

**AFRICAN ECONOMIC RESEARCH CONSORTIUM
(AERC)**

**COLLABORATIVE MASTERS DEGREE
PROGRAMME (CMAP) IN ECONOMICS FOR SUB-
SAHARAN AFRICA**

JOINT FACILITY FOR ELECTIVES



Teaching Module Materials

ECON 546 Public Sector Economics I

(Revised: August, 2020)



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I. COURSE OBJECTIVES

The course will expose students to the state-of-the-art in public sector economics theory, while drawing on empirical evidence from developed and developing countries. The aim is to develop analytical tools and methods that will enable students to appreciate issues pertaining to public spending, taxation and financing of government. As much as possible, evidence will be drawn from African and other developing countries. By the end of the course the students should be able to:

- Discuss critically key issues in public economics, informed by recent research; and
- Demonstrate familiarity with a range of public policy issues and relevant analytical and empirical tools.

II. COURSE OVERVIEW

This is a master's level course in Public Sector Economics. The course covers: the role and size of the public sector, including the rationale for public sector interventions such as market and government failure and distributional concerns; public expenditure policy, including assessment of government social protection programs, public projects, public investment management, public-private partnerships, privatization and the role of the private sector in the production and provision of public goods and services. Also addressed are key factors determining a nation's fiscal architecture; public resource mobilization via user charges and taxation, including the economics of taxation, taxation of income, wealth, and consumption, tax incentives, tax compliance and enforcement, and tax reform. It also covers fiscal federalism and issues related to public debt, deficit financing and fiscal federalism.

III. COURSE ASSESSMENT

The course will be assessed by continuous assessment and a final examination. The weighting will be as follows:

Continuous Assessment:	40%
Final Examination:	60%

Continuous assessment shall be made up of trial questions at the end of each lesson, assignments, and term paper on a selected topic in public sector Economics.

IV. PRE-REQUISITES

The students are expected to have successfully completed the core courses (Microeconomics, Macroeconomics, and Quantitative Methods).



V. RECOMMENDED TEXTBOOKS

Atkinson, A. and J. E. Stiglitz (2015), *Lectures on Public Economics*, Updated Edition New York: Princeton University Press

Leach, J. (2004), *A Course in Public Economics*, Cambridge: Cambridge University Press.

Hindriks, J. and G.D. Myles, (2013), *Intermediate Public Finance*, (2nd edition), Cambridge: MIT Press.

Myles, G. (2008) *Public Economics*, Cambridge University Press

Kaplow, L. (2008), *The Theory of Taxation and Public Economics*, Princeton University Press

Salani (2011), *The Economics of Taxation*, Cambridge, Mass: MIT Press

Other readings

Rosen, H. S. and T. Gayer, (2014), *Public Finance*, Boston: McGraw Hill, 10th edition.

Gruber, J. (2016), *Public Finance and Public Policy*, 5th edition, New York: Worth Publishers.

Howard, M. M., A. La Foucade & E. Scott (2010) *Public Sector Economics for Developing Countries*, 2nd Edition, Barbados: University of the West Indies Press

Gaspar, V. Gupta, S. Mula-Granados. Ed. (2017). *Fiscal Politics*. Washington DC: IMF.

Hillman, A. L. (2009), *Public Finance and Public Policy – Responsibilities and Limitations of Government*, Cambridge: Cambridge University Press.

Cornes, R. and T. Sandler (1996), *The Theory of Externalities, Public Goods, and Club Goods*, Cambridge: Cambridge University Press.

Online Resources and Links

1. <https://www.sciencedirect.com/handbook/handbook-of-public-economics/volumes>
2. www.jstor.org
3. www.ebsco.org (EBSCO host articles)
4. http://aercafrica.org/index.php/publications/view_category/20-senior-seminar-policy-reports?layout=table
5. <http://www.journals.elsevier.com/journal-of-public-economics/>
6. www.globethics.net/library
7. www.digitallibrary.edu.pk/oaebbooks.html
8. <https://www.wdl.org/>
9. www.elibrary.bigchalk.com/
10. www.webcrawler.com

VII. DETAILED MODULE CONTENT



LESSON ONE: INTRODUCTION

By the end of the lesson, you should be able to:

- 1.1 define Public Economics
- 1.2 explain the nature of Public Economics
- 1.3 describe the scope of Public Economics
- 1.4 explain the methodology of Public Sector Economics
- 1.5 describe the structure of the Public Sector

1.1 Definition of Public Economics

Public Economics has always been one of the core branches of economics since its inception as a scientific discipline. In its broadest interpretation, public economics is the study of economic efficiency, distribution, and government economic policy. Public economics is the study of the role of the government in the economy. It is the field of economics that analyzes government taxation and spending activities. (Rosen and Gayer, 2014), On the expenditure side of public finance, we ask: why is the government the primary provider of goods and services such as highways, education, and transfers to the unemployed, while the provision of goods and services such as clothing, entertainment, and property insurance is generally left to the private sector? On the revenue side of public finance, we ask: how much should the government tax its citizens, and how should that amount be related to the economic circumstances of those individuals? What kinds of activities should be taxed or be given tax relief in difficult times? What effect do taxes have on the functioning of the economy? By and large, these questions come under two broad questions that public economics attempts to answer. The two types of questions are:

1. How do government policies affect the economy?
2. How should policies be designed to maximize social welfare?

Three motivations underpin the study of these questions in public economics: practical relevance, academic relevance and methodological relevance (Gruber, 2016)

Practical Relevance: The study of public economics has a host of practical relevance as an integral part it is concerned with improving economic welfare. Almost every economic intervention occurs through government policy (that is, involves public economics) via two channels: i) price intervention such as taxes, subsidies, social insurance, public goods and ii). regulation including minimum wages setting, regulations, zoning, labour laws, minimum education laws and environmental regulation etc. Government is also directly involved in the employment of more than one sixth of the workforce in every economy. The stakes in public economics are extremely large because policies it employs are far reaching. For instance, tax reforms immediately affect millions of citizens. Finally, public economics deals with some of the contentious debate on contemporary issues such as the appropriate role of government in society regarding the question of replacing public health insurance with decentralized private insurance. Whereas one group hold the view that such a policy will improve health outcomes and reduce costs, other proposals argue that it will worsen health outcomes and raise costs. In



such an instance only one of the two views can be appropriate. Thus, injecting science into these debates has great practical relevance.

Academic Interest: Public economics is typically the end point for many other sub-fields in economic studies as in the case of Macroeconomics, Development economics, Labour economics and Corporate Finance questions which are often motivated by public economics questions. Examples like Macroeconomic studies on costs of business cycles and intertemporal models of household behaviour and Labour studies on employment effects of the minimum wage can be cited. Such studies involve a blend of public economics and other fields. Understanding public economics can help one to work on relevant issues.

Methodology: Public economics is at the frontier of a methodological transformation in applied microeconomics. Studies in public economics use data-driven approach to answering important policy questions. Such studies combine a broad set of skills in applied theory, applied econometrics and simulation methods. Generally, topics in the course reflect a broad set of methodological themes.

1.2 Nature of Public Economics

The study of the government's role in the economy involves answering four questions:

- a) When should the government intervene in the economy?
- b) How might the government intervene?
- c) What is the effect of those interventions on economic outcomes?
- d) Why do governments choose to intervene in the way that they do?

When should the government intervene in the economy?

There are two reasons why governments may want to intervene in market economies: market failure and redistribution (Wolf, 1987). The first fundamental theory of welfare states that, a Pareto efficient allocation of resources emerges if all producers and consumers act as perfect competitors and if markets exist for every commodity. This theory further implies that, a competitive economy automatically allocates resources efficiently without the need for any centralized direction (Hindriks and Myles, 2013). If a market is efficient then there may be no need for government intervention. A market is said to be efficient if the quantity of goods and services produced and exchanged is such that the marginal benefit to all the members of the society from the last unit of that good is equal to the marginal cost of all members of the society (Betleys, 2000; Diamond and Dybvig (1983). The failure of the market is therefore the strongest justification for the role of the state in allocating economic resources. It does not, however, imply that government intervention will necessarily improve efficiency because there could be government failure too (Datta-Chaudhuri, 1990; Black and Dollery, 1989; and Wolf, 1987). There are several areas where the competitive market system may fail, Suffice to say, however, the Lecture 3 is devoted to discussing Market Failure. So we will just mention the factors that are responsible for market failure, and discuss the details in the ensuing lecture. These factors include: macroeconomic stability, market imperfection externalities, public goods (Wolf, 1987; Besley, (1994; individual failure and information asymmetry (Akerlof, 1970, Stiglitz and Weiss 1986), Beges, 1994, Holman and Lorig (2000) and Watts and Segal, 2009)

Apart from market failure, the other reason for government intervention is redistribution (Wolf 1987). Redistribution implies the shifting of resources from some groups of society to others.



The type of income distribution produced by the market may be considered as unfair or unjust by the society. Viner (1960, 68) argued that government intervention in the free market has come about largely because of the dissatisfaction with the prevailing distribution of income. Wolf (1987) also observed that when left on its own, the free market will produce less redistribution than is efficient (that is, socially desirable). Such a situation, according to Wolf (ibid), arises because of the free-rider problem that characterizes externalities, public goods and incomplete markets. Other factors such as land, capital and labour may also not be equitably distributed and may give reasons for government intervention by employing tools such as taxes and other regulations. The intervention is needed to correct resource misallocation by redistributing resources from groups that are deemed to be “too well off” to those groups the society considers “not well off enough” (Gruber, 2016). However, redistribution of resources from one group to another may result in efficiency losses. These losses occur because the act of redistribution causes individuals to shift their behaviour away from the efficiency-maximizing point. For instance, if we tax the rich to distribute income to the poor, then this tax may cause the rich to work less hard and the poor to work less hard (Gruber 2016). Another form of redistribution is the existence of merit and demerit goods.

How might the government intervene?

There are several different approaches that the government can use for intervention. These include:

1. Tax or subsidize private sale or purchase. One way that the government can try to address failures in the private market is to use the *price mechanism*, whereby government policy is used to change the price of a good in one of two ways:
 - i) through taxes, the government can raise the price of private sales or purchases of goods that are overproduced, or
 - ii. through subsidies, which lower the price for private sales or purchases of goods that are under produced.
2. Restrict or Mandate Private Sale or Purchase. Alternatively, the government can directly restrict private sale or purchase of goods that are overproduced, or mandate private purchase of goods that are under produced and force individuals to buy that good. An example is motor insurance in Ghana where motorists are mandated to purchase insurance or face penalty.
3. Public Provision. Another alternative is to have the government provide the good directly, in order to potentially attain the level of consumption that maximizes social welfare.
4. Public Financing of Private Provision. Finally, governments may want to influence the level of consumption but may not want to directly involve themselves in the provision of a good. In such cases, the government can finance private entities to provide the desired level of provision.

What are the effects of alternative interventions?

In assessing the effects of government interventions, policy makers must keep in mind that any policy has direct and indirect effects. The direct effects of government interventions are those effects that would be predicted if individuals did not change their behaviour in response to the



interventions whilst the indirect effects are effects that arise only because individuals change their behaviour in response to the interventions (Gruber, 2016). For instance, suppose that the government wants to provide unemployment allowance to an estimated 400,000 people at an average of US\$ 300 per person per month. This intervention will cost a total of US\$ 120,000,000 and this is the direct effect of the intervention. However, being unemployed is something that people can change about themselves. By providing allowances to the unemployed, the government provides strong incentives for those employed. Now suppose that 200,000 people who were employed but earn less than US\$300 decide to stop working, the government cost of the program would increase to US\$180,000,000 and this is the indirect effect when people change their behavior in response to the policy.

Why do governments do what they do?

To answer this question, we will turn to the tools of political economy. Political economy is the theory of how the political process produces decisions that affect individuals and the economy (Howard et al., 2010). Governments face enormous challenges in figuring out what the public wants and how to choose policies that match those wants. In addition, governments may be motivated by much more than simply correcting market failures or redistributing income. Just as there are a host of market failures that can interfere with the welfare-maximizing outcome from the private market, there are a host of *government failures* that can lead to inappropriate government interventions (Datta-Chaudhuri, 1990).

Politicians must consider a wide variety of viewpoints and pressures, only two of which are the desire to design policies that maximize economic efficiency and redistribute resources in a socially preferred manner.

Why Limit Government intervention

Economic theory offers several useful approaches that inform government policy making. For instance, market failure provides conceptual justification for government intervention to enhance economic growth and economic efficiency in the economy (Wolf, 1987). Economists believe that even with good intentions government seldom get their policy application correct. Government can tax, control and regulate but the eventual outcome may be deepening market failure. The question of why limiting government intervention arises and the following are some of the reasons:

- a) **Government failure:** Government failure can arise because government may have limited control over private market's response to its action. For example, government's rent control legislation can cause supply of rental houses to decline as landlords divert their investments elsewhere in response to the fall in their returns from apartments.
- b) **Information problems:** Due to information problems it may be difficult for government to determine what consumers preferences are, so that determining what must be produced becomes difficult. There is also the difficulty of aggregating preferences based on the number of people that are willing and able to pay for a particular good or service.
- c) **Providing more public goods** require more distortionary taxation, which can lead to inefficiency in production.
- d) **Deadweight loss of large governments:** The consequences of many actions of government are complicated and often difficult to foresee.
- e) **Incentive effects:** In the free market, individuals have a profit incentive to innovate and cut costs, but in the public sector, this incentive may be lacking.



Therefore, government intervention can lead to inefficient production. For example, state-owned industries have frequently been inefficient, overstaffed and produce goods not demanded by consumers.

- f) Providing more social insurance can induce bad incentive effects: Government intervention to provide health care services, for instance, may be limited by tax revenue. It is more likely that services will be rationed leading to longer waiting lists and some treatments not available.
- g) Additional redistribution leading to distortions in incentives: Redistribution of income through the imposition of taxes can have adverse effects on work, investment and savings. This can create important trade-offs in any policy analysis.

1.3 Scope of Public Economics

The scope of public finance is wide and may not be limited to studying the composition of public revenue and public expenditure but include analysis of the effect of government fiscal operations on the general economic activities of a given economy.

According to Musgrave (1959) , the scope of public finance can be classified under the three main functions of government budgetary policy, namely, allocation, distribution and stabilization. These functions which align with the three objectives of budget policy are under control of the fiscal department. The allocation branch of the fiscal department is saddled with the responsibility of determining the needed adjustments in allocation, who bears the cost, what are the needed changes in revenue and expenditure policies are required to fulfil the intended objectives. The distribution aspect is concerned with the determination of the appropriate steps needed to be taken to ensure that desired or equitable distribution in the economy is attained, whereas the stabilization aspect is concerned with determining the essential policies to be employed to attain price stability and the maintenance of full employment.

The scope of public economics has been extended to include five thematic areas, namely, i) public revenue, ii) public expenditure, iii) public debt, iv) financial management and v) economic stabilization.

Public Revenue: Every government is expected to make expenditure to meet the developmental needs of its citizenry. To achieve this objective adequate revenue must be mobilized. The bulk of government revenue is obtained from taxes, whilst other are also generated from non-tax sources such as fees and penalties. Thus in the study of public finance an attempt is made at studying the various types of taxes, the principles of taxation, the incidence or burden of tax as well as tax systems.

Public Expenditure: Government raises revenue with the main aim of spending. So, another objective of public economics is to study the principle of government expenditure making as well as the main components of government expenditure. There is further probe into whether the expenditures are incurred productively or are diverted to unproductive activities. The effects of public expenditure on economic growth and income distribution are also studied.

Public Debt: Most often government expenditure exceeds total revenue in a fiscal year. Government resorts to borrowing to finance the budget deficit. This action creates public debt. Thus in public economics we study public debt in various perspectives such as: the types of public debt available to government, the size of and components of public debt, the debt burden



and what the interest rates on loans are. There are questions also about what type of bonds the government have to issue to raise loans, how government will repay her debt and whether the loans raised through public debt will be spent on productive activities or not etc.

Financial Administration: In addition to studying how government mobilize revenue and make expenditures as well as how it issues bonds to raise loans, the study of public economics is also concerned with studying the mechanisms which help government to perform these tasks efficiently. Thus, public economics has an interest in studying financial management. Under financial management we study how budgets are prepared in terms of budget estimates -both actual and revised estimates of government revenues and expenditures.

Economic Stabilization: How to attain economic stability and economic growth have become two major objectives of government policy, which feature prominently under public economics theory. This aspect analyses the various economic policies and other actions of government needed to establish stability in the economy.

In modern times the scope of public finance is widened to embrace both positive and normative economic analyses:

The positive analysis of public economics answers the questions of the economic effects of government programmes and interventions such as the effects of government taxation, expenditures and transfers on resource allocation and relative prices. Answers to these questions are provided primarily through empirical studies. Thus, the analysis of positive economics involves the study of the general equilibrium effects of government activities. Equilibrium can either be partial or general. When equilibrium occurs in any particular market in an economy, say, labour market or the product/goods market, we say there is partial equilibrium. However, when equilibrium occurs in all markets simultaneously, we call it a general equilibrium. Government activities can cause the market to attain simultaneous equilibrium. The private sector depends largely on the activities of government.

With normative analysis, also referred to as welfare economics, public economics attempts to answer the questions of what ought to be the role of public sector in influencing resource allocation in the market? It also answers the question of when should government intervene, what is the best way to intervene (best amount of intervention) and at what level should government intervene in the free market?. These value judgements implicitly recognise the competitive market as an economic system in an ideal form of economic organisation. The key to welfare economics is the Pareto-Optimality Rule.-where a societal/programme is Pareto-Optimal if it does not make any human being worse off from its implementation. Because of the explicit recognition that no one should be worse off from the implementation of a programme, this criterion constitutes a value judgement. A programme is an Actual Pareto Improvement if it makes someone better off but does not make anyone worse off and this programme should be implemented. A practical modification of Pareto-Optimality is the Potential Pareto Improvement Criterion. With this criterion, it is accepted that there are winners and losers from a programme. A programme leads to Potential Pareto Improvement if the winners could hypothetically compensate the losers and still be better off. The compensation is hypothetical and does not have to occur in actual practice. Normative or Welfare economics is the theoretical basis of Cost-Benefit Analysis which is the core component Public Economics.



1.4 Methodology of Public Sector Economics

Public finance, like any branch of economics, uses both theoretical and empirical methodologies in arriving at conclusions. Economic theory is a useful starting point for analyzing the impact of government policy because it provides a framework for thinking about factors that might influence the behaviour of interest. It involves the use of a set of tools designed to understand the mechanics behind economic decision-making. The primary theoretical tools of economics are graphical such as supply and demand curves, indifference curves and mathematical expositions.

Empirical public finance involves the use of data and statistical methods to measure impact of government policy on individuals and markets. Empirical methods involve the use of a set of tools that allows one to analyze data and answer the questions that are raised by theoretical analysis. Empirical tools have become as important as theoretical tools in addressing the problems of public finance, as both the quality of data and the ability to carefully analyze that data have improved dramatically. Some of the empirical methods used in public sector economics include the following: (Hindriks and Myles, 2013; Gruber, 2016),

1. Correlation and causation: Economic variables are said to be correlated if they move together. But this relationship is causal only if one of the variables is causing the movement in the other. If, instead, there is a third factor that causes both to move together, the correlation is not causal. For instance, if we want to know if government action X causes societal effect Y, three conditions must hold:

- h) The cause (X) must precede the effect (Y).
- i) The cause and effect must be correlated. The correlation may be positive or negative and if Y does not change when X changes, then X cannot be causing Y.
- j) Other explanations for any observed correlation must be estimated.

2. Experimental studies: An experimental study is an empirical study in which individuals are randomly assigned to treatment and control groups. With random assignment, the people in the control group are not literally the same people as those in the treatment group, but they have similar characteristics on average. Importantly, because selection into treatment group is outside the control of the individual, it is less likely that other factors, like motivation, can lead the investigator to confuse correlation for causation. Empirical studies are considered the best standard of empirical studies because of the potential to eliminate bias and as a result they are frequently used in the natural sciences. It is, however, hard for economist to conduct controlled experimental studies due to ethical issues

3. Observational studies: These are empirical studies that rely on observed data that are not obtained from an experimental setting. Observational data come from a variety of sources. Some are collected by surveying people such as telephone surveys of consumers or written surveys. Without randomization, observational studies must rely on other techniques such as econometrics, to rule out factors that might contaminate causal inferences. Observational data comes in three forms, which are time series data, cross-sectional data and panel data. Time series data analysis involves analysis of co-movement of two or more variables over time. Cross-sectional data is data that contain information on entities at a given point in time whilst panel data is a type of data that contain information on individual entities at different points in time.



One pitfall of observational studies is that one cannot assume a causal relationship because outside factors could affect both the dependent and independent variables. This bias could be avoided by including other independent variables, which are referred to as control variables.

4. Quasi- experimental studies. A quasi- experimental study is an observational study that relies on circumstances outside the researcher's control to mimic random assignment. The difference between an experiment and quasi-experiment is that an experiment explicitly randomizes people into treatment or control group, whereas a quasi-experiment uses observational data but relies on circumstances outside of the researcher's control that naturally lead to random assignment. Quasi-experiment is in various forms and include:

- a) Difference in Difference (DiD) which involves analysis that compares changes overtime in an outcome of the treatment group to changes over the same time period in the outcome of the control group.
- b) Instrumental variables quasi-experiment is an analysis that relies on finding some variable that affects entry into the treatment group, but in itself is not correlated with the outcome variable.
- c) Regression-discontinuity analysis which relies on strict cut-off criterion for eligibility of an intervention under study in order to approximate an experimental design.

The biggest pitfall in quasi-experiment is that it may not truly mimic random assignment to the treatment group. Secondly, quasi-experiments can only be applied to a limited number of research questions.

In conclusion, it is important to note that economic theory plays a crucial role in empirical research by framing the research questions and helping isolate a set of variables that may influence the behaviour of the variable of interest. Empirical works then test whether the causal relationship between a policy and an outcome suggested by theory is consistent with real-world phenomena.

1.5 Structure of the Public Sector

In the study of public finance measuring the size of government, their institutional composition and complexity, how they carry out their huge and sophisticated transactions as well as their impact on other sectors have become a daunting task. The IMF's Government Finance Statistics Manual 2001 (GFSM 2001) have addressed the institutional complexity by defining various levels of government. The GFSM (2001) defines the government sector as the group of agents that have the capacity to implement public policy through the provision of primary non-market goods and services and the redistribution of income and wealth, and when such activities are funded largely from compulsory levies on other sectors.

The GFSM (2001) further classifies the general government sector into three sub-sectors, namely, central government, state government and local assembly. (see Figure 1). This classification excludes public corporations. Public corporations together with the general government make up the public sector (See Figure 2).

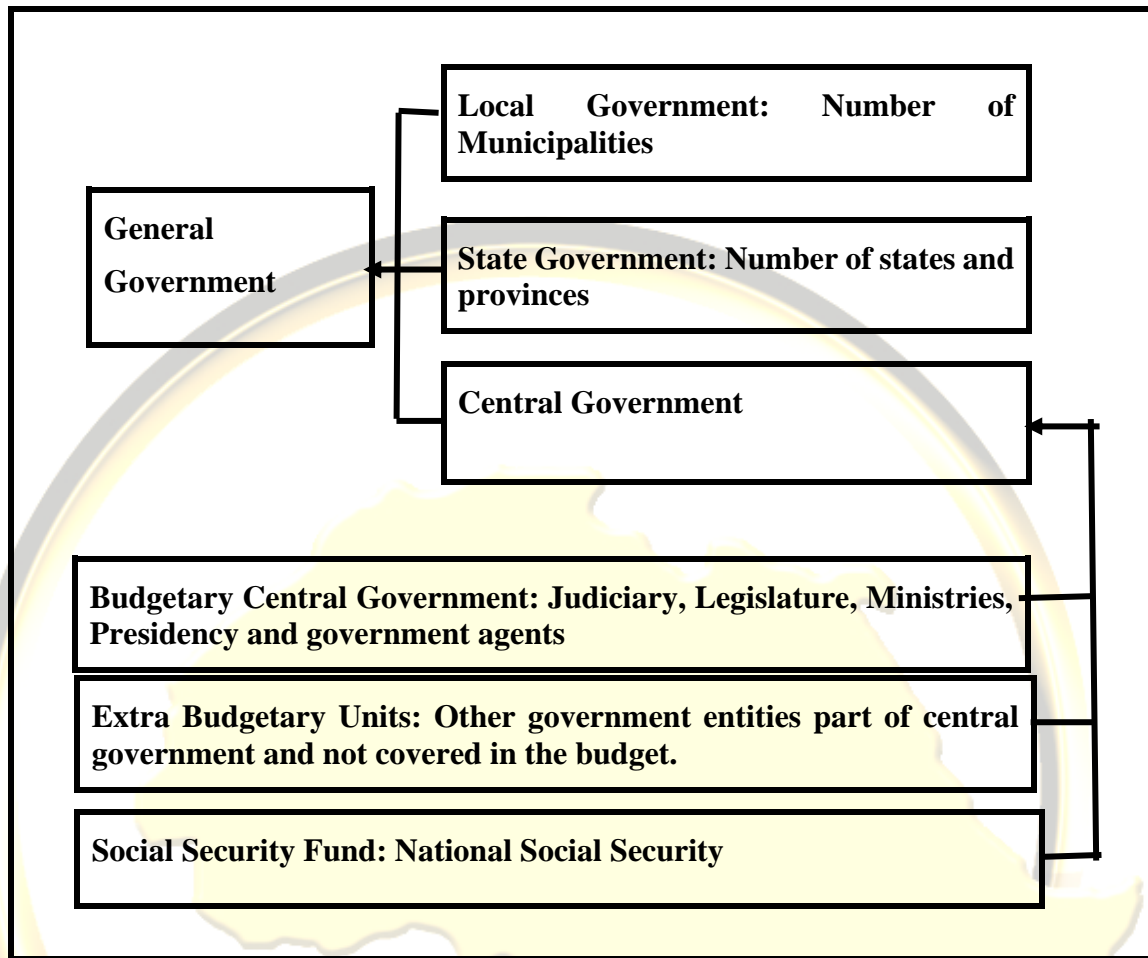


Figure 1.1: Classifications of General Government

Source: IMF Government Finance Manual 2001, Washington, (2001)

The general government sector of a nation includes all non-private sector institutions, organizations and activities. This sector by convention, includes all the public corporations that are not able to cover at least 50% of their costs by sales, and, therefore, are considered non-market producers.

The European System of Accounts Report (2010) defines the general government sector as: “All institutional units which are other non-market producers whose output is intended for individual and collective consumption, and mainly financed by compulsory payments made by units belonging to other sectors, and/or all institutional units principally engaged in the redistribution of national income and wealth”.

The main functions of the general government sector according to the European System Accounts Report (2010) can therefore include:

- d) organizing or redirecting the flows of money, goods and services, or other assets among corporations, among households, and between corporations and households; in the purpose of social justice, increased efficiency or other aims

legitimized by the citizens -- examples are the redistribution of national income and wealth, the corporate income tax paid by companies to finance unemployment benefits, the social contributions paid by employees to finance the pension systems;

- e) producing goods and services to satisfy households' needs (example, state health care) or to collectively meet the needs of the whole community (example, defense, public order, and safety).

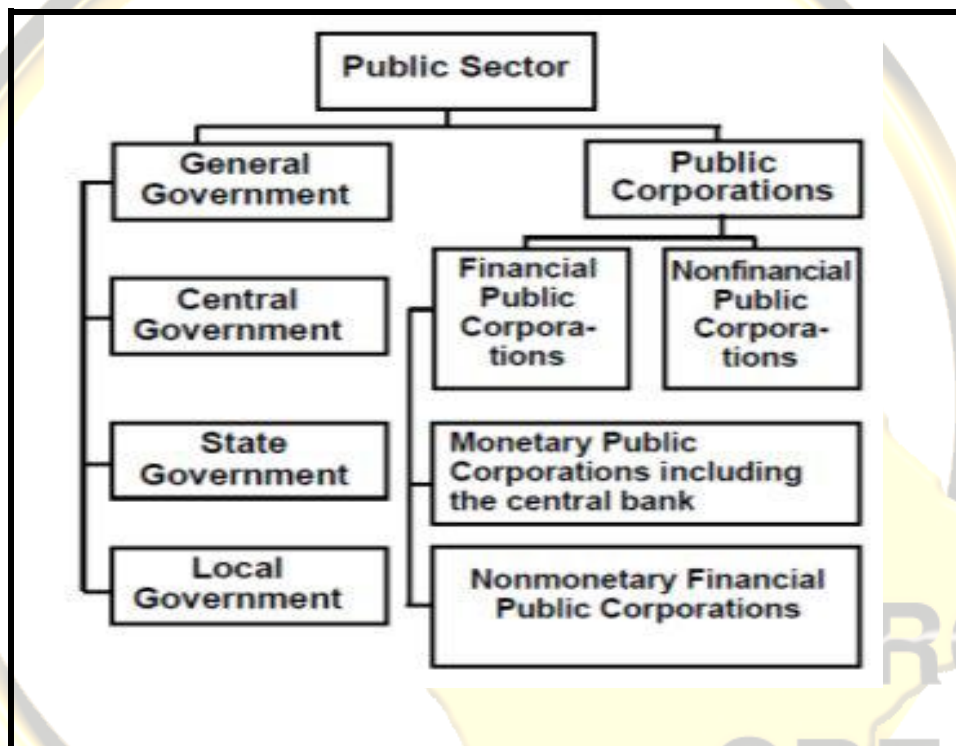


Figure 1.2: Classifications of the Public Sector

Source: IMF Government Finance Manual 2001, Washington, (2001)

The European System Accounts, disaggregates the general government sector into four sub-sectors as: i) central government, ii) state government, ii) local government and iv) social security funds. The following are the definitions for these sub-sectors.

Central government: This sub-sector consists of all administrative departments of the state and other central agencies whose functions cover the whole economic territory of a country, except for the administration of social security funds.

State government: The state government cover the separate institutional units that perform some governmental functions below those units at central government level but above those units at local government level, excluding the administration of social security funds.

Local government: This sub-sector is classified as all types of public administration whose responsibilities are limited a local part of the economic territory, apart from local agencies of social security funds.



Social security fund: This sub-sector is the central, state or local institutional unit whose main activity is to provide social benefits. It fulfils the two following criteria:

- a) by law or regulation (except those about government employees), certain population groups must take part in the scheme and have to pay contributions;
- b) general government is responsible for the management of the institutional unit, for the payment or approval of the level of the contributions and of the benefits, independent of its role as a supervisory body or employer

Trail Questions

1. “Studying Physics is simpler than studying Public Economics. This is because the objects of its study are bound by physical laws.” Do you agree? Explain
2. Explain how the study of Public Sector Economics can contribute to an understanding of how government decisions are made?
3. How could a minimum wage law be evaluated as government intervention?

Basic Readings:

Gruber Chapters 1, 2, and 3 (including appendix)
Rosen & Gayer chapters 1 & 3
Hindriks & Myles chapter 1
Howard, M. M., A. La Foucade & E. Scott

Other Readings

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LESSON TWO: FOUNDATIONS OF PUBLIC ECONOMICS

By the end of the lesson, you should be able to:

- 2.1 explain pareto optimality and efficiency of competitive markets
- 2.2 describe efficiency conditions in a two-period intertemporal model
- 2.3 explain consumer and producer surplus
- 2.4 describe the theory of second best

2.1 Pareto Optimality and Efficiency of Competitive Markets

Government intervention is required when competitive markets are inefficient i.e. market failure. So when are competitive market said to be efficient? A market is said to be efficient if it satisfies the Pareto optimality criterion. An allocation is Pareto Optimal if there is no alternative allocation that can make someone better off without making anyone worse off. Thus, Pareto efficiency is an allocation such that no person can be made better off without making another person worse off. A related notion is that of a Pareto improvement which implies a reallocation of resources that makes one person better off without making anyone else worse off. The Edgeworth Box (Figure 2.1) demonstrate the concept of Pareto efficiency. Consider two people (Alex and Bernice) and the two commodities (Malt and Water).

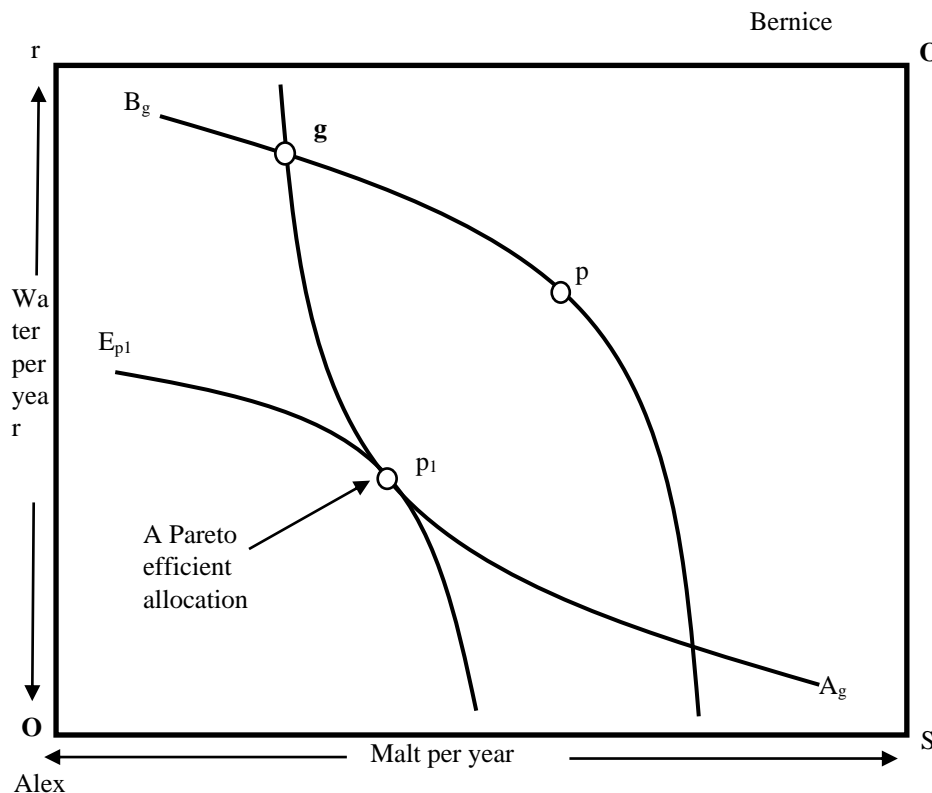


Figure 2.1: Illustration of the Concept of Pareto Efficiency

Source: Rosen and Gayer (2014)

In the above figure, moving from point g to point p leaves Bernice's utility unchanged but improves Alex's utility, hence moving from point g to point p constitutes Pareto improvement.

At point p_1 , it is impossible to make one of them better off without hurting the other. Therefore, point p_1 is a Pareto efficient allocation.

The Pareto efficient allocation at p_1 is not unique. Infact, there are many points of tangency between the two consumers' indifference curves. The locus of all Pareto efficient points is called a contract curve and denoted by the curve mm in Figure 2.2. Note that for an allocation to be Pareto efficient (to be on mm), it must be a point at which the indifference curve of Alex and Bernice are barely touching.

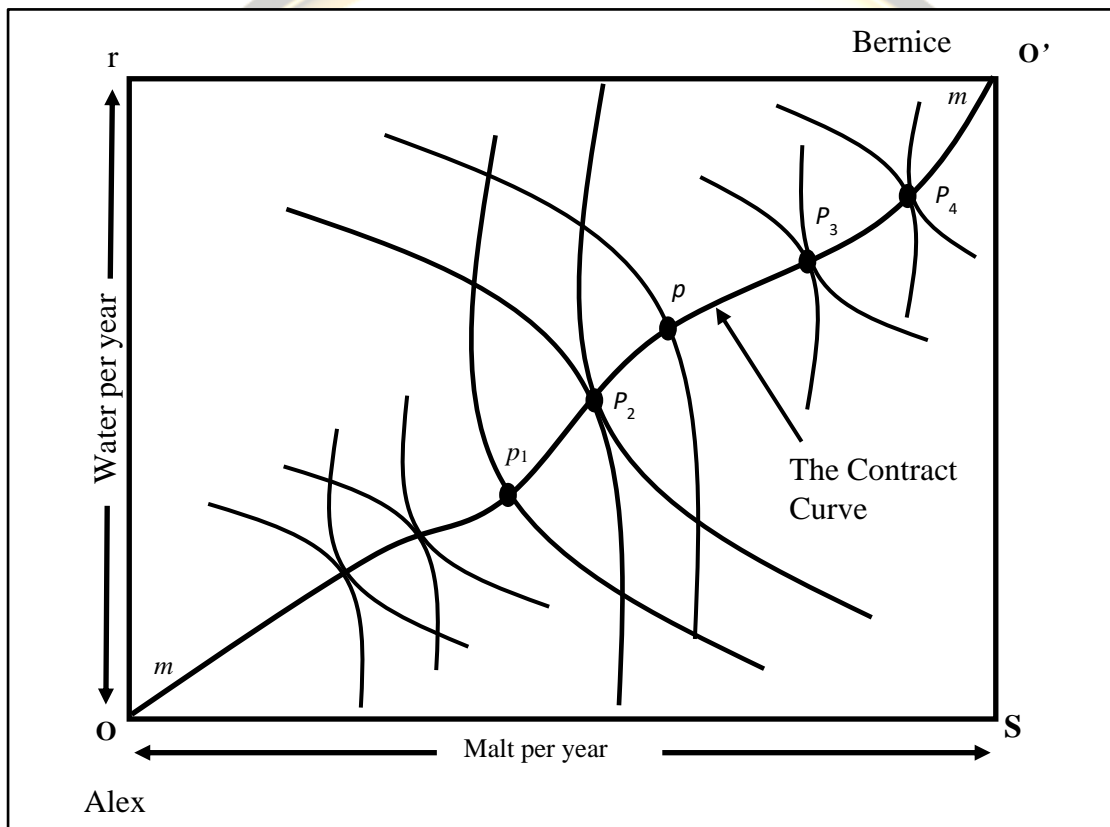


Figure 2.2: Determination of the Contract Curve
Source: Bator (1957)

Pareto efficiency does not involve value judgement of what goods are produced or who is to receive them. For the analysis of Pareto optimality in the economy we make the following assumptions:

1. There are only 2 persons in the economy, for example, Alex (A) and Bernice (B)
2. There are only 2 commodities in the market, such as: Malt (X) and Water (Y)
3. There are only 2 factors of production, for example, Capital (K) and Labour (L)
4. There are only 2 markets, For instance, the goods and the labour markets.

These assumptions pave the way for discussing three types of Pareto efficiency models, namely: i) Input (Production) Efficiency, ii) Exchange (Consumption) Efficiency and Product-mix (Substitution) Efficiency.



2.2 Efficiency Conditions in a two Period Intertemporal Model

2.2.1 Input (Production) Efficiency

An allocation of inputs is *production efficient* if the only way to increase the output of one commodity is to decrease the output of another commodity.

Assumptions:

- Two goods Malt (X) and Water (Y) are produced using two inputs, capital (K) and Labour (L).
- The two inputs are allocated to the production of the outputs, such that for $K_x L_x$, it implies, K_x is the amount of K used for X production and L_x is the amount of L used for X production. Also, for $K_y L_y$ it means K_y is the amount of K used for Y production and L_y is the amount of L used to produce good Y.
- Initial endowments are: $K = K_0^x + K_0^y$ and $L = L_0^x + L_0^y$, refers to the total amount of Capital and Labour used in the production of the two goods.
- Production function for good X and Y are respectively: $X = X(K_x, L_x)$ and $Y = Y(K_y, L_y)$
- These production functions are of smooth curvature, exhibit constant returns to scale, diminishing marginal rate of technical substitution (that is, the isoquants are convex to the origin).

For production of goods to be Pareto efficient we require that we cannot reallocate production such that one output X is increased without reducing the production of the other good Y. The determination of Pareto efficiency in production is illustrated with the use of the Edgeworth-Bowley diagram in Figure 2.3.

In Figure 2.3, the vertical and horizontal axes represent amounts of input K and L respectively used in the production of good X and Y. The isoquants for good X increases towards the north east (origin OX) of the diagram, whereas the isoquants for producing good Y increases towards the south west (origin OY). Every point in the box represents six variables namely, K_x, K_y, L_x, L_y, X and Y . Our problem is to determine the production efficiency level, which is a locus of points where an increase in the production of good X necessarily implies reducing the amount of good Y produced and vice versa. From Figure 2.3 that locus is depicted by points of tangency between good X and Y isoquants (that is the curve, FF). From this efficiency locus it becomes possible to obtain the marginal combinations of good X and Y and plot them in an output space. Rising from the curvature assumption given earlier, we can derive a smooth concave Pareto efficient production possibility curve F'F' which is concave to the origin as depicted in Figure 2.4. This curve which represents the Pareto efficient points from Figure 2.1, represents the input- output combinations such that the MRTS of K for L in the production for of given quantities good X, that is, the absolute value of the slope of good X's isoquant equalizes the MRTS of K for L in the production of good Y.

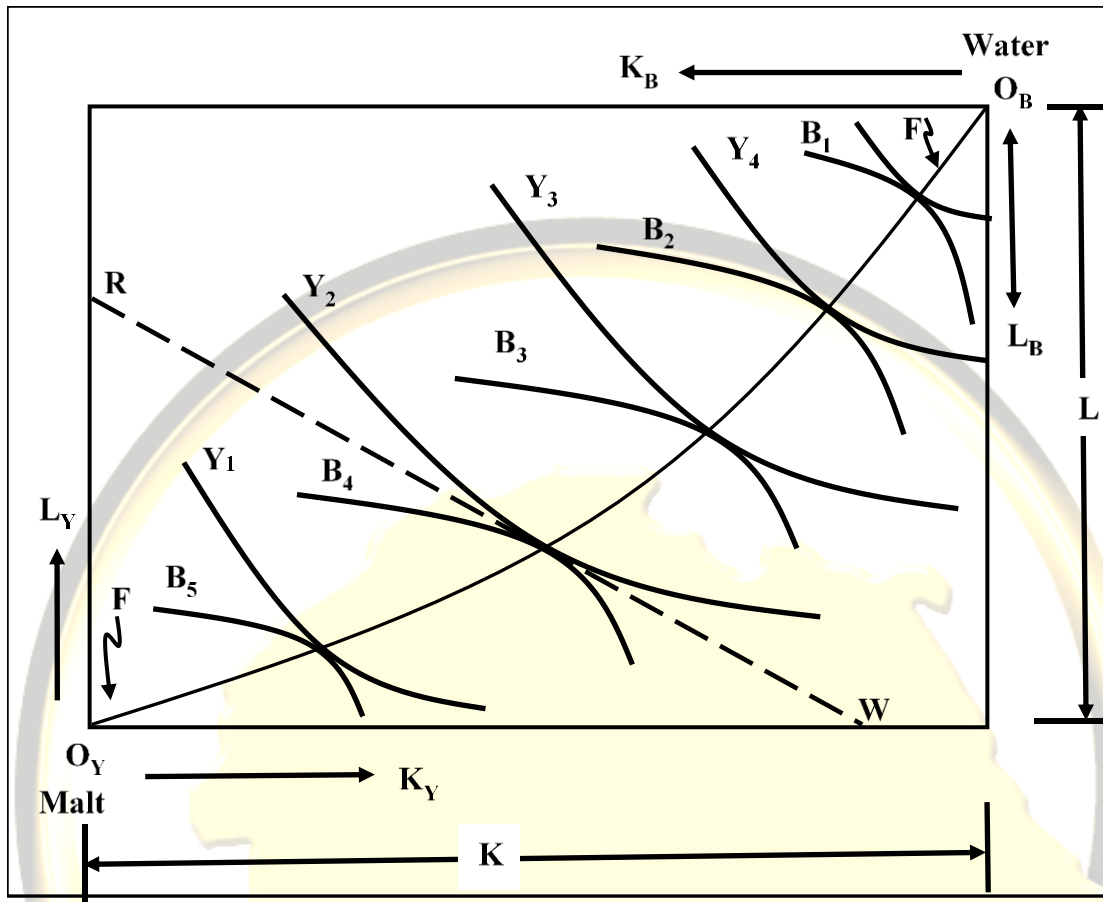


Figure 2.3: Determination of Pareto Efficiency in Production
Source: Bator (1957)

In Figure 2.3 the curve FF reflects the production possibility frontier, which is concave to the origin and it reflects the MRTS existing between the production of good X and Y. This curve indicates the units of good Y that can be produced by sacrificing some amounts of K and L from good X to good Y's production, with optimum reallocation of inputs in the production of both goods to maintain MRTS-equality requirement of Figure 2.3. It is the marginal good X-cost of good Y or reciprocal of marginal Y-cost of good X. That is,

$$MRTS_{xy} = MC_x / MC_y \quad (1)$$

Where, $MRTS_{xy}$ is the marginal rate technical substitution of good X for Y, MC_x and MC_y are the marginal cost of commodity X and Y respectively.

2.2.2 Exchange (Consumption) Efficiency

An allocation of commodities is *consumption efficient* if the only way to make one person better off is to make another person worse off.

Assumptions.

- a) Two consumers – Alex (A) and Bernice (B)
- b) They consume quantities of 2 goods Malt (X) and Water(Y).

- c) Total quantity of the two goods is given by X and Y such that X- total quantity of X and Y total quantity of Y for the two individuals. Thus X_A, Y_A are the amounts of good X and Y consumed by individual A, respectively. Also, X_B, Y_B > amount of goods X and Y consumed by individual B.
- d) We have an initial endowment of both goods such that $X = X_0^A + X_0^B$ and $Y = Y_0^A + Y_0^B$
- e) Individuals derive utility from the consumption of the two goods. Such that, $U^A = U^A(X^A, Y^A)$, represents the Utility of A from consuming X and Y and $U^B = U^B(X^B, Y^B)$ Utility of B from consuming X and Y.
- f) Utility is increasing and concave, implying that consumption of more units of X and Y increases the utility of the individuals.

For an allocation of X and Y between the two individuals to be Pareto efficient in consumption, it's required that we cannot raise a consumer's utility without lowering the utility of the other individual. Derivation of efficiency in consumption is attained with the aid the Edgeworth-Bowley diagram in Figure 2.4.

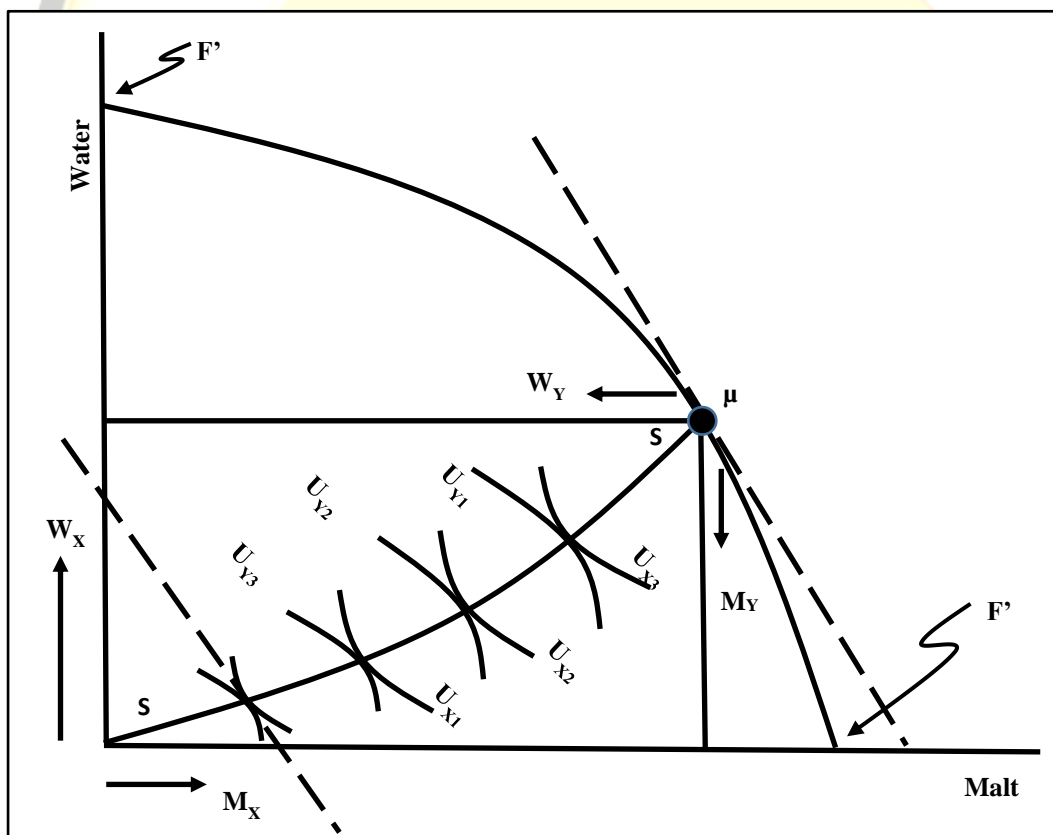


Figure 2.3: Determination of Efficiency in Consumption
Source: Bator (1957)

In Figure 2.4 we first identify the point μ , on the curve $F'F'$, which is the production possibility frontier (FF) derived under Pareto efficiency in production from Figure 2.3. This point denotes the specific quantities of goods X and Y to be exchanged among the two consumers. It also indicates the equilibrium quantities of goods X and Y produced with optimum use of inputs. In Figure 2.4 we have our two commodities X and Y, and our two consumers Alex (A) and



Bernice (B), The indifference curves for individual A increases towards the north east, whereas that for B increases towards the south west. Each point in the box fixes six different variables, which are: good X to individual A (X_A) and to individual B (X_B), good Y to individual A (Y_A) and to individual B (Y_B) and the levels of satisfaction of X and Y as measured by the indifference curves U^A , U^B , etc.

Our concern with consumption efficiency is to identify the locus of feasible outcomes in the exchange box where an increase consumer A's utility (U^A) necessarily involves a reduction the satisfaction of individual B (U^B). In Figure 2.4 this outcome is reached when exchange goes on until we operate along the locus of points of tangency between individual A's indifference curve and that for individual B. This Pareto efficient curve is shown as the contract curve and its depicted by the curve SS. On the contract curve the MRCS of good X for Y in order to maintain the utility of individual A must be equal to the MRCS of good X for Y to maintain individual B's utility. Graphically the absolute slope of individual A's indifference curve should be equal to the absolute value of individual B's indifference curve.

Thus, under consumption efficiency, Pareto optimality is attained when the marginal rate of commodity substitution (MRCS) between each pair of goods must be equal for all consumers, which must be equal to the price ratio. That is,

$$MRCS_{XY}^A = MRCS_{XY}^B = P_x/P_y, \quad (2)$$

where $MRCS_{XY}^A$ is Alex's marginal rate of commodity substitution of good X for Y, and $MRCS_{XY}^B$ is Bernice's. P_x and P_y are of prices of commodity X and Y respectively.

2.2.3 Product-Mix (Substitution) Efficiency

From the exchange-efficiency locus, SS, (Figure 2.4) which is associated with the single production point μ , we are able to determine the maximum combinations of U^A and U^B obtainable from μ which can be plotted in a utility ($U^A U^B$) space. Thus, the point μ in the output space "maps" unto a line in utility space -the $U^A U^B$ mix is sensitive to how the fixed total of Malt and Water are distributed between Alex and Bernice. Given that each point on the production possibility frontier requires a new trading box (exchange), then each point on the production possibility frontier will correspond to different points in the utility space. Hence, we are able to generate a grand utility possibility frontier of Pareto-efficient input-output combination indicated as curve BB in Figure 2.5. On this curve the marginal rate of technical substitution (MRTS) between inputs equalizes the marginal rate of commodity substitution (MRCS) between commodities among the two individuals. Each point on this frontier also gives the maximum U^A for any given level of U^B and vice versa. For the economy as a whole, the preferences of consumers are represented by the welfare functions, such as W_1 to W_5 in Figure 2.5. For the given welfare functions, product-mix efficiency (economic efficiency) is attained when the utility possibility envelope frontier BB is tangential to the highest possible contour of welfare functions at the point Ω . This point is unique because at this point Pareto-efficient production and commodity-distribution is attained and may be superior to any feasible point such as point γ .

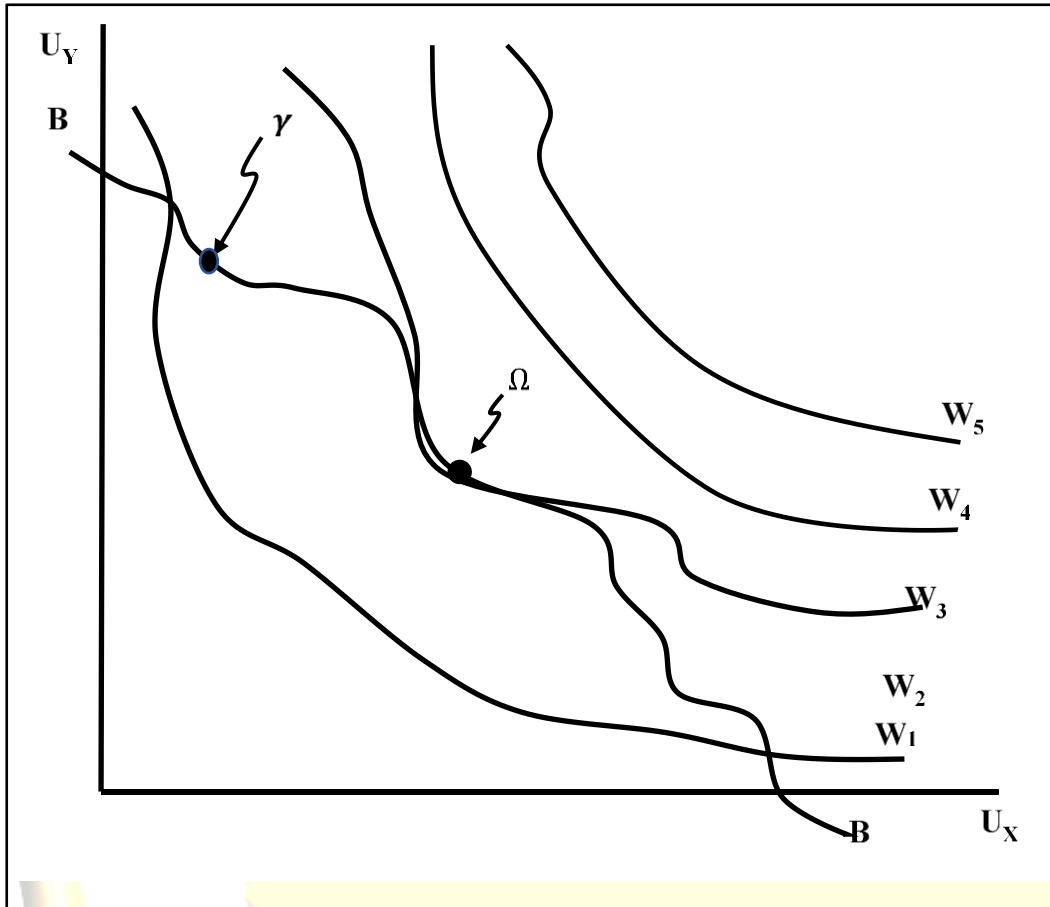


Figure 2.4: Determination of Product-Mix (Economy-wide) Efficiency
Source: Bator (1957)

Thus, product mix allocation efficiency occurs when the marginal rate of technical substitution (MRTS) between any two goods is equal to consumers' common MRCS between the two commodities (the ratio in which goods are being produced is the same as people want to consume).

Thus,

$$MRTS_{XY} = MRCS_{XY}^A = MRCS_{XY}^B \quad (3)$$

Hence, $MRTS_{XY} = MRS_{XY}$ is a necessary condition for Pareto efficiency. The rate at which commodity X can be transformed into commodity Y ($MRTS_{XY}$) must be equal to the rate at which consumers are willing to trade commodity X for commodity Y (MRS_{XY}).

2.2.4 Types of Efficiency: Mathematical Approach

Let us characterize a Pareto optimum in an economy with 2 consumers (A and B), two goods (1 and 2), and two exogenously given factors (K and L) mathematically:

$$\begin{aligned} \text{Max} \quad & U^A(X_1^A, X_2^A) \\ \text{s.t.} \quad & U^B(X_1^B, X_2^B) = U^B \end{aligned}$$

$$\begin{aligned} X_1^A + X_1^B &= F^1(K^1, L^1) \\ \text{s.t.} \quad U^B(x_1^B; x_2^B) &= \underline{U}^B \\ X_1^A + X_1^B &= F^1(K^1, L^1) \end{aligned}$$

$$\begin{aligned} X_2^A + X_2^B &= F^2(K^2, L^2) \\ X_1^A + X_1^B &= F^1(K^2, L^2) \\ K^1 + K^2 &= K \\ L^1 + L^2 &= L \end{aligned}$$

So individual A is the person we are trying to make better off. The first constraint makes sure that no one else will be worse off. The last four constraints make sure that the allocation is feasible or technically possible: We cannot use more factor inputs in production than there are and we cannot consume more output than is produced. Now, substituting the last four constraints for x^A_1 ; x^A_2 ; K^1 , and L^1 results in an optimization with only one constraint (the first) which can best be solved by setting up the Lagrangean:

$$\text{Max } U^A(F^1(K - K^2; L - L^2) - X_1^B, F^2(K^2, L^2) - X_2^B) + \lambda(U^B(X_1^B, X_2^B) - U^B) \quad (4)$$

The FOCs are:

$$X_1^B : -U_1^A + \lambda U_1^B = 0 \quad (5)$$

$$X_2^B : -U_2^A + \lambda U_2^B = 0 \quad (6)$$

$$K^2 : -U_1^A F_K^1 + U_2^A F_K^2 = 0 \quad (7)$$

$$L^2 : -U_1^A F_L^1 + U_2^A F_L^2 = 0 \quad (8)$$

The first two FOCs can be combined [dividing (5) by(6)] to show that $MRCS^A = MRCS^B$. More generally (with many goods and consumers), the MRCSs must be equal across consumers: $MRCS = MRCS^A = MRCS^B$. This represents efficiency on the consumption side or consumption efficiency.

The third and fourth FOCs [(7) and (8)] can be rewritten as:

$$MRCS^A = \frac{F_K^2}{F_K^1} = \frac{F_L^2}{F_L^1} \quad (9)$$

Note that the second and third terms in (9) are simply the marginal rate of transformation (between outputs X and Y). So, we see that the MRCS (equal across different consumers) must equal the MRTS. This is called overall efficiency, that is, efficiency across consumption and production.

Finally, rewrite the second equality above as:

$$MRTS^X = \frac{F_K^2}{F_K^1} = \frac{F_L^2}{F_L^1} = MRTS^Y \quad 10$$

2.2.5 Walras's Law

Walras's law is a principle in general equilibrium theory that argues budget constraints imply that the values of excess demand (or excess market supply) must sum to zero regardless of whether the prices are general equilibrium prices. In other words, Walras's law states that the sum of the values of excess demands across all markets must equal zero, irrespective of the economy being in general equilibrium or not. That is:

$$\sum_{j=1}^K p_j (D_j - S_j) \quad (11)$$



Where: p_j is the price of good j ; D_j is the demand for good j and S_j is the supply of good j . Walras's law implies that if positive excess demand exists in one market, negative excess demand must exist in some other market. Thus, if all markets but one are in equilibrium, then that last market must also be in equilibrium. Walras's law is in contrast with Keynesian economics, which assumes that it is possible for just one market to be out of equilibrium without a corresponding general equilibrium.

In our example, assume that Malt and Water are the only commodities in the economy and there are no other markets. We also assume an exchange economy with no money, so that Malt is exchanged for Water and vice versa. If it happens that excess demand for Malt is zero, then by Walras's law excess demand for Water must also be zero. For any excess demand in Malt, there will be an associated surplus (excess supply or negative excess demand) for Water, so that the market value of the excess demand for Malt will be equal to the market value of the excess supply of water.

Walras's law is ensured if every consumer's budget constraint holds with equality (that is, where a consumer's planned expenditure is less or equal to the market value of his income), then the total market value of all consumers' planned outlays for all commodities consumed must equate the total market value of all consumers' sales of all commodities. It then follows that the market value of total excess demand in the economy must be zero. The law implies that if there are n markets and $n - 1$ of these are in equilibrium, then the last market must also be in equilibrium, a property which is essential in the proof of the existence of general equilibrium.

2.2.6 Algebraic Analysis of Walras's Law

Assume an exchange economy with n consumers and k divisible goods. For each consumer i , let E_i be their initial endowment vector and X_i their Marshallian demand function (demand vector as a function of prices and income).

Given a price vector p , income of consumer i is given as $p \cdot E_i$. Hence their demand vector is represented as: $X_i(p, p \cdot E_i)$

Then excess demand function is a vector function,

$$Z(p) = \sum_{i=1}^n (X_i(p, p \cdot E_i) - E_i) \quad (12)$$

From (2) Walras's law can be clearly stated as

$$p \cdot Z(p) = 0 \quad (13)$$

Proof:

Excess demand can be defined as:

$$p \cdot \sum(p) = \sum_{i=1}^n \{(p \cdot X_i(p, p \cdot E_i) - p \cdot E_i)\} \quad (14)$$

The Marshallian bundle is bundle x that maximizes the consumer's utility given the budget constraint. The budget constraint in our case is represented as:

$$p \cdot x = p \cdot E_i \quad (15)$$

Given that all terms in the sum are zero, then the sum itself should also zero.

2.3 Economic Surplus

Economic surplus represents the net gains to society from all trades that are made in a particular market, and it consists of two components: consumer and producer surpluses.

The gain to consumers from trades in a market for consumer goods is **consumer surplus**. Consumer surplus is the benefit that consumers derive from consuming a good, above and beyond the price they paid for the good. It is the area below demand curve and above market price. Consumer surplus is easy to measure because each point on a demand curve represents *the consumer's willingness to pay for that quantity*. Consumer surplus is determined by two factors: the market equilibrium price and the elasticity of demand (See Figure 2.6).

Producer Surplus: Consumers are not the only ones who derive a surplus from market transactions. There is also a welfare gain to producers, the **producer surplus** which is the benefit producers derive from selling a good, above and beyond the cost of producing that good. It is the area above supply curve and below market price. Like consumer surplus, producer surplus is easy to measure because every point on the supply curve represents the marginal cost of producing that unit of the good. Thus, producer surplus is represented graphically by the area above the supply (marginal cost) curve and below the equilibrium price (See Figure 2.6). This area is producer surplus because these are units where the market price is above the willingness to supply level (the supply curve). Producer surplus is, in effect, the profits made by the producer.

Social Surplus: **Total social surplus**, also called **social efficiency**, is the total surplus received by consumers and producers in a market; that is, the sum of consumer surplus and producer surplus. It is the area above the supply curve and below demand curve. Figure 2.6 illustrates the consumer surplus, producer surplus and the social surplus

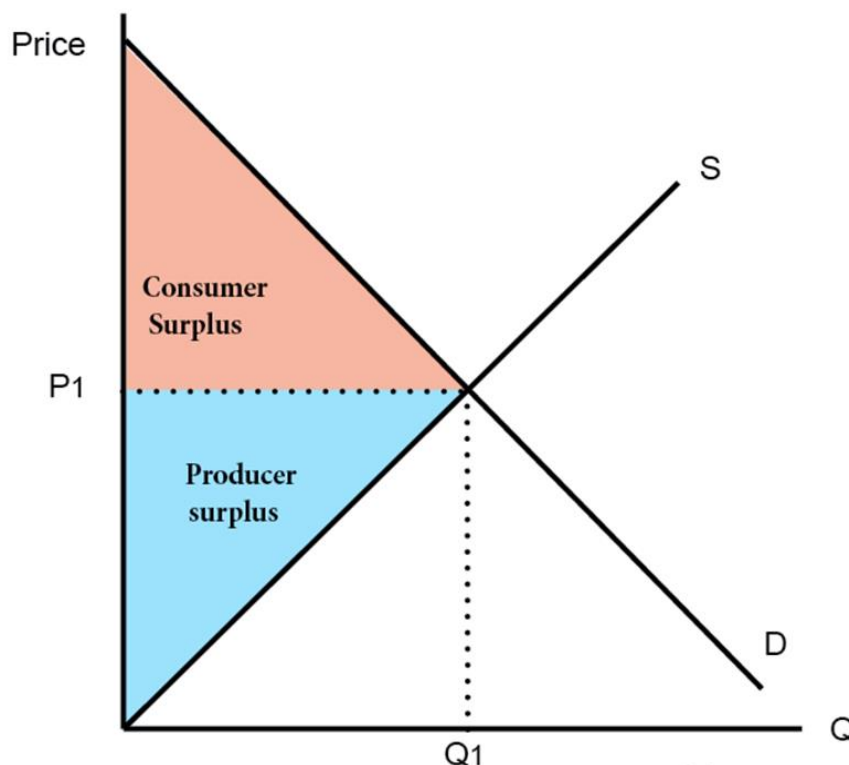




Figure 2.6: Illustration of Consumer, Producer and Social Surpluses
Source: Schotter, (2009))

2.6 First Fundamental Theorem of Welfare Economics

Now that we have described the necessary conditions for Pareto efficiency and equipped with the knowledge of social efficiency, we may ask whether a given economy will achieve this apparently desirable state. It depends on what assumptions we make about the operations of that economy. Assume that: (1) no externalities, (2) perfect competition [individuals and firms are price takers], (3) perfect information, (4) agents are rational. Under these assumptions, the First Fundamental Theorem of Welfare Economics states that a Pareto efficient allocation of resources emerges, the competitive equilibrium, where supply equals demand, maximizes social efficiency. The First Best Theorem states that the allocation of commodities at a competitive market is Pareto-efficient. In effect, a competitive economy “automatically” allocates resources efficiently, without any need for centralized direction. That a complete competitive market equilibrium is Pareto efficient. In other words, so as long as we have a competitive market, our markets left all to themselves will be efficient. The essence of competition is that all people face the same prices—each consumer and producer is so small relative to the market that his or her actions alone cannot affect prices.

For instance, consider the example of Alex and Benice. The necessary condition for Alex to maximize utility is

$$MRS_{xy}^A = P_x/P_y \text{ and that of Bernice is } MRS_{xy}^B = P_x/P_y$$

This implies that $MRS_{xy}^A = MRS_{xy}^B$ and this is the necessary conditions for Pareto Efficiency. On the production sides, a profit-maximizing competitive firm produces output to the point at which $MC=P$. In our example this means $P_x = MC_x$ and $P_y = MC_y$ or $MC_x/MC_y = P_x/P_y$. Note that MC_x/MC_y is the Marginal Rate of Transformation, hence $MRT_{xy} = P_x/P_y$. Since P_x/P_y appears on the right-hand side of each and equating these three equations imply that $MRS_{xy}^A = MRS_{xy}^B = MRT_{xy}$. This is a necessary condition for Pareto efficiency. Thus, competition with maximizing behaviour on the part of all individuals leads to efficient outcome.

2.4 Second Fundamental Theorem of Welfare Economics

Government intervention may be particularly desirable if the assumptions of the first welfare theorem fails, i.e., when there are market failures. Government intervention can potentially improve everybody's welfare.

The assumptions under the first best theorem constitute an inseparable set, in other words, they must all be satisfied for Pareto optimality. However, these conditions required for its validity may not be satisfied by real-world markets and when these conditions are absent, the free-market allocation of resources may be inefficient and hence the first best situation cannot be achieved. Given these constraints, the best that can be achieved is the second best.

According to the Second Fundamental Theorem of Welfare Economics, society can attain any Pareto efficient allocation of resources by making a suitable assignment of initial endowments and then letting people freely trade with each other. In other words, society can attain any efficient outcome by a suitable redistribution of resources and free trade. Thus, even if the economy generates a Pareto efficient allocation of resources, government intervention may be necessary to achieve a “fair” distribution of utility. Figure 2.7 explains further the second fundamental theorem of welfare economics.

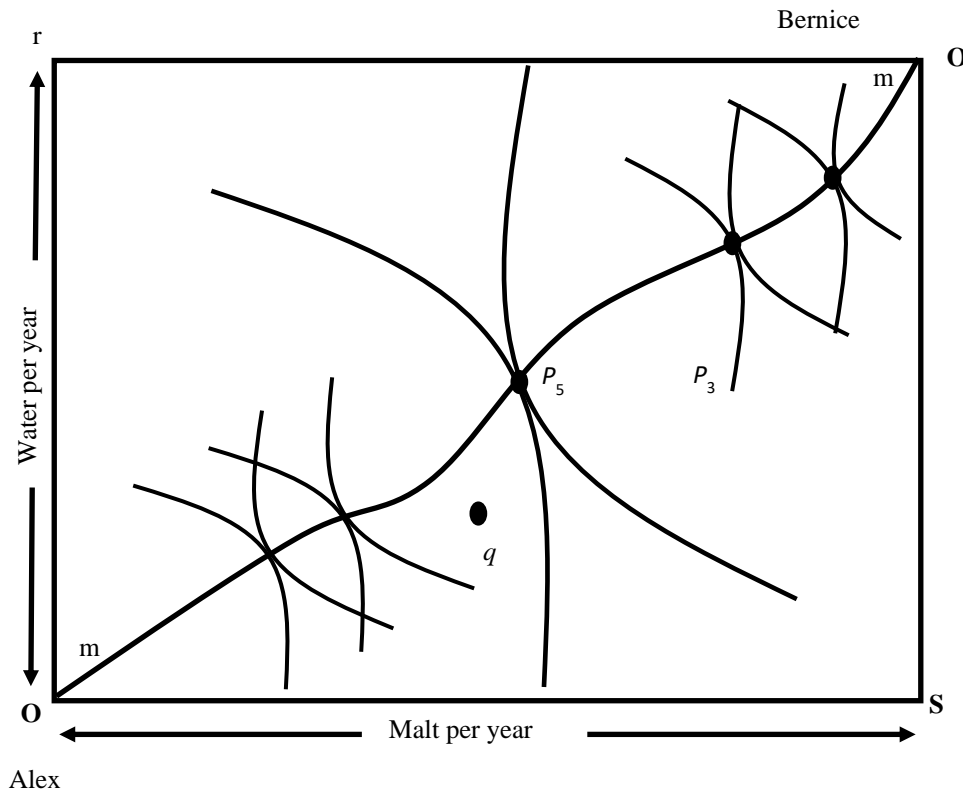


Figure 2.7: Illustration of the Second Fundamental Theorem of Welfare Economics
Source: Rosen and Gayer, (2014)

From Figure 2.7, point p_5 is Pareto efficient and point q is not. However, society might prefer point q because it provides a more equal distribution of the two goods.

2.4.1: The General Theory of Second Best¹

The general theorem for the second best Optimum states that if there is introduced into a general equilibrium system a constraint which prevents the attainment of one of the Paretian conditions, the other Paretian conditions, although still attainable, are, in general, no longer desirable. In other words, given that one of the Paretian optimum conditions cannot be fulfilled, then an optimum situation can be achieved only by departing from all the other Paretian conditions. The optimum situation finally attained may be termed a second best optimum because it is achieved subject to a constraint which, by definition prevents the attainment of a Paretian optimum (Lipsey, 1956).

From this theorem there follows the important negative corollary that there is no a priori way to judge as between various situations in which some of the Paretian optimum conditions are fulfilled while others are not. Specifically, it is not true that a situation in which more, but not all, of the optimum conditions are fulfilled is necessarily or is even likely to be, superior to a situation in which fewer are fulfilled. It follows, therefore, that in a situation in which there exist many constraints which prevent the fulfilment of the Paretian optimum conditions, the removal of any one constraint may affect welfare or efficiency either by raising it, by lowering it, or by leaving it unchanged.

¹ This section dwells significantly on Lipsey (1956)



The general theorem of the second best states that if one of the Paretian optimum conditions cannot be fulfilled a second best optimum situation is achieved only by departing from all other optimum conditions. It is important to note that in general, nothing can be said about the direction or the magnitude of the secondary departures from optimum conditions made necessary by the original non-fulfilment of one condition.

Example: Suppose we have a monopolist who is a big polluter, such that his activities produce negative externalities. This monopolist charges higher prices than the perfect competitive prices but produces lower quantity as he has market power. Supposing we want to remove this distortion, one option is for the government to allow entry. As more firms are allowed entry, output increases and prices lowered. But this solution happens at the expense of higher pollution rate. Hence, we are able to solve the problem of monopoly but pollution increases. Thus, by trying to solve one problem, welfare has not been increased as pollution now increases.

Also, in the health sector everyone is required to have license to operate. Once there are license laws, it creates monopoly and information asymmetry problems about the quality of doctors. One way of resolving such a problem is to remove the license law. But in removing the license law, as a way of solving monopoly creates another problem of receiving dangerous health care from quack doctors. Thus, it cannot be said that the attempt to make the health market competitive is a good thing-welfare wise. Every policy should therefore be well evaluated before its introduction. The desire to achieving competitiveness may not be the outmost solution at all times.

2.4.2 Scope of the Theory of Second Best

The best way to approach the problem of defining the scope of the theory of Second best is to consider the role of constraints in economic theory. In the general economic problem of maximization, a function is maximized subject to at least one constraint. In the theory of the Paretian optimum, certain constraints are assumed to be operative and the conditions necessary for the maximization of some function subject to these constraints are examined. In the theory of second best there is admitted at least one constraint additional to the ones existing in Paretian optimum theory (Lipsey, 1956).

It is important to note that even in a single general equilibrium system where there is only one Paretian optimum, there will be a multiplicity of second best optimum positions. This is so because there are many possible combinations of constraints with a second best solution for each combination. The approach used by Lipsey and Lancaster (1956) is to assume the existence of one constraint additional to those in the Paretian optimum problem (e.g., one tax, one tariff, one subsidy, or one monopoly) and then to investigate the nature of the conditions that must be satisfied in order to achieve a second best optimum and, where possible, to compare these conditions with those necessary for the attainment of a Paretian optimum. The other approach used by Professor Meade is to assume the existence of a large number of taxes, tariffs, monopolies and then to inquire into the effect of changing any one of them. Meade, therefore, deals with a system containing many constraints and investigates the optimum (second best) level for one of them, assuming the invariability of all the others.

It would be futile to argue that one of these approaches was superior to the other. Meade's is probably the appropriate one when considering problems of actual policy in a world where many imperfections exist and only a few can be removed at any one time. On the other hand,



the approach used by Lipsey and Lancaster would seem to be the more appropriate one for a systematic study of the general principles of the theory of second best.

2.4.3 The Theory of Second Best in the Literature of Economics

The theory of customs unions provides an important case study in the application of the general theory of second best. Until customs union theory was subjected to searching analysis, the 'free trader' often seemed ready to argue that any reduction in tariffs would necessarily lead to an improvement in world productive efficiency and welfare. In his path-breaking work on the theory of customs unions Professor Viner has shown that the removal of tariffs from some imports may cause a decrease in the efficiency of world production. He argued that with customs union, countries are to import from member countries, whereas before the customs union it imported them from a third country, because that was the cheapest possible source of supply even after payment of the duty. In a related study, Professor Meade has shown that a customs union has exactly parallel effects on the location, and hence the "utility" of world consumption. Meade (1956) isolates the "consumption effects" of customs unions by considering an example in which world production is fixed. Meade argues that, customs union will tend to raise welfare by encouraging trade between the member countries but that, at the same time, it will tend to lower welfare by discouraging the already hampered trade between the union area and the rest of the world. The Viner-Meade conclusions provide an application of the general theorem's negative corollary that nothing can be said a priori about the welfare and efficiency effects of a change which permits the satisfaction of some but not all of the Paretian optimum conditions.

Another application of second best theory is that of tariffs provided by S. A. Ozga. Ozga argued that the adoption of a free trade policy by one country, in a multi-country tariff ridden world, may actually lower the real income of that country and of the world. Ozga, (1955) demonstrates the existence of this possibility by assuming that all commodities are, in consumption rigidly complementary so that their production either increases or decreases simultaneously. He then shows that in a three country world with tariffs all around, one country may adopt a policy of free trade and, as a result, the world production of all commodities may decrease.

In the field of Public Finance, I. M. D². Little has shown that because of the existence of the "commodity" leisure, the price of which cannot be directly taxed, both direct and indirect taxes must prevent the satisfaction of some of the conditions necessary for the attainment of a Paretian optimum. Little, (1950) suggested that there is an a priori case in favour of raising a given amount of revenue by some system of unequal indirect taxes rather than by either an income tax or an indirect tax on only one commodity. This interesting conclusion was first

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- Lipsey, R. G., 1956 "The Theory of Customs Unions: Trade Diversion and Welfare" in a forthcoming issue of *Economica*.
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stated by W. J. Corlett and D. C. Hague who argued that the optimum way to raise any given amount of revenue is by a system of unequal indirect taxes in which commodities " most complementary " to leisure have the highest tax rates while commodities " most competitive" with leisure have the lowest rates. Thus, when an equal *ad valorem* rate of tax is placed on all goods the consumption of leisure will be too high while the consumption of all other goods will be too low.

Professor Meade has given an alternate analysis of the same problem. His conclusions, however, support those of Corlett and Hague. In theory at least, the tables have been completely turned and the indirect tax is proved to be superior to the income tax, provided that the optimum system of indirect taxes is levied. This conclusion is but another example of an application of the general theorem that if one of the Paretian optimum conditions cannot be fulfilled then a second best optimum situation can be obtained by departing from all the other optimum conditions.

A. Smithies in his article, "The Boundaries of the Production and Utility Function". Smithies considers the case of a multi-input firm seeking to maximize its profits This will be done when for each factor the firm equates marginal cost with marginal revenue productivity. Smithies then suggests that there may exist boundaries to the production function. These boundaries would take the form of irreducible minimum amounts of certain inputs, it being possible to employ more but not less than these minimum amounts. It might happen, however, that profit maximization called for the employment of an amount of one factor less than the minimum technically possible amount. Profit maximization may require that some factors be employed only to a point where marginal productivity exceeds marginal cost while other factors are used up to a point where marginal productivity falls below marginal cost.

Finally, mention may be made of the problem of " degrees of monopoly". A Paretian optimum requires that marginal costs equal marginal revenues throughout the entire economy. If this equality is not established in one firm, then the second best conditions require that the equality be departed from in all other firms. However, as usual in second best cases there is no presumption in favour of the same degree of inequality in all firms. In general, the second best position may well be one in which marginal revenues greatly exceed marginal costs in some firms, only slightly exceed marginal costs in others, while, in still other firms, marginal revenues actually fall short of marginal costs. A similar problem is considered by Lionel W. McKenzie in his article " Ideal Output and the Interdependence of Firms." McKenzie shows that even in this partial equilibrium setting if allowance is made for inter-firm sales of intermediate products, the condition that marginal costs should bear the same relation to prices in all firms does not provide a sufficient condition for an increase in the value of output. Given that the optimum condition, marginal costs equals price cannot be achieved, McKenzie shows that a second best optimum would require a complex set of relations in which the ratio of marginal cost to price would vary as between firms.

Trial Questions

1. Consider a free market with demand equal to $Q = 1,200 - 10P$ and supply equal to $Q = 20P$.
 - a. What is the value of consumer surplus? What is the value of producer surplus?



b. Now the government imposes a \$10 per unit subsidy on the production of the good. What is the consumer surplus now? The producer surplus? Why is there a deadweight loss associated with the subsidy, and what is the size of this loss?

2. As economists are experts in resource allocation, you are invited by two friends to resolve a dispute about the shared use of a car. By applying Pareto-efficiency, how are you able to advise them? Are they impressed with your advice? Explain

3. Two consumers have utility functions $U_h = \ln(X_1^h) + \ln(X_2^h)$.

a. Calculate the marginal rate of substitution between good 1 and good 2 in terms of consumption levels.

b. By equating the marginal rates of substitution for the two consumers, characterize a Pareto-efficient allocation.

c. Using the solution to part b, construct the contract curve for an economy with 2 units of good 1 and 3 units of good 2.

Basic Readings:

Leach Chapters 1, 3, 4 & 5.

Atkinson and Stiglitz, Chapter 1

Hindriks & Myles chapter 2

Other Readings:

Bator F. (1957), "The Simple Analytics of Welfare Maximization". *American Economic Review* 47.

Lipsey, R. G. and K. Lancaster (1956), "The General Theory of Second Best". *Review of Economic Studies* 24: 11 - 32.

Lipsey, R. G., 1956) " The Theory of Customs Unions: Trade Diversion and Welfare " in a forthcoming issue of *Economica*.

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LESSON THREE: MARKET FAILURE

By the end of the lesson, you should be able to:

- 3.1 define market failure
- 3.2 explain sources of market failure

3.1 Introduce and define market failure

In Lesson two it was shown that resource allocation at the equilibrium of a competitive market system is Pareto efficient. Competitive market is said to be Pareto efficient if it satisfies all the three conditions of Pareto efficiency (first fundamental theorem of Welfare). In a competitive market system, resources are allocated according to the interaction of demand and supply. Through the price mechanism, markets ration scarce resources to their most highly valued uses. The first fundamental theorem of welfare economics asserts that the economy is Pareto efficient only under certain circumstances or conditions. There are certain important conditions under which markets are not Pareto efficient and these are referred to as **market failures** (Hindriks & Myles, 2013; Wolf, 1987; Watts and Segal, 2008; Bator, 1958; Randall, 1983).

Market failure refers to those instances in which the allocation of resources does not achieve the best possible outcome, from society's point of view. In other words, **Market failure** arises when the outcome of an economic transaction is not completely efficient, meaning that all costs and benefits related to the transaction are not limited to the buyer and the seller in the transaction (Gruber, 2016; Wolf, 1987; Mrinal Datta-Chaudhuri, 1990).

3.2 Sources of Market Failure

Sources of market failure include: Public goods, Externalities, Market imperfections (Monopoly), Missing markets, Increasing returns to scale, Risk and uncertainty, Income distribution, Information Asymmetry, Tax distortions.

Public Goods

Public goods are non-excludable and non-rivalry in consumption. One defining characteristic of a public good is that it is non-rival in consumption : consumption of it by one individual does not actually or potentially reduce the amount available to be consumed by another individual. Examples include radio and television broadcasts and national defense. Any individual can listen to or watch the output of a broadcasting station, without preventing any other individual who possesses a radio or television receiver from consuming the same output. The second defining characteristic of public goods is that they are non-excludable. Thus, once the good has been provided, it is impossible to prevent someone from consuming it. If it is not possible to exclude non-payers from consuming a public good, firms will find it difficult to collect revenue from consumers to cover the cost of producing the public good. (Gruber, 2016). Thus, public goods apply where most of an activity's consequences consist of nonappropriable benefits (examples, national security, immunization to eradicate a communicable disease- true public goods) or noncollectible cost (example, crime-public bad), Wolf, (1987).

If any consumers free-ride because they cannot be excluded, the prices that firms charge for supplying public goods will not be an adequate measure of the marginal benefit of the good and there will be a less than efficient supply of the good. Public goods are in two forms: **pure**

public goods and **impure public goods**. **Pure public goods** are perfectly non-rival in consumption and are non-excludable. **Impure public goods** are goods that satisfy the two public good conditions (non-rival in consumption and non-excludable) to some extent, but not fully. For instance, some public goods are excludable or can be produced in excludable form at relatively low cost. For example, television broadcasts can be scrambled in transmission so that they can be watched only by consumers who have a descrambler fitted to their television set and use of the descrambler can be charged for by the broadcasters.

However, most economic analysis focuses on pure public goods and the properties of non-rivalry and non-excludability of pure public goods imply difficulties for the market mechanism. This is a result of the free-rider problem; the free market will not provide enough of these goods. So what is the optimal quantity of a public good that should be produced? Before we model how to determine the optimal quantity of public goods to provide, let's review the conditions for optimal provision of private goods. Imagine that there are two individuals, Ben and Jerry, who are deciding between consuming cookies (c) and ice cream (ic), two pure private goods. For simplicity, suppose that the price of cookies is US \$1.

- With private goods, Consumers demand different quantities of the good at the same market price.
- The optimality condition for the consumption of private goods is written as:

$$\frac{MU_{ic}^A}{MU_c^B} = MRS_{ic,c}^B = MRS_{ic,c}^J = \frac{P_{ic}}{P_c} \quad \text{Note } P_c = 1$$

- Equilibrium on the supply side requires: $M_{ic} = P_{ic}$
- In equilibrium, therefore: $MRS_{ic,c}^B = MRS_{ic,c}^J$

Now suppose we replace private good ice-cream ic by a public good missiles m

- $MRS_{ic,m}^B$ = number of cookies Ben is willing to give up for 1 missile
- $MRS_{ic,m}^J$ = number of cookies Jerry is willing to give up for 1 missile
- In net, society is willing to give up $MRS_{ic,m}^B + MRS_{ic,m}^J$ cookies for 1 missile
- Social-efficiency-maximizing condition for the public good is:

$$MRS_{ic,m}^B + MRS_{ic,m}^J = MC$$

- This implies that Social efficiency is maximized when the marginal cost is set equal to the sum of the MRSs, rather than being set equal to each individuals MRS. This is called the Samuelson rule (Samuelson, 1954)

Note that for public goods we must sum the individual demand vertically because the services provided by the public good must be consumed in equal amount but with private good, everyone has the same MRS, but people can consume different quantities and therefore demands are summed horizontally over different quantities.

Public goods create market failures if a section of the population that consumes the goods fails to pay but continues using the good as actual payers. For example, police service is a public good that every citizen is entitled to enjoy, regardless of whether or not they pay taxes to the government. The major problem with public good provision is therefore the free rider problem. Government solves this problem by imposing taxes and user fees and other regulatory policies.



Externalities

The first fundamental welfare theorem says that competitive markets with no externalities yield a Pareto-efficient outcome (Besley, 1994). According to (Wolf, 1987), in situations where actions of economic agents create spillovers, in the form of benefits or cost, which are not, respectively, appropriable by or collectable from the producer, then market outcomes will not be efficient (Wolf, 1987). Externalities exist when the actions/activities of one/some economic agent(s) affect other economic agents in a way that is not transmitted through market forces. Externalities are the effects of a decision on a third party that is not taken into account by the decision-maker (Datta-Chaudhuri, 1990, Wolf, *ibid*). In other words, an externality is said to exist if an activity of one party affects the utilities or production possibilities of another party without being priced (Caldari and Fabio, 2011). The fact that it is not being priced implies that the emitting party has no incentive to take into consideration the effects; beneficial or detrimental on the affected party. The emitting party may therefore devote an inefficient amount of resources to pursuing that activity (Wolf, *ibid*).

Externalities can be positive or negative. **Negative externalities** occur when the effect of a decision on others that is not taken into account by the decision-maker is detrimental to the third party. Examples include water pollution, and congestion. When negative externalities are present, the free market will overproduce the good in question (Wolf, *ibid*). Chemical and noise emissions from aircraft or other industrial activities are examples of negative externalities (costs). The existence of such externalities provides a rationale for government intervention – through taxing or direct regulation (Pigou, 1970) - to compensate for the market's tendency to produce excessive output in this instance, because the externalities are otherwise not taken into account Wolf, (*ibid*).

Positive externalities occur when the effect of a decision on others that is not taken into account by the decision-maker is beneficial to others. Examples include innovation, education, Research and Development (R&D). When positive externalities are present, the free market will under produce the good in question (Wolf, *ibid*, Bator, 1958).

Meanwhile, Coase (1960) argued that externalities should not necessarily cause markets to fail. The reason is that those who are the victims of an external costs (negative externality), can offer payment to the emitting party to reduce or desist from the culpable activities (example reduce emissions). A similar proposition can be advanced to cover beneficiaries, rather than victims, of externalities (Wolf, 1987)

Market Imperfections

Imperfect markets such as monopoly does not satisfy the first theorem of welfare economics, hence resources are not allocated efficiently. An important feature underlying the first fundamental theorem of welfare economics is that all the participants are price-takers i.e. households and firms do not influence price. The price-taking condition is reasonable only if the market is populated with many buyers and sellers. However, in the case of the imperfect markets firms are price-setters (Hindriks and Myles, 2013). In the real world, perfect competition markets do not exist. There are however the existence of monopoly and oligopoly markets where agents operate in a way to maximize their profit or minimize their cost. Besley (1994) observed that market power may lead to inefficiencies in credit markets if trade is restricted to maximize profits and if goods are not priced at marginal cost. Again Besley (*ibid*) noted that in a world of imperfect information, people who are privileged to have access to

information may obtain some market power. Monopoly power is the ability of firms currently in business to prevent the entry of new firms into the industry. Such monopoly power gives existing firms the power to restrict output and raise prices. A monopolist maximizes profit by producing an output at which marginal revenue equals marginal cost. The monopolist's equilibrium is shown in Figure 3.1.

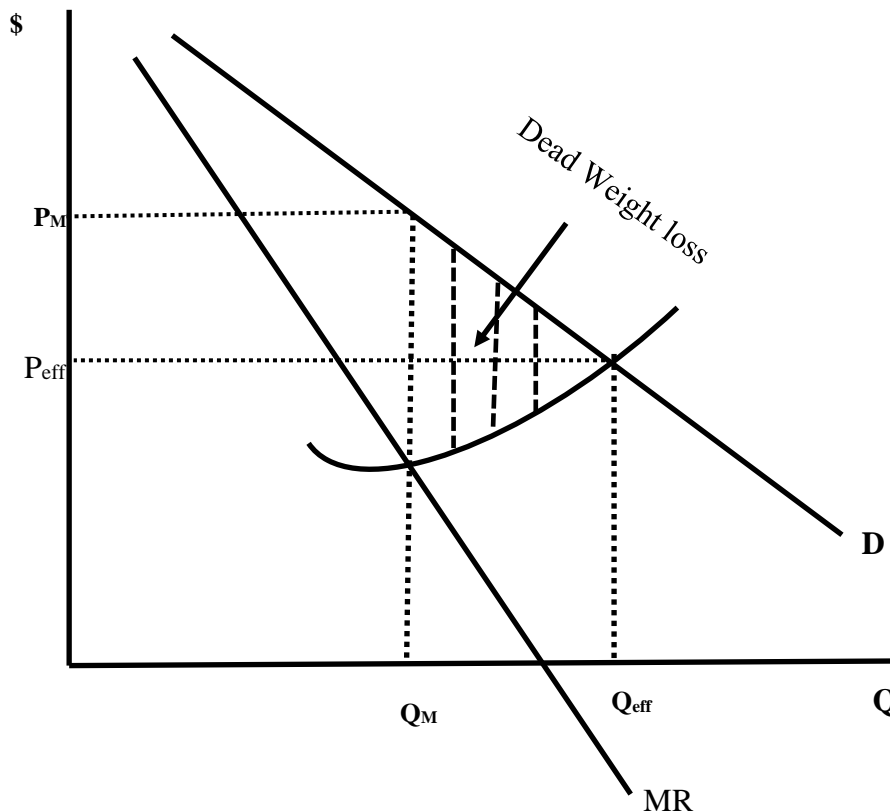


Figure 3.1: Illustration of Monopoly Equilibrium
Source: Authors' illustration

From the diagram above, q_m and P_m are the monopoly's output and price respectively. The consumers would be prepared to pay up to P_m for an additional unit of output, and the cost of an additional unit is the monopolist's marginal cost MC. Since $MR = MC$ and $P_m > MR$ it follows that $P_m > MC$: consumers are willing to pay more for an extra unit than its cost of production. Consumers pay higher prices and hence some consumers chose not to buy the product, or to buy less of it. So, if imperfect markets such as monopolies are a problem, what do we do about them? Government can reduce monopoly power through direct regulation and by providing alternative sources for acquiring the good, such as alternative source of credit to break the monopolist-lender (Besley, *ibid*) or through the facilitation of access to information and lowering the barrier to entry and mobility (Wolf, (1987).

However, Basu(1989) argued that monopoly does not always lead to an inefficiency. For instance, if the monopolist-lender in the credit market is able to discriminate in the price charged to each borrower, the lender will be able to extract all of the consumer surplus from each borrower. Monopoly power has no efficiency cost in this case; it pays the monopolist to



lend to the point where the marginal value of credit to each borrower is the same (a "discriminating monopoly" outcome). In that case loans will be made efficiently, even though they will be designed to extract all of the surplus from borrowers and the lender may be labeled as exploitative (for a discussion of these issues (Basu 1989).

Incomplete/Missing Markets

Whenever private markets fail to provide a good or service even though the cost of providing it is less than what individuals are willing to pay, there is a market failure that we refer to as **incomplete markets** (because a complete market would provide all goods and services for which the cost of production is less than what individuals are willing to pay). The absence of such market causes market failure because resources will not have been allocated efficiently since there is no way to equate their social and private benefits and costs either in the present or in the future because their markets are incomplete or missing. Reasons for missing markets include: pure public goods, huge initial capital outlay and common property resources. Some economists believe that private markets have done a particularly poor job in providing insurance and loans, and provides rationale for government activities in these areas through regulations and provision of subsidies. Sometimes markets become highly unstable, and a stable equilibrium may not be established, such as with certain agricultural markets, foreign exchange, and credit markets. Such volatility may require intervention by Government by providing guarantee prices and other forms of regulations (Gruber, 2016).

Risk and Uncertainty

In a free market, the objective of producers is to maximize profit hence resources are channel into sectors that offers low risk and uncertainty. Few resources will be channel into sectors with high risk and uncertainty although such sectors are needed and wanted by the society and This leads to market failure. Government can deal with this source of market failure through the introduction incentives and subsidies to encourage production of such goods associated with high risk levels (Gruber, 2016)

Income distribution

An unequal distribution of income and wealth may result in an unsatisfactory allocation of resources. Under the free market, the price mechanism performs two roles – allocate resources according to consumer sovereignty as well as allocate goods according to the ability and willingness to pay for them. By signaling to the producers what they want or do not want through their effective demand, the resources will be diverted away from or towards the production of the goods. The price mechanism does not cater for the needs of those who are not able to pay for the good. The free market channels insufficient amounts of essential goods to lower income groups who do not have the ability to pay for the goods and possible channel an excessive amount of resources to produce goods to those who can afford them which can possible result in overconsumption or wastage. It is the undesirability of such allocation of resources that leads to the society's welfare being skewed towards a particular group of the population. Government could address this type of market failure through the introduction of differential taxes, where the rich are made to pay high taxes to correct the imbalances in income distribution (Rosen and Gaye, 2014).

Information Asymmetry

In purely competitive markets all agents are fully informed about traded commodities and other aspects of the market. But what about markets for medical services, or insurance, or used cars?



In the health sector, doctors know more about medical services than does the buyer Holman and Lorig (200) and Watts and Segal (2009) . In the same vein an insurance buyer knows more about his riskiness than does the seller and a used car owner knows more about it (quality) than does a potential buyer (Arkelof, 1970, Bassoco, Cartas, and Norton 1986). These scenarios present situations where available information to parties engaging in a trade do not have access to the same level of information. Markets with one side or the other imperfectly informed are markets with imperfect information. Imperfectly informed markets with one side better informed than the other are markets with asymmetric information. If information about quality is costly to obtain, then it is no longer possible that buyers and sellers have the same information. Asymmetric information occurs when one party to a transaction knows more than does the other Arkelof (1970). Markets may not be fully efficient when one side has information that the other side does not have. The costs of information provide an important source of market friction and can lead to a market breakdown. So then what are the channels through which asymmetric information affect the functioning of a market? It is worthy noting that the concept of asymmetric information is attributed to the 2001 Nobel Prize in Economics: George Akerlof, Joseph Stiglitz, and Michael Spence.

Information asymmetry leads to two main problems: adverse selection and moral hazard. Adverse selection occurs when products of different qualities are sold at the same price because of asymmetric information (Gruber, 2016; Besley, 1994; Stiglitz & Weiss 1981). Particularly, adverse selection (anti-selection or negative selection) is the term used in economics to refer to a market process in which buyers and sellers have asymmetric information (i.e. access to different information) and “bad” products or services are more likely to be selected (Basley ,ibid) . Consider the case of health insurance, a customer seeking insurance will often have private information about his or her own health status and family medical history that the insurance company does not have. Consumers in good health may not bother to purchase health insurance at the prevailing rates. A consumer in poor health would have higher demand for insurance, wishing to shift the burden of large anticipated medical expenses to the insurer. Asymmetric information can lead to inefficiencies (Gruber, ibid) Insurance companies may offer less insurance and charge higher premiums than if they could observe the health of potential clients and could require customers to obey strict health regimens. The whole market may unravel as consumers who expect their health expenditures to be lower than the average insured consumers withdraw from the market in successive stages, leaving only the few worst health risks as consumers. In the credit market adverse selection occurs when lenders do not know particular characteristics of borrowers; for example, a lender may be uncertain about a borrower’s preferences for undertaking risky projects (Besley, ibid)

More formally we discuss the adverse selection problem (hidden information) by using the market for used car as first discussed by Arkelof (1970). In this market there are two types of cars; “lemons” and “peaches”. Suppose that each lemon seller will accept \$1,000 and a buyer will pay at most \$1,200. Each peach seller will accept \$2,000; a buyer will pay at most \$2,400. If every buyer can tell a peach from a lemon, then lemons sell for between \$1,000 and \$1,200, and peaches sell for between \$2,000 and \$2,400. Suppose further that no buyer can tell a peach from a lemon before buying. Now gains-to-trade are generated when buyers are well informed. So given this background, what is the most a buyer will pay for any car?

The answers to this question will involve the following:

First, let q be the fraction of peaches and $1 - q$ is the fraction of lemons. Expected value (EV) to a buyer of any car is at most:



$$EV = \$1200(1-q) + \$2400q \text{ -----(3.1)}$$

Suppose EV is greater than \$2000, then every seller can negotiate a price between \$2000 and \$2400 (no matter if the car is a lemon or a peach). So that all sellers gain from being in the market. If EV is however less than \$2000, then a peach seller cannot negotiate a price above \$2000 and will exit the market. All buyers know that remaining sellers own lemons only. Buyers will pay at most \$1200 and only lemons are sold. Hence “too many” lemons will “crowd out” the peaches from the market. Thus, gains to trade are reduced since no peaches are traded. The presence of the lemons inflicts an external cost on buyers and peach owners. The cars that are most likely to be offered for sale are the ones that people want most to get rid of.

Also, how many lemons can be in the market without crowding out the peaches? Here, buyers will pay \$2000 for a car only if:

$$EV = \$1200(1-q) + \$2400q \geq \$2000 \Rightarrow q \geq 2/3. \text{(3.2)}$$

So, if over one-third of all cars are lemons, then only lemons are traded.

A market equilibrium in which both types of cars are traded and cannot be distinguished by the buyers is known as a **pooling equilibrium**. A market equilibrium in which only one of the two types of cars is traded, or both are traded but can be distinguished by the buyers, is referred to as a **separating equilibrium**.

Moral hazard occurs when an insurance policy or some other arrangement changes the economic incentives we face, thus leading us to change our behaviour, usually in a way that is detrimental to the market. If a person is fully insured against losses then he or she will have a reduced incentive to undertake costly precautions, which may increase the likelihood of a loss occurring. Thus, moral hazard is a reaction to incentives to increase the risk of a loss and is a consequence of asymmetric information. In the case of the automobile insurance, for example, a person who has a policy that covers theft may park in less safe areas or refrain from installing antitheft devices. This behavioral response to insurance coverage is an example of moral hazard (Gruber, 2016). According to Besley (1994), moral hazard may also lead to externalities in insurance markets, where individuals who have income insurance may make no effort to repay their loans, so that default ends up as a transfer from the insurer to the lender—a scenario reminiscent of the experience of some countries (for example, Mexico, as documented by Bassoco, Cartas, and Norton 1986).

If an insurer knows the exact risk from insuring an individual, then a contract specific to that person can be written. If all people look alike to the insurer, then one contract will be offered to all insureds; **high-risk** and **low-risk** types are then **pooled**, causing **low-risks** to subsidize **high-risks**.

Insurance companies cannot observe all the relevant actions of those they insure. Full insurance means too little care will be undertaken because the individuals do not face the full costs of their actions. In standard market analysis involving demand and supply, marginal willingness to pay must equal the marginal willingness to sell. If consumers purchase more insurance, they would rationally choose to take less care.

So far it has been established that moral hazard implies a situation in market transactions where one side of the market cannot observe the actions of the other (hidden action) problem. Adverse selection also indicates a situation where one side of the market cannot observe the “type” or quality of the goods on other side of the market (hidden information) problem. Equilibrium



with hidden action is suboptimal since firms would like to provide more but are unwilling since it will change the incentives of their customers. Equilibrium with hidden information will involve too little trade taking place because of the externality between the “good” and “bad” types. Both outcomes are therefore inefficient.

Can Government Help?

Hidden action? Not really, but government may compel a particular level of care through criminal punishment. With hidden information, government can compel all risk classes to buy insurance. But there are costs associated with government interventions. It should be stressed that just because actions can improve social welfare doesn't mean they would be taken. According to Besley, (1994), the incentive effects of moral hazard need not in themselves argue for government intervention in credit markets, but if they are combined with multiple indebtedness, outcomes are likely to be inefficient, and government intervention designed to deal with such externalities may increase efficiency.

Dealing with Adverse Selection: Signaling

With asymmetric information the *good* cannot be distinguished from the *bad*. This can be improved if the seller can convey information about quality, through mechanisms such as references from previous customers and a report from an independent agency. Such signals can be mutually beneficial. The more-informed agent can use a signal to help less-informed agents discover the truth. Owners of a good used car can offer a warranty. By offering the warranty (the signal) the sellers of the good cars can distinguish themselves from the sellers of the bad used cars. A signal will only work if it is *verifiable* and *credible*.

Signaling models assume that the informed agent acts first and invests in a signal. The uninformed party forms beliefs based on the signals. In equilibrium it is optimal to invest in the signal and the beliefs are confirmed. Thus, there are two primary solutions to the information asymmetry problem, signaling and screening. Michael Spence originally proposed the idea of signaling. He argued that in a situation with information asymmetry, it is possible for people to signal their type, thus believably transferring information to the other party and resolving the information asymmetry problem.

He argued that going to college can function as a credible signal of an ability to learn. Assuming that people who are skilled in learning can finish college more easily than people who are unskilled, then by attending college the skilled people signal their skill to prospective employers. This is true even if they did not learn anything in school, and school was there solely as a signal. However educational qualification alone may not be sufficient since the working environment may differ from the classroom environment. For this reason job interviews, the use of personal curriculum vitae and informal means are used as screening devices to supplement education as a productivity signaling device. Joseph Stiglitz pioneered the theory of screening.

We will look at the signaling model more formally through the labour market. A labour market has two types of workers; *high-ability* and *low-ability*.

Let high-ability worker's marginal product be represented as aH and the marginal product of a low-ability worker represented as aL , implying that aL is less than aH .

Assume a fraction h of all workers are high ability, so $1 - h$ is the fraction of low-ability workers. Each worker is paid his expected marginal product. If firms knew each worker's type they would pay each high-ability worker $wH = aH$, and pay each low-ability worker $wL = aL$. If



firms cannot tell workers' types then every worker is paid the (pooling) wage rate; *i.e.* the expected marginal product:

$$wp = (1-h)L + haH \text{-----}(3.3)$$

This implies that,

$$wp = (1-h)L + haH < aH \text{-----}(3.4)$$

(NB: aH is the wage rate paid when the firm knows a worker really is high-ability).

So high-ability workers have an incentive to find a credible signal, such as education. But education has an associated cost. Suppose education costs a high-ability worker cH per unit and costs a low-ability worker cL per unit, such that $cL < cH$. Suppose that education has no effect on workers' productivities; *i.e.*, the cost of education is a deadweight loss.

Hence high-ability workers will acquire eH education units if:

$$wH - wL = aH - aL > cHe \text{-----}(3.5)$$

$$wH - wL = aH - aL < cLeH \text{-----}(3.6)$$

Where: (3.5) says acquiring eH units of education benefits high-ability workers and (3.6) says acquiring eH education units hurts low-ability workers.

Signalling can improve information in the market but total output did not change and education was costly, so signalling worsened the market's efficiency. So, improved information need not improve gains-to-trade. An unproductive but costly signal can distinguish quality levels through self supporting beliefs. The pooling equilibrium may dominate the separating equilibrium. Signalling is a market response to asymmetric information but it may not entirely solve the problems

Dealing with Adverse Selection: Screening

Insurance companies will want to distinguish the high-risk from the low-risk: – Policies can then be tailored for each type, this eliminates the pooling of risk. Insurance companies can offer a menu of contracts with each risk type self-selecting the contract designed for it. Self-selection means each type must prefer their own contract. In equilibrium the high-risk obtain full insurance and the low-risk partial insurance

Examples of efforts to avoid moral hazard by using signals are: higher life and medical insurance premiums for smokers or heavy drinkers of alcohol and lower car insurance premiums for contracts with higher deductibles or for drivers with histories of safe driving. One device for screening out poor-quality borrowers is to use a collateral requirement (Stiglitz and Weiss 1986). If the lender demands that each borrower put up some collateral, the high-risk borrowers will be least inclined to comply because they are most likely to lose the collateral if their project fails.

Incentives Contracting

The problem of asymmetric information is present in the concept of incentive contracting. In his model a worker is hired by a principal to perform a task. It's only the worker who knows the effort he/she exerts (asymmetric information). The effort exerted affects the principal's payoff. The principal's problem is to design an incentive contract that induces the worker to exert the amount of effort that maximizes the principal's payoff.

Let e represent the agent's effort and the principal's reward is: $y = f(e)$. The agent's pay (benefit) is $s(y)$. An incentive contract is a function $s(y)$ specifying the worker's payment when the principal's reward is y .



The principal's profit is thus:

$$\pi p = y - s(y) = f(e) - s(f(e)) \text{ -----}(3.7)$$

Let u be the worker's (reservation) utility of not working. To get the worker's participation, the contract must offer the worker a utility of at least u . The worker's utility cost of an effort level $e : c(e)$.

Thus, maximization problem is: $Max \pi p = f(e) - s(f(e)) \text{ ----- } (3.8)$

But : $s(f(e)) - c(e) = u \text{}(3.9)$

Given that, $s(f(e)) - c(e) = s(f(e))$

Then the maximization problem becomes: $Max \pi p = f(e) - s(f(e)) - u \text{ ----- } (3.10)$

First Order Condition : $f'e = c'e, e = e^* \text{}(3.11)$

Therefore $e = e^*$ must be most preferred by the worker.

So the contract $s(y)$ must satisfy the incentive-compatibility constraint;

$$s(f(e^*)) - c(e^*) \geq s(f(e)) - c(e), \text{ for all } e \geq 0 \text{ } (3.12)$$

Tax distortion

A distortion is "any departure from the ideal of perfect competition that therefore interferes with economic agents' maximizing social welfare when they maximize their own." Market distortions are often a byproduct of government policies that aim to protect and raise the general well-being of all market participants. Taxes create distortions in an economy. Taxes on goods and services can artificially raise prices and distort how markets work to allocate scarce resources. Direct taxation can create a disincentive effect for households and firms because it discourages individuals from working hard.

Increasing Returns to Scale

Increasing returns to scale refer to production situations with large fixed costs so that as the scale of production increases the average (per unit) cost of production decreases. This is true in industries that require expensive machinery to operate and, once the machinery is in place, the extra costs of production are not as high as the initial costs of setting up such machinery. In health care, there are increasing returns to scale. For example, a hospital or imaging center might cost a lot to build and equip, but once it is in operation the more services it provides the smaller the per unit costs of providing each unit of service. The existence of economies of scale leads to market power because large firms have lower average costs and are able to survive in the market and to make profits. This also means that the large firms are more efficient than the smaller ones. If there are economies of scale, it would make sense to ensure that the industry has a few larger firms producing at low per unit costs rather than many little ones producing at higher per unit costs. This might happen naturally (survival of the most efficient) because larger producers experience lower average costs and are less likely to make a loss than small firms producing at high average costs. If there are infinite economies of scale, the most efficient production might need only one firm—a situation termed natural monopoly. This situation gives the one or few firms a great deal of market power which can be used to set prices at very



high levels (reducing consumer purchasing power and welfare), produce poor quality services, or practice price discrimination. This situation can lead to a transfer of income from consumers to the powerful producer, and therefore, a decrease in consumer welfare and hence market failure. Where increasing returns exist, various types of government intervention may be justified to alter the market outcome:

- (i) through direct operation or regulation of a natural monopoly (for example, public utilities), through setting prices or allowable rates of return on its capital, that levels closer to those which would prevail in a competitive environment;
- (ii) through legal protection to prevent a single-firm takeover and to encourage competition (for example, through antitrust legislation).

Such types of intervention depart from a theoretically efficient outcome, although they seek to approach it. A recent development in economics - the theory of contestable markets - suggests that, even in the face of increasing returns and the prevalence of monopoly, strong tendencies may persist for efficient, or nearly efficient, pricing and output decisions by monopolists, thereby avoiding or mitigating the impact of this source of market failure. The theory of contestable markets has been developed by William Baumol, and was foreshadowed several decades ago by the French economist Francois Perroux. Perroux suggested that, if markets are open to new entrants and there are few barriers and limited costs to entry, monopolists will be disciplined by the potential entry of competitors (the potential rival), who would contest the monopolized market unless profit margins are kept low and output is kept high.

Thus, where barriers to entry are low, the production of a good or provision of a service by a monopolist does not necessarily signify that he will be able to exploit monopoly power. In the case of the airline industry, for example, even monopoly suppliers of service on thinly-served routes have been unable to charge monopoly prices because the existence of potential entrants and competitors has discouraged such practices by the existing monopolists. Consequently, following deregulation of the airlines, rates charged on thinly-served routes have not been characterized by monopoly-pricing or monopoly-profits any more than have the heavily served and clearly competitive routes. (Federal Reserve Bank of San Francisco, 1984: 2).

Even for the Schumpeterian criterion of dynamic efficiency, increasing returns and monopolistic market structure may not stray as far from the desirable goal of innovation and rising productivity as has usually been assumed. Here again the influence of the contestability of the market by potential entrants (rivals), may enforce a strong discipline on monopolists, obliging them to maintain a high level of R&D and to sustain rapid innovation to protect their presently monopolized markets. Potential competition may thus have an effect similar to that of actual competition (Bator, 1958)

The recent breakup of AT&T, after lengthy litigation in which the huge corporation was found in violation of antitrust legislation, provides an interesting example of the conflict between the two preceding types of market failure: externalities and increasing returns. To remedy one source of market failure (increasing returns), the courts have perhaps created another (externalities). Perceiving a lack of effective competition in an industry subject to increasing returns (telecommunications), the courts have perhaps created a situation in which benefits from undertaking R&D and innovation, which formerly were largely internalized by the giant



AT&T, are now largely external to the seven or eight regional firms into which the industry has been split. Hence, incentives may be weakened for the newly competing entities in the telecommunications industry to undertake as aggressive efforts in R&D and technological improvements as did AT&T in the past (Bator, 1958).

The AT&T case illustrates a frequent experience in the public policy arena. Public policy efforts motivated by the aim of remedying one type of shortcoming may well create a different one as a byproduct.

Trial Question

Discuss the extent to which market failure provides sufficient justification for government intervention into your country's economy.

Basic Readings

Hindriks & Myles chapter 2
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Gruber

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LESSON FOUR: ROLE GOVERNMENT AND GOVERNMENT FAILURE

By the end of the lesson, you should be able to:

- 4.1 describe the role of government in an economy
- 4.2 explain the sources of government failure

4.1 Government's role in an economy

4.1.1 Introduction

In perfect competitive market, pareto–efficiency is assumed to exist where given the set of prices of factors, when there is a reallocation of factor inputs will not expand total production of output. It is not possible, given the initial income distribution, it will not possible, by reallocating the produced output between persons, to make an individual better off without making another one worse-off (Atkinson and Stiglitz, 2015).

Competitive markets contribute to well-being of the citizens materially, but of course such market have their own flaws. If the government operates in consort with the market system, correcting these flaws and ironing out the its harsh effects, higher level of material welfare will be realised. The government has two well-defined functions in this context (Leach, 2004):

The function is derived from the fact that actual economies never satisfy the pareto-efficiency conditions (where there is no better solution than the one generated by competitive markets. Any alternative solution that makes someone in the economy better off must make someone else worse off). There is imperfect allocation of resources in an economy, and improvement might be done by the government.

The other role of the government comes from the fact that although markets generate a pareto-optimal solution, this solution is not always an equitable one. Competitive markets may lead to distribution of material welfare that is not equal. Caritable acts of the rich may partially mitigate this, but charity has the characteristics of a public good, and thereferoe there will be underprovision. Where consensus in support of redistribution exists, redistribution will occur adequately only by government action (Leach, 2004).

Therefore the government functions (or public policy objectives) are:

- g) The allocation function
- h) The distribution function
- i) The stabilization function
- j) Regulatory role of the government

4.1.2 Allocation Function

Given the market failure, the government should intervene to perform the function of allocating resources in order to correct the failure. But the government might also introduce policies that may compensate for the effects of market failure.

Pure Public Goods

These goods called pure public goods ca not be provided if the market is competitive. Defense is a classic example of such a good. Other public goods include the legal system, the collection



of statistics, parks and recreational facilities among others. The chief characteristic of these goods is that their benefits are collective or indivisible in nature. No one, for example will be excluded from the benefits of defense once provided. Thus such goods will not be provided through the private sector. You cannot “divide” up the output among individuals and sell it at a certain price. Certain services also exhibit the same characteristics, for example, enforcement of contract, prevention of fraud and deception.

The provision of clean air is an example of a pure public good that only the government can provide (not by spending necessarily but perhaps through regulation or taxation). There is no private market for clean air because it is not possible to assign units of air to individuals for the purpose of exchange. Any air that is “cleaned up” will be available to every citizen, and because whoever initially paid for cleaning up the air cannot charge others for service, the cleaning will not be undertaken. Therefore if it is desired, the government should provide for it.

Government’s ability to finance their provision through public revenues implies that it is not hampered by “free riders”, though it must still cope with the preference revelation problem. Private goods with strong positive externalities are also good candidates for public provision, because self-interested individuals will purchase them in insufficient quantities. Goods in this category include education and public health measures (such as the inoculation of children). Finally, the government might also choose to provide goods produced under increasing returns to scale, such as mail service, water, and sanitation (Hindriks and Myles, 2013).

Merit Goods

Goods that government wishes to promote their consumption. The market system will not produce a socially desirable output for these goods since externalities and imperfect knowledge are present. Examples of such goods include educational and health services. This is because the benefits accrue to others over and above the direct recipients of education or health services.

Group Consumption Goods

These goods can be provided through the private sector, but is more efficient to provide them through the government sector. An example might be a mosquito control programme in a swampy area. Although it could be done by each individual hiring the services of the private sector, the service could be more efficiently supplied (that is, at a lower per capita cost) through a non-marketing mode of production.

Taxation Policy

To finance public expenditures and transfer payments, there must be taxation and with taxation, the likelihood of resource reallocation as factors of production and expenditure patterns respond to the incentives or disincentives embodied in taxation. But tax policy may also be deliberately directed at encouraging changes in behavior and thereby cause resources to be allocated in a manner different from that in the absence of such tax policies.

4.1.3 Distribution Function

Competitive markets do not always lead to just distribution of welfare. The government need therefore to intervene to bring income distribution to be in line with that which is considered fair and just. If the government does not intervene, the income redistribution might depend upon both the ownership of factors of production and the market price they command. Governments should be able to obtain the consensus from the citizen as to whether the low



income groups should be assist more, and if that is the case, determine who might bear the greatest tax burden so as to provide the needed assistance in case of an unequal income distribution pattern.

A country could decide that the socially desirable income distribution is one that is determined by the forces of demand and supply in a highly competitive economy, directing their government to concentrate its policies toward the reduction of monopoly elements in factor and product markets. But most market economies have also adopted policies to redistribute income away from the rich to the poor. The common approach used to achieve this objective is the progressive income tax combined with transfer payments to low-income families or subsidized services such as housing or education.

Moreover, *the government can shift the economy from one efficient allocation to another by redistributing purchasing power.* That is, redistribution can be accomplished without a loss of economy efficiency. But this also could be at odds with reality. It holds only if the redistribution is lump sum. Lump sum redistribution requires each person's tax or transfer to be based upon his/her innate characteristics, rather than his/her market behaviour. These characteristics are better known to the individuals themselves than to the government, however, and this asymmetry of information makes lump-sum redistribution impossible. A deadweight loss will result from any attempt to redistribute income.

This failure does not mean that income should not be redistributed. It might simply mean that redistributing the pie also shrinks the pie, so that society will have to balance the perceived benefit of the redistribution against its cost (See Bénabou, 2002, for alternative argument). The failure suggests that the design of policies to redistributive income is very important. If the deadweight loss associated with transferring income between the rich and the poor can be reduced, greater redistribution is associated with any given deadweight loss or a lower deadweight loss is associated with a given amount of redistribution.

One aspect of a least-cost policy of taxes and transfers is that there is a limit to its progressivity. The aim of a redistributive policy is to tax very able people so that less able people can be subsidized. But since the government cannot directly observe ability, it cannot be taxed. The government must instead base transfers and taxation on the market behaviour, when high income earners are taxed and the low income earners are subsidized. People will respond to this kind of policy by altering behaviour in order to decrease the taxes to pay or increase transfers to be received. If the tax is too progressive, those citizens with high-ability to pay tax might be induced to behave like the lower-ability citizens, and therefore the government will collect taxes from them that is intended for the lower-ability citizens. That is, the government will fail in its attempt to tax these people more heavily than their less able counterparts.

Two policies that might assist the government in its attempt to redistribute income are ***tagging and targeting*** (Leach, 2004).

Tagging redistributes income toward people who have characteristics (such as age or disability) that are strongly correlated with need.

Targeting restricts some aspects of market behaviour in order to more accurately identify those in need. The government might, for example, restrict the income earned by transfer recipients, or require them to consume a certain amount of particular goods, for example health services.



The decision of government to provide certain private goods can be viewed as an application of targeting.

Government redistributes income in the following ways:

- a) Public assistance programs meant to provide benefits to those who qualify according to their poverty levels or in terms of disaster. This involves providing them with cash or providing payment for special services or commodities (in kind benefits)
- b) Social insurance, which confers benefits to the disabled, retired, the sick and the unemployed.
- c) Progressive taxation, subsidy programs and quotas, spending on goods and services. For example, the poor may benefit from subsidies to the urban public transport.

4.1.4 Government's Stabilization Function

There are three types of stabilisation issues: the short -run stabilization; the automatics and discretionary stabilisation (Gruber, 2016). The budgetary policy can be used to maintain high employment, stable price level and acceptable rate of economic growth and effects on trade and balance of payment. The government uses monetary and fiscal policies for stabilisation purposes (Hindriks and Myles, 2013).

4.1.5 Regulatory function

The government puts in place laws of contract and makes sure that they are enforced. This ensures that market trades and private exchanges take place smoothly. The laws passed by governments often allow it to regulate an industry, that is, to impose new operating standards from time to time. Two areas in which these powers are particularly important are the control of externalities (notably environmental pollution) and the regulation of goods and services produced under increasing returns to scale. Government regulates businesses so as to protect consumers, environment and workers, to prevent anti-competitive practices, and discriminations (Hindriks and Myles, 2013).

The government regulates individual behaviour by administering the system of justice and law which regulates individual's behaviour. These laws made by the government can alter market outcomes thereby improving resource allocation within the economy. These interventions must be carefully targeted otherwise intervention could reduce welfare instead of increasing it.

Furthermore, the government affects financial sector via a varoius activities and regulations and sometimes the government usually establishes bodies to offer credit and insurance services.

Trail Questions

Explain the extent to which your country has achieved the four public objectives of the government discussed in this lecture. Have there been any conflicts in the implementation by the government such that the achievement of one objective is accomplished at the cost of another? Explain using your country's experience.



4.2 Government Failure

4.2.1 Definition

This is a situation where government intervention does not lead to Pareto efficient allocation of resources. In such a situation, then have we have government (non-market) failure.

4.2.2 Sources of government Failure

The following are the sources of government failure (Wolf, 1987).

- a) Disjunction between revenues and costs.
Markets links, the production costs to the income required to sustain it. The link is provided by the prices charged for output that is paid by consumers who can choose whether and what to buy. This link is absent where the market because the revenues that sustain non-marketed goods come from non-price initiatives such as taxes paid to government, donations, non-priced sources of government and other non-market institutions that are not government.

The absence of the link separates the non-market output from its production cost. This disjunction increase the scope for misallocation of resources. When the revenues sustaining an activity are unrelated to their production cost, more resources than necessary might be used in production of an output, or more of the non-market activity may be provided than is required in the first place. This results in inefficiencies and redundant costs (x-inefficiency) and over time, costs will increase.
- b) Internalities' and organizational or private goals
Presence of internalities lead to the separation of narrow bureaucratic or agency interests and the broader social goals. Certain standard are required for agencies or bureaucracies to conduct their activities. This requirement arises from the problems associated with internal, day-to-day managerial and operational environment such as evaluating personnel; promotions, among others (Wolf, 1987). The standards developed by agencies or bureaucracies are known as *internalities* or private goals since they goal highlighted in the agency's responsibilities will provide a motivation behind for individual and collective behaviour in the bureaucracy or the agency.
- c) Externalities that are derived.
Government intervention to correct market failure may generate side effects. Externalities in the market domain are side effects that those who produce services do not consider when they derive benefits or pay when they impose costs. Derived externalities are not realized by the agencies that create them, and hence do not affect their behavior (Wolf, 1987).
- d) Inequities in distribution rather than income and wealth.
Power and privilege rather than income and wealth lead to distributional inequities. Examples of some plausible standards for judging equity or fairness (Wolf, 1987): equality of an opportunity; and equality of outcome; among others. Market activities may produce distributional inequities. Non-market activities in the form of power and privileges rather than income and wealth that are used to deal with the distributional inequities in the market may generate distributional inequities themselves. Public policy measures to address



distributional inequities, regulate industry, produce public goods, or redress market imperfections place power in the hands of some citizens to be exercised over other citizens. Such redistribution of power might provide opportunity for abuse and inequity (Wolf, 1987).

e) Corruption

Corruption refers to a situation where government officials sell public properties for personal gain (Shleifer and Vishny, 1993). For example, government officers may collect bribes in order to provide permits, or licenses, among other services. A government that does not control the agencies may be exposed to high levels of corrupt practices and failure (Hindriks and Myles, 2013).

Some level of corruption may be desirable because a government employee may be more helpful if paid directly (Leff, 1964). It also enables firms to overcome some cumbersome procedures and regulations. However, several studies found that corruption has negative consequences on resource allocation and therefore on development (United Nations, 1989, and Klitgaard, 1991).

f) Distortionary taxes

Where the government has perfect information on the characteristics of each citizen in the community, it can not impose taxes that are distortionary. Therefore, taxation can easily distort economic decision-making; lead to excessive administrative and compliance costs; and inconsistent with macroeconomic policy.

g) Limited government control over private market responses leading to lack of control of the consequences for its actions.

h) *Inadequate government control over bureaucracies and agencies created by parliament, national and local governments, who are responsible for ensuring that the regulations are enforced.*

i) *Inadequacies imposed by political the process.* Government actions may affect several individuals, and yet the decisions are made by limited group of elected representatives. This may lead the government to act in an inconsistent manner.

A summary of other sources of government failure:

- a) Self-interest pursuit by politicians and civil servants instead of acting on behalf of citizens. This leads to misallocation of resources within the economy.
- b) Inappropriate decisions by the government on spending and taxation due to electoral pressure (Wawire, 2020).
- c) Inadequate consideration for long-term analysis in favor of short-term solutions to economic problems.
- d) State and regulatory capture that takes place in situations where firms and other organizations control regulatory bodies which allows them to move policy options in their favor (Wawire, 2020).
- e) Disincentive effects created by measures that are designed to reduce income inequalities and loss of business competitiveness caused by, for example, the introduction of minimum wages or a tax credit may lead to disincentive effects.
- f) Failures in the implementation of projects by government also do exist in any economies.



4.2.3 Limitations Government Action

Some of the limitations of government action include (Leach, 2004):

- a) The government can provide the quantity of public good that is optimal only if it has quite complete information about individual preferences, but it cannot directly observe this information. If it asks people about their preferences, they are likely to respond strategically rather than honestly. Hence, the quantity of public goods provided will differ somewhat from the optimal quantity.
- b) A lump-sum tax must be either entirely unconditional, or conditioned only on innate characteristics. Some revenue could be raised by imposing an unconditional tax on every citizen, but not the amount of revenue needed to finance a modern government. (The tax would be so large that some people would be unable to pay it, and others would be impoverished if they did). The alternative, then, would be to base each person's tax on innate characteristics that indicate his ability to pay. The government, however, is unable to observe these characteristics and hence unable to levy lump-sum taxes. It must fall back upon distortionary taxes. Consequently, the social benefit of government policies undertaken to remedy market failures are to some extent offset by the social cost of financing them.
- c) The managers of a regulated firm will act in their own interests. These interests will often differ from those of society at large. Since the managers know more about the operation of the firm than the government does, there will be opportunities for the managers to advance their own interests (at society's expense) without being detected by the government. The government may try to eliminate these opportunities, but the social benefits of the firm's operation will be bigger full information and smaller under asymmetric information. The government will face a problem in dealing with government-owned firms and with the civil service, leading to inefficiencies in the operation of these organizations.
- d) The government will severally find that social welfare can be increased by enacting laws that restrict individual behaviour. These laws will not necessarily be obeyed, however, so some resources will be expended in enforcing these laws and prosecuting those who violate them. If the government can observe each citizen's behaviour, the use of scarce resources would not be necessary.

It is acknowledged that, whatever, the shortcomings of an elected government are, individuals would be worse off without it. The national government formulates laws and organizes defense for example, and at the local level, the government ensures that the laws are enforced, and public goods provided. The elected governments can only be successful in these activities if:

- a) the election of local representatives to a government assembly allows all voices to be heard. This assembly is then able to develop and implement acceptable compromises.
- b) the elected government levy taxes eliminate free-rider problem that might lead to collapse of projects that benefit the community at large.

The following three mechanisms can constrain the actions of an elected government:

- a) the structure of government,
- a) the act of voting, and
- b) the existence of alternative in the public sector.



4.2.4 Addressing government failure

- a) Public sector reforms
- b) Reducing government size,
- c) Rationalization of government functions,
- d) Privatization
- e) Non-governmental institutions as channels for donor aid for projects due to government failure; rent-seeking, corruption, embezzlement, etc.).
- f) Establishing institutions to fight corruption.

Trial Questions

Explain the sources of government failure in your country and write an essay on what the government is doing to address the issue.

Basic Readings:

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LESSON FIVE: EXTERNALITIES

By the end of the lesson, you should be able to:

- 5.1 define externalilty
- 5.2 explain the types of externalities
- 5.3 eplain sources of externality
- 5.4 describe the consequences of externalities, and
- 5.5 explain the corrective mechanisms for externality.

5.1 Definition

An externality occurs whenever the actions of one party make another party worse or better off, yet the first party neither bears the costs nor receives the benefits of doing so. In other words, an externality is a cost or benefit that occurs when the activity of one entity directly affects the welfare of another in a way that is outside the market mechanism. Caldari and Fabio (2011) also defines externality as the effect that someone's decision (positively or negatively) influences someone else without any specific contractual agreement. Externalities occur in many everyday interactions. Sometimes they are localized and small, such as the impact on ones roommate, if you play your stereo too loudly or the impact on your neighbours if your dog uses their garden as a bathroom. Externalities also exist on a much larger scale, such as global warming or acid rain. Externalities are a classic example of market failures (Gruber, 2016). Externalities can arise either from the production of goods or from their consumption and can be negative or positive.

5.2 Types, and Sources of Externalities

Types of Externalities

Externalities may arise between economic agents such as firms, households and governments, etc and may be positive or negative and may amanate from consumption or production sources. According to the Organization for Economic Cooperation & Development (1993), a negative externality is a cost imposed on society by the production or marketing of a good or service that the price charged for that good or service does not reflect. Chemical and noise emissions from aircraft or other industrial activities are examples of negative externalities (costs). Positive externalities occur when the effect of a decision on others that is not taken into account by the decision-maker is beneficial to others. Examples include innovation, education, Research and Development (R&D).

Consumption Externalities and Pareto Efficiency

Suppose your neighbour smokes and you do not smoke and so you do not like the smell from the smoke. This is an externality which must be incorporated in the calculation of Pareto Efficiency as follows:

We assume our usual two good model.

We make the following assumptions.

$$p^x = 1$$

Here utility for individual A and B are:



$$U^A(X^A, Y^A, X^B) \text{ and } U^B(X^B, Y^B)$$

The appearance of X^B in A's utility function in a negative way is a consumption externality (negative),

The maximisation problem is:

$$\begin{aligned} & \text{Max}_{X^A, Y^A} U^A(X^A, Y^A, X^B) \\ & \text{s. t. } U^B(X^B, Y^B) \geq \bar{U}^B \\ & \quad X = X^A + X^B \\ & \quad Y = Y^A + Y^B \end{aligned}$$

$\bar{U}^B =$ level of utility that B must realise.

Substitution leads to the following:

$$\begin{aligned} & \text{Max}_{X^A, Y^A} U^A(X^A, Y^A, X^B) \\ & \text{s. t. } U^B(X - X^A, Y - Y^A) \geq \bar{U}^B \end{aligned}$$

We form the Lagrangian function as:

$$\text{Max}_{X^A, Y^A} U^A(X^A, Y^A, Y^B) + \lambda[\bar{U} - U^B(X - X^A, Y - Y^A)] \text{ ----- (1)}$$

Where $\lambda =$ multiplier associated with utility cost.

First Order Conditions become,

$$\frac{\partial U^A}{\partial X^A} + \frac{\lambda \partial U^B}{\partial X^B} \frac{\partial X^B}{\partial X^A} = 0 \text{ ----- (2)}$$

$$\frac{\partial U^A}{\partial Y^A} + \frac{\lambda \partial U^B}{\partial Y^B} \frac{\partial Y^B}{\partial Y^A} = 0 \text{ ----- (3)}$$

Using the expression:

$$\frac{\partial X^B}{\partial X^A} = \frac{\partial Y^B}{\partial Y^A} = -1 \text{ ----- (4)}$$

We have:

$$\frac{\partial U^A / \partial X^A - \partial U^A / \partial X^B}{\partial U^A / \partial Y^A} = \frac{\partial U^B / \partial X^B}{\partial U^B / \partial Y^B} \text{ ----- (5)}$$

Equation (5) represents Pareto efficiency in consumption. Under externality the left hand side of equation (5) the MRS^A adjusted for externality, which is given as:

$$\frac{\partial U^A / \partial X^B}{\partial U^A / \partial Y^A}$$

\Rightarrow When there is externality we cannot have $MRS^A = MRS^B$ because we now have,

$$MRS^A - \frac{\partial U^A / \partial X^B}{\partial U^A / \partial Y^A} = MRS^B \text{ ----- (6)}$$

HS: MRS^B for the two goods



Failure of the Fundamental Theorem in Consumption.

From our earlier analysis we know that market allocation will be achieved when

$$\frac{\partial U^A / \partial X^A}{\partial U^A / \partial Y^A} = \frac{\partial U^A / \partial X^B}{\partial U^A / \partial Y^B} \text{ --- (7)}$$

But Pareto allocation in externality is given as:

$$\frac{\partial U^A / \partial X^A - \partial U^A / \partial X^B}{\partial U^A / \partial Y^A} = \frac{\partial U^B / \partial X^B}{\partial U^B / \partial Y^B} \text{ --- (8)}$$

So that there is a failure of the fundamental theorem because equation (7) and (8) are not the same. The implication is that market allocation is not Pareto Efficient in the presence of consumption externalities.

Production Externality.

This often involve the effects that one firm's output decisions have on another firm's cost. A classic example is the industrial pollution of good water. The farmer using the water will have to filter the water or purchase clean water from an alternative source.

We should use its source for our analysis.

Let X be industrial production and Y be agricultural production.

Each producer uses two inputs water (W) and labour (L) to produce outputs via the following technologies:

$$X(L^X, W^X) \Rightarrow \text{Technology for producing } X$$

$$Y(L^Y, W^Y) \Rightarrow \text{Technology for producing } Y$$

All prices are assumed to be unitary and are determined in competitive market.

For the industry profit maximisation involves:

$$\begin{aligned} \text{Max } \Pi^X &= X - C^X \\ \text{s. t. } X &= X(L^X, W^X) \\ C^X &= L^X + W^X \end{aligned}$$

By substitution we reduce equations to:

$$\text{Max}_{L^X, W^X} \Pi^X = X(L^X, W^X) - (L^X + W^X)$$

First Order Conditions are:

$$\frac{\partial X}{\partial L^X} - 1 = 0 \text{ --- (9)}$$

$$\frac{\partial X}{\partial W} - 1 = 0 \text{ --- (10)}$$

From Agric profit maximisation involves the following:

$$\begin{aligned} \text{Max } \Pi^Y &= Y - C^Y \\ \text{s. t. } Y &= Y(L^Y, W^Y) \\ C^Y &= L^Y + W^Y(1 + X/N) \end{aligned}$$

Where $(1 + X/N)$ captures the effect of the production X on the cost of water to the producer of Y

By substitution we arrive at:

$$\text{Max}_{L^Y, W^Y} Y(L^Y, W^Y) - [L^Y + W^Y(1 + X/N)]$$

First Order Conditions: .



$$\frac{\partial Y}{\partial L^Y} - 1 = 0 \text{ --- (11)}$$

$$\frac{\partial Y}{\partial W^Y} - (1 + X/N) = 0 \text{ --- (12)}$$

What we deduce from First Order Conditions is that for a greater production of X the more expensive will be water to produce Y and typically this will involve Y using less water and producing less when more X is produced.

Pareto efficiency requires one firm's profit to be maximised subject to the other being damaged.

We can then now write that

$$\begin{aligned} & \text{Max}_{L^X, W^X, L^Y, W^Y} \Pi^X = X(L^X, W^X) - (L^X + W^X) \\ & \text{s. t. } Y(L^Y, W^Y) - [L^Y + W^Y(1 + X(L^X, W^X))] \geq \Pi^Y \end{aligned}$$

First Order Conditions:

$$\frac{\partial X}{\partial L^X} - 1 + \lambda \left[\frac{W^Y}{N} \frac{\partial X}{\partial L^X} \right] = 0 \text{ --- (13)}$$

$$\frac{\partial X}{\partial W^X} - 1 + \lambda \left[\frac{W^Y}{N} \frac{\partial X}{\partial W^X} \right] = 0 \text{ --- (14)}$$

$$\frac{\partial Y}{\partial L^Y} - 1 = 0$$

$$\frac{\partial Y}{\partial W^Y} - (1 - X/N) = 0 \text{ --- (15)}$$

These conditions differ from market solution hence are not Pareto Efficient. This is because the producer of X neglects the effect that his production has on Y's cost and then over produces. This implies that social costs are higher than the firm's unit cost.

Sources of Externality

Externalities may originate from different sources which may include the following:

1. Externalities as a missing market

In the framework of competitive market economy, the presence of externality may be viewed as synonymous with the absence of a market. Consider two consumers, one plays music in a high volume but only derives small benefit from doing so. The other has a headache and derived benefit from a quiet atmosphere. The question is: why doesn't the headache victim pay the music player to turn off the music? And the next question is: why is there no market for this good? If the market for the good is established then the first theorem of welfare Economics will apply, and the market outcome will be Pareto efficient. Thus, one source of externality is missing market.

2. Externality as the Absence of Property Right

The absence of property right is another source of externalities. Consider the loud music example, does the headache sufferer has the right to silence off the music lover? Or does the music lover have the right to play music? If the headache sufferer has the property right then the music lover is to pay him to play his music/tunes. If the music lover has the right to listen to his tunes then the headache sufferer will have to pay him not to play his music. But it may be difficult to identify who has the property right -the music lover or headache sufferer.



3. The reciprocal nature of externalities

There is always potential for problems in establishing property rights because externalities are reciprocal in nature (Coase 1960). This because by undertaking an action or activity, the economic agent A receives benefit from his own actions, which may further generate a positive or negative effect on another agent B. So, avoiding the harm to B (in the case of negative externality) will also hurt A. Then the question to be asked is: does the first agent have the right to the action or the second agent has the right to deny the action? Both desire property rights since they have value and property rights are wealth. Consider the example of the problem of straying cattle which destroy crops on neighbouring farm. If its impossible for some cattle to stray, then there could only be an increase in meet supply if there is a corresponding reduction in the supply of food crops. The question is: more meet or more food crops? The response is unclear unless the value of what is gained and that of what is sacrificed to obtain the first are known (Coase 1960). Thus, the problem should be looked at in total *and* at the margin (Stigler 1952). Also depending on who has the property right more meet or food crops will be produced.

3. Cost of establishing property rights.

Even if there is an agreement that property right to a good should belong to a given agent, it may still be costly to establish one or maintain them. Consider a public grazing land. If private property rights are not established, each rancher does not consider the effects on other ranchers of his cattle grazing on the “commons”. So, there will be land degradation, and this will affect all ranchers, this is a type of negative externality. One way to solve the problem is to divide the “commons” among the ranchers so that each gets a private portion to graze his cattle. Thus, there is the need to fence to confine the cattle. This can be possible if there are small ranchers. But supposing there are larger ranches it will be expensive to do so and so property rights may not be established and Pareto efficiency cannot be attained.

4. High production Cost

Being able to establish property rights may not be enough for the production of certain goods. Again, even if competitive market equilibrium potentially exists, it may be the case that in the presence of externality some agents will find it in their private interest not to produce because of high fixed production cost. Consider a paper producer that is located near a river has the property to produce. His activity however pollutes the river that affects fishing. In this case the fisherman may have to pay the paper producer to reduce pollution. Paper production will reduce, even though paper may be socially desirable.

5.3 Consequences of Externalities

With a free market, quantity and price are such that $PMB = PMC$. Social optimum is such that $SMB = SMC$. Private market leads to an inefficient outcome (first welfare theorem does not work). Negative production externalities lead to over production. Positive production externalities lead to under production. Negative consumption externalities lead to over consumption. Positive consumption externalities lead to under consumption.



5.4 Corrective mechanism for Externalities

5.4.1 Private-Sector Solutions to the Problem of Externalities

Coasian Solution (Coase, 1960)

The Coase Theorem comes in two versions- the strong and weak version. The strong version states: given a structure of property rights which is completely specified and exclusive, costlessly transferable, and costlessly enforced, voluntary exchange will eliminate all Pareto-relevant externality, *and* the resultant allocation of resources will be independent of the specific assignment of property rights. This theorem relies upon a number of restrictive assumptions, notably that income effects are zero, non-attenuated property rights may be costlessly established and maintained, and markets in goods and rights are frictionless. For these reasons, the strong theorem must be regarded more as a pedagogical device than a source of policy prescriptions (Randall (1983). The weak version of the Coase Theorem casts much more light on the problem of externality. It states: given a structure of property rights consistent with Pareto-efficiency, voluntary exchange will eliminate Pareto- relevant externality and thereby establish an efficient allocation of resources (Randall (ibid). the weak version is developed the relaxation of the assumptions stated earlier.

Thus, a classical Coasian solution to an externality problem simply involves establishing property right and allowing the agents concerned to bargain, where both sides make a take it or leave it offer at the going market price. Then the Coase theorem goes on to say that the results may be efficient whatever the allocation of property rights.

To see how this works we should assume that after property rights are established the agents bargain and reach an agreement according to the Nash Bargaining solution.

Nash Bargaining Solution: this involves the two bargainers maximising the product of their joint surplus over and above that which they could have received in the absence of the agreement. And this can be justified via a bargaining process of alternating concessions where each agent concedes to the other until further concessions on their parts are more costly than concessions by the other agents.

The Problems With Coasian Solutions

In practice, the Coase theorem is unlikely to solve many of the types of externalities that cause market failures due to the following:

The assignment problem: *In cases where externalities affect many agents (e.g. global warming), assigning property rights is difficult. Coasian solutions are likely to be more effective for small, localized externalities than for larger, more global externalities. In our example, the first problem involves assigning blame. Rivers can be very long, and there may be other pollution sources along the way that are doing some of the damage to the fish. Assigning damage is another side to the assignment problem. Can we trust the fishermen to tell us the right amount of damage that they suffer?*

The holdout problem, *which can arise when the property rights in question are held by more than one party. This is because shared ownership of property rights gives each owner power over all the others (because joint owners have to all agree to the Coasian solution). As with the assignment problem, the holdout problem would be amplified with a huge externality like global warming, where billions of persons are potentially damaged.*



The free rider problem: When an investment has a personal cost but a common benefit, individuals will underinvest. For instance, suppose we solve the holdout problem by assigning the property rights to the side with only one negotiator, in this case the steel plant? Unfortunately, doing so creates a new problem. And now suppose that we have 100 fishermen and each is to pay \$100 to the steel plant. Assuming 99 fishermen pay with one refusing to pay but the 99 units will benefit all fishermen equally because they all share the river. With this incentive, all the other fishermen will also not pay their \$100, and the externality will remain unsolved; if the other fishermen realize that someone is going to grab a free ride, they have little incentive to pay in the first place.

Transaction costs and negotiating problems: The Coasian approach ignores the fundamental problem that it is hard to negotiate when there are large numbers of individuals on one or both sides of the negotiation. How can the 100 fishermen effectively get together and figure out how much to charge or pay the steel plant? This problem is amplified for an externality such as global warming, where the potentially divergent interests of billions of parties on one side must be somehow aggregated for a negotiation.

Ronald Coase's insight that externalities can sometimes be internalized was useful. It provides the competitive market model with a defense against the onslaught of market failures. It is also an excellent reason to suspect that the market may be able to internalize some small-scale, localized externalities. It won't help with large-scale, global externalities, where only a "government" can successfully aggregate the interests of all individuals suffering from externality.

5.4.2 Public Sector Remedies for Externalities

Public policy makers employ three types of remedies to resolve the problems associated with negative externalities:

1. Pigouvian Solution (Pigou, 1912, 1920)

This solution relies on pricing the externality by a tax imposed on the externality – generating activity. The agent generating the externality is then induced to internalize the externality because the tax makes him to face the full social cost of his activity.

We have seen that the Coasian goal of "internalizing the externality" may be difficult to achieve in practice in the private market. The government can achieve this same outcome in a straightforward way, however, by taxing the steel producer an amount MD (for the marginal damage of the pollution) for each unit of steel produced as shown in the Figure 5.1.

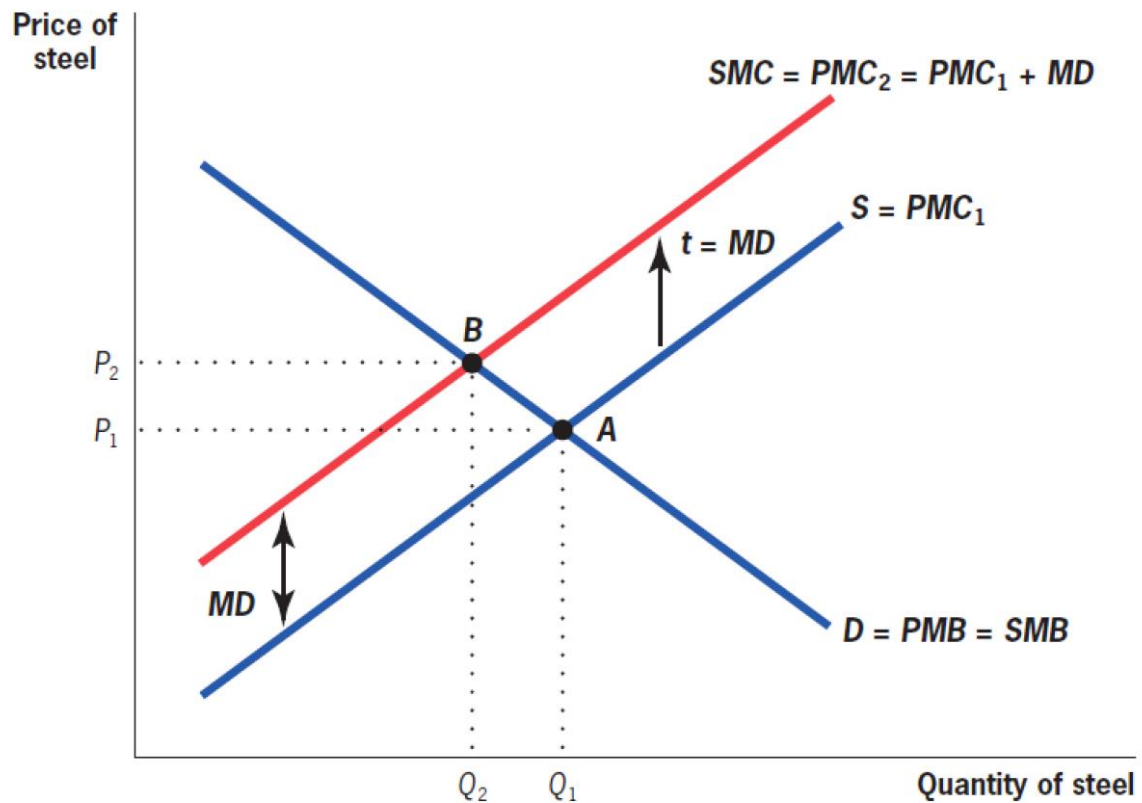


Figure 5.1: Taxation as a solution to Negative Production Externality

It is evident from Figure 5.1 that, a tax of \$100 per unit (equal to the marginal damage of pollution) increases the firm's private marginal cost curve from PMC_1 to PMC_2 , which coincides with the SMC curve. The quantity produced falls from Q_1 to Q_2 , the socially optimal level of production. Just as the Coasian payment, this tax internalizes the externality and removes the inefficiency of the negative externality.

2. Pigouvian Subsidy

A Pigouvian subsidy is government payment to an individual or firm that lowers the cost of consumption or production, respectively. In the example of oil exploration, the government can give a subsidy to the initial driller to search for more oil. Again, with our steel plant example, the government can give a subsidy to the owner of the steel plant to reduce production. Figure 5.6 illustrates the situation for subsidy payment by government to the steel plant to discourage the emitting of negative externality.

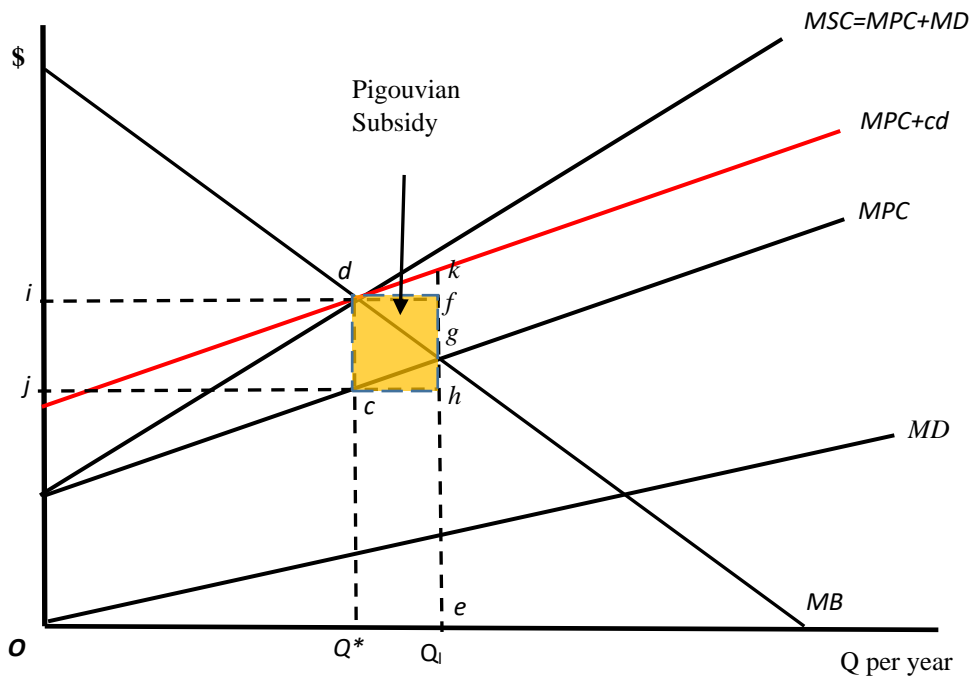


Figure 5.2: Pigouvian Subsidy for Correcting Negative Externalities
Source: Rosen and Gayer (2014)

A Pigouvian subsidy for each unit the steel plant shifts up his private marginal cost curve by the amount of the per unit subsidy, cd , and induces him to produce at the efficient level of output, Q^* . In this situation production is reduced leading to a cut in the emission of negative externalities. In situations where government subsidizes a producer that emits positive externalities, the socially optimal level of production would have increased (Figure 5.6 B).

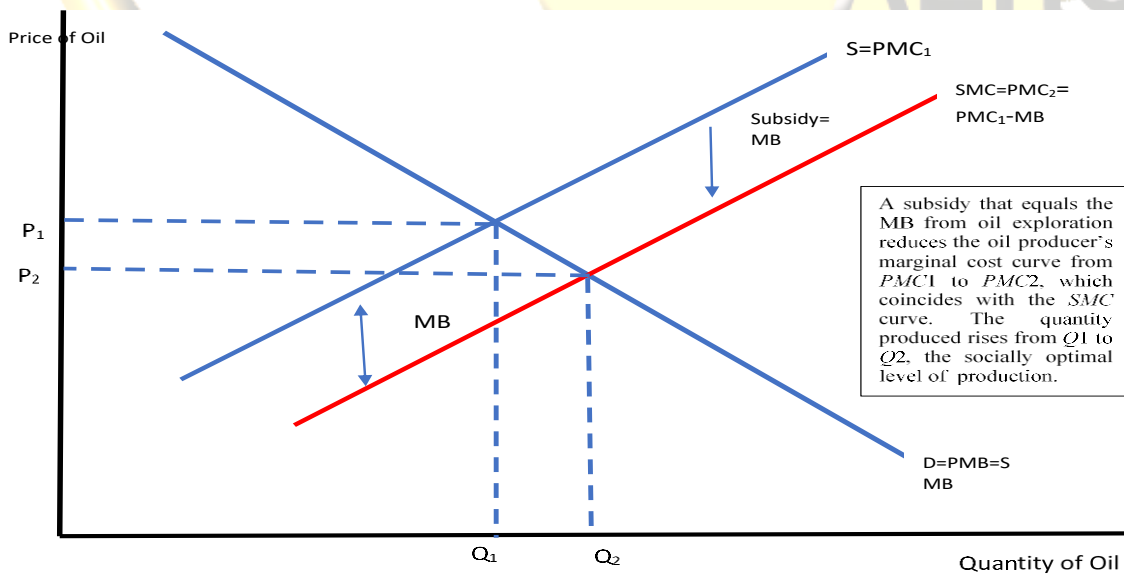


Figure 5.6: Pigouvian Subsidy for Correcting Positive Production Externality

Figure 5.3 Pigouvian subsidy for correcting positive production externality.
Source: Gruber, (2016)

Thus, policy makers often use subsidization not just to promote positive externalities but to combat negative externalities as well, by subsidizing alternatives to the externality-producing activity. The most common form of such policies are tax credits or other benefits for producers of renewable energies (such as solar or wind power) that produce fewer environmental externalities than traditional energy sources (such as fossil fuels). Such policies are generally inferior to taxing the negative externality-producing activity because they require government to raise revenues rather than provide revenues.

3.Regulation (Bates, 1993)

In an ideal world, Pigouvian taxation and regulation would be identical. Because regulation appears much more straightforward, however, it has been the traditional choice for addressing environmental externalities in the United States and around the world. When the U.S. government wanted to reduce emissions of sulfur dioxide (SO₂) in the 1970s, for example, it did so by putting a limit or cap on the amount of sulfur dioxide that producers could emit. In practice, there are complications that may make taxes a more effective means of addressing externalities.

Regulation is likely to be inefficient when we have more than one firm and all are asked to cut down production by the same amount. Let's look at why this is likely to be so:

Let's assume we have two firms (X and Z) each of which pollute the river Andy fishes from. MB_x and MB_z are the marginal benefit schedules for firm X and Z respectively. For simplicity let's assume that the firms have identical marginal private cost (MPC), hence $MPC_x = MPC_z$

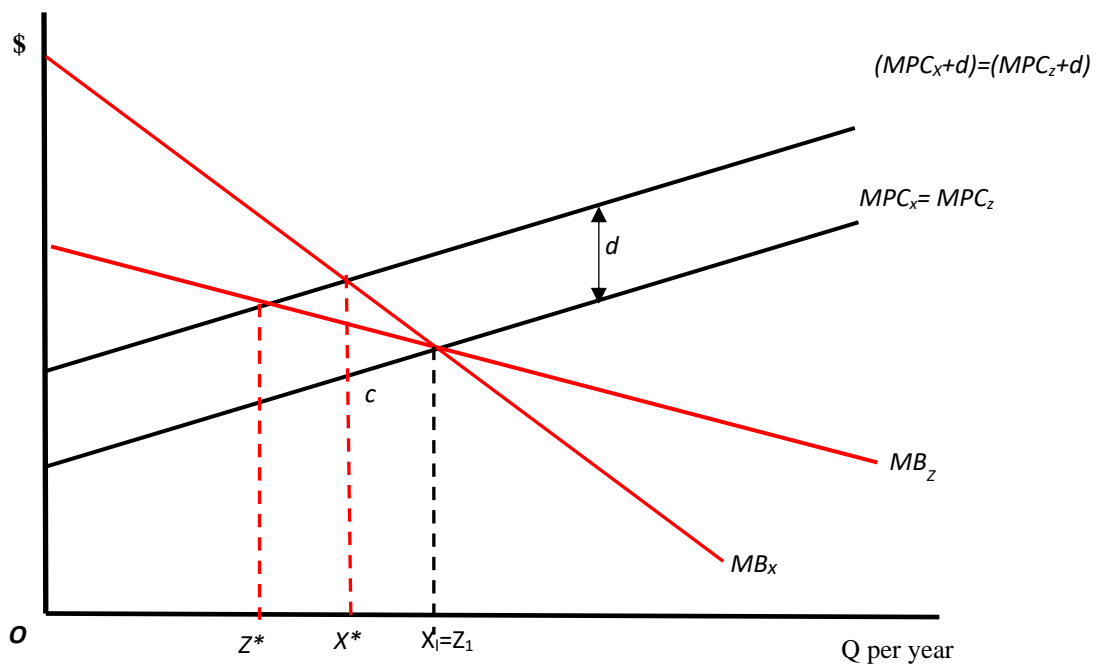


Figure 5.4: Regulations as Solution for Correcting Externalities

Source: Rosen and Gayer (2014)



Based on the MB and MPC the firms will maximize profit at the point where the MB curve cut the MPC. This corresponds to the output levels X_1 and Z_1 . Note that they are equal. Suppose it is known that the marginal damage inflicted by these firms at the efficient level is d dollars. From the societal point of view, efficiency requires firm X and Z to produce X^* and Z^* respectively. The crucial observation is that efficiency does not require the firms to reduce their output equally. The efficient reduction in production of firm Z exceeds that of firm X and this is due to the different MB schedules. This implies that a regulation that mandates all firms to cut back production by equal amounts leads to some firms producing too much and others too little.

Mathematical Approach: When there are more than one firm and each is asked to cut down production by the same amount

- Assume MD of pollution is \$1 per unit of pollution.
- 2 firms with low (L) and high (H) cost of pollution reductions q :

$$C_H(q) = 1.5q^2 \rightarrow MC_H(q) = C_H^1(q) = 3q$$

$$C_L(q) = 0.75q^2 \rightarrow MC_L(q) = C_L^1(q) = 1.5q$$

With no taxes, no regulations, firms do $q_L = q_H = 0$

Social welfare maximization:

$$V = \max q^H + q^L - C_H(q^H) - C_L(q^L)$$

$$\circ MC_H = 1, MC_L = 1 \rightarrow q^H = \frac{1}{3}, q^L = \frac{2}{3}$$

- Optimum outcome is to have the low-cost firm do more pollution reduction than the high cost firm.
- Socially optimal outcome can be achieved by \$1 tax per unit of pollution (same tax across firms):
 - Firm H chooses q^H to maximize $q^H - C_H(q^H) \rightarrow MC_H = 1$
 - Firm L chooses q^L to maximize $q^L - C_L(q^L) \rightarrow MC_L = 1$
- Uniform quantity regulation $q^H = q^L = \frac{1}{3}$ is not efficient because firm H has higher MC of polluting than firm L:
- Proof: Firm H would be happy to pay firm L to reduce q^L and increase q^H to keep $q^L + q^H = 1$, firm L is happier, and society has same level of pollution.
- Suppose we start with quantity regulation $q^{H_0} = q^{L_0} = 1/2$ and allow firms to trade pollution reductions as long as $q^L + q^H = 1$
- Assume we generate a market for pollution reduction at price p
 - Firm H maximizes $pq^H - C_H(q^H) \rightarrow MC_H = p$ and $q^H = \frac{1}{3}$
 - Firm L maximizes $pq^L - C_L(q^L) \rightarrow MC_L = p$ and $q^L = \frac{2p}{3}$
 - $\rightarrow q^L + q^H = p$
 - As $1 = q^{L_0} + q^{H_0} = q^H + q^L$, in equilibrium $p = 1$ and hence $q_H = 1/3$ and $q_L = 2/3$
- Final outcome q_H, q_L does not depend on initial regulation q^{H_0}, q^{L_0}
- Quantity regulation with tradable permits is efficient as long as total quantity $q^{L_0} + q^{H_0} = 1$



Correcting Externalities: Remedies for Externalities

1. Emission taxes or Pigouvian corrective taxation?

Imposing a tax equal to the marginal damage inflicted at the optimum Q^* , effective MPC shifts up, and new market equilibrium is attained. Optimal Pigouvian tax of $t = d$ restores Pareto efficiency and maximizes welfare in our simple model. General principle of optimal taxation in this context: set tax equal to wedge between marginal social cost of production and marginal private cost to restore production efficiency (i.e. set tax equal to marginal damage).

Practical problems with corrective taxation:

- a) Need to know MD function to set-up the optimal tax. Difficult and if MD is not constant. For example, consider a gasoline tax and car pollution: True that cars produce pollution, but difficult to measure the marginal damage done by cars.
- b) What is the optimal Pigouvian tax: European level or US level?

2. Regulation: Command and Control

Each polluter has to cut pollution down to a certain level or use only certain types of production processes or else face legal sanctions. In theory Pigouvian tax and regulation produce exactly the same outcome.

Advantages of regulation:

- a) Easier to enforce/administer.
- b) Useful to quickly reduce pollution levels if you want to meet a certain salient target. Can be sure to meet a certain target, easier to enforce politically, rather than agree on some taxes that may or may not achieve much of a pollution reduction.

Disadvantages of regulation:

- a) [Dynamics] Discourages innovation: no monetary incentives to discover new technologies to reduce pollution further. With a tax, there is such an incentive.
- b) [Heterogeneity] Inefficient allocation when there is heterogeneity in costs of pollution abatement across firms.

In the real world, Pigouvian taxation and regulation would be identical. Because regulation appears much more straightforward, however, it has been the traditional choice for addressing environmental externalities in around the world. In practice, there are complications that may make taxes a more effective means of addressing externalities

3. Permits (cap-and-trade):

Problems of externality can be addressed using an auction-based permit system. Cap total amount of pollution and allow firms to sort out between themselves who pollutes more and less using tradeable permits. In equilibrium, firms with highest marginal costs of reducing pollution will end up buying the most permits.

Firms that can easily reduce pollution will do so. If total number of permits is set to achieve the social optimum, both allocative and productive efficiency will be achieved. Also they have dynamic incentives to innovate because each firm is bearing a marginal cost of pollution.



Note that price mechanism (Pigouvian tax) also has these desirable properties with heterogeneity and dynamics. So how to choose between price mechanism (tax) and permit (quantity) mechanism?

Application of Externality: Global Warming

The earth is heated by solar radiation that passes through our atmosphere and warms the earth's surface. A large portion of the heat is trapped by certain gasses in the earth's atmosphere, which reflect the heat back toward the earth again. This is known as the *greenhouse effect*.

The concentration of greenhouse gasses like carbon dioxide and methane has increased due to human activity. Using fossil fuels like coal, oil, and natural gas produce carbon dioxide and contribute to this effect. The surface temperatures have increased by more than 1 degree Fahrenheit in the past 30 years. Projections for the next 100 years suggest an unprecedented increase by as much as 6 - 10 degrees. This could have very bad consequences for the environment. Carbon dioxide in the earth's atmosphere has increased in recent times as evidence in the next figure .

Atmospheric carbon dioxide and Earth's surface temperature (1880-2018)

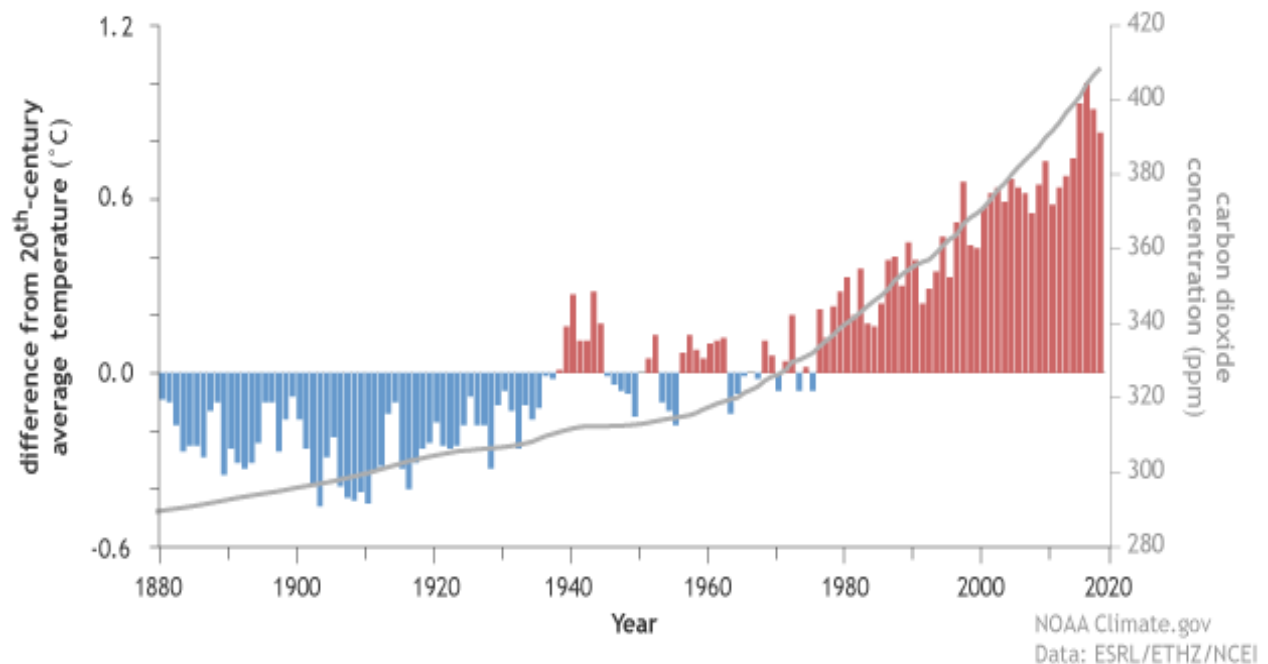


Figure 5.5 Atmospheric carbon dioxide and Earth's surface temperature (1180 – 2018).

Global warming is truly a global problem. Carbon emissions in Boston and Bangkok have the same effect on the global environment. The stock, not the flow, of carbon dioxide cause the warming. Thus, it takes a long time to undo the damage. Global warming is a thus a complicated externality involving many nations and many generations of emitters.

The Kyoto Protocol

The goal of the Kyoto treaty in 1997 was to reduce the emissions of greenhouse gasses to 5% below their 1990 levels. United States and Russia have not signed on; many other of the 38 industrialized nations have, however.

For the United States, the Kyoto treaty would:

- a) Mean reducing emissions in 2010 by roughly 30%



- b) With a present discounted cost of \$1.1 trillion.
- c) The United States would bear 90% of the total world cost, even though it contributes only 25% of annual greenhouse gas emissions.

Can Trading Make Kyoto more Cost-Efficient?

Kyoto treaty introduced international emissions trading. Under the Kyoto treaty, the industrialized signatories are allowed to trade emissions rights among themselves, as long as the total emissions goals are met.

There are tremendous differences across developed nations in terms of meeting these goals, for two reasons:

1. Slow growth in some countries: Relatively easy for a country like Russia to meet its goal. Estimates suggest that emissions trading (say, from Russia to United States) could lower the cost of the treaty by 75%.
2. Environmentally conscious growth: Other countries, like Japan, tend to use more gas and nuclear-powered production.

Developing Country Participation

The Kyoto treaty does not include developing nations, yet they will produce more than half the world's emissions by 2030. Cost to developing countries for complying with the treaty is 10 times smaller than for developed countries because developing nations do not need to “retrofit” their industrial base. Including these countries lowers the cost of reducing emissions by another factor of four. Including both developing countries and tradable permits lowers the cost to 1/16th of the cost without those flexibilities. There is however resistance among developing countries. Solution to including developing nations will likely involve significant international transfers.

Trial Questions

- 1a. Why should the concept of externalities constitute a crucial concern of public finance economist?
 - b. Briefly explain the Coase Theorem. Suppose that the conditions for the Coase Theorem hold; that is, property rights for a resource are clearly established and bargaining costs are low. If so, what are the efficiency consequences if the government imposes a Pigouvian tax equal to the marginal external damage of production?
 - c. Using the case of “producer-producer” externalities, establish the optimal conditions and explain.
2. The Kenyan Metropolitan Assembly (KMA) is concerned with the level of air pollution caused by wood-burning.
 - a. Why is this a problem in a market economy?
 - b. Compared with the socially efficient level of wood-burning, will there be over- production or under-production of wood burning by markets? (You may find it useful to use graph in your explanation).
 - c. What options are available to the KMA to reduce the level of air pollution? Which do you think would be most successful?

Basic Readings:

Gruber chapters 5 & 6



Leach chapters 6 - 8
Cornes and Sandler, chapters 3 & 4
Hindriks & Myles chapter 7

Other Readings:

Coase, R. (1960). The problem of social cost. *The Journal of Law and Economics*, (October, 4).

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Stigler, G.J.(1967) "Imperfections in the capital market." *Journal of Political Economy* 75, no. 3 : 287-292.

Picasso E, Bonoli E. M., Harris M. S. and F. Tanco (2016), "Measuring the externalities of urban traffic improvement programs" *Habitat International* 55: 10–16.

Caldari, K. & M. Fabio (2011), "Pigouvian versus Marshallian tax: Market Failure, Public Intervention and the Problem of Externalities" *The European Journal of the History of Economic Thought* 18(5): 715-732.

Biglan A. (2009), "The Role of Advocacy Organizations in Reducing Negative Externalities" *Journal of Organizational Behavior Management* 3-4: 2015-230.

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LESSON SIX: THEORY OF PUBLIC GOODS

By the end of the lesson, you should be able to:

- 6.1 define a public good and distinguish it from a pure public good, a merit good, and a club good.
- 6.2 explain optimal provision of public goods;
- 6.3 describe mechanism for provision of public goods.
- 6.4 describe impure public goods

6.1 Definitions and Distinctions

A pure public good is defined as a good that is non-rival and non-excludable in consumption. Example is knowledge (Leach, 2004).

- a) No extra resources are required from another person for him/her to consume once it is provided.
- b) Consumption of one individual will not reduce another individual's consumption.
- c) It is expensive and even impossible to bar any other individual from using once it is available.

A pure private good is diminishable/rival in consumption and one can be excluded from consumption. While a club good/an impure public good is non-rival in consumption but one can be excluded from its use (Leach, 2004) and Hindriks & Myles, 2013).

The following are aspects to note on the definition of a public good (see also Leach, 2004):

- a) The consumption need not be valued equally for everyone even if individuals consumes the same quantity of the public good.
Consider house cleaning in an apartment with many college roommates, which has a public good characteristic to it: everyone benefits from a clean bathroom, and it is hard to exclude everyone from these benefits. Yet some students care about cleanliness much more than others.
- b) Market conditions and the state of technology determines a good as public good. Therefore, classification is not absolute.
When there is a small number of individuals involved, a scenic view could be considered a pure public good. As the number of sightseers rise, the place becomes congested. As much as the same quantity of the scenic view is being consumed by each individual, its quality could decrease with the number of individuals. Therefore, the nonrival aspect is no longer satisfied.
- c) "Publicness" is an issue of degree.
If the good is pure, it will satisfy the definition exactly. However, consumption of an impure public good could be rival or excludable.
- d) A good could satisfy an aspect of the definition of a public good but not the other aspect.
A good does not have to be non-excludable and non-rival always. Consider for example, the streets of Nairobi in the rush hours. Non-excludability holds, and yet consumption is rival.



- e) There are things that have the characteristics of public good which are not normally thought of as public goods.
Honesty is a good example. If a commercial transaction is done by honest persons, the community benefits because that reduces the cost of doing business. The reduction in cost characterizes both by non-excludability and non-rivalness.
- f) The private sector does not have exclusive power to provide private goods. Some private goods are publicly provided by the government and yet they are rival and excludable. Universal health services or even housing services are examples of private goods provided by the government. On the other hand, there are public goods that are provided privately. For example, where individuals donate funds to maintain the beauty of a public park.

6.2 Optimal Provision of a Public Good

6.2.1 Samuelson's Rule

Samuelson (1954), followed by Samuel (1955), came up with the rule for efficient provision of a public good. The rule says that *Pareto-efficient provision of the public good occurs when the marginal rate of transformation between the public good and each private good is equal to the sum, over all households, of the marginal rates of substitution* (See also Hindriks & Myles, 2013).

That is,

$$\sum_{h=1}^H MRS_{Gx}^h = MRT_{Gx}$$

Where

H = Number of households, and $h = 1, \dots, H$

G = Public good

x = Private good

MRS = The marginal rate of substitution

MRT = The Marginal rate of transformation

The rule for efficient provision of two private goods i and j is as follows:

$$MRS_{ji}^h = MRT_{ji}, \text{ all } i, j \text{ and } h.$$

Derivation of the optimal condition for providing a public good.

Consider a situation where there are just two people, George (G) and Harriet (H), who derive utility (U) from the consumption of a private good, bread (b), and a public good, parks (z). The following are their utility functions:

$$U_G = u_G(z, b_G)$$

$$U_H = u_H(z, b_H)$$

b_G and b_H represent the quantities of bread (number of loaves) consumed by George and Harriet, respectively, and z is the quantity of parkland (in terms of number of acres). Assume that Parks are non-excludable, therefore George and Harriet consume the same quantity of parkland. Assume that the utility functions u_G and u_H are increasing and concave in shape. Assume further that the marginal utility (mu_b and that of parks (mu_z) becomes large as consumption of that good approaches zero (Leach, 2004; Myles, 2001).



The land endowment in the economy is \bar{s} acres. Each acre of land could be used for farming or serve as parkland. On one acre of land, enough wheat can be grown to make k number of loaves of bread.

The number of loaves of bread manufactured in the economy is consumed by either Harriet or George, such that:

$$b = b_G + b_H$$

This economy's allocation will be described by the quantities of bread and parkland that will be available for use, and the division of bread between Harriet and George. Hence each allocation is given as b_G , b_H , and z . The aim is to find out which allocations are optimal and which ones are not Pareto optimal.

The Pareto optimal allocation satisfies the condition (Leach, 2004):

$$\begin{aligned} \text{MRS}_G - \text{MRT} &= - \text{MRS}_H \\ \text{or} \\ \text{MRS}_G + \text{MRS}_H &= \text{MRT} \end{aligned}$$

In this case, the marginal rate of substitution (MRS) is the number of loaves of bread needed to compensate an individual for the loss of one acre of parkland. The marginal rate of substitution changes from individual to individual: and for each individual, it varies as that individual's commodity bundle varies. The number of loaves that must be given up to obtain an extra unit of the public good is the marginal rate of transformation (MRT).

The total benefit in this example is $\text{MRS}_G + \text{MRS}_H$ and MRT represents the Marginal cost. The decision rules are that:

- g) When total benefits are larger than the marginal cost, then Harriet and George will be made better off by enlarging the quantity of parkland and appropriately redistributing the remaining bread appropriately.
- h) When the total benefit are smaller than the marginal cost, both individuals will be made better off by shrinking the quantity of parkland and redistributing bread appropriately.
- i) If the two are equal, changing the allocation so that at least one individual is better off and neither individual is worse off is not possible.

In the case of n people, where $1, \dots, n$, the condition by Samuelson becomes:

$$\text{MRS}_1 + \text{MRS}_2 + \dots + \text{MRS}_n = \text{MRT}$$

Empirical example

If George and Harriet's utility functions are given by the following:

$$u_G = b_G + 10z$$

$$u_H = (b_H)^{1/2} z^{1/2}$$



Assume that the economy is endowed with one acre of land, and that one acre of land allocated to farming produces 50 loaves of bread. What is the Pareto optimal allocation in which George's utility is \bar{u} (where \bar{u} is less than 50)?

Solution

j) By replicating algebraically the graphical procedure described in this section.

The HH locus shows the amount of bread that is left for Harriet when z units of public goods are produced, given that George must reach his specified utility level. Since all of the bread is given to George or given to Harriet or used in the production of public goods,

$$b_H = 50(1 - z) - b_G, \quad (1)$$

But George's utility is fixed at \bar{u} , so

$$\bar{u} = b_G + 10z \quad (2)$$

Using this condition to eliminate b_G from (1) gives the HH locus:

$$b_H = 50(1 - z) - (\bar{u} - 10z) = 50 - \bar{u} - 40z \quad (3)$$

This locus does not quite have the shape shown in the figure within the explanation (it's downward sloping everywhere, instead of hill-shaped) because George's indifference curves are straight instead of curved, but its interpretation is the same.

We must now find the commodity bundle (z, b_H) that makes Harriet as well off as possible, subject to the constraint that $50 - \bar{u} - 40z$ (3) is satisfied. We substitute $50 - \bar{u} - 40z$ (3) into Harriet's utility function to eliminate one of the variables (i.e. either b_H or z). If b_H is eliminated, Harriet's utility is:

$$u_H = (50 - \bar{u} - 40z)^{1/2} z^{1/2}$$

She is as well off as she can possibly be if z is chosen so that

$$\frac{du_H}{dz} = 0$$

Evaluating this derivative and simplifying gives

$$z^* = \frac{50 - \bar{u}}{80}$$

Substituting this value into (3) gives



$$b_H^* = \frac{50 - \bar{u}}{2}$$

Since George gets the bread that is not given to Harriet,

$$b_G^* = 50(1 - z^*) - b_H^* = \frac{9\bar{u} - 50}{8}$$

These three values (z^* , b_H^* and b_G^* describe the Pareto optimal allocation associated with any \bar{u} . Varying \bar{u} between 0 and 50 yields all of the (infinitely many) Pareto optimal allocations.

By assuming that the Samuelson rule is known.

The allocation that is optimal we are looking for satisfies three conditions.

It lies on the production possibility frontier. (The economy cannot produce any combination lying inside the frontier.)

George's utility is exactly equal to \bar{u} .

The public good is optimally provided, so the Samuelson condition is satisfied.

Expressing each of these conditions as an equation gives a system of three equations, and this system can be solved to find the three values that constitute an allocation.

$$b_H = 50(1 - z) - b_G, \quad (1)$$

But George's utility is fixed at \bar{u} , so

$$\bar{u} = b_G + 10z \quad (2)$$

Re-writing the Samuelson condition, we can make the following substitutions:

$$MRS_G = \frac{\partial u_G}{\partial z} \div \frac{\partial u_G}{\partial b_G} = 10$$

$$MRS_H = \frac{\partial u_H}{\partial z} \div \frac{\partial u_H}{\partial b_H} = \frac{b_H}{z}$$

$$MRT = 50$$

So that the Samuelson condition reads (after a little rearrangement):

$$b_H = 40z \quad (3)$$

Solving (1), (2), and (3) yields the Pareto optimal allocation.

$$z^* = \frac{50 - \bar{u}}{80}$$

$$b_H^* = \frac{50 - \bar{u}}{2}$$

$$b_G^* = \frac{9\bar{u} - 50}{8}$$

Free-riding

Free riders can be persons who consume more than their fair share of a public good or contribute less than their fair share of its production costs. The government should therefore try to prevent **free rider problem**, or minimize its negative effects in the community (Leach, 2004). Free riding is a problem when it leads to no production or inadequate production of a *public good, implying that Pareto efficiency is not achieved. But may also* lead to the use of common property resources excessively (Hindriks & Myles, 2013).

Expenditure on defense is an example of a free rider problem. No individual can be excluded from defense. But free riders can refuse to pay for it, even though they are enjoying defense services just like those who made the contributions. Hence the government must use taxes and not rely on volunteer donations for provision of public goods.

6.2.2 Alternative provision of public good

1. Voting for a Discrete Public Good

Individuals may vote to increase or decrease the existing amount of a public good. The amount is decided upon by the majority rule. A **voting equilibrium does exist when the amount of public good preferred by the majority is not less or more.**

2. The Bowen Model

In order to explain the foundations of this model, assume that there are two persons, A and B, each one having a conventional downward sloping demand curve for some public good. That is, if the public good could be sold in units at a price, each individual would demand more as the price is reduced. These two demand curves are shown as D_A and D_B .

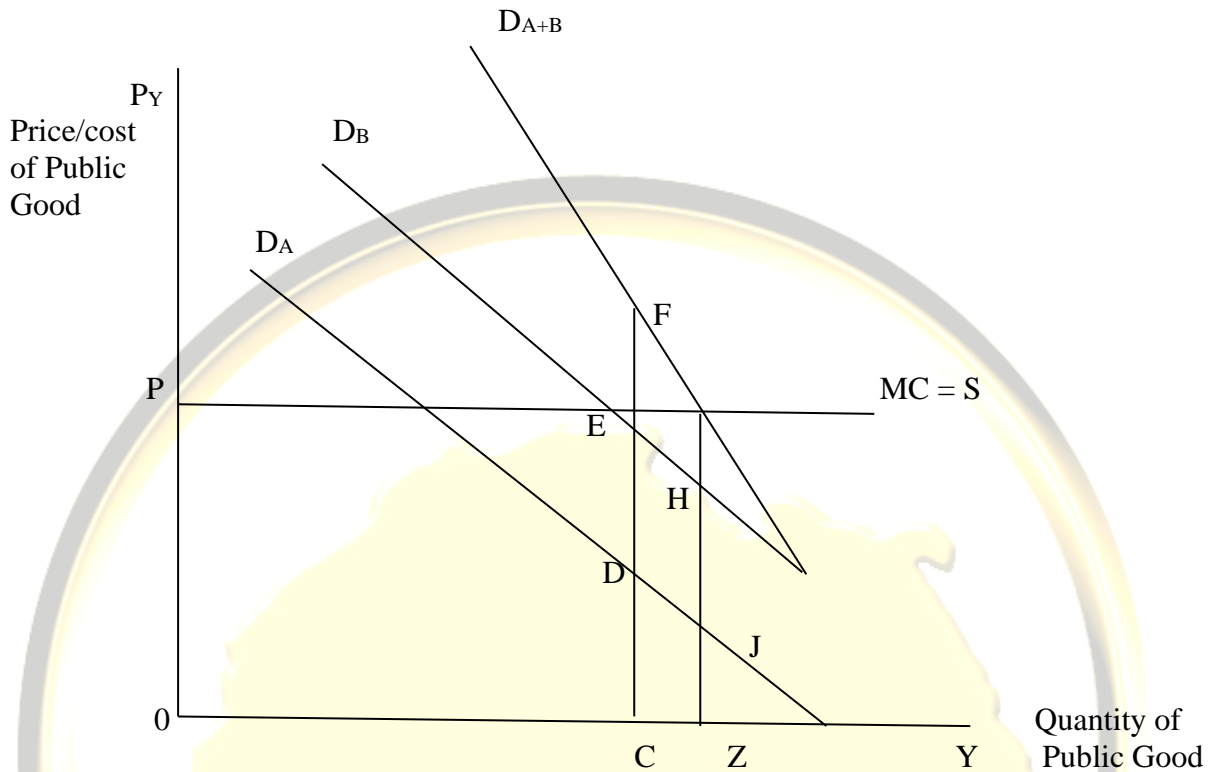


Figure 6.1: The Bowen model

Source: Modified from Stiglitz and Rosengard (2015)

We have already defined a public good as one which, once produced, is consumed equally by all. Thus no one person can vary in the quantity to be taken. To derive the total quantity demanded for the public good, we add the demand curves vertically. Assume a quantity OC of the public good is made available to A. The same quantity is available to B. But how much would A and B, together, be willing to pay for OC of the public good? To get this we add CD and CE to obtain CF . This is done for each and every amount of the public good, giving us the total demand curve D_{A+B} . This tells us how much A and B, together, would pay willingly for various amounts of the pure public good Y . It should be noted that for each amount of Y supplied, B is willing to pay more than A for that amount.

We introduce a constant marginal cost (supply) schedule into our diagram, and from its intersection with the total demand curve, obtain the equilibrium quantity and price, in this case OP and OZ . Thus we see that the sum of the marginal evaluation by each person for Y equals the price, which equals marginal cost, thereby meeting the conditions of optimal pricing implying that price *equal marginal cost*. This approach is usually termed the *Bowen model*.

Immediately it can be seen that a normal market mechanism would be an impossible avenue to use for providing pure public goods. In a perfectly competitive market, equilibrium requires that the price of a good be equal to each consumer's marginal evaluation, which in turn is equal to marginal cost. The consumer theoretically adjusts his/her purchases to achieve this, since he/she faces a fixed price.

In the public goods case, the price does not equal each consumers' marginal evaluation, and the consumer cannot vary his/her purchase to achieve this. What would have to be done is to vary the price of each consumer, and this would require that each person reveal his/her true preference for the public good, a condition that is not likely to occur. If preferences are revealed, then the optimum quantity and price to each person could be achieved.

The conclusion of this analysis is that where we have goods exhibiting the characteristics of equal consumption by all and the inability to exclude users, the good will not be provided by the private market. Such goods must be provided by government and financed through the compulsory levies (taxation) or public borrowing.

What if exclusion is technically feasible but the good or service is equally available to all? The private market can and does in some cases operate to provide such goods, but the solution is not likely to be equal to each individual's marginal evaluation of the good Stiglitz and Rosenguard (2015).

3. The Lindahl Approach

This is the second partial equilibrium approach to the pure theory of public goods (by Erik Lindahl).

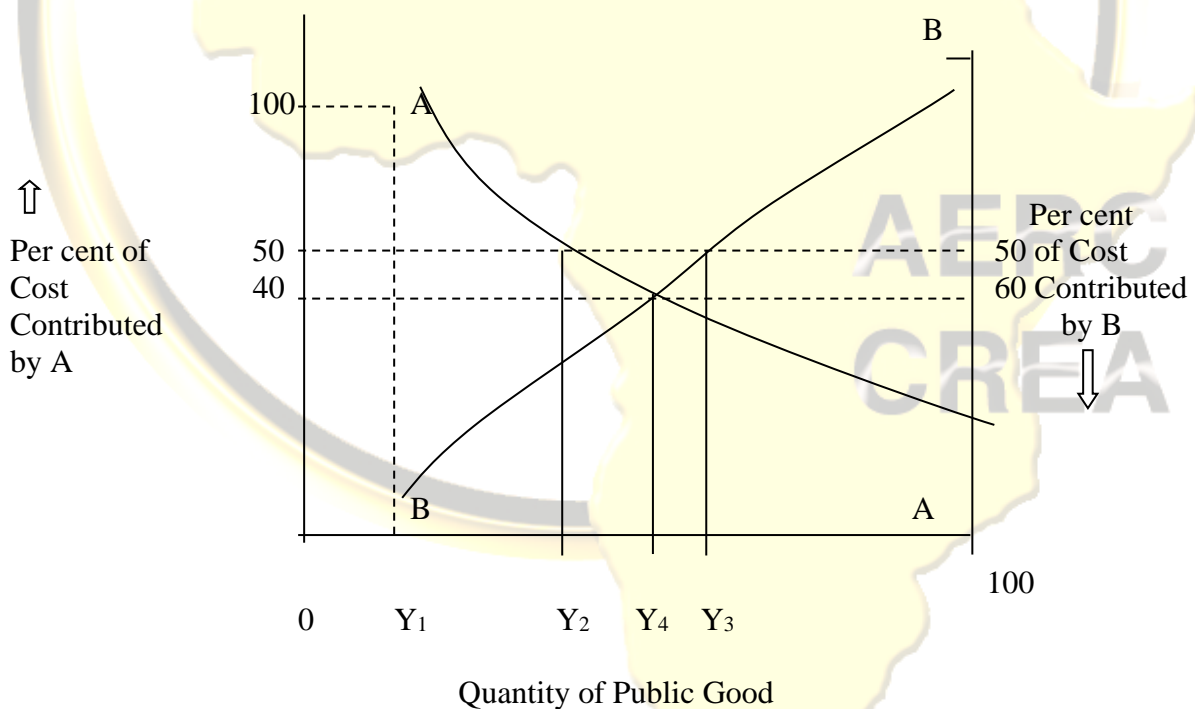


Figure 6.2: Lindahl Model

Source: Atkinson, A. and J. E. Stiglitz (2015), *Lectures on Public Economics*. New York: Princeton University Press

In this model, we measure once again units of the public good on horizontal axis. The left hand vertical scale measures the share of the cost that A would be willing to pay for a given amount of Y while the right hand vertical axis measures the same for B. If OY_1 of the public good were

supplied, A would be prepared to pay the full cost. As more is supplied, A is prepared to pay a declining percentage of the cost as the incremental units of the public good (Y) are not valued by A at their supply price. The behaviour of B is similar. Consider the situation where B pays one half the cost of a public good. His/her choice would be to have OY₃ supplied but A, if he/she had to pay one half the unit cost, would want only OY₂ of the good.

A 50/50 cost sharing agreement would not, in these cases, produce the desired amount of the good for both A and B because once it is made available to one, it is available to all. If OY₂ were produced, B would feel he/she is not getting sufficient quantity, and the reverse would be true for A if OY₃ were produced to satisfy B. The amount OY₄ would satisfy both A and B, and these cost contributions would add to 100% but be different for each. A would contribute 40% and B, 60%. We see that the market system, where one price is available to all consumers adjust their quantity, would not work in this case. What is needed, in the market sense, is a perfectly discriminating monopolist who knows the preferences of each person interested in receiving the public good Y, which is an impossibility.

Illustration of Lindahl Allocations

Assume that the government want to support efficient allocation of a public good using a price mechanism. Each consumer is offered *i* the right to “buy” as much as that consumer wants of the public good and will be willing to pay a price *p_i*. *x* is a private good. The maximization problem of consumer *i* to be solved is:

$$\max_{x_i, G} u_i(G, x_i)$$

$$\text{Such that } x_i + p_i G = w_i$$

Deriving the first order condition gives

$$\frac{\partial u_i}{\partial G} = p_i$$

$$\frac{\partial u_i}{\partial x_i}$$

The consumer’s demand function for the optimal amount of public good *G* as a function of *p_i* and *w_i* is *G_i(p_i, w_i)*.

To find a set of prices such that consumers are will choose an efficient amount of the public good, it must satisfy the following.

$$\frac{\partial u_1(G^*, x_1^*)}{\partial x_1} + \frac{\partial u_2(G^*, x_2^*)}{\partial x_2} = 1.$$

Therefore choosing $p_i^* = \frac{\partial G}{\partial u_i(G^*, x_i^*)}$ will give that set of prices that will support an efficient

allocation of the public good. These set of prices are referred to as Lindahl prices or Lindahl taxes (Leach, 2004).

6.3.4 Demand revealing mechanisms

The Groves-Clarke Mechanism (Discrete public goods).

We address the issue of how to induce each agent to correctly reveal her/his true value of the public good. The Groves-Clarke mechanism is applied in this case:

- Each person should report a “bid” for the public good, b_i . This might not be his/her true value or it may be the true value.
- The provision of public good is done if $\sum_i b_i \geq 0$, and not provided if $\sum_i b_i < 0$,
- Each individual i receives a side payment that is equal to the sum of the other bids, $\sum_{j \neq i} b_j$, once the public good is provided. (If the sum is positive, then the agent i receives it; if it is negative, agent i will pay the amount).

The agents must tell the truth which might be very costly because they have to be induced to do so. Total side payments might be very large.

b. Demand Revealing Mechanisms with a Continuous Good

If we provide G units of a continuous public good, then consumer i will have a utility function:

$$v_i(G) = u_i(G) - s_i G,$$

Where $u_i(G)$ is utility for the public good and s_i is cost share of individual i . Suppose that agent i reports the function $v_i(G)$ such that the his/her reported function is $b_i(G)$. If the government announces that it will provide G^* level of the public good that maximizes the sum of the reported functions, each agent i will receive a side payment equivalent to:

$$\sum_{j \neq i} b_j(G^*).$$

It is always in the interest of the agent in this mechanism to report honestly his/her true utility function. Individual i wants to maximize:

$$v_i(G) + \sum_{j \neq i} b_j(G),$$

And yet the government will want to maximize

$$b_i(G) + \sum_{j \neq i} b_j(G).$$

Each individual i by reporting $b_i(G) = v_i(G)$, ensures that the government will choose a G^* that maximizes her/his utility. The side payment that results in the best choice in this case is: $\max_G \sum_{j \neq i} b_j(G)$. Which leaves agent i with a net utility of:

$$v_i(G) + \sum_{j \neq i} b_j(G) - \max_G \sum_{j \neq i} b_j(G)$$

6.4 Impure Public Goods

6.4.1 Definitions

Impure public goods: refers to a good where its consumption by an individual reduces, but does not eliminate the benefits that other individuals receive by consuming it. Therefore they are



partially rival or congestible (Leach, 2004). Examples include, parks, bridges, and recreational facilities. These goods are usually excludable

The implications of controlling access to these goods are:

- a) Free riding is eliminated and the good can be provided by a private firm or government at a fee.
- b) The degree of congestion can be influenced by the agent providing the good by regulating either the number of people who use the good, or the frequency with which they use the good, or both.

The study of impure public goods has centered on two broad classes of goods; the club good, first studied by Buchanan (1965), and the variable use public good, first analyzed by Oakland (1972) and Sandmo (1973). The central issue in the discussion of impure public goods is the control of congestion

6.4.2 Club Good

A **Club good** refers to a good that is **replicable**, and there is control of the number of members of each facility. However, the frequency of use by each member is not controlled. Since they are replicable, a person who is excluded from one facility can become member of another equivalent club. Examples include: swimming pools, fitness clubs, and tennis courts (Buchanan, 1965).

The benefit received by each club member depends upon the size of the club's facilities and the club's membership Buchanan (1965). This benefit can be shown as follows.

$$B = b(s, m)$$

Where B is each member's benefit, s is the size of the facility, and m is membership. This equation asserts that B is determined by s and m , but does not give definite instructions for calculating the benefit. The form of the function b must be restricted so that the relationship between B and its determinants, s and m , is a sensible one. But we can't know what restrictions should be placed on the function unless we know what kind of behaviour we want to depict.

Let's imagine a particular kind of club such as a *tennis club*, and consider how the typical member would respond to a change in the club's size and membership. *First*, imagine that the membership is fixed, and that a bigger facility means one with more tennis courts. Members meet, find other players with whom they are compatible, and try to book court time. If the club has only a few courts, the most desirable time slots are quickly booked, and the remaining players must either accept inconvenient time slots or cancel their matches. Building another court increases the number of desirable time slots, so more matches are played, and more matches are played in desirable time slots. The benefits associated with the additional court are large.

However, if the club has many courts, an additional court yields quite small benefits. The members are already playing as much tennis as they would like, and the additional court simply allows them to obtain bookings in slightly more convenient time slots. Arguably, the benefit associated with each increase in facility size declines as the facility size rises.

Now imagine that the club's size is fixed and that the membership is changing. When the membership is small, each member has difficulty finding fellow players who have roughly

equal skills and compatible schedules. Adding members increases the chances that any given member is able to find a satisfactory partner, increasing the benefit that he/she obtains from club membership. But adding members also increases the competition for time slots, and this congestion reduces the benefit that each member obtains from club membership. The first effect is likely to dominate when the membership is small, because there are a few compatible pairs, and therefore little demand for courts. Increasing the membership creates more compatible pairs, and therefore little demand for courts. Increasing the membership creates more compatible pairs who readily find court time. The second effect is likely to dominate when the membership is large. A large membership implies that there are already many compatible pairs, and that the courts are highly congested. Increasing the membership does not markedly increase the number of matches that each member would like to play, but the greater congestion forces each member to play in less convenient time slots. Thus, the benefit received by each member first rises and then falls as the number of members rises.

The assumption that clubs are replicable means that it is socially optimal to maximize the net benefits of each club member. The optimal membership is m^* . Members prefer bigger facilities to smaller facilities, but successive increases in facility size bring smaller and smaller increases in benefits. These aspects of the club are incorporated by assuming that

$$\frac{\partial b}{\partial s} > 0$$

$$\frac{\partial^2 b}{\partial s^2} \equiv \frac{\partial}{\partial s} \left(\frac{\partial b}{\partial s} \right) < 0$$

The idea that each member's benefit first rises and then falls as the membership rises can be expressed by assuming that, for each s , there is the presence of a critical membership $\hat{m}(s)$ such that:

$$\frac{\partial b(s, m)}{\partial m} = 0 \text{ when } m = \hat{m}(s)$$

And that

$$\frac{\partial^2 b}{\partial m^2} \equiv \frac{\partial}{\partial m} \left(\frac{\partial b}{\partial m} \right) < 0$$

The second condition states that the marginal benefit of one more member gets smaller as the membership rises. If this marginal benefit of one more member is equal to zero when there are $\hat{m}(s)$ members, it must be positive when there are fewer than $\hat{m}(s)$ members, and negative when there are more than $\hat{m}(s)$ members. This relationship is shown in the above figure.

Clubs have costs as well as benefits. If the club's total cost is proportional to its size and if each member bears an equal share of the costs, each member's share of the cost, C is

$$C = \frac{ks}{m}$$

Here, k is the cost of each unit of the club's facilities and hence ks is the total cost of the club's facilities. This relationship is also shown in the figure above. The net benefit (NB) of each club member is the difference between the cost and benefit:

$$NB = b(s, m) - \frac{ks}{m}$$



The assumption that the clubs are replicable implies that the social net benefits of a system of clubs are maximized when an individual member's net benefit is maximized. That is, the socially optimal club size and membership maximize NB and therefore satisfy the conditions

$$\frac{\partial NB}{\partial s} = \frac{\partial b}{\partial s} - \frac{k}{m} = 0 \quad (1)$$

$$\frac{\partial NB}{\partial m} = \frac{\partial b}{\partial m} + \frac{ks}{m^2} = 0 \quad (2)$$

These conditions have simple interpretations:

Re-arranging (1) gives:

$$m \left(\frac{\partial b}{\partial s} \right) = k$$

This is the Samuelson condition. The facility has the optimal size when the total sum of member's marginal benefits from a unit of the facilities is equal to its marginal cost.

Alternatively, re-arranging (2) gives:

$$m \left(\frac{\partial b}{\partial m} \right) = -\frac{ks}{m} \quad (3)$$

This states that the club has the optimal membership when a small change in membership has no net change in the welfare of the existing members. Adding another member increases congestion, reducing the benefits of each of the existing m members by an amount $-\partial b/\partial m$. (Note that $\partial b/\partial m$ must be negative for this condition to be satisfied.) Since the new member bears an equal share of the costs, adding a new member reduces the existing members' share of the cost by ks/m . A new member has no effect on the welfare of the existing members when his/her impact on their benefits and costs are exactly offsetting. Since (1) and (2) can be solved to obtain the optimal size and membership since they constitute a two-equation system in two unknowns.

Illustration: Homogeneous club model with fixed utilization rates

Homogeneous members possess the same tastes and endowments. The model could be stated as follows.

$$\text{Max} = U^i(Y^i, X^i, S)$$

$$\text{Subject to} \quad 1$$

$$F(Y^i, X^i, S) = 0$$

Where S is club membership size

The Lagrangian becomes

$$L = U^i(Y^i, X, S) + \lambda F(Y^i, X, S) \quad 2$$

The first order conditions are:

$$\frac{\partial L}{\partial Y^i} = \frac{\partial U^i}{\partial Y^i} + \lambda \frac{\partial F}{\partial Y^i} = 0 \quad (a)$$

$$\frac{\partial L}{\partial X} = \frac{\partial U^i}{\partial X} + \lambda \frac{\partial F}{\partial X} = 0 \quad (b)$$

$$\frac{\partial L}{\partial S} = \frac{\partial U^i}{\partial S} + \lambda \frac{\partial F}{\partial S} = 0 \quad (c)$$

Dividing equation (b) by (a) gives

$$\frac{\frac{\partial U^i}{\partial X}}{\frac{\partial U^i}{\partial Y^i}} = \frac{\frac{\partial F}{\partial X}}{\frac{\partial F}{\partial Y^i}} \quad i = 1, \dots, S \quad (\text{Provision}) \quad 3$$

$$(MRS_{x,y}^i) = (MRT_{x,y}^i)$$

Dividing equations (c) by (a) gives

$$\frac{\frac{\partial U^i}{\partial S}}{\frac{\partial U^i}{\partial Y^i}} = \frac{\frac{\partial F}{\partial S}}{\frac{\partial F}{\partial Y^i}}, \quad i = 1, \dots, S \quad (\text{Membership}) \quad 4$$

$$(MRS_{s,y}^i) = (MRT_{s,y}^i)$$

Equation 3 indicates that for each member, the marginal rate of substitution (MRS) between the club good and the private good must be equal to the marginal rate of transformation (MRT) between the two goods.

Equation 4 shows that for the club optimality, a representative member equates the MRS between group size and the private good with the MRT hence attaining equality between the marginal benefits and marginal costs from having another club member.

Alternative model

$$\begin{aligned} & \text{Max } U(y,x,s) \\ & \text{Subject to} \\ & I = y + c(x,s)/s \end{aligned}$$

Where $c(x, s)/s$ is the club's cost.

The Lagrangian becomes

$$L = U(y,x,s) - \lambda[y+c(x,s)/s - I] \quad 5$$

The first order conditions are as follows

$$\frac{\partial L}{\partial y} = \frac{\partial U}{\partial y} - \lambda = 0 \quad (a)$$

$$\frac{\partial L}{\partial x} = \frac{\partial U}{\partial x} - \lambda \frac{\partial c}{\partial x} / s = 0 \quad (b)$$

$$\frac{\partial L}{\partial s} = \frac{\partial U}{\partial s} - \lambda \left(s \frac{\partial c}{\partial s} - \frac{\partial c}{\partial s} c(x,s) \right) / s^2 = 0 \quad (c)$$

Dividing equations (b) and (c) by (a) gives

$$\frac{\partial U/\partial x}{\partial U/\partial y} = \frac{\partial c/\partial x}{s} \quad (\text{Provision}) \quad 6$$

For the provision condition, the MRS between the two goods is equated with the individual's share of the marginal costs of provision.

$$\frac{\partial U/\partial s}{\partial U/\partial y} = s \frac{\partial c/\partial s - c(x,s)}{s^2} = \frac{\partial c/\partial s}{s} - \frac{c(x,s)}{s^2} \quad (\text{Membership}) \quad 7$$

Optimal membership condition requires equality between the relevant MRS and the marginal costs of increasing the membership size

6.4.3 A Variable-Use Public Good

A Variable-use public good: refers to a good that is either excludable or non-excludable. If it is excludable, frequency of use rather than number of users is controlled. The good is also not replicable therefore a facility should provide the service to all users (Oakland, 1972; Sandmo, 1973). The good is made available to everyone, but each person chooses the frequency with which he/she uses it. Examples are roads and bridges.

Each person's use leads to congestion which affects adversely every other person who uses the facility. This reduces the frequency with which the other persons use it. Each person's frequency of use therefore depends upon every other person's frequency of use. Oakland (1972) and Sandmo (1973)

Suppose, for example, that the public good is a road connecting a suburb to a city center. Each user believes that trips to the city are rewarding, but that each additional trip has a smaller value than the last. A simple function that reflects these beliefs is

$$B = (2h)t^{1/2}$$

Where B is the value that single user places on t trips to the city, and h is a positive constant. The act of traveling to the city imposes two types of costs on the user. There might be a **monetary cost**; specifically, a toll p might be charged for each use of the road. Travelers' might also experience delays, or aggravation, or be exposed to an element of danger when road use is high. These costs are referred to as **congestion costs**, and are represented by z.

Congestion costs depend upon the capacity of the road system, s, and the number of trips made by the other users. If there are m - 1 other users, and if the average number of trips made by these users is v, the total number of trips by other users is (m - 1) v. Assume that the congestion costs incurred by a single user are

$$z = \frac{(m-1)v}{s} \quad (1)$$



An increase in use raises each person's congestion costs, while an increase in capacity reduces these costs.

Constructing the road system uses up scarce resources. Assume, as before, that the flow cost of building a road with capacity s is ks (k is the cost of each kilometer of a road). If the number of users is fixed and equal to m , the *capacity cost per user* is ks/m .

The social net benefit of the public good, expressed on a per capita basis, is

$$SNB = (2h)t^{1/2} - \left[\frac{(m-1)v}{s} \right] t - \frac{ks}{m}$$

That is, the social net benefit is the value of the trips taken, less the associated congestion costs and the individual's share of the capacity cost. Note that the social net benefit is not reduced by the toll, if one is charged, because the toll is simply a transfer from one member of society, the user, to another member of society, the provider.

Since the users are assumed to be identical, the equilibrium number of trips taken by each user will be the same, implying that v is equal to t . The social net benefit of the good then depends only upon t and s :

$$SNB = (2h)t^{1/2} - \frac{(m-1)t^2}{s} - \frac{ks}{m} \quad (2)$$

Inspection of this equation shows that:

- c) *Capacity can either be too large or too small.* For each value of t , the partial derivative $\partial SNB/\partial s$ is positive when s is sufficiently small, indicating that the social net benefit would be higher if capacity were greater. It is negative when s is sufficiently large, indicating that the social net benefit would be higher if capacity is smaller. Thus, for each t , there is an ideal capacity. At this capacity, a small increase in capacity would reduce the congestion costs encountered by each person by exactly as much as it would raise each person's share of the capacity costs.
- d) *The number of trips taken by each user can also be too small or too large.* For each value of s , the partial derivative $\partial SNB/\partial t$ is positive when t is small and negative when t is large, indicating that the users can take either too few or too many trips. They are taking the ideal number of trips if the benefit of an additional trip is just offset by the added congestion costs.

This combination of s and t maximizes the social net benefit. It is characterized by the following conditions (3) and (4) because, at the maximum, there is no small adjustment in s or in t that will raise the social net benefit.

$$\frac{\partial SNB}{\partial s} = -\frac{1}{m} \left\{ mt \frac{\partial z}{\partial s} + k \right\} = 0 \quad (3)$$

$$\frac{\partial SNB}{\partial t} = ht^{-1/2} - \frac{2(m-1)t}{s} = 0 \quad (4)$$

The first condition (3) is the Samuelson condition. The benefit that each individual receives from an increase in capacity is a reduction in congestion ($-\partial z/\partial s$) on each of the t trips taken by that individual. The facility size is optimal when the sum across all users of the benefits from expansion is equal to the cost of expansion (k)

The second condition (4) states that, if each person takes one more trip, the benefit that each person obtains from his/her additional trip is exactly offset by the increase in his/her congestion costs. Each person's congestion costs are higher for two reasons: he/she travels one more time, and (because every other person also takes an additional trip) the congestion costs are higher on each of the trips that he/she takes. This condition can be re-arranged to obtain the socially optimal number of trips associated with each capacity:

$$t^* = \left[\frac{hs}{2(m-1)} \right]^{2/3}$$

Note that the ideal number of trips rises with capacity. The ideal number of trips is not t^{**} if capacity is not s^{**} . Similarly, the ideal capacity varies with the number of trips taken, and is equal to s^{**} only if the number of trips taken is t^{**} . Although the government sets capacity unilaterally, each person chooses the number of trips that he/she takes. The government's ability to implement the best possible outcome hinges upon its ability to influence this decision.

6.4.4 Considering the factors that determine how often each person will travel.

Equilibrium Use

Each person's private net benefit of travel, PNB, is the difference between the benefit of travel and its private costs, which include both tolls and congestion costs:

$$PNB = (2h)t^{1/2} - (p + z)t \quad (5)$$

Where, p is the toll. Each person believes that the congestion cost z is beyond his/her control, and hence chooses the number of trips, t , that satisfies the condition

$$\frac{\partial PNB}{\partial t} = ht^{-1/2} - (p + z) = 0 \quad (6)$$

However, z is determined by the average number of trips taken by the other users, and each of these users is applying the same reasoning to determine the number of trips that they will take. Each individual will ultimately choose to make the same number of trips as every other user, implying

$$t = v$$

Substituting (1) into (6) and setting v equal to t , yields

$$ht^{-1/2} = p + \frac{(m-1)t}{s} \quad (7)$$

This condition describes the number of trips taken by each user.

If no toll is charged ($p = 0$), the number of trips taken by each person is

$$t^0 = \left[\frac{hs}{m-1} \right]^{2/3} \quad (8)$$

This number is not a socially optimal one and is greater than the socially optimal one.

$$t^0 = 2^{2/3} t^* > t^*$$

Each person's travel increases the congestion experienced by all of the other travelers, so travel is an activity that generates a negative externality. Each person would be better off if every person could be persuaded to travel less.

Tolls are the lever that the government can use to control the degree of congestion. Inspection of (7) shows that the number of trips taken by each person falls as the toll rises. Imposing a positive toll pushes the number of trips below t^0 . The ideal toll behaves like a Pigouvian tax, in the sense that it includes each user to make the socially optimal number of trips. The ideal toll

will cause each person to take t^{**} trips, so that the ideal capacity will be s^{**} . That is, the best possible outcome is achievable if tolls are levied.

The Optimal Toll

Private and social marginal benefits are both equal to the value of one more trip:

$$PMB = SMB = ht^{-1/2}$$

We are concerned with a group of m users, and the behaviour of each user impacts every other user. The marginal cost will depend upon the actions of every user, and their definition must reflect that dependence. Specifically;

- e) *Private marginal cost (PMC)* refers to the cost borne by a person when he/she, alone, takes z one more trip, given that all users are initially taking t trips.
- f) *Marginal damage (MD)* is the increase in the congestion costs borne by all other users when one user takes one more trip, given that all users are initially taking t trips.
- g) *Social marginal cost (SMC)* is the cost borne by all users when one user takes one more trip, given that all users are initially taking t trips.

Each person's private marginal cost is the sum of the total that he/she must pay and the congestion costs that he/she must incur when he/she takes one more trip. If all individuals are initially taking t trips (so that v is equal to t), then

$$PMC = p + \frac{(m-1)t}{s}$$

Now consider marginal damage. An extra trip by one person raises the congestion costs faced by each of the other $m - 1$ people on each of their trips by $1/s$ units. Since marginal damage is the total increase in congestion costs that one person's additional trip imposes on the other people in the community, then

$$MD = \frac{(m-1)t}{s}$$

The social marginal cost of travel is the sum of the two components. The first component is the congestion cost willingly borne by an individual who chooses to take one more trip, and the second component is marginal damage. Thus:

$$SMC = z \Big|_{v=t} + MD = \frac{2(m-1)t}{s} \quad (9)$$

These concepts can be used to reinterpret some of the conditions set above. Equation (7) describes the number of trips taken by each person. It can be written as:

$$PMB = PMC$$

Each person extends his/her travel until the private benefit of one more trip is just offset by its private cost. By contrast, equation (4) describes the socially optimal number of trips. It can be written as:

$$SMB = SMC$$

Optimal Provision when Tolls Are Not Imposed

The provider of the club good might choose not to impose a toll for a number of reasons:

- h) The resource cost of collecting the toll might be prohibitive.
- i) The act of collecting the toll might create further congestion, frustrating the intent of the toll.
- j) The toll falls equally on both the rich and the poor, hence constitutes regressive

taxation.

However, a decision not to impose a toll also adversely affects society's welfare. The number of trips taken, t^0 , will be greater than the socially optimal number, t^* , at every capacity, so the best outcome is not obtainable. The government's decision not to control use means that it must adopt a different rule to choose capacity.

The effect of a rise in capacity on the social net benefit is can be found by totally differentiating SNB with respect to s :

$$\frac{dSNB}{ds} = \frac{\partial SNB}{\partial s} + \frac{\partial SNB}{\partial t} \frac{dt^0}{ds} \quad (10)$$

The first term to the right-hand side is the direct effect of the added capacity on the social net benefits. Given the number of trips taken by each user, an increase in size reduces congestion but expends scarce resources. *The social net benefit rises if the decline in congestion costs is greater than the resource cost.*

However, each person will respond to the reduced congestion by travelling more. Each person will receive the benefit of extra trips, but will also bear higher congestion costs. The effect of this adjustment is described by the second term to the right-hand side. Thus the socially optimal capacity is reached when the two effects are exactly offsetting, so that:

$$\frac{dSNB}{ds} = 0$$

Or equivalently

$$-\frac{\partial SNB}{\partial s} \div \frac{\partial SNB}{\partial t} = \frac{dt^0}{ds}$$

Trial Questions

A community has n members. The marginal benefit of each individual from Knowledge is .

- Is knowledge public good? Explain
- What is the socially optimum knowledge for a society of $n = 5$ persons if the marginal cost of improving x is $MC = 10 + 2x$? What is net social welfare per a member of the community if they share the cost of knowledge equally?
- What is the socially optimal knowledge for $n = 10$ and $N = \infty$?
- Suppose that the community has two groups of members. Group 1 of 5 persons whose marginal benefits is $MB_x^1 = 6 - 0.4x$ and group 2 with 5 persons and marginal benefit is $MB_x^2 = 10 - 0.4x$. What is the socially optimal knowledge in this case?
- Now in the case of part (d) the government cannot raise taxes to pay for improving knowledge. Suppose the member of group 2 form a cooperative and share the cost of improving knowledge. What will be the knowledge in this case? What will be the welfare loss to a person who belongs to each group relative to the socially optimal outcome?



Basic Reading

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LESSON SEVEN: PUBLIC CHOICE THEORY

The expectation of this course is that after completion we expect a student lesson, you should be able to:

- 7.1 explain the theory of public choice
- 7.2 describe the interpersonal utility comparison
- 7.3 explain the unanimous Consent on Public Goods Levels
- 7.4 describe the Lindahl pricing
- 7.5 describe the mechanism for aggregating Individual Preferences
- 7.6 explain when majority voting work
- 7.7 explain when the majority voting does not work
- 7.8 describe Arrow Impossibility Theorem
- 7.9 describe median voter theory
- 7.10 describe the Condorcet method
- 7.11 describe the social welfare functions and impossibility
- 7.12 Explain the extra assumptions of the median voter model.
- 7.13 explain the link between public choice and government failure

7.1 Theory of public Choice

Public choice theory is a theory of collective analysis of individual preferences, tastes, satisfactions or social welfare. The aim is to enable societies to have a systematic way of reaching a collective agreement or public collective decision for the public welfare interest. It is anticipated that through such a tool collective decisions will be reached as it appears in frameworks of individual decisions. It is important to note that there are other collective decisions within the society that do not necessarily pass through a theoretical tool. For instance when a Government enact a law or make constitutional reforms these do not require a theoretical tool like this one within public choice theory. In economics the theory of public choice is one of the oldest innovations within economics thinking and social behaviour assessment.

There are prominent economists who for decades have worked on setting up aspects of Voting for social decisions and the associated voting paradox. These include the Condorcet framework, Social Choice values and Arrow impossibility theorem way back in 1951. To date such tools have proved relevance in providing a systematic framework for analysing the best ways of provision of public goods. For example Marquis de Condorcet in the late 18th Century proposed that when we vote for provision of public goods and services or even in general elections and the related there is a possibility that choices by individuals will be cyclic to the extent that no decision about the winner will be possible based on voting.

This situation named voting paradox happens because of individual heterogeneity. Decisions are made by individuals who differ in various ways which can potentially result into conflicting majorities over goods and services to be voted. We see even in today's world majority wishes are sometimes in conflict with different preferences such that one group can prefer good A over B, the other groups can prefer good B over C and another possibility being C over A. The formulation of Arrow Impossibility Theory that will be discussed later suggest that it is



practically difficult to arrive at an optimal decision through voting. We see in today's World where decisions and selections might lead to adverse selection even through a democratic voting.

In terms of the structure of the public choice as observed this is a theoretical framework that combines elements of welfare economics on one hand and voting theory on the other. The voting theory is both economics and non economics formulation of behaviour in social sciences disciplines. There are wide range of applications of the voting theory by Law, Politics, Political Science and businesses related disciplines. In all these respects the unifying feature is that the methodology is more individual such that the aggregates of preferences in a given society will roughly sum up to the individual behavior of each member and when put together they will form one block of a public or group preference within a given society. When a society discuss on project implementation or a decision that will democratically be obtained on any socially interested service the public choice will roughly mirror individual opinions aggregated together through discussions, voting agreements or count checks done by those who decide on behalf of the society. This is what give power to the public choice.

The scope of public choice theory is broad and combines the other important segments of public sector economics such as the positive analysis of economics famously named normative economics. This is the branch of economics that looks on the descriptions of the economic phenomenon by focusing on facts, cause and effects behavioral relationships and including the recent development of empirical testing of economic theories. The other side of the scope of public choice theory is the famous social choice theory. This theory consider the horizontal summation of different individual preferences for the society and using a theoretical framework it combines these individual preferences to reach a collective or social choice.

7.2 Aggregating Individual Utility (Interpersonal Comparison)

The discussion so far has revealed that in any society collective agreement or decisions are likely to be made and according to the theory of public choice such decisions to be collective their collectiveness or individual summation of each member of the society should roughly represent group or social decision. In this case the theory of public choice suggest need to aggregate or put together all individual preferences first then obtain a combined social welfare function that can allow modeling of the socially combined individual preferences in terms of economic theories such as the utility functions.

In economics and even other disciplines summation of individual opinions is not an easy and straight forward exercise. The important condition is that one should be able to defend comparability of the individual preferences before you can combine them in any form. For instance in a dilemma of whether the society prefers a football stadium that a hospital it must be possible to compare individual preferences of football stadium against a hospital, then be able to group these preferences between the two groups. A combination of individual preferences of football stadium against a hospital is what allows the individual preference comparability or interpersonal comparability.



There are a range of aspects that have been used to amplify the analysis of public choice focusing on interpersonal comparability of individual choices. One of the oldest questions has been how and when one can sense or observe that the correct decision has been made for an individual and hence make him happy. Utilitarianism frameworks based on works by Jeremy Bentham and John Stuart Mill have been popular in this area in providing clues of when the right decisions are made that will make the society satisfied. Based on this utilitarianism framework an action is right if it tends to promote happiness and is wrong if it causes sadness and reverse happiness all together.

The main problems in applying the equity principles relate to the difficulty of defining equals. This calls for an interpersonal comparison of welfare levels, which is difficult in practice. In levying taxes for example, the equity principle is one of the most important considerations facing the governments of small developing countries, because most of the people are poor (see Goode 1984).

7.3 Unanimous Consent on Public Goods Levels

Unanimous consent is just a situation where the society is in agreement that a given level of provision of public goods or services is adequate to make them happy or satisfied. The utility theory predicts that such a provision will maximize utility of individuals within a given society. As we are aware governments are responsible for providing goods and services as a primary activity. The main idea is to ensure a mechanism where there is optimal provision of public goods. This is a major concern for any government because for provision of public goods and services to be meaningful every member of the society must be happy.

As we have argued before, heterogeneity of individuals in a given society makes it impossible in many situations where every individual will consent to the chosen level of provision. In public sector economics attempts are made to make this unanimous consent possible. One way has been to estimate the willingness and ability to pay for compensation of acquiring the public goods and services. It is common in social services provision to see project evaluation reports that give indication of cost for compensation. This has also been one way of arriving at a level where a unanimous consent might be attained.

The other method of estimation that gives an indirect way of arriving at a unanimous consent to the level provided is the taxation named Lindahl. Samuelson (1955) advanced a model of the optimal provision of public goods, which was a neoclassical formulation influenced by the earlier work of Wicksell and Lindahl. Under this sort of taxation individuals pay for public goods according to their marginal benefits. The amount they are ready and willing to pay is taken as what they perceive as the maximization of utility from the benefit they will receive once the goods are made available. It is common that government finance provision of public goods and services by the use of taxation and other forms. The question usually arises what will amount to an agreeable formula to generate the exact amount of public goods and services that will satisfy the general public to the extent that all will be happy and satisfied. In sum the mechanism and observation of the optimal provision of public goods is the fundamental part of public choice theory.



To address the question of when and under what circumstances can the provision of public goods attain unanimous consent this section makes the following provisions as indicated:

To begin with we discuss the aspects of Lindahl Pricing or taxation for provision of public goods by discussing its effectiveness and weaknesses by looking at when it works and when it fails to work. The other important aspect in this area discussed is the Median Voter theory and aspects of lobbying and public choice issues.

7.4 Lindahl Pricing

In the original setting Lindahl was concerned with finding an equilibrium which would reflect just tax shares and public good output. Lindahl assumes two consumers who determine their tax shares through a tatonnement process.

Unanimous agreement is assumed. The higher the proportion of tax paid by A the lower the proportion paid by B. The tax shares are plotted along A's demand curve which B views as a supply curve for the public good.

The intersection of the two demand curves determine the equilibrium quantity of the public good and equilibrium tax shares. The sum of the two tax prices equals the cost of providing the public good.

The Lindahl equilibrium, is based on the view that individuals reveal their preferences. The failure of individuals to reveal their preferences becomes a problem in the large-group case. But limitation is that, Lindahl's assumption of unanimous agreement among individuals may not be realistic for large communities.

From the assumptions and overview of Lindahl pricing we can see that this is a pricing mechanism that elicit willingness to pay for each player in the market who are expected to benefit from the consumption of the good once completed. As discussed in the theory of social choice we are interested in the ability to aggregate the preferences of individuals within the given society.

The question is on how does this work?

In the first setting the Government will introduce a tax price of public goods or services that are intended for provision. The expectations here is that tax experts must have done an exercise to know the ability of each eligible payer within the society or group members within a few blocks with different pricing brackets.

In case there are significant differences on willingness the government find where the willingness to pay is higher and charge more. For the lower willingness to pay groups it is advised to set a lower rate.

There is a possibility where all groups want the same amount and have similar willingness to pay. This is the point of Lindahl equilibrium. It is the level where Government should choose to provide the goods and charge the price. This is a unanimous consent level of public goods in the context of Lindahl model.

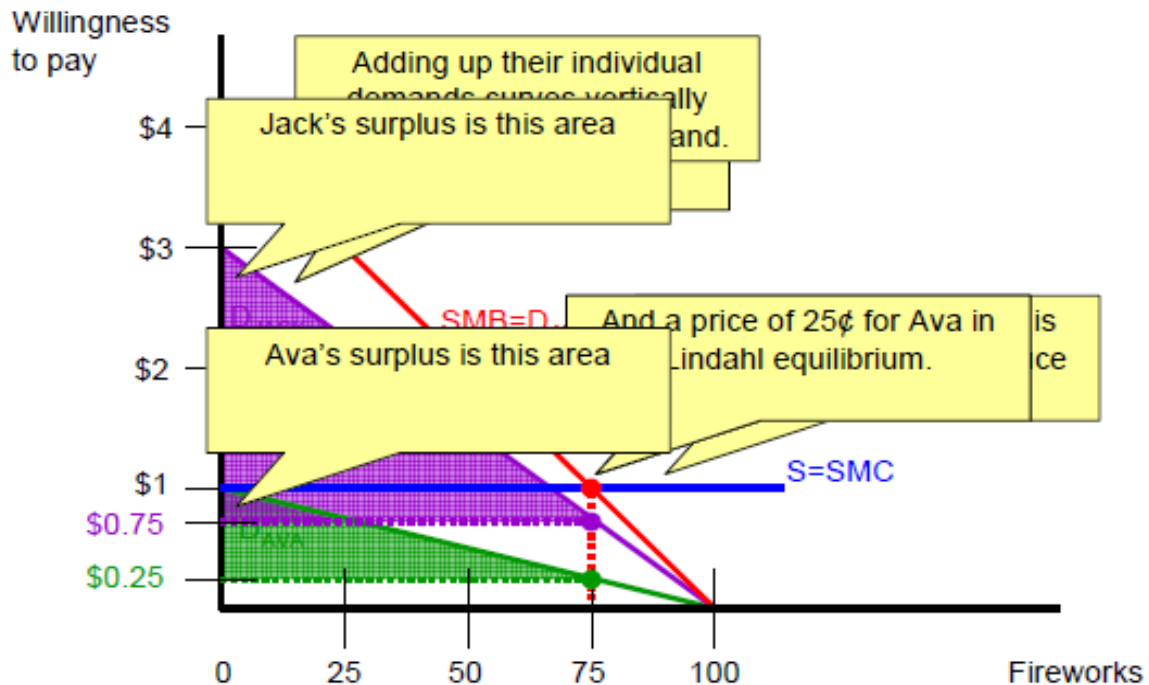


Figure 1 Lindahl pricing

Figure 7.1: Lindahl pricing Adopted from Stiglitz 2009

However there are limitations of the Lindahl mechanism and the following situations make it fail to work;

- a) Preference revelation problem: Individuals may behave *strategically*, and *pretend their willingness to pay* is low in order to get others to bear a larger cost of the public good.
- b) Preference knowledge problem: It is hard for people to properly value goods they do not shop for on a regular basis.

Preference aggregation problem: Aggregating millions of voters' preferences is difficult in reality. However, as long as these observations can be avoided the Lindahl pricing will work.

7.5 How could we aggregate the Preferences of Individuals?

It is common knowledge that the provision of public goods tends to display excludability problem such that when a given level has been provided you cannot prevent some members within the society from enjoying it in fact will consume it whether or not contributed to its provision. .



Therefore there is no room for an individual to adjust the choice available. As indicated in the above sections the major problem of public goods provision is having a choice that will satisfy at least majority within the society. Thus one of the key areas of concern in this topic is on how a public provision can be adjusted to take into account individual preferences while observing optimal provision objectives of public goods and services.

The least possibility is having a mechanism of voting in such a way to safeguard principles of aggregating individual preferences into a social decision. There are several possibilities but in this paper we focus on *direct democracy*, whereby voters directly cast ballots in favor of or in opposition to particular public projects.

Thus more attempts are made to aggregate the individual voting and see how an equilibrium can be attained

Let us assume a three-person community with individuals V_1 , V_2 and V_3 . They vote on three alternative proposals as follows:

- i) Proposal A - spend nothing on a school
- ii) Proposal B - spend \$1,000 on a school
- iii) Proposal C - spend \$2,000 on a school

The three voters have an ordinal preference ranking. Individual V_3 prefers proposal C, and he prefers the middle proposal to no spending at all. Individual V_2 prefers the middle spending proposal B to each of the other extremes. Individual V_1 prefers proposal A but he would vote for proposal B if for some reason proposal A is unattainable. An individual's preference is said to be single-peaked, if as he or she moves away from the most preferred outcome, his or her utility falls consistently. Proposal B will gain the majority of the votes against all other proposals. If put against C, both V_2 and V_3 will vote for B. If put against A, both V_1 and V_2 will vote for B. Hence majority voting will favor B. The preferences of V_2 are therefore median for the group of voters. V_2 is therefore the median voter. As a result, a political equilibrium will be reached because proposal B (spending \$1,000 on a school) will be chosen.

7.6 When Does Majority Voting Work?

For majority voting to work there are three conditions. The choices must be consistent for each voter and this requires that they must display a dominance condition and lastly independent from irrelevant alternatives. What do these conditions mean to have consistency? These are elaborated below *Dominance condition: This is another important precondition for the majority voting to be effective and it assumes that the choice is arrived at by the society or a public body when the choice of one is accepted by all voters. Transitivity is another factor that matters for the majority voting: This is a condition on the ordering of choices that should be consistent with a logical ordering in a way that when confronted with three choices and assuming that a voter is rational voter A, B and C if A is preferred to B and B is preferred to C then A is preferred to C. The last condition is named the independence of irrelevant alternatives. This simply says that in case a third choice is introduced ranking of the first two choices shall remain the same.*

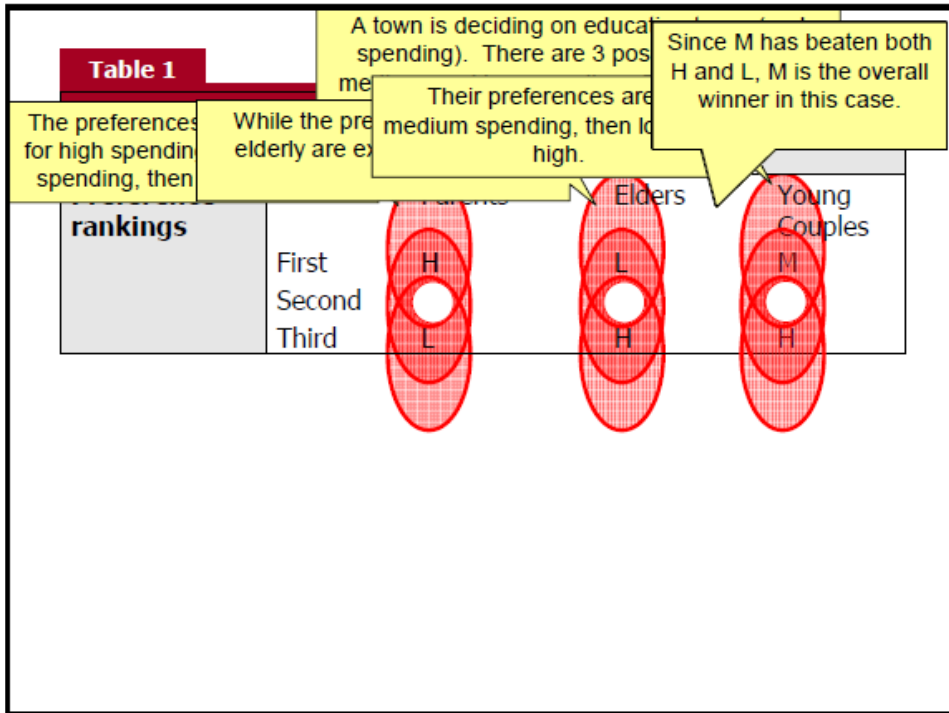


Figure 7.2 Adopted from Stiglitz 2009

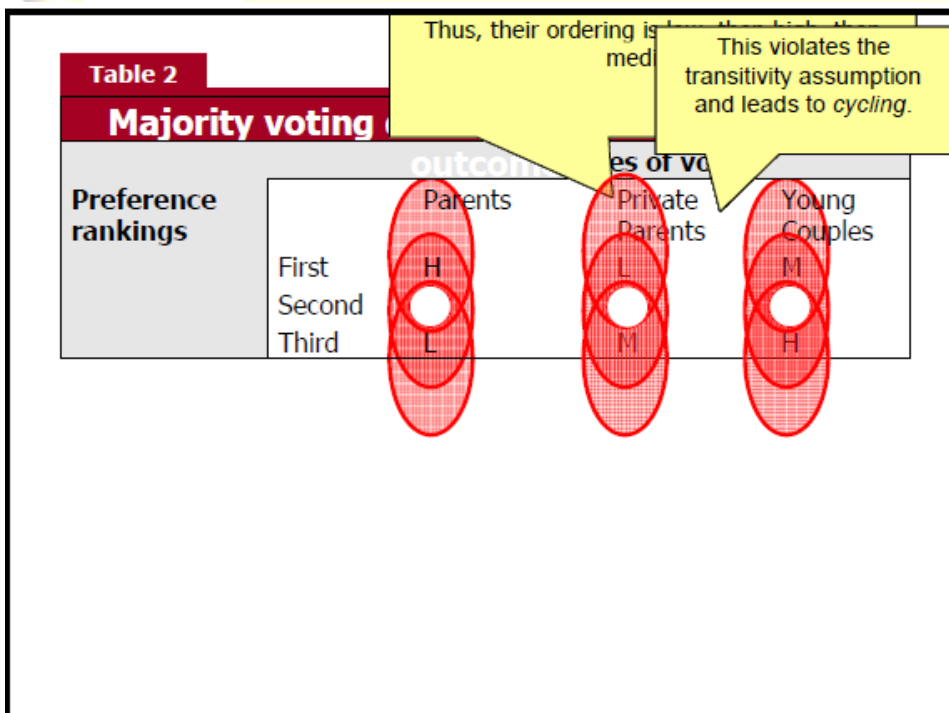


Figure 7.3: Majority voting Adopted from Stiglitz 2009



7.7 Limitations of the Majority Voting

There are several cases when the majority rule fails to work. Most importantly it is possible to fail to get a clear winner. Such a circumstance occurs when the condition of transitivity fails to work leading to cycling that results in inconsistent aggregation of the preferences of individuals within a society. This might happen independent of inability of each individual in arriving at agreeable preferences. When this happens voting collapses as a mechanism of arriving at optimal provision of social outcome. The other problem that follows is agenda setting when an individual decides the sequencing of the votes. When such a problem arises, the setter of agendas will affect the results. For example, first set up a vote between H and M. H wins, then a vote between L and H means L will win, any outcome can win with appropriate ordering 7.8

Arrow Impossibility Theorem. So far we have seen how public sector economics has battled to achieve a system that can guarantee consistent outcome or social choice that is unanimously agreed upon by the entire society what we call, aggregating satisfaction or preferences of the society. The mixed results have prompted development of theories like the Arrow Impossibility Theorem which basically states that it is impossible to reach consensus in voting where you will observe a voting system that can produce consistent outcome. In other words we can formally state that there will be no social decision which is also the voting rule that can be representing conversion of individual preferences into a consistent aggregate social function without either restricting preferences or imposing a dictatorship. In this respect dictatorship is justified as a means to ensure optimal social outcome.

Setting of the Arrow Impossibility Theorem

The environment under which the Arrow impossibility operates is within the Social Choice or Public Choice Theory. It considers a setting of voting paradox when voters have three distinct alternatives. Then a ranking order that can precisely convert the preferences from what the society believe to be their social choice then converted to ranked preferences of the society that satisfy the three conditions namely

- i) Being Non dictatorial
- ii) Display unrestricted domain
- iii) Be Pareto efficient
- iv) And independent of irrelevant alternatives.

Why impossibility? The Arrow Impossibility concludes that it is impossible to find any ordering that meets these conditions.

Just recall what we discussed before, the Non dictatorship simply means that a single voter should not dominate and set influence the decision of the society. In practice this is what happens. There are minorities who have voting power to influence what is ultimately the social choice. Hence Non dictatorship is hard to observe. The unrestricted domain is like what we have discussed in one way or another. We expect that the social choice of individual voter preferences result into a social welfare function that is unique and complete ranking of the social preference. In the third condition of independence of irrelevant alternatives is what we discussed above. Given two choices x , y and z , the preference between x and y is only influenced by the preference between x and y what we call pairwise independence. Pareto efficiency is the condition on unanimity. Under this condition it is assumed that if every



individual prefers a certain option to another, then the resulting community preference ranking.

7.9 Median Voter Theory

So far we have seen how difficult it is to arrive at a socially acceptable choice that will mirror the preferences of each individual in a given society. Arrow Paradox or the Impossibility Theorem has concluded that it is impossible to observe choice that satisfy strict conditions that are pre-requisite for voting that will be a total summation of individual preferences in the society. The Median Voter Theory is further attempt to explore mechanism of sorting the preference ordering that will represent the public choice.

What the median voter Theory predicts is no far from the other exposition of voting paradoxes. According to the theory there exist a median voter, whose preferences are likely to be an average preference for the society such that for Majority rule voting, the outcome will depend on what what is the most preferred preference of the median voter. In a sense this is a Dictatorial in that the social choice is influenced by the median voter.

What are the Assumptions of the Median Voter?

The Model depends on two main assumptions

- i) The first assumption is that a voter can display all possible choices or alternatives in one dimensional social spectrum.

Secondly The voters preferences are assumed to be single peaked such that they have only one choice or alternative they prefer more than the other. In practice this is commonly observed when public officials make decision on behalf of the community. In Politics there are likely to exist what we see as committees that set agenda and in some cases make choices for the society.

In principle the median voter probably represents a different person or collection of It should be noted that if a voter prefers A to B and C to B his preferences will be double-peaked. When preferences are single-peaked, then majority voting will deliver a consistent aggregation of preferences of the individual voters.

7.10 Condorcet Method

The other famous criteria to ensure social choice effectiveness is through the method termed Condorcet Method. Through this method social preferences are obtained by finding a set of voters or a voter who wins in every pairing of head to head selection against other candidates whenever such a candidate exists.

Under this circumstance a candidate is said to have the property of pairwise champions which give him or her the name the Condorcet winner. However there are possibility that such a candidate cannot exist in a particular competition or election. This impossibility arises when there is a possibility of cyclic such that each candidate has an opponent that defeats them in a two candidate contest.



The **Condorcet paradox** (also known as **voting paradox** or the **paradox of voting**) in social choice theory is a situation noted by the Marquis de Condorcet in the late 18th century, in which collective preferences can be cyclic, even if the preferences of individual voters are not cyclic.

This is paradoxical, because it means that majority wishes can be in conflict with each other: Majorities prefer, for example, candidate A over B, B over C, and yet C over A. When this occurs, it is because the conflicting majorities are each made up of different groups of individuals. Thus an expectation that transitivity on the part of all individuals' preferences should result in transitivity of societal preferences is an example of a fallacy of composition.

7.11 Social Welfare Functions and Impossibility

A social welfare function is basically a logical framework for aggregating individual welfare that derives from individual preferences in a given society. Key variables in the Social Welfare Functions are the individual preferences that when taken together they represent the majority preferences or make the society satisfied. This is also a summary of social utility function which is a set of individual utilities in a horizontal setting.

However the paradoxes of voting and the impossibilities discussed tend to impair the quality and outcome of the social welfare functions, because for the social welfare function to be realistic it must contain individual preferences that possess the conditions of completeness, transitivity, independence of irrelevant alternatives and Pareto efficiency. This is why the impossibility paradox poses a challenge to arrive at a social welfare function that will be a socially representative of individual preferences within a society.

7.12 Public Choice Theory and Government Failure

In the theory of public choice there is a possibility of modelling Government failure. The setting starts from the reality that all that the Government aims at is maximizing welfare of the public or society. It does so through a coordination of a number of assumptions and public led projects that are initiated by the Government and funded by the public through taxes which is levied by the Government along with other forms of funding. The dilemma for the Government is to forecast accurately the social preferences and make the decisions that will make the society happy. This is what we have learnt to be the preference maximizing attitudes and hence social welfare maximization.

But according to the public choice theory individuals within the public and the Government are likely to have behaviour that do not match up with the realization of social welfare maximization. The guarantee to having the rational outcome is for the Government to act preliminarily in the interest of its people the citizens.

Government failure arises when the Government fails or is unwilling to act in the interest of its people.

There are several explanations why and how does this happen.



Corruption is the most common factor why Government fails or become unwilling to act in the interest of its people. This could be a situation where the Government leaders make decisions for the public with less consensus or decisions that are likely to be associated with Rent or kick backs. Weak institutions, lack of motivations, poor monitoring and inadequate compensation to public officials have resulted into abuse of offices where Government officials find loopholes and use their positions to benefit themselves. This will lead to Government failure.

Size maximizing breaucracy is another reason for Government failure. e.

Niskanen (1971) developed a model of the *budget maximizing bureaucrat*. In this model, the *bureaucrat* runs an agency that has a monopoly on the government provision of some good or service. Based on this reason it was discussed that income of the Government leaders might not be influencing efficiency and instead spark into adverse selectivity and the notion that the more one gets the more one wants. It should be noted that Government are there to serve people not for their own sake. High salaries are paid to motivate work and ensure high productivity. If this situation does not increase the productivity and effectiveness of leaders to deliver for Country development then there will be Government failure.

Leviathan Theory

The other explanation of Government failure is through the Levian Theory. According to this theory the individual bureaucrats and the larger Governments are considered as monopolists with the aim of maximizing the size of public sector, The competition between the two is in provision of taxes and expenditure patterns that will enable the realization of the size of what is anticipated by the society as utility maximizing provision. The Government is faced with conflicting decision between maximization of tax revenues and allocation of expenditure for ranning the Government, funding public projects and maintaiing social services. This is not an easier task and in any angle there is likely to be a failure. For instance Government may fall short of adeaute revenue when tax revenue are less than the expenditure set for the public. This is common in typila African economies where tax revenues are lower due to narrow tax base, inadequcies in tax administration and the rapid popolation growth that lead to more demand for goods and services. The expenditure array might some time be too big when Government venture into uge spending in military, white elephant projects or excessive borrowing to invest in non productive investment and pilling up of national debt that is repaid at the expense of tax revenue.

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LESSON EIGHT: PUBLIC EXPENDITURE THEORY

By the end of the lesson, you should be able to:

- 8.1 define the meaning and scope of public expenditure
- 8.2 describe the size and composition of public expenditure
- 8.3 explain the factors responsible for growth of public expenditure
- 8.4 describe theories of Public Expenditure
- 8.5 Inequality
- 8.6 Social transfer programme
- 8.7 Social efficiency
- 8.8 Social insurance
- 8.9 Social security
- 8.10 Public expenditure policies in Africa

8.1 Meaning and scope of Public expenditure

Public expenditure refers to the expenses which the government incurs for its own maintenance as also for the entire economy. It also refers to the expenses of the public authorities – central, state and local governments – either in protecting the citizens or in promoting their social and economic welfare. The volume of public expenditure has been growing in all countries because of the continuous increase in the activities of the state and other public bodies (Holzmann, 1990; Ortiz-Ospina and Roser, 2015). Hence the study of public expenditure, its causes principles and effects is very important, from the point of view of the subject matter of public finance.

There are two divergent views, regarding the scope of public expenditure. That is the traditional and the modern. Earlier writers attached to the classical school, were opposed to increasing public expenditure for two main reasons. The first was the belief of Adam Smith and his followers that the functions of the state should be restricted to justice, police and arms. The second was the belief that government expenditure is wasteful, and that money can be better utilized by private persons than by government (<https://www.amu.ac.in/emp/studym/99996351.pdf>).

Economist such as John Maynard Keynes long argued for increased intervention of state in economic activities of nations, due to the spread of socialist ideas and peoples' democracy. Thus, public expenditure has acquired great importance in modern times for two basic reasons.

Firstly, the economic activities of the state have increased in many ways and secondly, it has now been realized that the nature and volume of public expenditure can have important effects on the economic life of the country on production, distribution and the general level of economic activity.

Hence it is only after the great depression of 1930's and the feverish activities during war and post war period, that increased attention was paid to the study of public expenditure. This change in attitude was facilitated by the writings of Adolf Wagner, a German economist, through his famous law of increasing state activities.



8.2 Size and Composition of Public Expenditure

The Public Sector is part of the assets of the economy and society that is owned by the state. It is also defined as the goods and services that are provided collectively and funded in whole or in part from taxation. Or part of the labour market in which people work for a public body, not a private company. But all these definitions have overlapping boundaries. The boundaries between public and private sector are changeable and permeable over time.

The “size” of the government is often measured relative to some benchmark, the most common one being GDP. It adjusts the size of government for inflation and population growth. The sum of general government consumption and public investment, expressed as a percentage of GDP provides a measure of public sector size from the perspective of final aggregate demand. This however, excludes public expenditures on transfers, making public sector final demand an indicator of public sector size that is tailored to assess the potential macroeconomic effects of public expenditure. In comparison with government consumption, it is likely to be more unstable because it includes public sector investment.

As much as governments are faced with the challenge of raising enough revenue through taxation, equally, the opposite is true. Ensuring a safe and peaceful environment and providing water, electricity, education, healthcare, social security, adequate housing among others, to a large extent, is the responsibility of the state. All these are enabled by the ability of the government to spend. This resources to expend allows them to produce and purchase the goods and services to meet their objectives of, generally, providing public goods and redistributing resources fairly to maximize citizen’s welfare.

The public sector in all countries has grown significantly over the past century. For a typical country the public sector was small at the start of the twentieth century: in the order of 5-10% of GDP. Expenditure then rose steadily for the next *sixty years*. There was a leveling-out of the growth toward the end of the century; typically starting in the mid 1970s. Before the 1960s, especially periods of World War I and II, total government expenditure was fairly low. For example, in the US, total government spending was less than 2% of national income until 1916 (Ortiz-Ospina and Roser, 2015). In the 1930s government spending rose to 5% of GDP and increasing further to about 20% of GDP in the 1970s. Trends are similar to situations in other countries until 1960s. In recent years, the steady rise in public spending has been attributed to increase in government revenue in especially developed countries (ibid). General government consumption ranges from 2.5% of GDP in Equatorial Guinea to about 40% of GDP in Lesotho in 2008. For South Africa, the share of government consumption increased from 6% in the 1960s to 19.1% in 2008. Of 27 countries for which data is available, the average final consumption of the public sector as a share of GDP in 2008 was 16%. For sub-Saharan Africa, the public sector has grown from 18.5% of GDP in the 1980s to about 29% in 2005.

Figure 8.1 illustrates the trends in government expenditure as percentage of GDP for the United Kingdom, the United State of America (two countries with with very high GDP) compared with Ghana and South Afriac for the period, 1962 to 2011. The general trend in government expenditure for these countries show an upward trend with the United Kingdom showing significant growth in government spending followed by the United States before South Africa and Ghan. ,

A striking feature of public spending across the world is the variation in the size and composition of government expenditure. Governments in low-income countries tend to control

a lesser share of national production compared to their counterpart, governments from high and middle-income countries. For instance, government spending in France accounts for almost 50% of national output compared to Nigeria's less than 6%. Also, in 2011, education accounted for around 8% of government spending in the Central African Republic compared to Ghana's 30%.

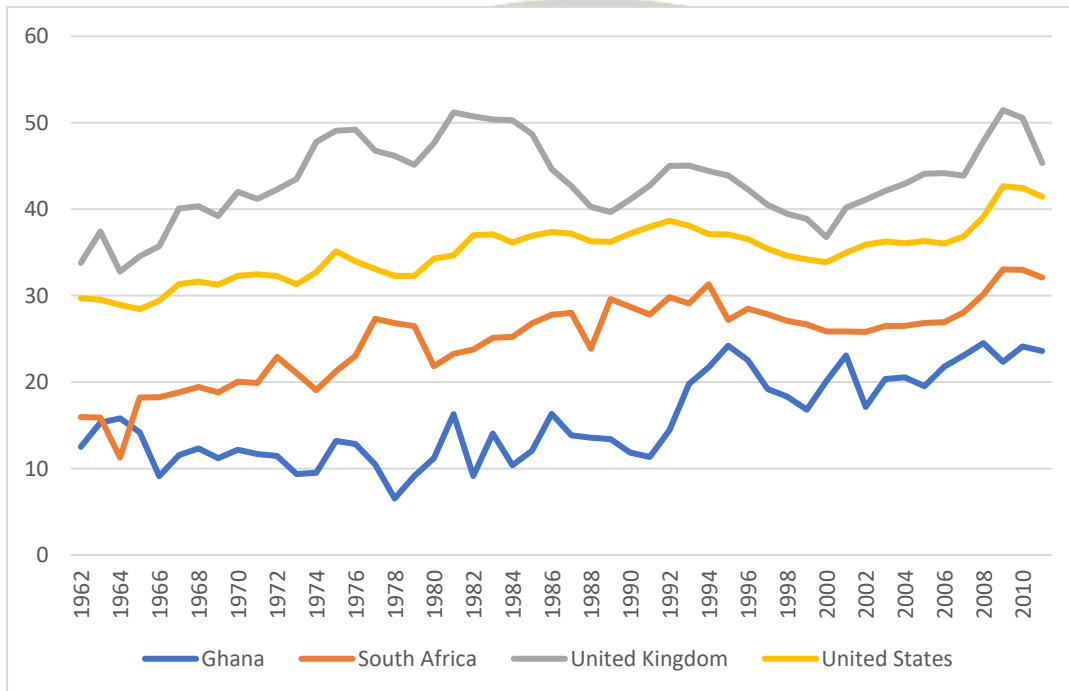


Figure 8.1. Government expenditure (%GDP) (1962-2011)

Source: IMF data

Furthermore, large sums of government expenditure in low-income countries, especially Africa goes to employees' compensation (salary and other benefits), education, infrastructure, public services among others. Whereas, in high-income countries, most of the spending is directed to transfers or social spending. Figure 8.2 illustrates the average levels and composition of government spending across regions for the period 2009-2018. It is evident that in Advanced economies, large portion of public spending is directed towards social protection. For Sub-Saharan Africa (SSA), large part of the spending goes to employee compensation and general public services. However, despite an appreciable portion spent on social protection in SSA, it is over two times less than the one spent in Advanced and Emerging and Developing Europe. Furthermore, it is obvious from Figure 8.2 that environmental spending attracts some of the least budgets.

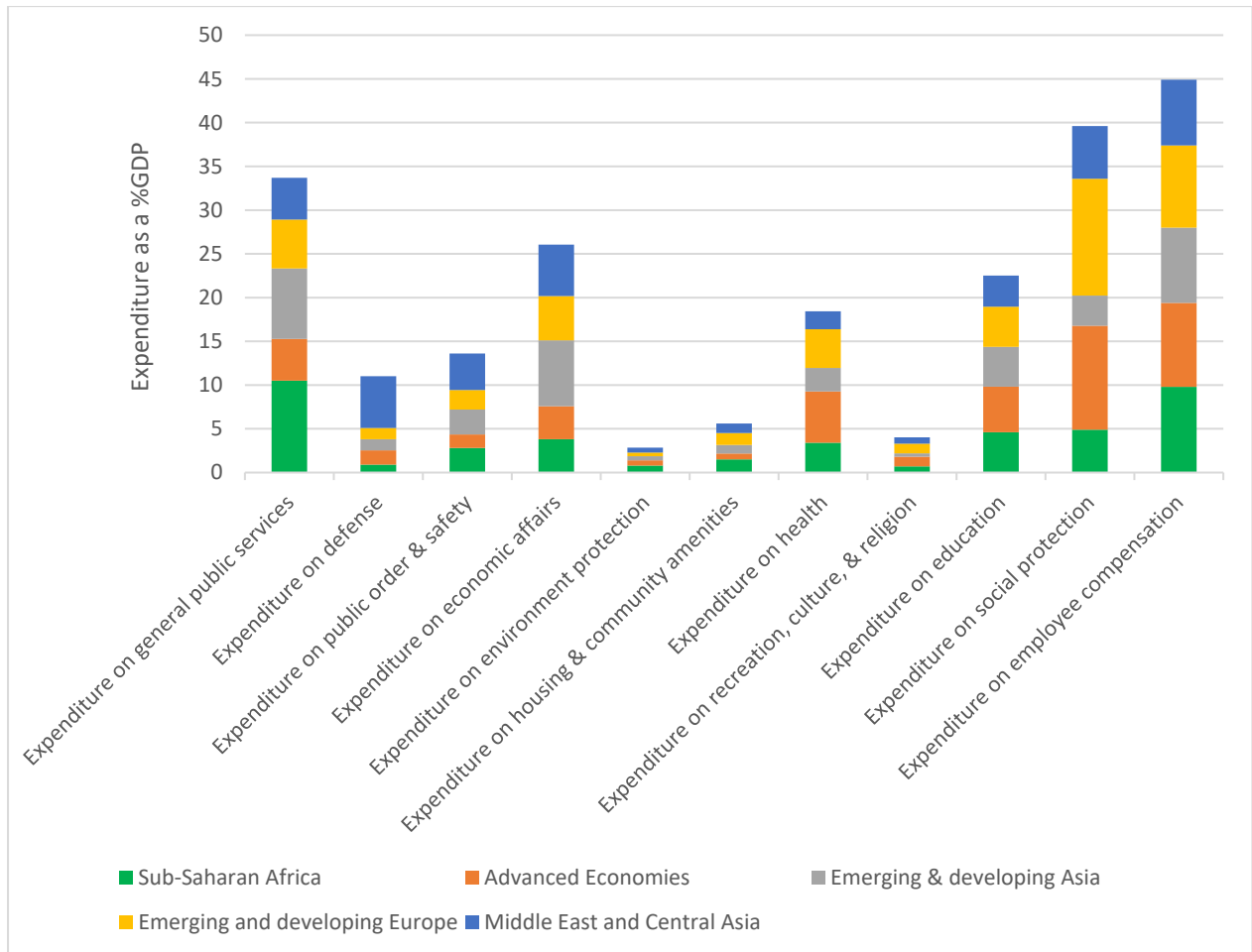


Figure 8.2. Levels and Composition of Public Spending (% GDP), World Regions (2009-2018)
Source: IMF data

Some additional International Comparison of Public Spending:

Howard (1992) analyzed the structure of public spending for some Caribbean countries, noting the heavy emphasis on education, health, and economic services. The study also indicated that wages and salaries comprised over 40 percent of current expenditures in Barbados and Trinidad and Tobago during the 1980s.

Over the same period, when analyzing the functional and economic distribution, respectively, of total public expenditure for selected developed and developing countries (Howard et al., 2010), first observed that spending on social security is much higher in developed countries. Social security systems in developed nations were also found to be more advanced than those in developing nations. Argentina happened to be the only developing country that exhibited similar patterns of spending on social security. In recent periods, however, some Latin American countries have improved their social security systems (Mesa-Lago 1997).

Again, (Howard et al., 2010) argued that governments in developing countries spend a greater proportion of their expenditures on economic services than developed countries. They attributed the trend to higher levels of state involvement in the market economy. Developing countries also invest heavily in infrastructure and provide a large number of support services



in agriculture, manufacturing and tourism. Howard et al., (2010) further observed that significant public outlays in developing countries in the 1980s were directed towards the drive to liberalization and deregulation. Public expenditure to education was found to be higher in some developing countries such as Barbados, Grenada, St Vincent, Ghana, and Botswana. Spending on education and health was lowest in India and Zaire.

However, capital expenditure is a much lower proportion of total expenditure in developed countries than in most developing countries. This trend was attributed a lower ratio of spending on economic services in the developed countries. For most developing countries wages and salaries constitute a higher proportion of their budgets. This can be partly explained by the lack of economies of scale in public services, some of which are large relative to the rest of the economy. However, subsidies and current transfers constitute a higher percentage of total expenditure in the developed than in the developing countries. Subsidies include payments to enterprises in both the public and private sectors (Howard et al., 2010). In developing countries, Gillis, et al., (1992) pointed out that food subsidies were rather common. Some countries in this regard are Sri Lanka, Egypt and India. These subsidies help to control the price of basic food and improve the income distribution. In developed countries, however, most transfers relate to the greater emphasis on social security and welfare.

Spending on defense also constituted one of the largest items of public spending among developed nations in the late nineteenth century. It has since been erratic and have been driven largely by the history of international relations. In all cases defense spending peaked at midcentury and has fallen continually since then. In 1996 for instance, the United States spent 4 percent of its GDP on defense (Hindriks and Myles, 2013).

Most marked rises in public spending among developed countries have also come from social spending on education, health, and pensions. Expenditure on education and pensions has risen sharply as a share of GDP in these countries. Even in the United States, which is predominantly run by private health care systems, public sector spending on health stood at 6.3 percent of GDP in 1994. (Hindriks and Myles, 2013). In 2014 the percentage of education expenditure increased from 2.9% of total expenditure in 1960 to 26.3 % (Gruber, 2016).

Expenditure Controls

Howard (1992) observed that during the 1980s, large amount of subsidies and transfers to public enterprises as well as increased spending on economic and public services, resulted in unsustainable fiscal deficits among developing countries. Structural adjustment and stabilization programme introduced by the World Bank and the IMF in such countries were meant to increase the efficiency of governments Expenditure controls form a major part of the structural adjustment and have been adjudged necessary in developing countries to ensure discipline in the operation of government (Howard et al., 2010).

Premchand (1983) outlined five techniques for expenditure controls as follows:



1. Across-the board-cuts in expenditure. This approach centralized control of budgetary expenditures. Applying this technique, however, has the disadvantage of ignoring the importance of high growth sectors leading to misallocation of resources.
2. Specific sector cuts. These have the advantage of eliminating or reducing unproductive programmes. Such expenditure cuts are preferable over across-the-board cuts because government can implement and maintain the priority areas in its plan.
3. Selection of quick-yielding projects technique. Such projects are often not identified in the budget. The challenge with this technique is that benefits from most government projects cannot be easily evaluated using revenue yield. Social and external benefits will have to be considered.
4. Public sector wage cuts and reductions in administrative expenditures
5. The imposition of cash ceilings. This approach designates the maximum amounts that could be spent on blocks on services. As much as such a technique may be necessary in reducing inflations because of the frequent revisions, it could lead to uncertainty in planning.

8.3 Factors Responsible for Growth of Public Expenditure³:

1. The New Concept of Welfare State: The 19th century state was mainly and basically a 'police state' primarily interested in the protection of the citizens from foreign aggression and in maintaining law and order within the country. Modern states are not police states, but welfare states. The main objective of the welfare state is to promote the economic, political and social well-being of citizens. Modern governments spend huge amounts on generation of employment, provision of basic service like educational facility. Health care facilities, social security measures, low cost housing to the poor, protection of environment etc. These welfare functions require enormous spending on the part of the government. This substantially contributed towards increasing the volume of public expenditure over years.

The New Concept of Welfare State: The initial intent of the term 'welfare state' was to raise the morale of British and distinct them from the Nazi warfare state during World War II as commented by Flora and Heidenheimer (1987). However, overtime, the term has taken a different outlook. Nowadays, welfare state is viewed as the provision, by state institutions, human and social services, design policies to alleviate poverty and enhancing the wellbeing of their citizens (Weir, 2001). However, the welfare of individuals does not only or exclusively derived from the state (Barr, 1992). For example, as argued by Barr (1992), welfare can be sourced through employment from which firms might willingly or unwillingly provide occupational welfare or through private provision through insurance and/or savings. Nevertheless, disagreement in definition of the term, state intervention is made to prevent citizens from falling below certain threshold in terms of standard of living, and to furnish the labour force with the requisite skills, human capital and basic well-being needed to make the state economically productive (Weir, 2001). Welfare state can be conducted in such a way that it can be restrictive or non-restrictive. It can be restrictive if it targets special class of people in society like the poor or women while non-restrictive if it cut-across every individual regardless of their financial standing (see, Harold Wilensky and Charles Lebeaux 1965).

³ Apart from the references provided, this section dwells heavily on:
<https://www.amu.ac.in/emp/studym/99996351.pdf>



2. War and National Defence: In most countries the heaviest increase in public expenditure has been on account of cost of war and preparedness for war. The larger the country, the greater the percentage of resources allocated to national defence. War and rumours of war between countries have forced them to be armed at all time and to get prepared to face a war situation. The cost of defence has phenomenally increased overtime, due to the use of new and sophisticated equipment's. The progresses of military arts and sciences have been so rapid that the war equipment's became extremely expensive and complex. The progress in modernization of warfare and advancement in military arts and sciences make the machines of war quickly out-dated and necessitate speedy and costly replacement. With the emergence of electronic and nuclear warfare, the nature and dimensions of war technology became much costly. More so, in addition to the provision of better living condition for defence personal, provision of pension and other social security measures, interest on war debt etc. positively helped to push the defence expenditure of almost all countries.

3. Population Growth: Population growth and the consequent concentration of people in towns have necessitated increased levels of many governmental activities. Along with growth in numbers, the responsibilities of government relating to the provision of basic services have increased considerably. Thus, leaving the state to bear additional responsibility of solving problems like food, unemployment, housing, sanitation, street lighting, drinking water, drainage etc. (<https://www.amu.ac.in/emp/studym/99996351.pdf>)

Moreover, modern society is becoming complex with increasing needs such as higher levels of education, growth of network of roads and railways and other transport system and provision of public welfare. To check the growth of population, again the government has to increase large amount for family planning and welfare programmes.

4. Growth of Democratic Institutions: Today almost majority of nations have accepted the principle of democracy. Democratic institutions exert structural compulsions on public expenditure. The growth of democracy in the political system of any country requires maintenance of political institutions like periodic elections, at different layers of government, the legislatures, advisory council, local boards etc. and other grass root level administrative units.

Democracy also requires formation of public opinion. A modern democratic state has to maintain the ceremonial head of the state. Besides, they had to maintain diplomatic and consular relations with all parts of the world. Many countries are members of international organizations like the U.N.O, I.M.F, World Bank, W.T.O etc. This means besides annual subscription, expenses on permanent delegates, annual conference and other committed expenditures (<https://www.amu.ac.in/emp/studym/99996351.pdf>)

A modern government thus has been compelled by the democratic forces to assume more and more functions. As a result of democracy, state activities have expanded, and the functions of government have increased both intensively and extensively. The government expenditure on account of these institutions and activities has been on a continuous rise.

5. Provision of Economic Over Head: For the development of a nation, creation and maintenance of economic overhead facilities is imperative. Provision of these facilities like well-developed transport and communication, generation of electric power etc. requires heavy capital investment. Since these investments are not highly profit induced, the private sector will



be discouraged from investing in these areas. Hence government has to assume these responsibilities, to fulfill the basic requirements of development. Hence public expenditure on account of economic infrastructure is huge in size in developing countries.

6. The Problem of Urbanization: Population explosion leads to urbanization and resulted in the growth of metropolitan centres throughout the world. Urbanization is creating major hurdles to the all-round development of the economic system. Urban settlements are creating a number of socio-economic problems to the state, which need huge investment by the central, state and municipal bodies to address these problems.

The size of cities is becoming larger and larger, while newer urban habitations are springing up. The thickly populated urban centres have necessitated the governments to initiate immediate steps to overcome some of the major problems associated with education, public health, water supply, pollution, environmental hazards, energy crisis, drainage and sanitation, migration of rural people to cities etc. urbanization also leads to concentration of industries in urban centres with all attended evils (<https://www.amu.ac.in/emp/studym/99996351.pdf>)

All these activities associated with rapid urbanization increases the responsibility of state to provide huge public expenditure for taking care of the problem of urban inhabitants. Urbanization necessitates a much larger per capita expenditure on civic amenities of life.

7. Rising Trend in Price Level: Rise in price level affect government expenditure in two ways. First, as a purchaser, the government has to pay higher prices for all goods and services it purchases. Secondly government, which is the single largest provider of employment, has to find out larger financial resources to meet its inflated administrative expenditure. That is when prices rise, the salary and allowances of government employees and other expenditures also increases correspondingly.

8. Education and Human Capital Formation: The overall development of a country depends on the quality of human capital. In most economies-developed and developing as well, government provides health and educational services (both general and technical and training of manpower)⁴. These facilities are provided either free of charge or at subsidized rate. The development of trade and industry necessitate specialization in different fields of technology and business administration. Government also launched programmes to eradicate illiteracy. Large amounts of grants of varying type are given to educational institutions at different levels. Coupled with this the massive investments in the field of science and technology, to cope with the advancement in the field also pushed up government spending. The net result is a substantial increase in public expenditure at different layers of government.

9. Modernization of Agriculture: Growth of agriculture is necessary, not only to achieve self-sufficiency in food production, but also to provide adequate support to agro-based industries by providing required raw-materials. Governments of most of these economics have realized the interdependence of agriculture and industry. The expansion of agricultural sector provides

⁴ This trend is however changing, to the extent that out of pocket expenditures on education and health are much greater in developing countries than advanced economies. To illustrate, in 2017, out-of-pocket expenditure in health among households living in LICs, was on average more than 50% of current health expenditure, whereas in HICs, this proportion was in the order of 14% (World Bank's WDI 2020)



impetus to industrialization by supplying raw-materials and wage goods to industrial sectors. Increased income to farmers creates demand for industrial goods. Likewise industrial sector supplies various inputs and implements to agriculture. Hence a systematic development of the agrarian sector is a vital need for the rapid economic development of a country (Mellor, 2017). So modern government undertake ambitious programmes for the modernization of agricultural sector. Hence in order to modernize agriculture, the government has to undertake expensive programmes for improving irrigation facilities, providing flood control methods, provision of fertilizer and other scientific agricultural inputs. Apart from this, huge investment are done in research and soil conservation, land reforms, subsidy to small and marginal farmers, export promotion activities, etc. All these modernization programmes involve huge public expenditure.

10. Industrial Development: Industrialization leads to increase in national income and promotes the standard of living of the people. However, for rapid industrialization, the involvement of the public sector is crucial. To industrialize the country the government has to develop basic and key industries (See Joon-Kyung et al., 1993)

Government also offers various incentives and concessions to private sector to attract industries in backward regions, and to ensure dispersal of industries in backward regions, to keep balanced regional development. The incentives are provided in the form of establishment of industrial estates, provision of cheap credit, subsidized raw materials, tax holidays and concessions, improved transport system and marketing facilities. Further government takes measures to control monopolies and to provide consumer goods and services at reduced price. All these resulted in an increase in public expenditure.

11. Provision of Public Goods and Utility Services:

Public goods are those, the consumption of which is externalized. It is consumed equally by all. These goods have no private market (See Samuelson, 1954, 1955, Holtermann, 1972). Defence, and police service, justice, roads, irrigation, flood control projects, public parks etc. are all examples of public goods. They involve huge investments and have to be provided by the government. Moreover the provision of major public utilities like railways, post and telegraph, electricity services etc. are coming under government sector. The provision and maintenance of these public goods and general utility services involve heavy expenditure.

12. Servicing of Public Debt

Public debt constitutes a substantial part of the government revenue; a major part of mounting government expenditure is met from public borrowing. Hence, the internal and external debt obligation of the government has increased considerably during the last few decades. This leads to a subsequent increase in public expenditure in the form of increasing cost of debt servicing and repayment of loans.

13. Protection from Market Inefficiencies : In all welfare states, government is the ultimate custodian of public welfare. It is bound to keep a constant vigil on the abuses of free market mechanism like malpractices by dishonest traders, black marketing, hoarding, monopoly practices and consumer exploitation. Modern governments consider it a part of its duty to protect the economy from the failures of market mechanism. Government adopts regulatory measures to check the imperfections in-the market system (See Bator, 1958, Wolf, 1987).



Government usually makes arrangements for buffer stock creation, and distribution of essential goods at reduced rates through a network of public distribution system. Government makes earnest efforts to reduce the income and wealth inequalities and to achieve social and economic justice. This necessary involves huge government expenditure through budgetary provisions.

14. Economic Depression: The worldwide depression of 1930's stressed the need for using public expenditure as a compensatory factor to overcome the deficiencies in trade and employment caused by reduced private investment. Public expenditure has been found as the best anti-dot to fight against and for preventing economic depressions. The government is expected to play an active role in maintaining the level of trade and employment. Depression of that 1930s proved that state has an active part to play, by making a judicious planning of public expenditure in advance, to mitigate the impact of depression in trade. Government expenditure on public works and other projects directly provides employment to large numbers and by increasing the effective demand for goods and services helps to raise the level of business activity. Government expenditure was considered as compensatory factors in maintaining the level of trade and employment especially during economic depression. This led to an increase in public expenditure after the world wide depression of 1930's (<https://www.amu.ac.in/emp/studym/99996351.pdf>).

The current Covid-19 pandemic has and will push most economies, developing and developed alike, into serious economic depression that will warrant serious bailout from the state, thus contributing to the rise in public expenditures

15. Maintenance of Law and Order: In tune with the growth of population urbanization and complexities of modern economic and socio-political life, law and order problem became more complex. Terrorism has become an international and national phenomenon threatening the law and order situations of nations across the world. The responsibilities of the government, to protect the people from internal conflict and breach of peace by antisocial elements have now become a crucial component of government activity. This requires large amount of funds for maintaining the law and order machinery in constant vigil with full preparedness to meet any adversities.

Apart from these the maintenance and preservation of historical places, monuments and forest resources, populist policies adopted by the ruling parties under pressure from democratic institutions and opinions and lethargy of the bureaucracy also contribute towards increasing the nature and volume of public expenditure in recent years.

16. Adoption of Planning: Almost all countries have now basically accepted the principle of planned economic development. Economic planning is considered as a panacea for all economic evils like poverty, deprivation, unemployment etc. planning is considered as an instrument to achieve certain socio-economic objectives. Planned economic development involves increasing state activities in many spheres of socio-economic life of the community. Eradication of poverty, equitable distribution of income and wealth, provision of increased employment opportunities, development of backward classes etc. are the major objectives of planned economic development. This require large sum of money leading to a consistent increase in public expenditure (<https://www.amu.ac.in/emp/studym/99996351.pdf>).



8.4 Theories of Public Expenditure

8.4.1 Musgrave-Rostow's (1969) Theory

The Musgrave-Rostow's (1969) theory sees public expenditure as a prerequisite of economic development, its level being directly related to the stage of development which a country has reached. In the early stage of economic growth and development, public investment as a proportion of the total investment of the economy is found to be high. The public sector is, therefore, seen to provide social infrastructure overheads such as roads, transportation systems, sanitation systems, law and order, health and education and other investments in human capital which are all necessary to gear up the economy for take-off into the middle stages of economic and social development.

The middle stage of development is characterized by rapid growth in which there are large increases in private saving, and public investment falls proportionately. During this phase, infrastructure expenditure is increasingly complementary with expenditure by private sector. Urbanization produces a range of externalities such as pollution and crime and an increasing proportion of expenditure is diverted towards the control of externalities. During this stage of development, market failures exist which can frustrate the push towards maturity; hence increase in government involvement in order to deal with these market failures

The final stage called the developed stage is associated with high income societies with increased demand for private goods which need complementary public investment (urbanization). At this stage there is the need to react to equity issues, so transfer payments are the main items of government expenditure. This is the mass consumption stage geared towards income maintenance programmes, and policies designed to redistribute welfare will grow significantly relative to other items of public expenditure and also relative to GNP

8.4.2: Dalton's Principle of Maximum Social Advantage Theory

The theory states that, maximum satisfaction should be attained by striking a balance between public revenue and expenditure by the government, such that economic welfare is achieved when marginal utility of expenditure equals = marginal disutility of taxation (<https://www.yourarticlelibrary.com/economics/complete-information-on-the-principle-of-maximum-social-advantage/2675>).

According to his theory, determination of public expenditure and taxation will happen on the basis of public preferences which they will reveal themselves. Cost of supplying a good will be taken up by the people. The tax that they will pay will be revealed by themselves according to their capacities.

He explains this principle with reference to

- a) Maximum Social Benefit (MSB)
- b) Maximum Social Sacrifice (MSS)

Dalton's Principle of Maximum Social Advantage. Graph showing point of Maximum Social Advantage at point "P"

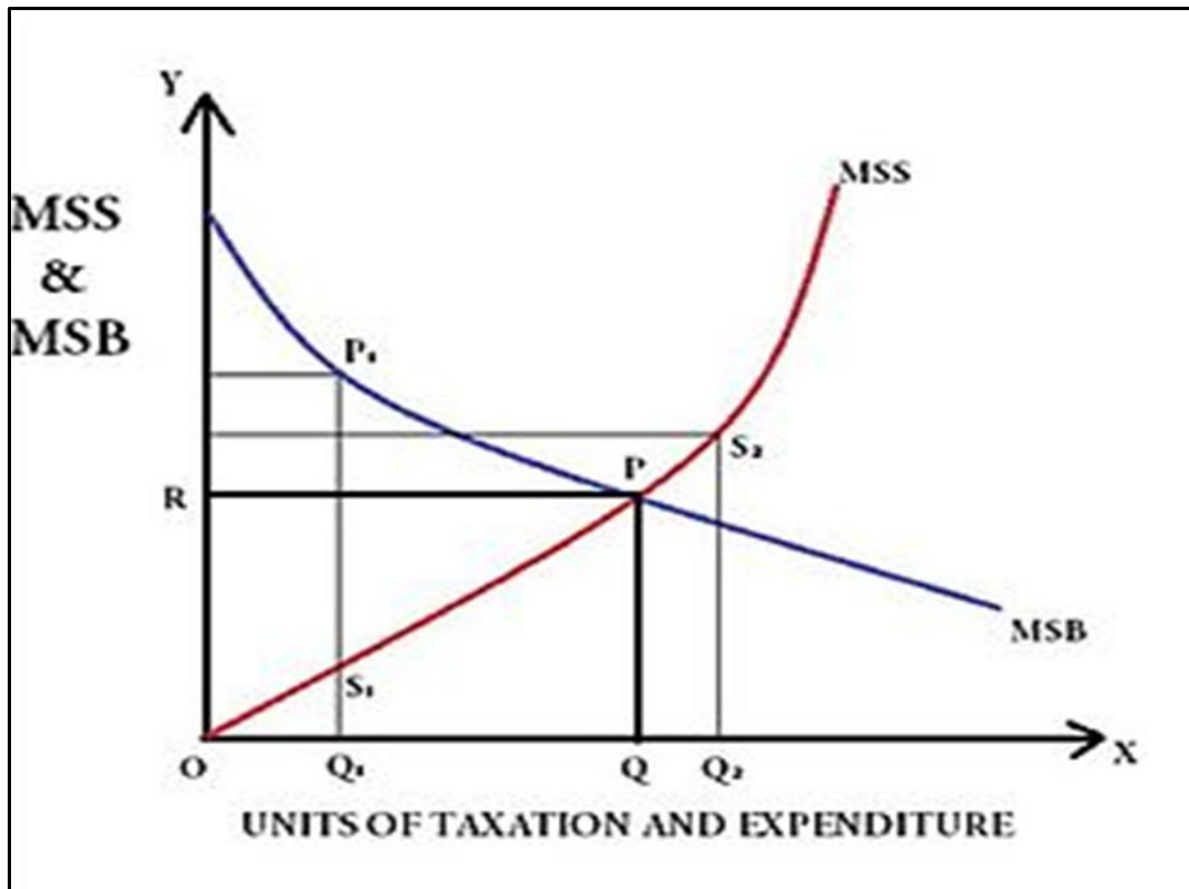


Figure 8.3: Graph showing point of Maximum Social Advantage at point "P"

<https://www.yourarticlelibrary.com/economics/complete-information-on-the-principle-of-maximum-social-advantage/2675>

8.4.3: Wagner's Law (Adolph Wagner (1835–1917) of Increasing State Expenditure

Wagner's Law (1835-1917) "states that increased public expenditure is due to the pressure of social progress." That is, for growing economies, the share of all major government expenditure increases.

Wagner based this generalization on two considerations

- The income elasticity of demand for services provided by the government is greater than unity.
- During the course of economic development, the public sector constantly encroaches upon the private sector.

In trying to demonstrate the first consideration Wagner divided government expenditure into two types:

- those dealing with justice and power functions (internal and external security)
- those dealing with cultural and welfare functions (socio-cultural and economic expenditures)

Considering the justice and power functions, Wagner argued that higher levels of economic development increase the strains of living and induce higher criminality; thus increasingly larger public expenditures are needed to control such crime. Furthermore, higher levels of



economic development lead to increasingly complicated trade and legal relations, which in turn, requires increasing arbitration on the part of the state. On the international level, military forces cast off their former aggressive aspects and assume a preventive role, which requires larger standing armies.

Concerning the cultural and welfare functions, Wagner stated that increasingly larger expenditures on education and public health are needed with higher per capita national products. Consumption of cultural services grows faster than the GNP, as the basic housing, nourishment and clothing needs of population are increasingly met. Expenditure on governmental administration rises faster than the GNP, with the increasing extensions of the functions of government and with the increasing bureaucratization of the state.

About the second consideration namely, public sector encroaching upon the private sector, Wagner argued that the encroachment of public sector upon private sector is:

- a) due to consolidation of state powers
- b) due to break down in the market mechanism in producing certain goods and services which brings about the state intervention.

Wagner suggested that the inevitable changes in technology and the increasing scale of investment required in many activities would create an increasing number of large private monopolies whose effects would have to be offset, or the monopolies taken over by the state in the interest of the economic efficiency.

Criticism of Wagner's Law

- (i) Lacks comprehensiveness in analysis. Political science, economics and sociology are among the several disciplines to be incorporated in any theory of public expenditure. Yet, Wagner's hypothesis excludes all these characteristics.
- (ii) It is based on an organic self-determining theory of the state, which is not the prevailing theory of the state in most western countries (Black et al. 1999: 88).
- (iii) The theory ignores the influence of war on governmental spending. It stresses a long term trend of public economic activity, which tend to overlook the significant 'time pattern' or process of public expenditure growth (Likierman 1988).
- (iv) By concentrating on demand, Wagner's law overlooks the supply side and the politics of provision (Likierman, 1988)
- (v) Empirical examinations demonstrate that Wagner's "law" cannot be unequivocally called a law. Recent studies show that the estimated relationship between the increase in per capita income and the growth in government expenditure might be spurious. (Dominic, 2001). Bohl (1996) examined the G7 countries during the post-World War II period and found that Wagner's "law" can only be supported by the results for two of them, Canada and the UK. Most of the early studies that corroborate Wagner do not go into the question of causality (Anwar et al. 1996: 167-168). To validate Wagner's law, however, the direction of causality is crucial. Causality from government expenditures to economic development would be in contrast to Wagner and shore up the Keynesian school of thought which understands government spending as an exogenous factor.



8.4.4: Displacement Model (Wiseman-Peacock Hypothesis)

Wiseman-Peacock (1961) based their hypothesis on the analysis of public expenditure in U.K for a period of 65 years from 1890 to 1955. They postulated that “Public expenditure tends to increase by sharp jerks in a step-wise manner rather than continuously and smoothly”. Usually each step coincides with social upheavals, notably wars.

Key assumptions

- c) The government can always find profitable ways to expend available funds (in terms of generating political support).
- d) Citizens, in general, are unwilling to accept higher taxes than they have grown accustomed to in the past.
- e) Governments must be responsive to the wishes of their citizens.

According to the hypothesis when revenue constraints dominate, the growth of expenditure is restrained. Public expenditure increases and makes the inadequacy of the present revenue quite clear to everyone. The movement from the older level of expenditure and taxation to a new and high level is the “Displacement Effect”. The inadequacy of the revenue as compared with the required public expenditure creates an “Inspection Effect”.

The government and people review the revenue position and the need to find a solution of the important problems that have come up and agreed to the required adjustments to finance the increased expenditure. They attain a new level of ‘tax tolerance’. They are now ready to tolerate a great burden of taxation and as a result the general level of expenditure and revenue goes up. In this way, the public expenditure and revenue get stabilized at new level till another disturbance occurs to cause a ‘Displacement Effect’

In addition to the displacement and inspection effects, Peacock and Wiseman also describe a ‘concentration effect’. Each major disturbance leads to the government assuming a large proportion of the total national economic activity, the net result is the ‘concentration effect’. The concentration effect also refers to the apparent tendency for central government economic activity to grow faster than that of the state and local level governments. Thus Peacock-Wiseman approach to government spending trends is much more modest in what it purports to explain than in Wagner’s hypothesis. The strong and weak versions of the Peacock and Wiseman Hypothesis are represented in Figures 8.3 and 8.4 respectively. In the case of the strong version, real absolute government expenditure per capita evolves in a steplike pattern, where the movement from one step to another coincides with major social disturbances such as wars (Henrekson, 1990). In the case of the weak version, the ratio of government expenditures to GDP follows an upward sloping trend in normal times. This trend is shifted permanently following a social upheaval Henrekson (ibid).

Graphical illustration

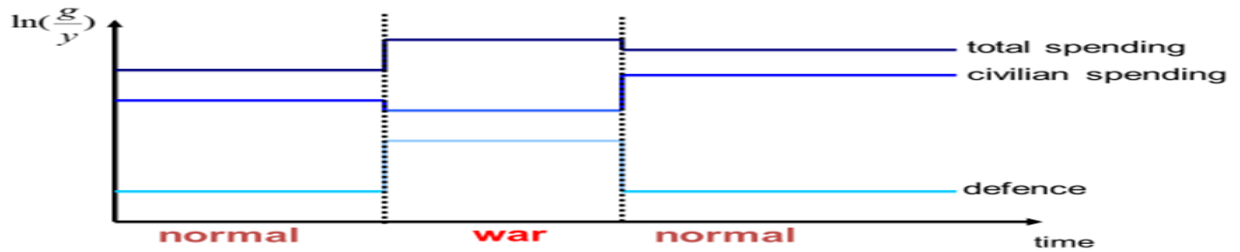
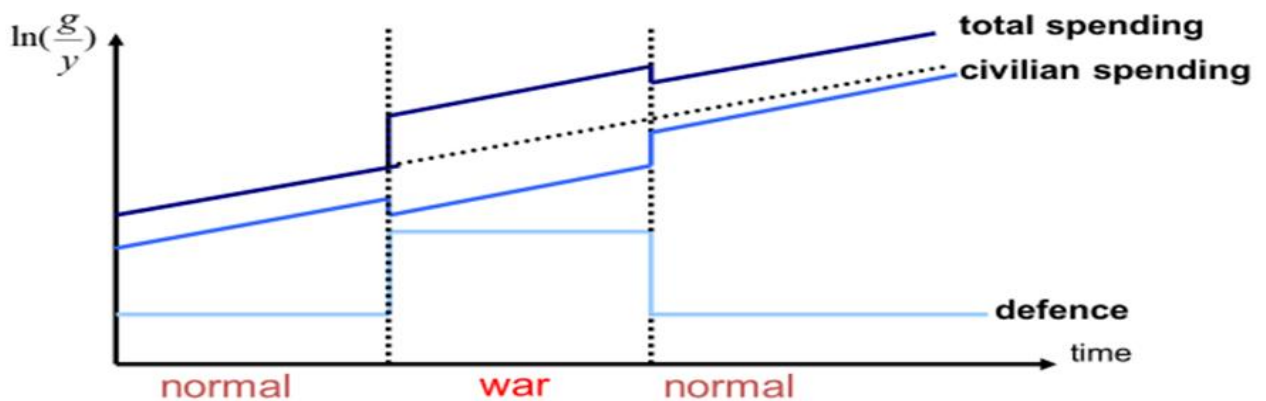


Figure 8.4: Strong Version of Wiseman-Peacock Hypothesis

Source: Based on Henrekson, 1990)

The weak version of the displacement hypothesis



Underlying trend growth: level shift but not trend effect

Figure 8.5: Weak version of the displacement hypothesis

Source: Based on Henrekson, (1990)

8.4.5: Colin Clark Hypothesis

Colin Clark (1945) in his “Public Finance and Changes in the Value of Money” puts forth what he calls the ‘Critical Limit Hypothesis’ regarding tax tolerance. Colin Clark based this hypothesis on the inter-war data of several western countries. The hypothesis is that when the share of the government sector exceeds 25 per cent of the total economic activity of the country, inflation occurs even under balanced budget.

To support his contention, he argues that when the government’s share of the aggregate economic activity reaches the critical limit of 25 per cent, income earners are so affected by reduced incentives (due to high tax incidence) that their productivity suffers. They produce



much less than what they are capable of, leading to a curtailed supply. On the other hand, demand effects of government financing become quite high even if the budget remains balanced. All told, inflation results from this maladjustment between demand and supply. The basic defect of Clark's hypothesis is its reliance on the institutional framework of the economy, and the choice of a definite figure (25%) as the critical limit. It would have been more acceptable to assert that in a market economy, increasing state activity leads to mounting inflationary pressures. Moreover, whether or not government's budgetary activities would lead to inflation also depends upon the manner in which public expenditure is incurred.

8.5: Inequality

Inequality is an observed difference in development among countries and citizens of a particular country. Differences in size, degree, circumstances. Lack of equality (Kuznets, 1955; Lenski (1966).

Economic inequality also known as the gap between rich and poor, income inequality, wealth disparity, or wealth and income differences) is the differences in the distribution of economic assets (wealth) and income within or between populations or individuals (Sala-i-Martin, 2006; Atkinson and Brandolini, 2010). The term typically refers to inequality among individuals and groups within a society (Cornia and Kiiski, 2001), .but can also refer to inequality among countries (see, Firebaugh, 1999, 2003, Melchior, Telle and Wiig, 2000). The issue of economic inequality involves equity, equality of outcome, equality of opportunity, and life expectancy.

The Tiebout (1965) model provides a framework for considering one of the most important problems in fiscal federalism. Tiebout postulate that if consumers' preference is heterogeneous then, for efficiency, it requires numerous communities to form and offer different public good provision. He further argues that the place to reside depends on tax paid and service package available. The model however, is grounded on a series of basic assumptions:

- Consumers are free to move to communities that meet their needs.
- Consumers are rational and fully informed.
- Several communities.
- No externality.
- Suitors are attracted by community leaders (known as managers).

There is currently enormous inequality in both the ability of local communities to finance public goods (the value of the property tax base) and the extent to which they do so. For example, in a certain community, the rural town raises only \$13,932 in local tax revenue per public school student, while the urban town raises \$22,472. Some of this difference comes from decisions about the level of local taxation: the tax per \$1,000 of property value is \$14.25 in the rural town and \$17.68 in urban. Most of the difference in revenue, however, comes from underlying differences in the values of taxed property.

In the state of New York, one study found that the property values per public school student varied by a factor of almost six, with the poorest 10% of districts having property values per student of less than \$313,891 and the richest 10% of districts having property values per student of more than \$1,871,956.



Should this inequality in revenue bases (as reflected in property values) or revenues raised (the product of property values and property tax rates) across communities concern public policy makers?

Should higher levels of government mandate redistribution across lower levels of government to offset these differences?

The broad answer to these questions is that it depends on the extent to which the Tiebout model describes reality. Since Tiebout does not perfectly describe reality, however, there are two arguments for redistributing from high-revenue, high-spending communities to low-revenue, low-spending communities.

The first is failures of the Tiebout mechanism. For example, suppose that there are reasons people cannot effectively vote with their feet, such as restrictive zoning rules that cause houses to be very large and expensive in communities with high public goods (e.g., each house must be on at least a one-acre lot). In this situation, there may be people who desire high levels of public goods but who cannot afford the high quality of house mandated by the zoning rules. These people could remain stuck in a town with low public goods provision, the only place where they can afford a house. In this case, it could be efficient to redistribute to the low public goods towns, to help the individuals stuck in a situation where they are forced to under-consume public goods.

The second reason for redistribution is externalities. If a large share of local tax revenue is spent on local public goods with spillovers or externalities for other communities, there is a standard externality argument for higher levels of government to subsidize spending in the communities providing the externalities. For example, suppose that high-quality elementary education in a town leads to lower crime rates in both that town and neighbouring towns. In this case, it may be optimal for the state government to tax high-revenue towns and redistribute to low-revenue towns to ensure that low-revenue towns can provide a high-quality elementary education.

8.5.1 Measuring Inequality

Measuring Inequality

The measure of inequality till today remain contentious among scholars. However, we are going to focus on the three most cited inequality measure: the relative, absolute and centrist measure for inequality.

The Relative Measure of Inequality

This measure is based on proportions of total amount and it suggest that inequality is unchanged if there is general increase in income levels of equal proportions (Nino-Zarazua *et al.*, 2017). For example, suppose the income level is raised by 20% in a country (say, on the order of a government regulation in the labour market), affecting both the poor and rich in the labour force. Under the notion of the relative approach, this change would be registered as no change, since the increase in income is by the same proportion, albeit the increase in absolute terms. In



a bid to equate different measures of inequality to different political or normative perspective, Kolm (1976), in his paper of “unequal inequalities” referred to the relative measure of inequality as “rightist”. The widely used Gini index, Theil index and mean log deviation fall under the class of relative inequality measure (Nino-Zarazua *et al.*, 2017). Using a purely relative approach to measure inequality, as is done in several of the economics literature, the growth in global income is frequently viewed as being unaccompanied by any alarming increase in inter-country inequality (Subramanian, 2014).

The Absolute Measure of Inequality

Rather than a proportional increase as suggested by the relative approach, the absolute measure depends on the actual numeric gap between the income of different class of individuals in society. It suggests that inequality is unaffected if there is some equal absolute increase in all incomes (Nino-Zarazua *et al.*, 2017). This measure was referred to as “leftist” by Kolm (1976). However, this measure is likely to be misleading (Subramanian, 2014). For example, consider a situation in which one individual (say A) has \$0 and the other \$2 million, and compare to a situation where one individual (say B) has \$2 million and the other \$4 million. In both scenarios the absolute difference in inequality is equal (\$2 million) but for various level of amounts. It would be morally odd to suggest that the individual A and B suffer the same extent of inequality (Subramanian, 2014) as would be qualified by the absolute approach. Absolute Gini index falls under this category.

The Centrist Measure of Inequality

The Centrist approach is the moderate measure for inequality from the extreme absolute and relative measures. This measures certify an increase in inequality if incomes increase through a uniform scale, and a decrease if the same absolute amount of income is added to all incomes (Nino-Zarazua *et al.*, 2017). Manfred Krtscha (1994) constructed a centrist measure of inequality index drawing on sound normative and mathematical reasoning (Subramanian, 2014). However, except for a study by Nino-Zarazua *et al.* (2017), very little evidence exists of studies adopting the Krtscha index in income-inequality studies.

Causes of Inequality

Foreign Aid: Despite increased ODA over the years, some funds which are aimed at improving the well being of the poor actually end up in the hands of a few individuals hence exacerbating the widening income gap in the country. This creates a widening gap in income inequality with the majority of the population who are poor and supposed to benefit from the aid money usually remaining poor, while a few individuals' income increasing. With the increase in income, the rich are able to invest and amass more wealth which can lead to a decade of income inequality unless the government embarks on re-distributive policies. In the same vein several studies (Berndt and Morrison, 1995; Autor *et al.* 1998; Bartel and Sicherman, 1999; IMF, 2007; Esquivel and Rodriguez-López, 2003) have found technological change in the form of improvements in communication and information technologies to increase the productivity of high skilled workers in a higher amount than it does for unskilled labour, thus generating a skill-biased technical change which can generate faster growth in real wages for skilled labour, therefore generating earnings inequalities.



Several studies have tried to define and measure the income inequalities among men and women (Sanborn, 1964; Fuchs, 1971; Becker, 1957; Oaxaca, 1973). The reasons advanced to explain the inequalities includes, including differences in educational attainment and its effects on productivity, hours assigned to work, occupational choices, motherhood and maternity leave, as well as discriminatory reasons such as professional and educational barriers, labour market bias in favor of men, motherhood penalties and occupational segregation among many others found in the literature (Charles-Coll, 2011). Ferreira (1999) as well as Gradín et al. (2006) find similar results in that the gender gap, and specifically the wage gap, is positively correlated with poverty levels.

Ethnic Diversity: According to Meisenberg (2007), ethnic diversity at certain levels leads to large discrepancies in income distribution. In countries whose ethnicity is diverse such as Ghana, political leaders from a particular ethnic group might favour individuals from such groups both in terms of resource allocations and distribution of opportunities, such as better jobs and government contracts which allows them to have a higher level of income. Growth in youth population, ethnic diversity, immigration, and growth of the informal sector or underground economy may all play roles in exacerbating inequality (Aghion 2002; Layton & Nielson 2009).

Globalisation through a number of variables has also been identified as a determinant of income inequality (Layton & Nielson 2009; Alderson & Nielsen 1999; Evans & Timberlake 1980; Reuveny & Li 2003). The explanation is that an economy tends to produce more of goods and services it has comparative advantage in, thus only augmenting income levels of those involved in international trade. Some studies which particularly looked at the effects of trade liberalisation on inequality showed that it might have an income gap widening effect. Meschi and Vivarelli (2009) found total aggregate trade flows to be weakly related to income inequality. However, once total trade flows were disaggregated according to their areas of origin/destination, they found that trade with high income countries worsens income distribution in developing countries, both through imports and exports. Studies such as Dreher (2008) have found that the effects of globalization are accountable for some degree of increase in income inequality in developed. Saba (2004) on the other hand found trade liberalization to generate income inequality in developing countries, through the skill-biased wage differentials derived from an increase in the demand for skilled labor.

A rather more general and long term view of the causes of income inequality, is the study that considers income inequality as a necessary condition in the dynamic process of economic development. Kuznets (1955) in this light, proposed the inverted 'U'-shaped hypothesis (later developed by Robinson, 1976), in which countries, in their quest for development pass through three stages of development, namely; the first stage, a period of high inequality derived from the gradual shifts of labour from agrarian less rewarded activities to urban industrial more rewarded work. As the country continues to develop it reaches the second stage where it begins to industrialize. Industrialization is normally accompanied by the development of the urban conglomerates, a change begins in the distribution of wages as people migrate to urban centres where they will now access higher wages in the industrial sector, thereby widening the income inequality further. The final stage of the hypothesis is reached when countries reach a certain level of development and the majority of the population is now involved in industrial activities. At this point, the government provides generalized access to education and implement income equalizing policies such as transfer or social protection programmes (Charles-Coll, 2011)



Unequal access to and control of resources: The “lack of control” of resources, and the associated lack of decision-making power, is by far the most important, and most complex, of the issues. The economic dependence of women-their lack of control over productive resources and assets-is at the root of the problems women face. At the household level, women’s limited decision-making is associated with their insecurity of access to productive resources, especially land, and to their being predominantly engaged in the unpaid care economy (see, Charles-Coll, 2011).

Corruption: According to the IMF high and rising corruption increases income inequality and poverty by reducing economic growth, the progressivity of the tax system, the level and effectiveness of social spending, and the formation of human capital, and by perpetuating an unequal distribution of asset ownership and unequal access to education (Sanjeev et al., 1998). The World of Work report (2008) also suggested a positive relationship between inequality and corruption.

Cultural Subordination: The fact that payment of bride price brings a control imperative where women are also “property” is one of the root causes of the gender inequalities within households. This has a bearing on all aspects of life ranging from resource allocation and control; roles and responsibilities in society and therefore livelihood options and opportunities; as well as acceptable levels of empowerment (Kabeer, 1988).

Unequal Legal status

There are important gender differences in men’s and women’s legal status and in the rights and protections afforded by law. Key gender-related barriers to access to justice have been identified as:

- i. substantive law issues, relating to gender biased laws and differences in evidentiary requirements;
- ii. administration of law issues, including physical access, training and orientation of staff, and delays in delivery of justice; and
- iii. barriers which exist in the community where disputes occur, notably the role of culture, religion, and patriarchy in community management, power imbalances in the household, and community dispute resolution for a which are not necessarily gender-inclusive or gender-responsive (Trubek, 1957)

8.6: Social Transfer Programmes

According to the study by Samson et al. (2006) cash-based social transfers are operationally defined as regular non-contributory payments of money provided by government or non-governmental organizations to individuals or households, with the objective of decreasing chronic or shock-induced poverty, addressing social risk and reducing economic vulnerability. The transfers can be unconditional, conditional on households actively fulfilling human development responsibilities (education, health, nutrition, etc.) or else uniforms and other school expenses. The unemployed and lowest paid workers can take a chance on riskier ventures that are likely to result in a higher income or acquire human capital such as education in order to find higher wage employment. The time and travel costs of job search – with its unpredictable outcomes – can lock vulnerable workers into poverty traps. Social transfers



provide a coping mechanism for the least fortunate, supporting a minimal level of subsistence and allowing them to invest time and money to improve their chances of getting better employment.

Importance of Social Transfers

According to the study by Devereux and Sabates-Wheeler (2004), and McCord (2005) social transfer is important for the following reasons:

- a. Social transfers provide cash income to enable households to address the worst consequences of poverty. Even short-term public works projects or temporary transfers provide important protective value, enabling households to cope (at least temporarily) with the circumstances of poverty.
- b. Social transfers can prevent poverty shocks from devastating households, mitigating the adverse consequences. Employment guarantee schemes and targeted programmes include many elements of risk insurance, helping to keep households from sinking deeper into poverty.
- c. Social transfers strengthen the economic power of households, potentially enabling workers to negotiate higher wages. Transfers support accumulation of assets, particularly human capital. Public works programmes create productive infrastructure. The macroeconomic stabilization effects of transfer programmes reduce the intensity of poverty shocks.
- d. In addition to their vital social contribution, social transfers can support critical economic objectives. Many of the world's fastest growing economies over the past several decades have built social protection into their policies at early stages because of its potential to increase productivity and contribute to stabilizing domestic demand. The failure to provide appropriate social protection limits prospects for growth and development at the very foundation of society because household poverty undermines children's nutrition and educational attainment, limiting their future prospects.

It is important to note however, that while social transfer programmes have demonstrated remarkable success in reducing poverty in many developing countries, they are not in themselves a solution for poverty eradication. They do not replace other development activities but rather serve as an essential element in a pro-poor strategy, effectively complementing investments in health, education and other sectors. Social transfers both reinforce and are strengthened by successful delivery of complementary social interventions. For example, social transfers are likely to have less of an impact on educational outcomes if school fees are high, but fee waivers may not benefit the poorest since children face other costs to accessing schooling. A combination of fee waivers and social transfers, for instance, maximizes the positive educational impact. Table 2 gives a summary of social transfer payments among developing countries.

Table 8.2: Summary information on selected social transfer programmes in developing countries

Programme	Country	Date Started	Type of transfer	Targeted group	Coverage	Transfer
Programa Familias para la Inclusión social PFIS	Argentina	2004	Cash	Poor mothers without capacity to work.	Poor household with poor women.	Monthly transfer calculated in proportion to the family size ranging from \$58-96.
'100 days employment guarantee scheme' (EGP)	Bangladesh	2008	cash	Geographic areas with high rate of poverty, the ultra-poor, poorest and jobless poor that falls between the ages of 18-50, eager to work but unemployed and unskilled.	The poorest with 37% of the beneficiaries from bottom quantile.	A form of unemployment allowance attracting a Taka 40 per day for 15 days after registration and officials are unable give any job. Beyond the 15 days, the allowance is raised by Taka 10 until a job is secured.
Challenging the Frontier of Poverty Reduction /targeting the Ultra Poor	Bangladesh	2002	Input grants-assets transfer, cash transfer ,health, micro credit	Women in the poorest household	100,000 women benefited between 2002 and 2007.	Taka 300 a month. Also enterprise development training, asset transfers.

Programme	Country	Date Started	Type of transfer	Targeted group	Coverage	Transfer
Bono Madre Nino and Bono Juana Azurduy de padilla	Bolivia	2009	cash	Women and their families without medical insurance or access breastfeeding grants.	Around half a million beneficiaries per year and it is nationwide.	Almost 2,000 Bolivianos in 33 months per household (Women and their families).
BONO DIGNIDAD	Bolivia	1997, changed in 2008	cash	Universal	0.5	\$320 a year
Bolsa Familia	Brazil	2003, replaced Bolsa Escola, PETI and Gas Subsidy	Cash	Households in extreme poverty and poor households with children.	8.2 million households by December 2005.	Households in extreme poverty (per capita income below US\$22) receive R\$50 (US\$22) a month plus US\$7 per child below 16 years of age up to three. Households in poverty (income between R\$50 and R\$100) receive R\$15 per child below 16 age up to three.
Pensionee Solidarias	Chile	2008	Cash	People above the age of 64 or disabled from age 18 and over,	Over 700,000 people to benefit, with the number expected to rise.	A monthly transfer of around \$100 with a possibility of an increase per stipulated conditions.

Programme	Country	Date Started	Type of transfer	Targeted group	Coverage	Transfer
				with household income less than \$60 per month.		
Chile Saldaro	Chile	2002	Cash	Households in extreme poverty	225,000 households	Equivalent to fixed and variable costs of water and sewage up to a ceiling, plus a schooling subsidy.
Old Age Grant (OAG)	Estwatini	2005	Cash	Older poor aged 60 years or above.	Nationwide.	A monthly transfer of US\$15.4, paid quarterly.
Productive Safety Net Programme	Ethiopia	2005	Cash/Food for Tax	Provides cash or food transfers to chronically food insecure households.	7.2 million people	Cash transfer amounts to around 30 Birr (around US\$3.30) per person per month, raised in January 2008.
The Global Social Trust (GST) pilot project	Ghana	Piloted 2007	Cash	Universal	3,200 households	An estimated \$10 per month.
Indira Gandhi National Widow	India	2007	Cash and in-kind transfer	Vulnerable women (such as	Expected to support over	Beneficiaries receive Rs 800 a year for Deepavali and Pongal festivals. Also, a free

Programme	Country	Date Started	Type of transfer	Targeted group	Coverage	Transfer
Pension Scheme (IGNWPS)				widows, beggars, victims of domestic violence and so on) aged 40-64 till remarriage.	half a million women per year.	daily nutritious meal for pensioners is supplied with a further two kilograms of rice monthly to those who are taking Nutritious Meal and four kilograms of rice per month to those who are not taking Nutritious meals.
National Rural Employment Scheme	India	Bill approved in 2005	Cash	Aimed at every adult living in a rural area and willing to do the work.	Expected to support 24 million households annually.	Wages will be paid in cash or in kind or both – not less than Rs. 60 a day (around US\$1.50).
Programme of Advancement through Health and Education	Jamaica	2002	Cash	Monthly cash benefit to households with vulnerable members conditional on School and health centre attendance	Target of 236,000 beneficiary	US\$6.20 per month.

Programme	Country	Date Started	Type of transfer	Targeted group	Coverage	Transfer
Pension Scheme	Lesotho	2004	Cash	Unconditional cash transfer to citizens over 70 years old.	69,046 direct beneficiaries.	M150 or US\$25 per month.
Pilot cash transfer scheme	Liberia	2010	Cash	Households with people too old or too young to work, disabled, chronically sick and child headed households	Families unable to fend for themselves nationwide.	Between US\$ 10 – US\$25 per month for each household, depending on household size. Also, households sending their children to primary and secondary school will receive a bonus of US\$2 and US\$4 / child.
Mchinji Social Cash Transfer Pilot Scheme	Malawi	2006	Cash	Targeted to the ultra-poor and the labour constrained.	By the end of 2008 12,000 households will be reached.	Between MK600 and MK1800 (US\$4– 13) according to household size. Plus, MK200 for children in primary school and MK400 for those in secondary School
PROGRESA. Renamed OPORTUNIDA DE	Mexico	1997	Cash	Targeted to poor rural households using	3.2million households in 2001 (40% of rural	US\$12.50 per family as consumption supplement. US\$8-16.50 per child in

Programme	Country	Date Started	Type of transfer	Targeted group	Coverage	Transfer
S in March 2002.				geographical and then proxy household means testing.	households, 3.38% of the population).	primary school per month and \$15.50 on school materials per year. US\$24-30.50 a month for secondary school and US\$20.50 for materials. Up to maximum of US\$75 per household per month.
Child Money Programme	Mongolia	2005	Cash	Targeted to the poor in 2005, made near universal in 2006. Paid to households on condition of children being immunised, not engaged in hazardous labour	By the end of 2005, 647,500 children (63% of total) in 292,400 households	US\$31 a year. An increase to \$117 a year was approved in the 2007 budget.



Programme	Country	Date Started	Type of transfer	Targeted group and enrolled.	Coverage	Transfer
Maintenance Grant (MG)	Namibia		Cash	Biological parent with child under the age of 18, whose gross-income is not more than N\$1000 per month.	Nationwide	N\$200 monthly for first child plus a N\$100 per month for every additional child until the sixth.
Care of the Poor COPE	Nigeria	2008	Cash	Struggling Households such as Female households with OVCs; Aged parent-headed households; Physically challenged people-headed households;	In 2009 the programme covered almost 9000 households nationwide.	Basic guaranteed income of N1,500-5000 based on number of children per household.

Programme	Country	Date Started	Type of transfer	Targeted group	Coverage	Transfer
				and Transient-poor-headed households.		
Social Safety Net Program (SSN)	Sierra Leone	2007	Cash	Elderly with no means of support.	Over 10, 000 beneficiaries.	A yearly pay \$18-\$125 per person.
Social Pension	South Africa	Early 1990s	Cash	Unconditional old age pension	1.9 million beneficiaries.	Means tested up to maximum of \$75 per month.
Child Support Grant	South Africa	1998	Cash	Unconditional child allowance	8 million children	Around US\$20 (R160 in 2002) a month.
Pilot cash transfer programme	Tanzania	2008-9-2011 (with pilot to be run for 20 and a half years).	Cash	Very poor households with no benefits, elderly, orphans and vulnerable children.	2000 households and 6000 individuals.	Households to receive a monthly grant of between \$12-36 condition on household size, \$3 for orphans and vulnerable children and a \$24 monthly grant for the elderly.
Pilot cash transfer scheme Kalomo district	Zambia	2004	Unconditional cash transfer	Targeted at critically poor households.	1027 households, 3865 individuals.	US\$6 (ZMK 30,000) per month.

Source: Barrientos *et al.* (2010)

8.6.1: Models of Social Transfer

In their paper, Nino-Zarazua *et al.* (2012), attempted to broadly categorize social protection into models: the Southern Africa Model (LIC Model) and the Middle African (West, East and Central Africa) Model (MIC Model). As will be discussed shortly, these models capture very much every form of social transfer programmes, from un(conditional) cash transfers, categorical grants, public work or in-kind transfers.

The Southern Africa Model

This model strongly anchor from the provision of categorical grant for older people and children and has a long history in the sub-region (Nino-Zarazua *et al.*, 2012). This programme is thought to have been initiated when the non-contributory pension scheme was introduced to smooth consumption for old age white minority South Africans during the 1920s (MacKinnon, 2008). Over time, however, the programme became more and more inclusive and integrated. Around the 1970s, Namibia introduced a similar programme and were swiftly followed by Botswana (1996), Lesotho (2004) and Eswatini (2005).

Pension schemes, child support grants, widows' allowances and grants for people with disabilities can be placed under the categorical grant and regarded as pure cash transfer (Nino-Zarazua, 2019; Nino-Zarazua *et al.*, 2012; Barrientos *et al.*, 2003). Normally, social pensions are non-contributory cash grants to older people provided either universally (subject to age requirements) or with eligibility determined by a means test. For instance, the pension scheme in South Africa benefits over 80% of South Africans aged 60 and above; in Namibia, the coverage is reported to be around 95% (Zarazua *et al.*, 2012). Other countries with similar programmes include Bangladesh, Brazil, Lesotho, Nepal, and others (Barrientos *et al.*, 2010). Examples of Child and family allowances that provide cash (or near-cash) transfers to poor households or families can be found in South Africa's Child Support Grant, Namibia's Child Maintenance Grants and Foster Parent Grants, Zambia's Kalomo pilot cash transfer scheme, and Kyrgyzstan's Unified Monthly Benefit. Whereas, other types of programmes – such as Disability Allowances and Widows' Allowances – include India's National Family Benefit Scheme (NFBS), Bangladesh's Assistance Programme for Widowed and Destitute Women (APWDW), Brazil's disability assistance programmes, and Namibia's and South Africa's disability grants. However, unlike other sub-regions in the SSA, the Southern African Model is funded from tax revenue and some of the schemes are regular and unconditional for target group with almost full coverage (Zarazua *et al.*, 2012). Given that these programmes have been around for long, it reflects more of a policy rather than projects like is normally done in middle African countries where some programs are only piloted (see Table 8.2).

The Middle African Model

Similar to the Southern African model, the Middle African model operates programmes that align to pure cash transfers. However, unlike the former's model, the latter's programmes are largely donor funded, and thus, most often than not programme design and implementation follow donors need, thus making the programmes diverse (Zarazua *et al.*, 2012). This in essence, bring about some form of uncertainty in the programmes longevity. Furthermore, some of the transfers are conditional and enjoys relatively little coverage (*ibid.*)



For example⁵, in 2004, five pilot social transfer schemes were supported in Zambia by Deutsche Gesellschaft für Internationale Zusammenarbeit (GTZ) for 14-months targeting very poor households with zero work capability and disabled children. Beneficiaries were to receive \$10 per month. Similar pilot scheme was supported by UNICEF in Malawi in 2006 with benefit ranging from \$4-13 monthly condition on household size. Other donor funded programs can be found in Kenya (cash transfer for orphans and vulnerable children) and Ghana (Livelihood empowerment against poverty) with transfer tied to some condition(s), whereas, Ethiopia's Productive Safety Net Programme (PSNP) offer both cash and in-kind transfer.

“While important strides have been made in the implementation and expansion of social assistance in the Global South, significant policy challenges and knowledge gaps remain. These challenges are linked to aspects of programme design, the interlink between the incentive mechanisms that social assistance and specific policy decisions can generate in school decisions, labour market participation and other welfare dimensions in the longer-term. Social assistance systems not only face the challenge of improving education and health outcomes among children, or protecting vulnerable groups against income shocks, but perhaps more importantly, finding ways to support more transformative and lasting third-order social impacts” Nino-Zarazua, 2019:7.

. Public works⁶: Public works are programmes that involve the regular payment of money (or in some cases in-kind benefits) by government or non-governmental organizations to individuals in exchange for work, with the objective of decreasing chronic or shock-induced poverty, providing social protection, addressing social risk or reducing economic vulnerability (Samson et al., 2006). . Examples include Argentina's Trabajar public works programme, Bangladesh's Cash-for-Work and Foodfor-Work public works programmes, Ethiopia's Productive Safety Net Programme, India's Employment Guarantee Scheme in Maharashtra, Malawi's public works programmes run by its social fund (MASAF), and South Africa's Expanded Public Works Programme (EPWP).

Public works programmes are particularly appropriate for addressing transient poverty by employing workers whose employment or livelihoods are disrupted by a seasonal, climatic or economic shock or cyclical downturn. Public works can be productive, holding the potential to create valuable assets that further reduce poverty or otherwise contribute to programme cost effectiveness. The projects often have political appeal, supporting their implementation and sustainability. The project orientation facilitates geographic targeting to areas of high unemployment and poverty

Offsetting these advantages are several potential pitfalls. Often they are expensive and difficult to administer, taxing government capacity. They are not appropriate for many of the most vulnerable (children, older people, those with disabilities) who are unable to accept the kind of employment offered. In some countries the work requirement fosters a gender bias. It is often difficult to target those of the poorest who live in remote and inaccessible locations.

⁵ Examples are borrowed from (Zarazua et al., 2012).

⁶ This section draws heavily on the study by: Michael Samson, Ingrid van Niekerk and Kenneth Mac Quene (2006) “Designing and implementing Social Transfer Programmes” Economic Policy Research Institute, Cape Town, South Africa



In most cases the projects offer employment of only a short duration, which undermines the delivery of a sustainable social impact. Sometimes the assets created by the projects are of poor quality, failing to contribute the expected productivity impact.

Public works programmes are more likely to succeed when the link between poverty and unemployment is exceptionally strong. Since most programmes offer only short-term employment, they are more appropriate for transient rather than chronic poverty. ²² It is also important that the value of assets produced through public works substantially offset the cost of the programme.

Public works can be an expensive way to deliver social protection. The net income gains to the workers from the Trabajar programme in Argentina have been estimated to be just a quarter of the benefits paid by the government. Due to their high implementation costs, unless programmes generate substantial production-related benefits, they are unlikely to deliver social transfers in a cost-effective manner (Samson et al., 2006).

Public works often aim to provide a safety net – to prevent the poor from falling deeper into poverty and liquidating their assets in order to survive. Policymakers employ public works in the face of economic shocks and natural disasters, and even for cyclical downturns in employment. For chronic poverty and deep structural unemployment, however, short-term public works have limited impact. In these circumstances, regular and predictable employment aimed at creating pro-poor assets is likely to provide more effective social protection.²⁴

8.6.2: Framework for Social Transfer: Growth-Mediating Processes and Outcomes

According to Barrientos (2008) any framework for tracing the growth effects of social transfers would need to identify the growth-mediating processes through which the transfers lead to investment and growth at the household level. Three of such processes have been identified in the theoretical and empirical literature. They are:

- a) the extent to which social transfers are able to lift credit constraints. As has been noted, credit markets often exclude the poor and poorest, but regular and reliable transfers can help overcome barriers in access to credit. This can work in two ways, through enhancing the saving capacity of poor households or through facilitating improved access to credit.
- b) the extent to which social transfers provide greater certainty and security in consumption and investment outcomes. Poor households have fewer buffers to protect themselves and their assets against hazards. Insurance services seldom reach the poor and poorest. Uncertainty and insecurity make investment especially risky and therefore undermine income growth. Transfers can provide increased security and in the process make investment possible.
- c) the extent to which social transfers facilitate improved household resource allocation and dynamics. Household resources allocation can be less than optimal if poverty related credit and liquidity constraints prevent resource re-allocation. Service user fees, or migration costs, are relevant examples. Social transfers can help overcome investment restrictions arising from intra-household dynamics. Social transfers channelled through the mother or carer can ensure

greater investment in children’s education and health.

Barrientos (2008) also provides a basic framework to identify and organize the main effects of social transfers on growth. Figure 8.5 summarizes the main linkages and can be explained as follows:

First, human development investment constitutes a primary objective for a good number of social transfer programmes. This is particularly the case for programmes focused on breaking the intergenerational persistence of poverty, such as *Bolsa Familia* in Brazil. The emphasis on household investment, in schooling or primary health utilisation, is apparent from the conditional nature of the transfers. The growth effects of social transfers can be assessed on the basis of measured human development outcomes.

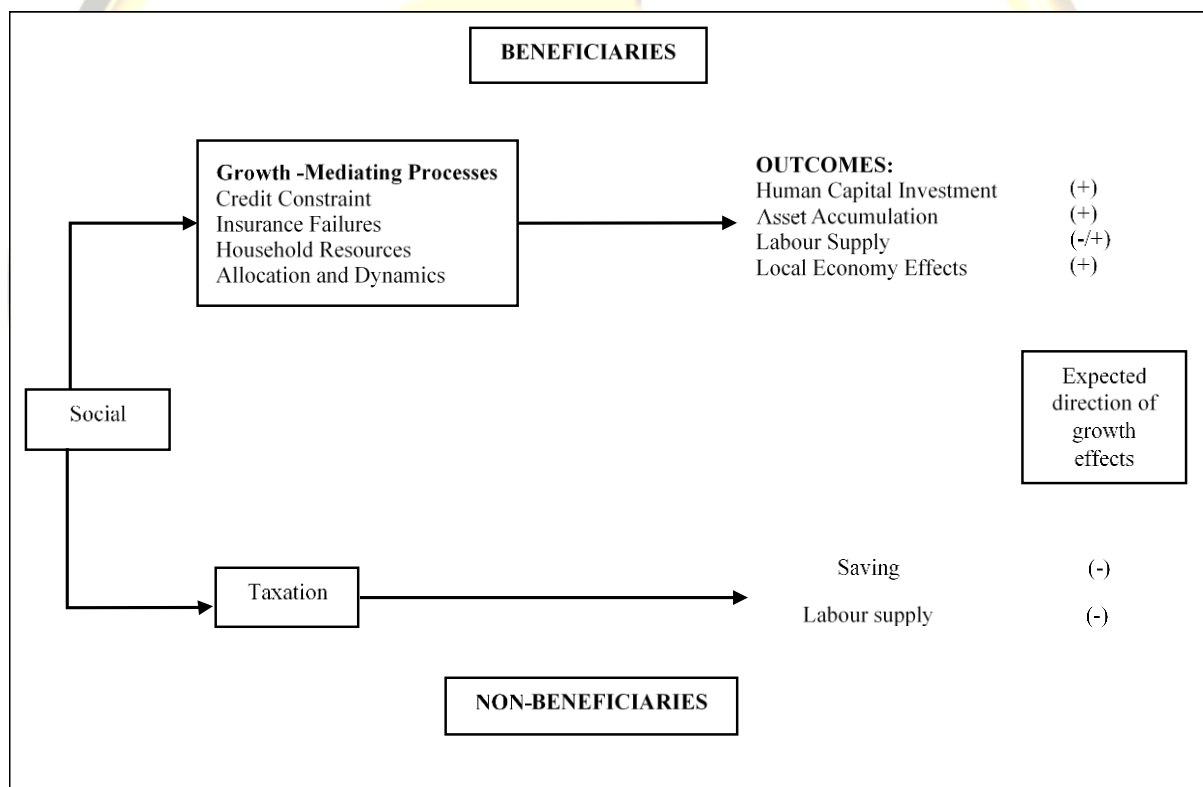


Figure 8.6: Basic Framework for Social Transfer
Source: Barrientos (2008)

Second, in some cases, social transfer programmes explicitly aim to facilitate productive or financial asset accumulation, as in Bangladesh’s Challenging the Frontiers of Poverty Reduction/Targeting the Ultra Poor programme. Here the growth effects of social transfers can be measured in the context of asset protection and accumulation by beneficiary households. The expectation is that social transfers will have positive effects on these outcomes.

Third, the expectations associated with the impact of social transfers on labour supply in beneficiary households are mixed. To the extent that social transfers raise the income of



beneficiary households. This could have negative or positive effects on their employment. Social transfers that include inactivity tests of eligibility, as most pension programmes in developed countries do, may restrict labour supply. On the other hand, where transfers improve productive capacity, as in the nutrition, labour supply may increase among beneficiary households following receipt of transfers.

Separately, the framework should consider the impact of social transfers on incentives to work and save among non-beneficiary households as a second order issue. Where social transfers are financed out of tax revenues, the imposition of taxes on non-beneficiaries may influence their decisions on saving or working. The size and type of the taxation required will largely determine the strength of these effects. There is a large literature focused on the disincentives to work arising from poorly designed social transfer schemes in developed countries that are financed out of payroll taxes. They have a direct influence on the labour supply and savings of workers. These effects are likely to be significantly smaller in developing countries, where the size of social transfer programmes is smaller by an order of magnitude, and where income and payroll taxes contribute only a small share of government revenues. Nonetheless it is important to consider the importance of the growth effects of social transfers on non-beneficiaries.

Finally, it is worth noting that potential positive external effects of social transfers on non-beneficiaries, through the presence of demand-side multipliers. These could be more significant in smaller, largely self-contained, local economies. Evidence is emerging from Africa in particular of social transfers stimulating the emergence of local markets. Mozambique's GAPVU programme led to the growth of street traders around transfer dispensing offices, while in Namibia many grocery stores arose in even the smallest villages in response to the increased demand generated by the social pension programme.

8.6.3: Redistribution across Communities

If higher levels of government want to redistribute across lower levels of government, it can be done through **intergovernmental grants**, which are cash transfers from one level of government to another.

Grants are a large and growing share of federal spending. From 1960 to 2014, grants to lower levels of government grew from 7.6 to 17% of federal spending in most developed economies. Higher levels of government use several different types of grants as tools in the redistribution process.

Tools of Redistribution **Matching Grant**

One type of grant the state government might use is a matching grant, which ties the amount of funds transferred to the local community to the amount of spending it currently allocates to public goods. For example, a one-for-one matching grant for education would provide \$1 of funding from the state for each \$1 of education spending by the local community. While we use a one-for-one match as the example here, match rates can vary from 0.01 to more than 1.

This one-for-one matching grant reduces the price of education by half; each dollar of education spending. So the locals now pay only \$0.50 because the state provides the other \$0.50.

Suppose that the town of Lexington provides only one public good to its residents—education. It finances education through property taxes, and any money families have after taxation is spent on private goods (such as cars or clothing). Residents of Lexington have a total budget of \$1 million to spend on education and other private goods, and we model how they choose to divide this budget. Figure 8.6 shows the situation in Lexington before any grant is provided.

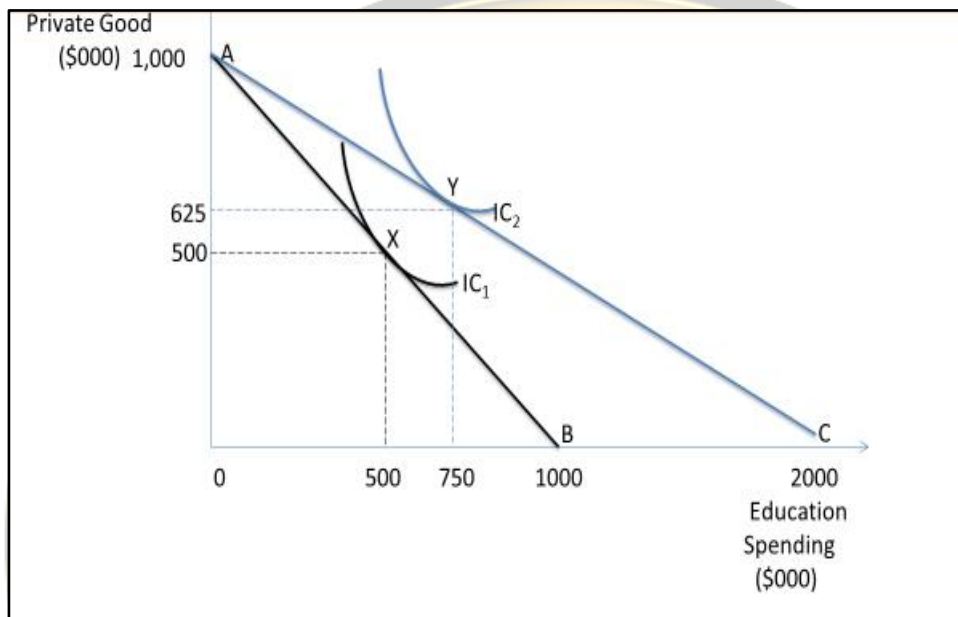


Figure 8.7: One-for-One-Matching Grant

Source: Gruber, (2016)

The voters of Lexington have some preferences for education and private goods that can be represented as an indifference curve IC_1 between these two sets of goods. That is, we can analyze Lexington's choice between education and private goods in the same way that we might analyze an individual's choice between these same items; IC_1 represents the aggregation of the indifference curves of the voters through a voting mechanism.

Before there are any state grants in place, Lexington chooses to spend \$500,000 per year on education and \$500,000 per year on private goods. This spending combination is represented by point X, where the town's indifference curve is tangent to its budget constraint.

Due to the one-for-one matching grant, total education spending increases from \$500,000 to \$750,000 at point Y. Lexington contributes \$375,000 toward education and receives the other \$375,000 in matching grants. Of its original \$1 million budget, Lexington now has \$625,000 to spend on private goods (the original \$500,000 it was spending plus the \$125,000 it no longer

spends on education). As a result of the matching grant, then, total spending on both education and private goods has increased. This causes a pivot rotation at A from AB to AC

Block Grant

Another grant option is a block grant, whereby the state simply gives the local community some fixed amount G^* with no mandate on how it is to be spent. The increase in education

spending is lower with the block grant than with the matching grant because there is now only an income effect on spending for local communities, whereas the matching grant has both a substitution and an income effect. To keep the cost to the government constant, suppose that the government gives Lexington a \$375,000 block grant. Because the block grant makes Lexington wealthy enough to afford to spend up to \$1.375 million on either education or private goods, it shifts the budget constraint out from AB to DE in Figure 8.7.

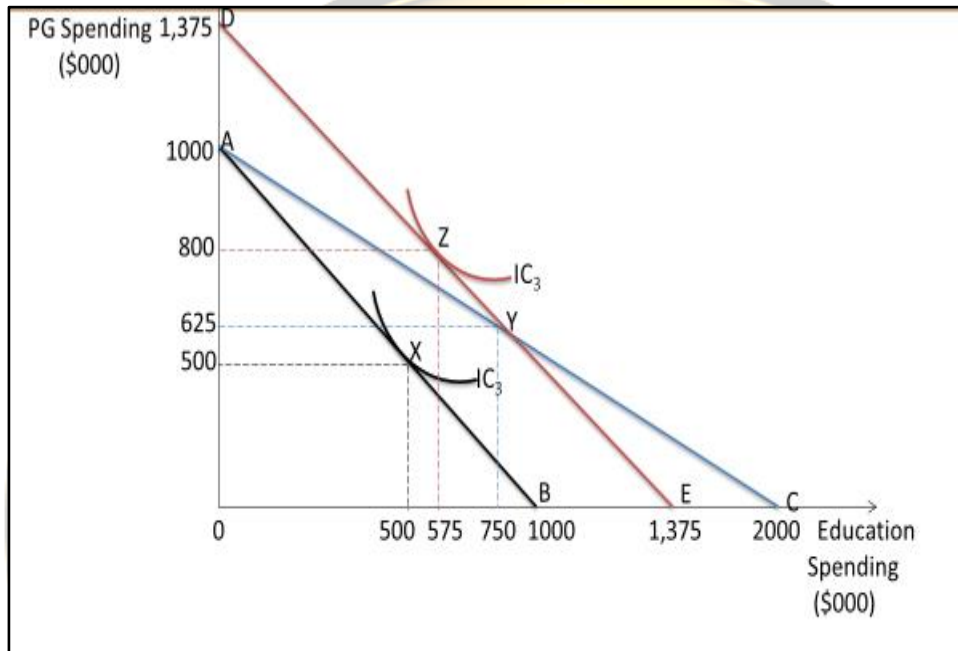


Figure 8.8: Block Grant Distribution

Source: Gruber, (2016)

The town moves to point Z, raising education spending by only \$75,000 and private goods spending by \$300,000 (from \$500,000 to \$800,000). The increase in education spending is lower with the block grant (\$75,000) than it was with the matching grant (\$250,000) because there is now only an income effect on education spending for Lexington, whereas the matching grant had both a substitution and an income effect. The income effect raises spending on education from \$500,000 to \$575,000, moving the town from point X to point Z. The substitution effect that is added with the matching grant then raises education spending by an additional \$175,000 to \$750,000, as reflected by the move from point Z to point Y.

On the other hand, Lexington has been made better off with the block grant than with the matching grant. This can be seen graphically by the fact that, with the new budget constraint under the block grant (DE), the town could have afforded its choice at point Y, with education spending rising to \$750,000 and private goods spending rising to \$625,000, but it chose a different combination.

Because the town chose point Z instead, it must be on a higher indifference curve. That is, given the freedom to spend its grant money as it likes, without the restriction of a matching condition, the town would rather spend most of the money on private goods and relatively little on education. The matching grant leads to more spending on education than the town would otherwise choose given that amount of money, so it leaves the town on a lower indifference curve.

Thus, the optimal choice of grant mechanisms for higher levels of government (such as states) depends on the goal of the grant program. If the goal is to maximize the welfare of the lower

level of government, block grants will be most effective. If the goal is to encourage spending on public goods such as education, matching grants will be most effective because they will put both income and substitution effects to work to increase town spending.

Conditional Block Grant

A grant of some fixed amount with a mandate that the money be spent in a particular way.

Suppose that government likes the fact that it has made Lexington better off with a block grant than with a matching grant, but it doesn't like the fact that education spending hasn't gone up as much. One way to remedy this is through a conditional block grant on education. In this case, the state could provide Lexington with a \$375,000 block grant and mandate that it spend the entire grant on education. The effect of this conditional block grant is illustrated in Figure 8.8.

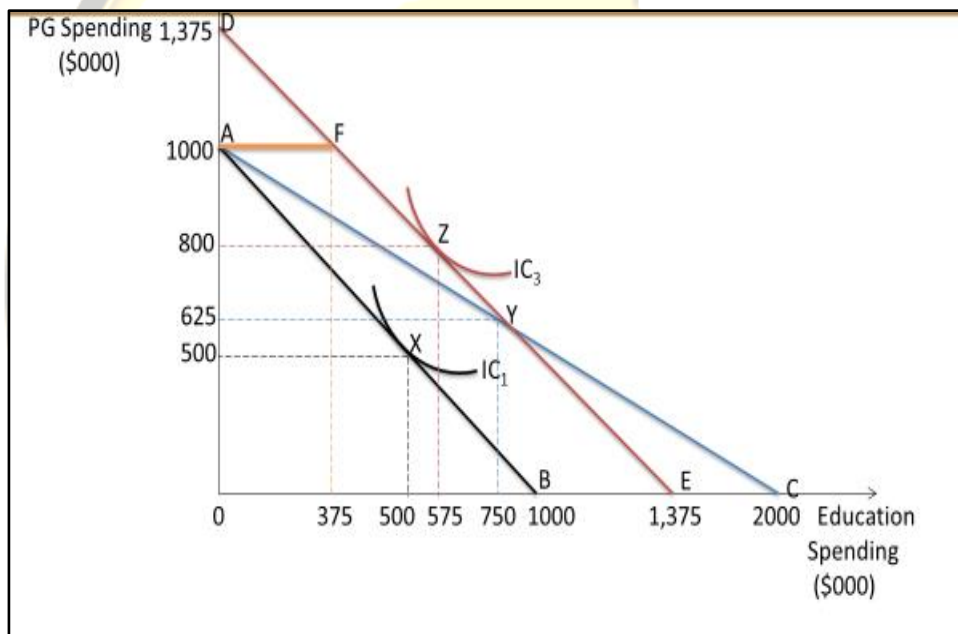


Figure 8.9: Conditional Block Grant Distribution

Source: Gruber, (2016)

Lexington can now spend up to \$375,000 (the grant amount) on education, while continuing to spend its original \$1 million budget on private goods. Thus, the first segment on the budget constraint is now AF. Once Lexington spends beyond \$375,000 on education, however, it faces the same trade-off between spending on education and spending on private goods that it did when it got the unconditional grant: the condition imposed on this grant doesn't matter if the town is already spending more than \$375,000 on education.

The new budget constraint is, therefore, AFE. Beyond the \$375,000 point on the horizontal axis, this new budget constraint is the same as the budget constraint from the unconditional block grant. Adding this condition has *no effect* on Lexington's behaviour: the town still chooses to spend the same \$575,000 on education that it spent with the unconditional block grant (at point Z).

Because Lexington was already spending more than \$375,000 on education, this grant is effectively not conditional for the town—it has the same effect as if the state had simply given it \$375,000 to spend on anything.

Thus, the town has undone the mandate to spend the money on education by reallocating existing spending to meet the mandate. The government gave the town \$375,000 to spend on education, but the town spent only \$75,000 net of that money on education; it spent the remaining \$300,000 on private goods. Thus, 80% ($\$300,000/\$375,000$) of the state's spending was crowded out by the town's reaction. Despite a large state grant, local education spending rose by only a small amount.

The effect of a conditional block grant will differ from that of an unconditional block grant *only* if the town receiving the grant would have spent less than the grant amount without the condition being imposed. That is, adding the condition to the block grant would affect Lexington's behavior only if it would have chosen to spend less than \$375,000 on education with the unconditional block grant. In that case, making the block grant conditional would increase Lexington's educational spending by more than just \$75,000. If towns such as Lexington would spend more than \$375,000 on education regardless of this restriction, then there is no effect of imposing the restriction.

8.7: Social Efficiency

Social efficiency represents the net gains to society from all trades that are made in a market, and it consists of two components: consumer and producer surpluses. Total social surplus, also called social efficiency is the sum of consumer surplus and producer surplus. The competitive equilibrium, where supply equals demand, maximizes social efficiency. This is the first theorem of welfare economics. This theorem makes intuitive sense because social efficiency is created whenever a trade occurs that has benefits that exceed its costs. See Figure 8.10

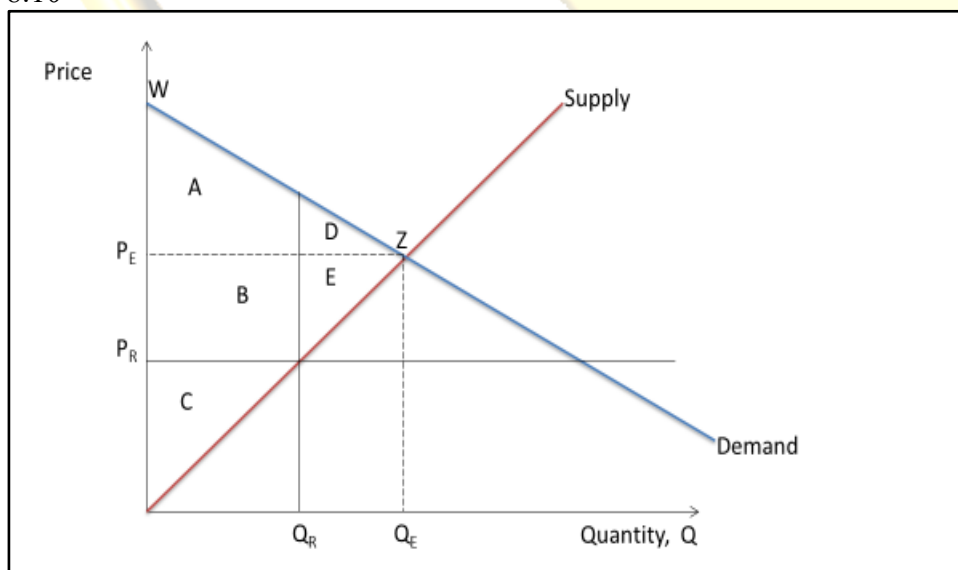


Figure 8.10: Equilibrium in Social Efficiency

Source: Gruber, 2016)



The sum of consumer surplus (the area below the demand curve and above the price i.e. $A + D$) and producer surplus (the area above the supply curve and below the price i.e. $B + C + E$) is maximized at the competitive equilibrium (at point Z). A restriction on price to P_R lowers quantity supplied to Q_R and P creates a deadweight loss of $D + E$. This part of the social surplus ($D + E$) has vanished because there are trades that could be made where benefits are greater than costs, but those trades are not being made.

8.7.1: From Social Efficiency to Social Welfare

The discussion thus far has focused entirely on how much surplus there is (social efficiency, the size of the economic pie). Societies usually care about not only how much surplus there is but also how it is distributed among the population.

The social welfare, the level of well-being in a society, is determined both by social efficiency and by the equitable distribution of society's resources.

Under certain assumptions, efficiency and equity are two separate issues. In these circumstances, society doesn't have just one socially efficient point but a whole series of socially efficient points from which it can choose.

Society can achieve those different points simply by shifting available resources among individuals and letting them trade freely. Indeed, this is the **Second Fundamental Theorem** of Welfare Economics: society can attain any efficient outcome by a suitable redistribution of resources and free trade. In practice, however, society doesn't typically have this nice choice. Rather, society most often faces an **equity–efficiency trade-off** which is the choice society must make between the total size of the economic pie and its distribution among individuals.

Resolving this trade-off is harder than determining efficiency-enhancing government interventions. It raises the tricky issue of making interpersonal comparisons or deciding who should have more and who should have less in society. Typically, we model the government's equity–efficiency decisions in the context of a **social welfare function (SWF)** (Okun, 1975). This function combines the set of all individual utilities in society into an overall social utility function. (Arrow, 1963) In this way, the government can incorporate the equity–efficiency trade-off into its decision making. If a government policy impedes efficiency and shrinks the economic pie, then citizens as a whole are worse off. If, however, that shrinkage in the size of the pie is associated with a redistribution that is valued by society, then this redistribution might compensate for the decrease in efficiency and lead to an overall increase in social welfare (Bertola et al., 2006) .

The social welfare function can take one of a number of forms, and which form a society chooses is central to how it resolves the equity–efficiency trade-off (Okun, *ibid*).

If the social welfare function is such that the government cares solely about efficiency, then the competitive market outcome will not only be the most efficient outcome, it will also be the welfare-maximizing outcome. In other cases where the government cares about the distribution of resources, then the most efficient outcome may not be the one that makes society best off.

Two of the most common specifications of the social welfare function are the:

- d) Utilitarian Social Welfare Function
- e) Rawlsian Social Welfare Function.



8.7.2: Utilitarian Social Welfare Function

From a utilitarian social welfare function, society's goal is to maximize the sum of individual utilities:

$$SWF = U_1 + U_2 + U_3 + \dots + U_N$$

The utilities of all individuals are given equal weight and summed to get total social welfare. This formulation implies that society is indifferent between one util (a unit of well-being) for a poor person and one for a rich person. Is this outcome unfair? No, because the social welfare function is defined in terms of utility, not currency (dollars). If individuals are identical, and if there is no efficiency cost of redistribution, then the utilitarian SWF is maximized with a perfectly equal distribution of income. With a utilitarian SWF, society is not indifferent between giving one dollar to the poor person and giving one dollar to the rich person; society is indifferent between giving one util to the poor person and one util to the rich person. In general, it wants to redistribute that dollar from the rich (who have a low MU because he already has high consumption) to the poor (who have a high MU).

8.7.3: Rawlsian Social Welfare Function

John Rawls suggested that society's goal should be to maximize the well-being of its worst-off member. Because social welfare is determined by the minimum utility in society, social welfare is maximized by maximizing the well-being of the worst-off person in society. The Rawlsian SWF has the form:

$$SWF = \min (U_1, U_2, U_3, \dots U_N)$$

If the individuals are identical, and redistribution of income, as does the utilitarian SWF: only when income is equally distributed is society maximizing the well-being of its worst-off member. On the other hand, the utilitarian and Rawlsian SWF do not have the same implications once we recognize that redistribution can entail efficiency costs (and reduce the size of the pie)

8.7.4: Egalitarianism versus Equality of Opportunity

Commodity Egalitarianism: The principle that society should ensure that individuals meet a set of basic needs such as housing or medical care, but that beyond that point income distribution is Irrelevant (Oppenheim, 1970).

Equality of Opportunity: The principle that society should ensure that all individuals have equal opportunities for success but not focus on the outcomes of choices made. But if some do and others do not, that is not the concern of the government (Paes de Barros, 2009)

8.8: Social Insurance: The New Function of Government

8.8.1: What is Insurance?

Insurance is provided for a wide variety of different circumstances, but it has a common structure. Individuals, or those acting on their behalf (for example, their employers or their parents), pay money to an insurer, which can be a private firm or the government. These payments are called insurance premiums. The insurer, in return, promises to make some payment to the insured party, or to others providing services to the insured party (such as physicians or auto repair shops). These payments are conditioned on a particular event or series of events (example, an accident or a doctor's visit).



Social Insurance Programs: government interventions to provide insurance against adverse events. Such programs include:

- a) Social Security, which provides insurance against earnings loss due to death or retirement.
- b) Unemployment insurance, which provides insurance against job loss.
- c) Disability insurance, which provides insurance against career-ending disability.
- d) Workers' compensation, which provides insurance against on-the-job accidents.
- e) Medicare, which provides insurance against medical expenditures in old age.

8.8.2: Why Do Individuals Value Insurance?

Insurance is valuable to individuals because of the principle of diminishing marginal utility.

The fundamental result of basic insurance theory is that individuals will demand full insurance in order to fully smooth their consumption across states of the World (that is, the set of outcomes that are possible in an uncertain future). That is, in a perfectly functioning insurance market, individuals will want to buy insurance so that they have the same level of consumption regardless of whether the adverse event (such as getting hit by a car) happens or not.

Given diminishing marginal utility, this course of action gives individuals a higher level of utility than does allowing the accident to lower their consumption. For example, given the utility functions with consumption of \$30,000 in both year one and year two delivers a higher utility level than having consumption of \$50,000 in year one and \$10,000 in year two. The gain in utility from raising consumption from \$30,000 to \$50,000 in year one is much smaller than the loss in utility from lowering consumption from \$30,000 to \$10,000 in year two.

Thus, individuals desire consumption smoothing: they want to translate consumption from periods when it is high (so that it has a low marginal utility) to periods when it is low (so that it has a high marginal utility).

8.8.3: The Role of Risk Aversion

One important difference across individuals is the extent to which they are willing to bear risk, or their level of risk aversion. Individuals who are very risk averse are those with a very rapidly diminishing marginal utility of consumption (Arrow, 1963, Feldstein 1999)

They are very afraid of consumption falling and are happy to sacrifice some consumption in the good state to insure themselves from large reductions in consumption in the bad state. Individuals who are less risk averse (risk loving) are those with slowly diminishing marginal utility of consumption; they aren't willing to sacrifice very much in the good state to insure themselves against the bad state.

Individuals with any degree of risk aversion will want to buy insurance when it is priced actuarially fairly; so long as marginal utility is diminishing, consumption smoothing is valued. When insurance premiums are not actuarially fair, those who are very risk averse may be willing to buy insurance even if those who are not very risk averse are unwilling to buy, because the former group is willing to sacrifice more in the good state to insure the bad state.

8.8.4 Why Have Social Insurance?

Asymmetric Information and Adverse Selection



Asymmetric Information: Asymmetric information **refers to** the difference in information that is available to sellers and to purchasers in a market. Information asymmetry can arise in insurance markets when individuals know more about their underlying level of risk than do insurers. This asymmetry can cause the failure of competitive markets which is the problem of adverse selection (Besley, 1994, Stiglitz & Weiss 1981)..

For example:

Suppose that the insurance company and the street crossers have full information about who is careful and who is not. In this case, the insurance company would charge different actuarially fair prices to the careless and careful groups. The people in the careless group would each pay 5cent per dollar of insurance coverage, while those in the careful group would each pay only 0.5cent per dollar of insurance coverage. At these actuarially fair prices, individuals in both groups would choose to be fully insured, with the careless paying $\$30,000 \times 0.05 = \$1,500$ per year in premiums and the careful paying $\$30,000 \times 0.005 = \150 per year in premiums. The insurance company would earn zero profit, and society would achieve the optimal outcome (each group is fully insured).

Now suppose that the insurance company knows that there are 100 careless consumers and 100 careful consumers, but it doesn't know in which category any given individual belongs. In this case, the insurance company could do one of two things. First, the insurance company could ask individuals if they are careful or careless, and then offer insurance at separate premiums. The premium would be only \$150 if you say you are careful when you cross the street, and \$1,500 if you say you are careless.

In this case, however, all consumers will say that they are careful so that they can buy insurance for \$150 per year. From the consumers' perspective, this is a fine outcome because everyone is fully insured and paying a low premium. But what about the insurer? The company is collecting \$30,000 in total premium payments (200 persons x \$150 per person). It is, however, expecting to pay out 5 claims to the careless and 0.5 claims to the careful, for a total cost of $5.5 \times 30,000$, or \$165,000. So the insurance company loses \$135,000 per year. Companies will clearly not offer any insurance under these conditions. Thus, the market will fail: consumers will not be able to obtain the optimal amount of insurance because the insurance will not be offered for sale.

Alternatively, the insurance company could admit that it has no idea who is careful and who is not, and then offer insurance at a pooled, or average, cost. That is, on average, the insurer knows that there are 100 careless and 100 careful consumers, so that on average in any year, the insurer will pay out \$165,000 in claims. If it charges each of those 200 persons \$825 per year, then, in theory, the insurance company will break even.

How Does Government Address the Problem of Adverse Selection?

- a) **Externalities:** A classic case for government intervention in insurance markets is the negative externalities imposed on others through underinsurance. It can do so by subsidizing, providing, or mandating insurance coverage.
- a) **Administrative Costs:** The administrative costs for Medicare, the government-run national insurance program for the elderly and paying their claim
- b) **Redistribution:** Governments may want to intervene in insurance markets, perhaps by taxing the low-risk individuals and using the revenues to subsidize the premiums paid by high-risk individuals, thereby achieving a more even distribution of insurance costs.



- c) **Paternalism:** Is another major motivation for all social insurance programs. Governments may simply feel that individuals will not appropriately insure themselves against risks if the government does not force them to do so. This motivation for intervention has nothing to do with market failures. Instead, it has to do with the failure of individuals to maximize their own utility. Thus, governments may insist on providing social insurance for individuals' own good, even if the individuals would choose not to do so themselves in a well-functioning private insurance market.

8.8.6: Moral Hazard

When governments intervene in insurance markets, however, the analysis is one step more complicated because of another asymmetric information problem called **moral hazard (Arrow, 1963)**

Moral hazard is a central feature of insurance markets: if families buy fire insurance for their homes, they may be less likely to keep fire extinguishers handy; if individuals have health insurance, they may be less likely to take precautions against getting ill (Holman and, Lorig, 2000; Watts and Segal, 2009);; if workers have unemployment insurance, they may be less likely to search hard for a new job. The existence of moral hazard means that it may not be optimal for the government to provide the full insurance that is demanded by risk-averse consumers (Bassoco et al., 1986)

In examining the effects of social insurance, four types of moral hazard play a particularly important role:

- a) **Reduced precaution against adverse events.** Examples: because you have medical insurance that covers illness, you reduce preventive activities to protect your health, or because you have workers' compensation insurance, you aren't as careful at work.
- b) **Increased odds of entering the adverse state.** Examples: because you have workers' compensation, you are more likely to claim that you were injured on the job, or because you have unemployment insurance, you are more likely to become unemployed.
- c) **Increased expenditures when in the adverse state.** Examples: because you have medical insurance, you use more medical care than you otherwise would, or because you have workers' compensation, you don't work hard to rehabilitate your injury.
- d) **Supplier responses to insurance against the adverse state.** Examples: because you have medical insurance, physicians provide too much care to you, or because you have workers' compensation, firms aren't as careful about protecting you against workplace accidents.

Determinants of Moral Hazard

The extent of moral hazard varies with two factors.

- a) The first factor is how easy it is to observe whether the adverse event has happened. If an employer truly knows whether a worker has been injured on the job, the moral hazard problem with workers' compensation is greatly diminished.
- b) The second factor is how easy it is to change behaviour in order to establish the adverse event. When it is neither easy nor attractive to change behaviour in order



to qualify for insurance, such as in the case for insurance against death, moral hazard is unlikely to be a problem. When the insurance is for an adverse event that is easily and costlessly attained (or faked), however, moral hazard may be a larger problem.

Consequences of Moral Hazard

Moral hazard is costly for two reasons:

First, the adverse behaviour encouraged by insurance lowers social efficiency. This moral hazard cost arises in any insurance context, such as health insurance. In the case of health insurance, individuals should use medical care only until the point where the marginal benefit to them (in terms of improved health) equals the marginal cost of the service. If individuals are completely insured, however, and don't pay any costs for their medical care, they will use that medical care until the marginal benefit to them is zero (their marginal cost, which is zero with full insurance). This will lead to an inefficiently high level of medical care if the true marginal cost is greater than zero.

The second cost for social insurance due to moral hazard is revenue raising. Whenever the government increases its expenditures, it must raise taxes to compensate (at least in the long run). There are efficiency costs associated with government taxation through the negative impacts that it has on work effort, savings, and other behaviours. Thus, when social insurance encourages adverse events, which raise the cost of the social insurance program, it increases taxes and lowers social efficiency further.

8.8.7: Social Insurance versus Private Insurance

The importance of social insurance programs as a source of consumption smoothing depends on the availability of self-insurance. If there is no self-insurance, then social insurance will provide an important source of consumption smoothing. Once we allow for private forms of consumption smoothing through self-insurance, then public intervention (social insurance) can crowd out private provision (self-insurance).

If social insurance simply crowds out self-insurance, there may be no net consumption-smoothing gain to social insurance. Given that there is an efficiency cost to raising government revenues, government insurance market interventions that do not provide consumption-smoothing gains (that simply crowd out private sources of support) are harder to justify.

Expected Utility

Expected utility model is the weighted sum of utilities across states of the world, where the weights are the probabilities of each state occurring.

The model is described by the following parameters:

- a) You are hit by a car with probability p
- b) Your income is W , regardless of whether you get hit or not.
- c) However, if you get hit, you incur medical cost d
- d) You can buy insurance, with premium m , per dollar of insurance
- e) That insurance will pay you $\$b$ if you are hit by the car

In this case, we can write the expected utility (EU) as:

$$EU = (1 - p) * U(\text{consumption with no adverse event}) + p * U(\text{consumption with adverse event})$$



That is:

$$EU = (1 - p) * U(W - mb) + p * U(W - mb - d + b)$$

The problem with this expression is that we have one equation, with two unknowns (m and b). To solve this equation, we need to add one more condition:

- f) that insurance is priced in an actuarially fair manner, so that insurance companies make zero expected profits (we assume, for now, zero administrative costs). In the zero expected profit ($E(\pi)$) condition for the insurer is:

$$E(\pi) = m * b - p * b = 0$$

The expected profit of the insurer, which equals premiums received minus expected benefits paid out, equals zero.

This, in turn, implies that the premium equals: $m = p$

That is, if the risk is 10%, then $m = 0.1$ per dollar of insurance.

Example: Assume the utility function $U = \sqrt{C}$ and the individual's income (W) is \$500, find the optimal level of insurance benefits (b^*) of the insured.

Solution

To maximize utility, find the expected utility, i.e.,

$$E(U) = (1 - p) * \sqrt{(W - bp)} + p * \sqrt{(W - d - bp + b)} \quad (1)$$

For maximization, differentiate (1) with respect to b , i.e.,

$$-(1 - p) * \frac{p}{\sqrt{(W - bp)}} + p * \frac{1-p}{\sqrt{(W - d - bp + b)}} = 0 \quad (2)$$

Since $p = m = 0.1$ and $W = \$500$, solve for the optimal level of insurance benefits (b^*)

If $b^* = d$, then the individuals should buy enough insurance so that if they have the adverse outcome, their benefits exactly offset their costs i.e., individuals should buy full insurance to smooth their consumption across states. At the optimal level, consumption is equalized at $(W - bp)$ in both state of the world and concludes that: Facing actuarially fair insurance markets, individuals will want to insure themselves fully against risk.

8.9: Social Security

Social Security is a government program that taxes workers to provide income support to the elderly. The basic operation of the program is straightforward. Workers pay a tax on their earnings, and the money from this tax is deposited into a trust fund that is invested in government bonds.

Cheques written on this trust fund are paid to those who enrol in the Social Security program, which is open to most people on retirement. Cheques are paid until the recipient dies, and, if there is a surviving spouse, he or she receives a payment until his or her own death.

Who Is Eligible to Receive Social Security?

To be eligible to collect Social Security benefits, a person must have worked and paid this payroll tax for 40 quarters over his lifetime (the equivalent of 10 years) and must be age 60 or older.



8.9.1: Rationale for Social Security

The rationale is that there are market failures in the annuities market. A pure annuity is a contract whereby a person pays some amount of money up front to an insurance company, and in return, the insurance company pays the person a fixed payment until he dies. Annuities should be valued by consumers facing an uncertain date of death because they facilitate the type of consumption smoothing.

That is, they allow people facing an uncertain date of death to smooth their consumption over their remaining years, solving the problem of saving too little (and therefore going hungry in old age) or too much (and therefore not fully enjoying their wealth). Although annuities market failure is the classic economic rationale for social Security, the true reason that most policy makers favour the program is paternalism; that is, they are concerned that people won't save enough for their own retirement.

8.9.2: Social Security Benefits Calculation

When eligible, the Social Security claimant receives an **annuity payment**, that is, a payment that lasts until the recipient's death. The amount of this annuity payment is a function of the recipient's average lifetime earnings, where each month's earnings are expressed in today's dollars by inflating their value for increases in the wage level since the earnings occurred.

In particular, the government averages a person's earnings over the person's 35 highest earning years. If a person has worked for fewer than 35 years—say, for 30 years—the formula just treats those missing years as years of zero earnings, so the benefit would be based on averaging 30 years of earnings and 5 years of zeros. If a person has worked for more than 35 years, the lowest earnings years are thrown out when computing the average. This 35-year average of real monthly earnings is called the Average Indexed Monthly Earnings. Benefits are then calculated as a redistributive function of past earnings; whereby low earnings are more strongly translated to higher benefits than are high earnings.

8.9.3: How Are Social Security Benefit Paid Out?

In the US individuals can receive their Pension Insurance Allowance (PIA) starting at age 66 and 4 months, which is the Full Benefits Age (FBA): The age at which a Social Security recipient receives full retirement benefits (Primary Insurance Amount).

It is possible to receive benefits as early as age 62, which is the Early Entitlement Age (EEA). For each year of benefits claimed before the FBA, however, there is an actuarial reduction in benefits of 6.67% per year (for the three years before the FBA) or 5% per year (for earlier months). Individuals who claim their benefits at age 62 today receive about 24.6% less in benefits than those who claim benefits at the FBA. This is called an "actuarial" reduction because it is designed to compensate for the fact that individuals who take benefits early receive them for more years.

With the actuarial adjustment, you can both expect to get the same total amount of benefits in your retirement years. Similarly, if you decide to wait past full benefits age to claim benefits, you receive a Delayed Retirement Credit (DRC), which raises your benefits for each year of delay by 8%.



8.9.4: Social Security and Retirement

In theory, there are two effects of Social Security on retirement decisions. The first is the implicit taxation that Social Security may levy on work at older ages by reducing the value of Social Security benefits if retirement is delayed. Gruber and Wise (1999) define the implicit tax rate from Social Security as the reduction in Social Security Wealth (the expected present discounted value of Social Security benefits received minus the expected present discounted benefits of taxes paid) if one continues working another year relative to the wage that could be earned by working that year. The numerator for this variable is calculated by computing the SSW at a possible age of retirement and then measuring how it changes if the person works another year.

The second effect of Social Security on retirement is through the redistribution process discussed earlier. This system results in some groups becoming richer over their life and others becoming poorer. These changes in wealth will have income effects on retirement as the groups that are richer use some of their wealth to buy themselves more retirement and the groups that are poorer work longer.

The rationale is that there are market failures in the annuities market. A pure annuity is a contract whereby a person pays some amount of money up front to an insurance company, and in return, the insurance company pays the person a fixed payment until he dies. Annuities should be valued by consumers facing an uncertain date of death because they facilitate the type of consumption smoothing. That is, they allow people facing an uncertain date of death to smooth their consumption over their remaining years, solving the problem of saving too little (and therefore going hungry in old age) or too much (and therefore not fully enjoying their wealth). Although annuities market failure is the classic economic rationale for Social Security, the true reason that most policy makers favour the program is paternalism; that is, they are concerned that people will not save enough for their own retirement.

In evidence, there are three effects of Social Security on retirement decisions.

- a) The first piece of evidence is time series evidence, as the Social Security program grew rapidly through the 1960s and 1970s, with a corresponding reduction in elderly labour force participation (LFP) rates i.e. the percentage of the elderly population that is either working or looking for work.
- b) The second piece of evidence is that Social Security matters for retirement behaviour comes from examining the age pattern of retirement. i.e. the **retirement hazard rate**, the rate at which workers of a certain age retire
- c) The third, and most compelling, type of evidence that Social Security matters for retirement decisions comes from international comparisons. There are enormous spikes in other countries at their early and normal retirement ages that mirror closely what we see in the country.

8.9.5: Social Security Reform:

Reasons for social security reforms include the following:

- a) **Raise taxes Further:** While the problems of financing Social Security are large, they are not insurmountable. Increasing the payroll tax by 2.83 percentage



points, from 12.4% to 15.23%, is projected to solve the financing problem for the next 75 years, and raising it by 4.23 percentage points is projected to solve the financing problem forever.

- b) **Extend the Base of taxable Wages:** Another tactic would be to try to delay the pain by extending the base of wages that can be taxed by Social Security to finance retirement benefits. Because the problem is that the number of elderly is growing rapidly relative to the number of young, we could try to increase the number of young who pay into the system.
- c) **Raise the Retirement Age:** Relative to life expectancy, the Social Security Full Benefits Age has been falling.
- d) **Lower Benefits:** Another option is to just lower the benefit amounts paid by Social Security.
- e) **Reduce Benefits for Higher Income groups:** Another alternative to an across-the-board cut in benefits is a reduction in benefits only for higher income groups. After all, more than one-third of benefits are paid to those in families with incomes of more than \$50,000 per year so that some reduction in their benefits would be unlikely to impose great hardship.
- f) Invest the trust Fund in Stocks

8.9.6: Social Security Example in Africa: The Social Security and National Insurance Trust (SSNIT), Ghana

The Social Security and National Insurance Trust (SSNIT) is a statutory public Trust charged under the National Pensions Act, 2008 Act 766 with the administration of Ghana's Basic National Social Security Scheme. Its mandate is to cater for the First Tier of the Three-Tier Pension Scheme. The Trust is currently the largest non-bank financial institution in Ghana.

The Trust was established in 1972 under NRCDC 127 to administer the National Social Security Scheme. Prior to 1972, the Scheme was administered jointly by the then Department of Pensions and the State Insurance Corporation. The Trust administered the Social Security Scheme as a Provident Fund Scheme until 1991 when it was converted to a Social Insurance Pension Scheme then governed by the PNDC law 247.

VISION: "To be the model for the administration of Social Protection Schemes in Africa and beyond".

MISSION: "To provide income security for workers in Ghana through excellent business practices".

Core Functions of SSNIT

- Register employers and workers
- Collect contributions
- Invest the funds of the Scheme
- Manage records on members
- Process and pay benefits to eligible members and nominated dependants.



Responsibility of SSNIT

- To provide input into the formulation of policies to improve operations and assists to implement them.
- To assist in the preparation of Divisional action plans
- To assist in developing and implementing service designs which will satisfy customers
- Evaluates and analyses reports from the various sections of the Operations Division and makes appropriate recommendations
- Collects, collates and analyses periodic Operations Reports for the Board of Trustees.
- Monitors compliance with the Social Security Act by employers and employees

How SSNIT Operates

SSNIT has a decentralised operational system made up of the Area, Branch, Day Offices and an Agency. An Operations Coordinator at the Head Office co-ordinates all operational activities and reports to the General Manager, Operations.

There are eight (8) Area Offices, fifty-one (51) Branches, twenty-three (23) Day Offices and an Agency spread throughout the country.

Act 766 makes provision for a contributory 3-Tier Pension Scheme and the establishment of a National Pensions Regulatory Authority (NPRO) to oversee the administration and management of the Pension Schemes. Under the Act, SSNIT is to manage the basic National Social Security Scheme referred to as the 1st Tier of a contributory 3-Tier Scheme.

The other Tiers of the National Pensions Scheme are:

- Tier 2 – A mandatory fully-funded and privately managed occupational Scheme.
- Tier 3 – A voluntary fully-funded and privately managed Provident Fund and Personal Pension Plan.

Contribution Rates Under the Social Security Scheme (Tier 1)

- Employer – 13.0% from worker basic salary
- Worker – 5.5% from workers basic salary
- Total – 18.5%
- Out of the 18.5%, the employer remits 13.5% within 14 days of ensuing month to SSNIT. 5% is remitted to the Second-Tier Mandatory Occupational Scheme.
- Subsequently, SSNIT also gives 2.5% out of the 13.5% to the National Health Insurance Authority (NHIA) for the member's Health Insurance.
- SSNIT effectively withholds 11% for the administration of Tier 1.
- Entry Age of joining the scheme– 15 years (minimum) and 45 years (maximum) only for new entrants (age 45+ to enter mandatory 2nd tier).
- Age Exemption – 55 years and above exempted (option to join)

Minimum and Maximum contributions indicated and reviewed periodically. Investment of Funds – investment policy, external investments permitted.

National Pension Reform (Amendment) In Ghana

An Act to amend the National Pensions Act 2008 (Act 766) to reduce the age for exemption from the First Tier Scheme, Act 766 and to provide for related matters:

1. Reduction in the Age Exemption

Members who were 55 years and above as at January 2010 were exempted from Act 766. Members aged 50-54 years who were affected by Act 766 were made worse off. Hence the



implementation of National Pensions (Amendment) Act 2014, Act 883. Members who were aged 50 as at 2010 have now been exempted from Act 766. This means that all those exempted will continue to contribute 17.5%. They will also be paid the full benefit namely, monthly pension and the 25% lump sum by SSNIT. Despite the reduction in the age exemption from 55 to 50 years, it is still optional for any such member to decide to join the Act 766.

2. Correction of the formulas for computation of Pensions

The Amendment Act 833 also corrected the formula for the computation of pensions by providing that the minimum 15 years or 180 months period of contribution entitles a member to 37.5% pension right and every additional twelve (12) months contribution entitles the member to 1.125% pension right up to a maximum of 60%

3. Emigration Benefit

Emigration benefit is a lump sum payment of benefit to non-Ghanaian members of the Social Security Scheme under Act 766 whose services are ended and are leaving Ghana permanently. Whether the member has reached the retiring age or not, whatever benefit is due him/her will be paid as lump sum in Ghanaian currency to the member.

4. Employers to furnish information by SSNIT within Seven (7) working days

The Amendment provides that, where SSNIT officials request an employer to furnish any information relating to the employer, the employer shall furnish the information within seven (7) working days.

8.10: Public Expenditure Policies in Africa

1. Clarity of Roles and Responsibilities

A budget law or administrative framework, covering budgetary as well as extra-budgetary activities and specifying fiscal management responsibilities should be in place. Taxation should be under the authority of law and the administrative application of tax laws should be subject to procedural safeguards.

2. Public Availability of Information

Extra-budgetary activities should be covered in budget documents and accounting reports. Original and revised budget estimates for the two years preceding the budget should be included in budget-documents. The level and composition of central government debt should be reported annually with a lag of no more than six months.

3. Open Budget Preparation, Execution, and Reporting

A fiscal and economic outlook paper should be presented with the budget, including among other things, a statement of fiscal policy objectives and priorities, and the macroeconomic forecasts on which the budget is based. A statement of “fiscal risks” should be presented with the budget documents. All general government activities should be covered by the budget and accounts classification. The overall balance should be reported in budget documents, with an analytical table showing its derivation from budget estimates. A statement of accounting standards should be presented with the budget. Final central government accounts should reflect high standards, and should be audited by an independent external auditor.



4. Independent Assurances of Integrity

Mechanisms should be in place to ensure that external audit findings are reported to the legislature and that remedial action is taken. Standards of external audit practice should be consistent with international standards. Working methods and assumptions used in producing macroeconomic forecasts should be made publicly available

Trail Questions

1. Do increases in public expenditure cause an increase in national income, or vice versa? How would you test which is the case?
2. “Expenditure to combat market failure is greater than expenditure for redistributive purposes”. To what extent do you agree or disagree with this statement? Explain with reference to your country.
3. Should social security taxes be viewed as a second component of income taxation? Explain
4. What is the “pensions crisis”? How can this be solved?

Basic Readings:

Gruber chapters 10 & 12
Atkinson and Stiglitz, Chapters 10, 16 & 17
Howard, M. M., A. La Foucade & Scott, Chapter 6
Hindriks & Myles chapter 4

Other Readings

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LESSON NINE: PUBLIC INVESTMENT MANAGEMENT

By the end of the lesson, you should be able to:

- 9.1 define public investment and explain briefly its historical perspective
- 9.2 explain various methods of evaluating of Public Projects
- 9.3 describe institutions for Public Investment Management
- 9.4 describe Planning mechanism
- 9.5 explain allocation and Budgeting
- 9.6 explain planning and budgeting
- 9.7 demonstrate public revenue and expenditure forecasting
- 9.8 explain implementation of public investment projects
- 9.9 explain the available incentives in the Public Sector.

9.1 Public Investment in Historical Perspective

Public Investment is core function of any Government. This is critical because Provision of public goods and services are the major preoccupation of a Government. There is usually a question on how to sequence public investment, when to invest, at what cost and who finances the public investment? The first wave of history in this area is dated in 1950s till 1960s and the famous Harrod Domar Growth Models.

Basically the model was advocating for the governance of investment to ensure a give degree of growth. This was the time when developing countries adopted the so called great leap forward and others import substitution strategies to catch up with the developed economies. India during the era of Indira Gandhi and China under Mao had in mind the predictions and assumptions. However there were some challenges of the original idea of management of public investment. In some cases there were observations of excess capacity in the economies due to investment in projects that later became white elephants and duplications of efforts sometimes adoption of inappropriate technology factors that led to emerging need for planning. Therefore the period from 1970s till 1980s witnessed Public investment plans era (often called Public Investment Programs, or PIPs) were recommended as a means of linking a portfolio of investment projects with a multi-year development plan (Schiavo-Campo and Tommasi, 1999)

Therefore in this lesson we focus on expenditure related to physical assets. The scope of the lesson is on the understanding that Public investment management encompasses all means and ways of Governments to manage investment expenditure, to select priority investment projects and the best way to construct and maintain public assets.

This calls to assess the rules, the means the institutions and strategies of public investment management. As discussed above Governments realized need to have planning in public investment as a way to avoid wasteful and unrealistic project initiations and executions. Even the planning of public investment adopted in 1980s went through a number of checks and improvements as there were equally problems. In some cases planning resulted into even further wastage. There were areas where the social choice on which projects to initiate were political in nature leading to misallocation of projects such as manufacturing industries, deserted airports, un used infrastructure. The idea behind these planning documents was to



create a pipeline of well-prepared projects, appraised using cost–benefit analysis, and made ready for selection in the annual budget process.

Thus failure of the public investment planning to deliver the intended optimality lead high critics on unrealistic planning that was not in line with economic sense in planning and development. Due to these shortfalls there came another wave of 1990s when public investment discussion shifted to ensuring management of the process of public project initiation. In summary there have been economic problems associated with the inappropriate public investment. Some examples are cited in former state owned companies in a range of African economies. Soon after independence there were efforts in many countries to set up factories such as Cotton Processing, Ginning, Spinning and fabrication, agricultural processing in other cash crops like tea, coffee, cashewnuts sisal, and other manufacturing firms. Nearly 90 percent of such projects failed for a number of factors that vary from one country to another. In Ghana, Tanzania, Uganda, Ethiopia and perhaps

New Developments in Public Investment Debates

Following addressal of the past mistakes and new development there have been considerably improved approach towards public investment. In this new setting the following have been considered as special features of public investment

- i) Need to consider the sunk cost in public investment. This is so because spending in public investment projects require significant amount of funds which might be borrowed, repayment may take long time before breaking even, the projects are expected to last for a long time hence making accurate budgeting inherently more challenging.
- ii) The project costs are likely to be subjective as they are influenced by a range of factors that are specific in nature such as currency movement, level of inflation, political environment managerial and engineering capacity. iii) Project cost overruns are typical and common sometimes affecting the projects especially through raising project risks, government fiscal risks and development challenges. Huge sum of money is required at a given time to implement public projects and in some cases projects delay because such amount of money is late or unavailable.

There is an imbalance in the timing of costs and benefits because projects usually require significant up-front financing, while the benefits accrue over years and may only be fully realised decades after the asset has been built. Investment in public projects create assets that will last for generations hence need to be maintained. The running and maintenance cost create a new liability for the Government

Based on the new dimension of debate Public Investment have moved to planning and preparation in a mechanism used by corporate and private investment. The public sector reforms instituted globally have focused attention in design of realistic and traceable frameworks for public investment. The traditional project management training that were based on old ideology are increasingly replaced by modern theories of Project Planning, Management and Monitoring. National audit systems have tightened monitoring and



evaluation of public investment projects, and where possible Public Private Partnership have played a blending mechanism for this tricky area.

9.2 Evaluation of Public Projects/Programs

Public project evaluation and monitoring have gained popularity especially in the modern era of public investment. Lessons from the previous experience creates need to design methods of avoiding waste and cost which is unintended. It is therefore a common phenomenon that a public project nowadays is subjected to strict evaluation before and after execution and strategies are introduced to rectify weaknesses that might lead to poor performance. In some cases evaluation is made step by step using a project logical framework of implementation schedule. Rajaram et al. (2014) suggest three 'must-have' institutional features at the start of the cycle to support sound decision-making: preliminary screening, formal project appraisal and independent review of appraisal. (benefit analysis; social cost-benefit analysis; cost effectiveness; shadow prices and market prices; discount rate for social cost-benefit analysis

The Role of Project Screening as Part of Evaluation process

There is a great chance of avoiding project failure if screening of a project should form one of the critical part of project evaluation projects. In deciding for a society which project to set up, when, where at what cost and who will benefit at a given price screening is one way to compare different options available and arrive at a point where public can remain with feasible projects that will be cost effective, likely to have more benefits to the society and avoid losses. In modern times screening as been used to weed out white elephant projects especially when there is a threat of politically motivated projects that are less sensitive to economic waste.

The screening has usually looked at response to questions like

- 1 Why should the project be initiated
- 2 What is the logical justification of the proposed project
- 3 Are there alternative ways of dealing with the intended solution of the proposed project?
- 4 Estimate of adequate demand for the goods and services to be provided
- 5 At what cost is the project going to be available

Financial resources availability and time required to repay if a loan will be sought as well as the interests. Even after passing a preliminary screening a public project before is approved for implementation ought to go through a formal evaluation.

Next Step after Screening Must involve Evaluation

Screening though being part of evaluation is in itself not adequate. Thus even after even after passing a preliminary screening a public project before is approved for implementation ought to go through a formal evaluation. This is important because there are projects which can go through during screening but the change in circumstances, or some overlook during screening give loopholes for unacceptable projects to qualify.

What are the Pre conditions for a Project Evaluation?

Precondition for a project evaluation is undertaking of appraisal. The project appraisal consider the key questions of project initiation that make a fully examination on why the project should be introduced. Specifically the appraisal look at the social needs and how the proposed project will address the existing problems. It further consider the economic and



social environment in which the project exist. The availability of resources needed for the project development is critical. During the appraisal it is highly recommended that such factors be considered. In the first wave of public projects of 1960s there were problems in industrial projects with some selected in areas where raw materials were not adequate. This lead to high cost of importation of raw materials. The availability of utilities such as water and electricity is also worthwhile sorting. In some areas such as manufacturing of textile huge amount of water is rquired durng the process. A public investment in this area need to allow appraisal of existing amount and wuality of such inputs. Human resources and stock of skills available are equally important.

Techniques of Project Evaluation

Public Project Investment Evaluation is made using various techniques and one of the most popular is cost and Benefir analysis.

Cost and Benfit Analysis of Public Investment Projects

This analysis involves assessing and deciding the negative and positive outcome of possible implementation of a project. Thus public project investment projects analysis use this framework to decide whether or not a project should be implemented.

Key aspects of the Cost and Benefit Analysis

1. To ascertain whether or not a proposal for utilization of resources between private, public or within private and public should be used from a social welfare preference.
2. To advise on the dilemma that allocation of resources might lead to wasteful of resources and might produce winners and Use various methods of evaluation to weigh the positive and negative aspects of a project. There are various valuation techniques such as contingent valuation willingness to pay and willingness to accept scenario are used to ascertain what the society value as a public project.
3. To essentially use a pseudo market process to evaluate proposals for resource re-allocation.

CBA has the following decision rules.

1. Benefits/PV costs > 1 .
2. Net present value > 0 .
3. Internal rate of return $>$ rate of interest.

More on the pre conditions for the Project Evaluation

There are other aspects that need to be examined before a project is allowed to proceed. Risk analysis is one of the important assessment that should be part and parcel of public project evaluation. There are many dimensions through which Risks can influence project during implementation and after completion of cinstuction. There are harzards that might be associated with the project to be produced, type of wastes to be generated tha might affect heatl of the neighbourhood proximity within the project location. Besides there are even political risks especially when social acceptability is low, environment social and other



economic costs. During evaluation a risk profile need to be compiled and in each aspect the possible mitigation approach be mentioned.

Furthermore an appraisal of the financial sustainability and fiscal impact of the proposed project. This appraisal should specify how a project would be financed and the expected monetary cash flows (i.e. expected expenditures and revenues) over the life cycle of the asset.

Credibility and Objectivity in Project Evaluation

There are many issues that influence credibility of project evaluation which need to be considered. We have seen the exercise from the screening stage to evaluation there are a number of checks and balances, analysis and assessment that take use of estimations and computations that will lead to conclude on whether or not a project should continue. The credibility and reliability will be very important. Given the political and social importance that might be against the economic rationale, this can lead to bias, project owners systematically overestimate the benefits and underestimate the costs of a project in their appraisals. To ensure credibility accuracy and objectivity public project evaluation need to be scientific and professionally conducted. An immediate pre-requisite who ever does the evaluation must be experienced and expert within a proposed project. There will be questions like who does the evaluation, should be neutral independent evaluator. The other question is which type of information and data to use for evaluation, how reliable those information are and when to conduct the analysis. Finally the institutional setting of evaluation is critical factor on credibility. Institutions like consulting firms with well experienced and professional evaluators as well as academic institutions offer a comfortability in credible evaluation of public investment projects.

9.3 Institutions for Public Project Management

Institutions for Public Investment Management - (planning, allocation and implementation). Planning: fiscal rules, national sectoral planning, central/local planning, management of PPPs. Public investment management (PIM) institutions have come to be seen as the missing piece of the puzzle (Rajaram et al., 2010, 2014; Dabla-Norris et al., 2012; IMF, 2015). There is a dire need to consider that a well defined institutional framework for public investment is critical in determining economic growth that is blended in institutions that are capable of design, implement and monitor public investments. Thus in any case the capacity of institutions to initiate, plan and implement public investment projects is very critical for overall development. There are a number of institutional elements needed for the effective management of public investment, across the three stages of planning, allocation and implementation. This is regardless of whether these are central or local Government public institutions. Typically all Government Ministries, A number Public institutions including Municipal Councils have a power to initiate and implement public projects in many African economies.

9.3.1 The Role of Institutions in Project Planning

The institutions in project planning play a vital role in determining implementation and execution of public investment projects. Their role begins at project initiation level. There is when a number of consultations will be made to educate and prepare stakeholders after a



realistic identification exercise. The project screening and evaluation exercises require ability to select professionals and experts who can do the job. An effective institution is capable of procuring the right candidates to design, screen, evaluate and implement a project that has been well appraised and a scientific and objective decision made. Hence, **lanning sustainable levels of public investment** requires institutions that ensure public investment is fiscally sustainable and there is effective coordination across sectors, levels of government and between the public and private sectors. However, there has been a concern on what facilitate an effective institution for implementing public investment.

The countries need to have institutions that ensure having fiscal disciplines, rules and efficiency such that public investment are provided in a way to be adequate, predictable and sustainable. Need for countries to have sectoral plans that ensure investment decisions are based on clear and realistic priorities, cost estimates and objectives for each sector. Availability of centrally managed and coordinated mechanism that put together public investment plans across levels of governments, provide certainty about funding from the central government and ensure sustainable levels of sub-national borrowing. Lastly there is a need for having a mechanism to manage the public private partnerships in such a way that effective evaluation, efficiency selection of monitoring of PPP projects are liabilities will be realised.

9.3.2 Public Private Partnership

The mode of public investment delivery has so far seen how Governments strive to ensure there is socially optimal level of investment projects. The new dimension of public investment projects especially after 2000s has been added that make use of experience resources and efforts from private sector to combine. Since this is a partnership and there are likely to be differences in operation between private and public sector. Although PPPs sometimes involve a private party providing the up-front financing for an investment, the costs of that investment will ultimately be paid for by the public, either directly by users (through user fees) or indirectly through taxation.

The rule of thumb is that as long as public sector has a stake in the project, the Public Private Partnered, should also be subject to the same procedures of appraisal to assess whether projects represent a good use of resources (Brumby et al., 2013).

PPPs have been championed as a means of promoting more efficient investment by bringing the discipline of the market to the selection and implementation of projects. In literature (see for details Brumby et al., 2013). a successful outcome of a PPP is likely to depend on several factors. These include the correct identification of the most efficient bidder, appropriate risk-sharing arrangements, and the nature of the contractual relationship established between the public and private partners.

PPPs also present risks to government budgets by creating large and long-term contingent liabilities, especially when such partnerships are used to circumvent budgetary constraints.



These liabilities can affect long-term fiscal and macroeconomic sustainability as well as transfer the financial burden to future generations. Given these potential risks, any government opting to deliver infrastructure services through a PPP should conduct a careful evaluation of its fiscal implications together with a proper assessment of its merits vis-à-vis traditional procurement.

From the perspective of resource allocation, the same appraisal methods used for traditionally procured public investment projects should therefore be applied to PPP projects, followed by additional analysis to verify the desirability of a PPP arrangement over traditional procurement.

9.4 Planning: fiscal rules, national sectoral planning

Fiscal rules and national sectoral planning are very important elements for project implementation in public investment. In most cases after project screening and evaluation exercises are completed any Government would require short medium and long term plans to ensure that a project will be implemented. For big projects that extend for more than one year a forward and rolling budget is likely to be required for ensuring financial resource allocation. Once a project has been inserted in the planning framework, the effective implementation of a project requires that funds should be made available to the project on a predictable basis throughout the life cycle of the investment.

Budget for a public investment project should ensure that

1. Proposed project for financing will be within the available financial resources
2. Feasibility of incorporating the project into the annual budget
3. Funds will be available timely and within the annual budget
4. Predictability of funding throughout the project life cycle
5. *Government need to be informed of its decisions along with other financial commitments..*

Before considering any new projects, the budget process should ensure that sufficient funds are being made available for the maintenance of existing assets and

Selection of New Projects

In many low-income countries the financing requirements of projects that have already started greatly exceed the resources available in a given fiscal year. These resource pressures may be further exacerbated by political commitments made to start new projects. The result is that the domestically financed component of the capital budget is often overloaded with a planned programme of work that far exceeds the resources available. Ongoing projects become subject to a repeated process of negotiation each and every year to receive funding in the annual budget.



9.5 Allocation and Budgeting

Allocation and Budgeting:-Definitions; multiple purposes of budgeting; types, and techniques of budgeting; budget policy, formulation and execution; planning and budgeting; public revenue and expenditure forecasting; Implementation (protection of investment, transparency of execution and monitoring of assets; Incentives in the Public Sector. The key issues on budget execution are always whether deficit targets are likely to be met, and whether any budget adjustments (both on the revenue and expenditure sides) agreed at the preparation stage (or in-year) are being implemented as planned.

On the expenditure side of the budget, the key issues are whether the outturn is likely to be within the budget figure; whether any changes in expenditure priorities (as against past patterns) are being implemented in specific areas as planned; and whether any problems are being encountered in budget execution, such as the buildup of payment arrears

9.5.1 Key Questions in Budget Execution

- a) What are the different stages of the budget execution process?
- b) Who is responsible for budget execution?
- c) How can budget appropriations be revised during the year?
- d) How good is the information on outturn expenditure?
- e) What are the problems encountered in budget execution procedures and how can these be overcome?
- f) How can expenditures be adjusted in-year?
- g) How should "good governance" be pursued

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9.5.2 Stages of Budget Execution

1. The authorization stage

Once a budget is approved by the parliament, ministries are authorized to spend money, consistent with the legal appropriations for each line item. Where parliament has not yet approved the budget before the budget year starts, it is normal to allow governments to start spending on a "Vote on Account" basis--a temporary authorization, often restricted to one-twelfth per month of the previous year's expenditure.



2. The commitment stage

This is the stage where a future obligation (liability) to pay is incurred. The precise definition of commitment varies not only from one system to another but even among those well-versed in public sector accounting.

3. The verification stage

This signifies that goods have been delivered fully or partially according to the contract, or the service has been rendered and the bill has been received. Physical delivery can precede verification by some period of time.

4. Payment authorization or payment order stage

This stage may have a different significance in different systems.²² In the *francophone system* a guiding principle is that the person who orders the supply (*engagement*) has to be different from the one who authorizes the payment (*ordonnancement*).

5. Payment stage

At this stage, the bill is paid--by cash, check, or electronic transfer. In some systems, the payment is made through a single ministry of finance account in the central bank or in a designated bank. In others, the payment is undertaken through the commercial banking system via bank accounts held in the names of individual line ministries

6. Accounting stage

The cash transactions are recorded as complete in the books, which allows a reconciliation from the cash based "above-the-line" fiscal accounts with the financing of any deficit "below the line." Some countries are moving toward accrual accounting,

9.5.3 Responsibility and Mechanism of budget allocation

Who is responsible for budget execution?

Budget implementation, in the sense of delivering services by undertaking expenditures, is the responsibility of the line ministries and spending agencies, within regulatory controls set by the ministry of finance.

Mechanism of Budget Allocation

Budget execution tends to be more decentralized. The ministry of finance distribute funds to the main ministries, which in turn distribute these funds to the bank accounts of a large number of ministries and from these to an even larger number of budget institutions--many of them being enterprises.

Payments are executed through the banking system usually electronically, and through the previously monolithic state bank system, reports were generated on payments made by each institution. While timely, the information derived was on a highly aggregated functional basis, with little economic content.



Line ministries and spending agencies report quarterly, in great detail, on their progress in executing their budgets, though with a considerable lag. Thus, despite the preconception of being highly centralized, budget execution is rather decentralized. Usually, a department within the central ministry of finance compiled the data on budget execution and prepared the accounts to reconcile them with the records of the state bank. This centralized department within the ministry of finance has typically formed the basis of new treasury departments that have subsequently been developed in these countries and that usually have assumed responsibility for the budget execution process

9.5.4 Budget Preparation

A full understanding of the budget planning and preparation system is essential, not just to derive expenditure projections but to be able to advise policymakers on the feasibility and desirability of specific budget proposals, from a macroeconomic or microeconomic perspective. It is much easier to control government expenditures at the "upstream" point of budget preparation than later during the execution of the budget.

Thus, fiscal economists and general budget advisors need to know:

- a) what is the framework in which budget decisions are made;
- b) who is responsible for planning and preparing the budget;
- c) what are the basic steps;
- d) what are the typical weaknesses in procedures and how can these be overcome; and
- e) how can changes in budget plans be programmed and targeted?

Budget planning and preparation are (or should be) at the heart of good public expenditure management. To be fully effective, public expenditure management systems require four forms of fiscal and financial discipline:

- a) control of aggregate expenditure to ensure affordability; that is, consistency with the macroeconomic constraints;
- b) effective means for achieving a resource allocation that reflects expenditure policy priorities;
- c) efficient delivery of public services (productive efficiency); and
- d) minimization of the financial costs of budgetary management (i.e., efficient budget execution and cash and debt management practices).

Who is responsible for the planning and preparation of the budget?

The responsibility for preparing the budget usually lies with the ministry of finance with input from the line ministries and some smaller spending agencies.

This exercise is normally controlled by a central budget department located in the ministry of finance, or sometimes in a separate budget ministry.



9.5.5 The basic steps in budget preparation systems

In principle, the basic steps in a standard budget preparation system comprise the following:

The first step in budget preparation should be the determination of a macroeconomic framework for the budget year (and ideally at least the next two years). The macroeconomic projections, prepared by a macroeconomic unit in the ministry of finance or elsewhere, should be agreed with the minister of finance. This allows the budget department within the ministry of finance to determine the global level of expenditure that can be afforded without adverse macroeconomic implications, given expected revenues and the level of deficit that can be safely financed.

The second step should be the allocation of this global total among line ministries, leaving room for reserves (a separate planning and a contingency reserve as explained below) to be managed by the ministry of finance.

The next step should be for the budget department to prepare a budget circular to give instructions to line ministries, with the indicative aggregate spending ceiling for each ministry, on how to prepare their estimates in a way that will be consistent with macro objectives. This circular will include information on the economic assumptions to be adopted on wage levels, the exchange rate and price levels (and preferably differentiated price levels for different economic categories of goods and services).

Step four is the submission of bids by line ministries to the budget department. Once received there needs to be an effective "challenge" capacity within the budget department to test the costing of existing and any new policy proposals.

The next step comprises the negotiations, usually at official and then bilateral or collective ministerial level, leading finally to agreement.

9.5.6 Weaknesses of budget preparation systems

1. There are often weaknesses in budget preparation systems: their nature, scale, and significance need to be understood, both to assess the value of the data produced and, where there are separate projections to be made by an IMF team or other external advisers, to accommodate such weaknesses. Eight common problem areas can be identified:
2. The central government budget is not really unified. It is a dual-budget system with separate recurrent and capital or "development" budgets that may be based on inconsistent macroeconomic assumptions, budget classifications, or accounting rules. Each budget may be compiled by a different ministry--for example, the ministry of finance for recurrent expenditures and a planning ministry for capital or "development" expenditures
3. The macroeconomic constraint is not explicitly taken into account in the budget process, or the economic assumptions underlying the estimated costs of expenditure programs are weak or erroneous.
4. Projections for the outturn of the previous and current years' budgets are not prepared, or the experience to date is not analyzed, so that budget preparation becomes a simple incremental exercise based on the previous year's (often erroneous) budget estimates.



5. Satisfactory procedures do not exist for review of expenditure policies and program prioritization.
6. There is no multiyear planning.
7. Extrabudgetary funds are used to divert spending to one or more "off-budget" accounts.
8. Quasi-fiscal expenditures, contingent liabilities, etc., are not taken into account
9. Appropriations-in-aid are used inappropriately.

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ACKNOWLEDGEMENTS

The African Economic Research Consortium (AERC) wishes to acknowledge and express its immense gratitude to the following resource persons, for their tireless efforts and valuable contribution in the development and compilation of this teaching module and other associated learning materials.

1. Dr. Miguel Niño-Zarazúa, UNU-WIDER, Helsinki, Finland. (Email: miguel@wider.unu.edu; soymanz@hotmail.com);
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4. Dr. William Bekoe, University of Ghana, Ghana. (Email: wbekoe@ug.edu.gh; Wbekoe80@yahoo.com).

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