of the bureau (y^b) can be obtained as:

$$B'(y^b) = \frac{\lambda}{\lambda + 1} C'(y^b) \tag{8.7}$$

Since λ is positive, Equation (8.7) implies that B' < C' at the optimum output level (Fig. 8.5) excessive size is one of the common features of bureaucracy, the excess budget will lead to inefficiency. In other words, the money spent on the bureau will not be able to generate optimum results. Niskanen postulates a utility function containing all the four P's i.e. power, prestige, pay and promotion. Niskanen's bureaucracy theory is based on the assumption that bureaucracy usually produces a level of public goods equal to double the social optimum. This would imply that the size of the public sector is two times larger than its social optimum. The policy implication that arise in this context is to decrease its monopoly power. One method of doing this is by increasing competition among the bureaus. This can, in turn, be achieved by changing the incentive structure (e.g. by allowing civil servants to keep a proportion of any genuine cost saved similar to distributing dividends by a private company). Let us now consider the demand curve of the median voter which is perfectly elastic (Fig. 8.6). We further assume that the bureau is monopsonist in the input market leading to a divergence between the marginal cost curve and the supply curve. The normal monopsony result says that

there will be too little allocation of input at Oq^M offering surplus equal to '012'. This can be allowed to be retained (as an incentive) whereby the bureau might wish to maximise its output, by raising employment to Oq^E with the triangle '234' becoming its new surplus. Bohm (1987) tried to balance these opinions of inefficient bureaucracy by providing the following three arguments: (i) not all economic policy are readily adaptable to the self-interested behaviour of the bureaucrats; (ii) literature on bureaucratic exploitative behaviour is long in theory but short on empirical evidence; and (iii) there is always a question of the role of media in a democracy which may act as a healthy discipline on inefficient bureau.

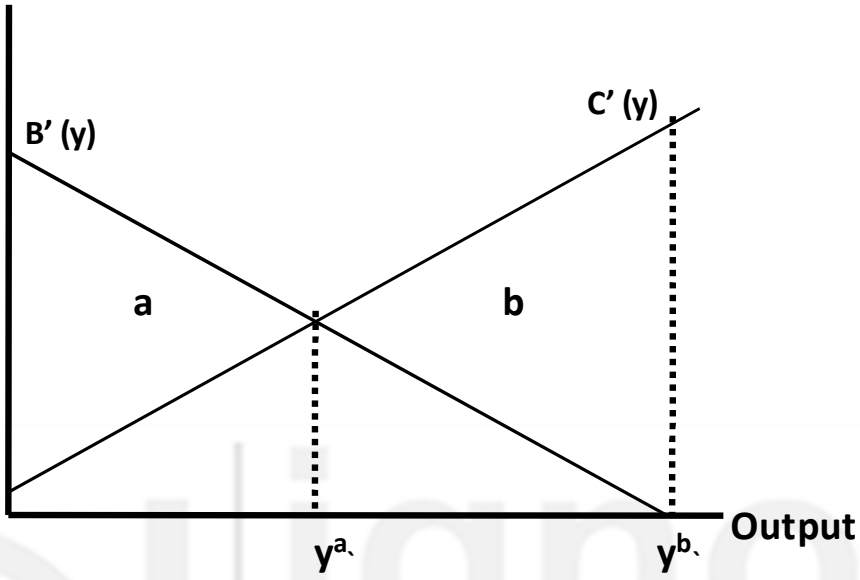

Fig. 8.5: Excessive Bureaucracy

Source: Hindriks and Myles, 2006.

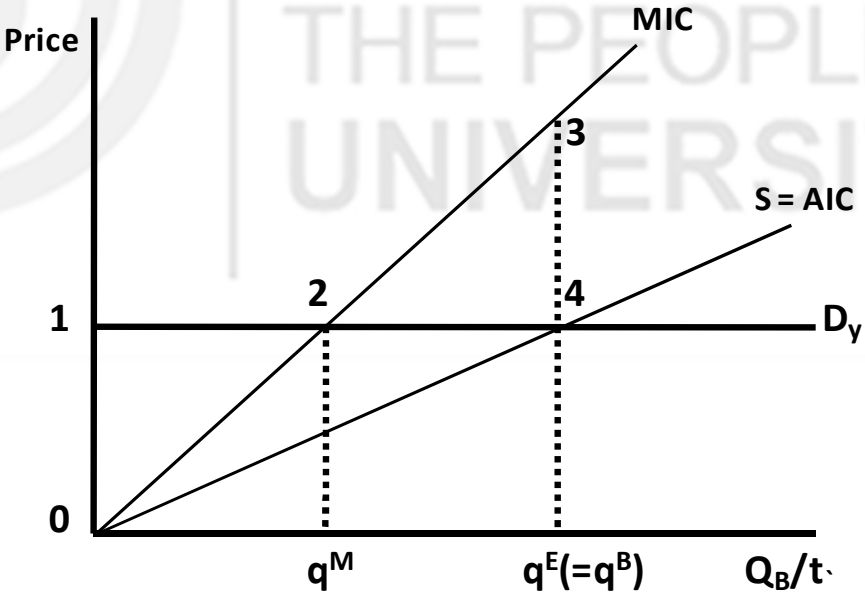

Fig. 8.6: Monopsonist Bureaucracy and Surplus as Incentive

8.4.3 Corruption

The bureaucracy uses its power for personal gain which leads to corruption in the public sector. Corruption diverts resources from productive purpose to rent-seeking activity i.e. it does not just transfer wealth from others to a particular

interest group but also results in economic costs since a corrupt official restricts economic growth. Therefore, it is important to recognise that the most important source of corruption in many countries is the regulation. In many cases, the government intentionally creates regulations so that the entrepreneurs have to pay bribes which increases the cost of production resulting in economic inefficiency. The damage is unusually large if several government officials create an obstacle to economic activity in order to extract bribe from the entrepreneurs. In this case, producers either cease to try or move into the underground economy to escape regulation altogether. Corruption is thus entirely harmful.

Check Your Progress 3 [answer within the space given in about 50-100 words]

1) In what way 'rent-seeking' distorts an economy?

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2) What assumption does Niskanen make in his theory of bureaucracy? What policy implication does this assumption prompt?

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3) What arguments did Bohm (1987) provide to balance the views on inefficient bureaucracy?

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8.5 LET US SUM UP

The unit discusses the issues involved in allocating resources for production of public goods. It then explains how in majority voting, the median voters hold the key in final outcome. The issue of government failure and in its light the emergence of the behaviour of rent seeking (crippling economic growth itself in the process) is then explained. How to deal with the excessive role of bureaucracy in order to deal with the issue of government failure and rent seeking is finally presented.

8.6 KEY WORDS

Collective Decision Making : Deals with deciding which good should be provided in the public sector and what taxes should be levied to raise resources needed for the same.

Stability : Refers to the tendency of voting systems to eventually result in a settled conclusion without ambiguity.

Single Peaked Preference : Our assumptions are that both the policy space and the voters are transitively ordered (i.e. ordered from left to right of the political spectrum). This assumption is known as the single crossing assumption i.e. half of the voters are to the left of the median voter and the other half is to his right.

Single Crossing Assumption : Refers to a situation where the voters are so transitively ordered that all those to the left of median voter prefer a, if median voter prefers a and all the voters to his right prefer b.

Rent Seeking : Is a behaviour which extracts valuable resources for unproductive purposes.

Tax-Price : Tax price is the change in total tax payment by an individual for one unit change in government expenditure (G). Tax-price= $\frac{1}{N}\frac{Y_i}{\bar{Y}}$. Given the number of tax payers, the total tax payment will depend on the income of the individual relative to average income. If $Y_i = \bar{Y}$ then tax price is $\frac{1}{N}$, if $Y_i > \bar{Y}$ then tax-price> $\frac{1}{N}$ and if $Y_i < \bar{Y}$ then tax-price< $\frac{1}{N}$.

8.7 SOME USEFUL BOOKS

1) Cullis J, Jones P & Jones P R (2009). *Public Finance and Public Choice: Analytical Perspectives*. Oxford University Press.

2) Brown C V & Jackson P M (1982). *Public Sector Economics*, Martin Robertson.

3) Buchanan J M & Tullock G (1962). *The Calculus of Consent* (Vol. 3), Ann Arbor: University of Michigan Press.

4) Hindriks J & Myles G D (2006). *Intermediate Public Economics* (Vol. 2), Cambridge: MIT Press.

5) Stiglitz J E (1999). *Economics of the Public Sector* (3rd edition), WW Norton & Company.

8.8 ANSWERS OR HINTS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

1) A public good is a good for collective consumption. Deciding on its public spending is different and unlike that of a private good due to differences in preferences, income and taxes paid.

2) Use Equations (8.1) to (8.3).

3) Larger the gap between actual expenditure and preferred expenditure, lower is the level of utility.

Check Your Progress 2

1) It is a tendency in the median of the decision-making process marking a settled conclusion without ambiguities though not equally desired by all.

2) A social intransitivity derived from such individual transitivity is called the Condorcet Paradox. Note that just the idea of social transitivity derived from individual transitive preferences does not constitute the paradox. The paradox can exist due to the possible contradiction between the principle of majority voting and the idea of individual transitivity.

3) That half the voters are to the left of the median voter and the other half are to his right.

Check Your Progress 3

1) Losses caused by distortions are potentially much more than the standard measure of 'deadweight loss'.

2) That bureaucracy usually produces a level of public goods equal to double the social optimum. Decrease the monopoly power of bureaucracy.

3) Among others, the literature on empirical evidence of bureaucratic behaviour is thin.