

# **ECONOMICS**

**Master of Arts/**  
**Postgraduate Diploma**



# **ECONOMICS**

**Whitaker School of Government and Management**

**Institute of Public Administration**

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## **Study Guide**

Welcome to your study of Economics. This manual, which consists of 12 lessons and an appendix containing the Public Spending Code issued by the Department of Public Expenditure and Reform, is accompanied by the following textbook:

- Connolly, S. and Munro. A, *Economics of the Public Sector* (Prentice Hall, Harlow).

The table below outlines the lessons in the textbook that should be read on completing carefully study of a lesson in the manual.

<b>Week</b>	<b>Manual</b>	<b>Essential Reading</b>
1	1	Connolly and Munro, Chs. 1, 2 and 3
2	2	Connolly and Munro, Chs. 10, 11, 12, & 13
3	3	Connolly and Munro, Ch. 4
4	4	Connolly and Munro, Ch.5
5	5 & 6	Connolly and Munro, Ch. 22
6	5 & 6	Connolly and Munro, Ch.22
7	7	Connolly and Munro, Ch.7
8	8	Connolly and Munro, Ch.7
9	9	Readings on Moodle
10	10	Readings on Moodle
11	11	Readings on Moodle
12	12	Readings on Moodle



# 1. Introduction to Public Sector Economics

## Learning Objectives

On completing this lesson and the associated reading, you should be able to:

- describe the economic rationale for government
- define public sector economics
- explain the role of the market and government in the economy
- understand the nature of efficiency
- understand the concepts of producer and consumer surplus
- describe the various market failures
- understand the basics of behavioural economics and its role in policy
- understand why resources such as common fishing grounds are overused.

### 1.1 Introduction

In a modern, complex society, our lives, from birth, are affected in numerous ways by government. In relation to our economic welfare – how resources are allocated to meet the needs and wants of the members of society – the government has an enormous, if sometimes subtle, impact. Most of us are born in hospitals that are publicly owned or regulated. It is a legal requirement that our birth is registered. Within weeks of our arrival home, we are visited by a public health nurse. Most of us attend schools that are publicly funded. When we start work, we notice that a sizable portion of our income is taxed to pay for government services (even though we have been paying indirect taxes from the moment we could spend our pocket money). If we lose our job, meanwhile, the government supports us with social security until we are re-employed. If we become ill, the government provides medical treatment. When we reach retirement age, the State pays us an old age pension until we die. Finally, it is also a legal requirement that our passage from this earth is registered with the State. From cradle to grave, for good and sometimes bad, government has a significant economic impact on our lives.

The above is a very selective and brief indication of the myriad of ways in which government impacts on our economic lives. In this course, we examine the economic roles of government. We seek to explore questions such as:

- Why do governments produce some goods and not others?
- Why do governments regulate markets?
- What can the government do to ensure that the outcomes of the economy are fair?
- What size should the government sector of the economy be?
- What can government do to ensure the resources of the economy are used efficiently?
- What is the proper role of government in the economy?

- Are government policies effective?
- How are government programmes financed?
- Who benefits from different government policies?

To begin to address the above questions, we shall briefly run through a necessarily eclectic history of how the economic role of government emerged and changed over time. We will then examine the theory for the economic role of government in a modern economy.

## **1.2 The Economic Role of Government: A Brief History**

Until relatively recently, humans tended to live in fairly small nomadic tribal groupings. The regular interactions of daily life were generally with blood relatives. Production in this “economy” was of a very simple “hunter-gatherer” nature; tribe members hunted for meat and gathered berries and grains. The distribution of these “goods” within this broad family structure was generally on the basis of need. Disputes would be referred to the tribal elders for adjudication. Central government did not exist in this kind of society. The little governance that existed was undertaken within a tribal system.

Occasionally tribes would come into contact with one another. Interaction with strangers could be dangerous. There could be disputes and violence over resources such as land, animals, crops, and slaves. On the other hand, there could be opportunities for mutual gain through marriage or the exchange of goods. Within the tribal structure everybody knew everybody else. As a result, there was little incentive to cheat and sanctions could easily be imposed by tribal leaders. When people dealt with outsiders, however, on a one-time basis, there were opportunities for unscrupulous people to cheat in transactions with little fear of consequences. Control mechanisms evolved that helped traders overcome this problem. For example, traders who obtained goods “on credit” often left a family member as security to ensure that payment would be realised. From around 10,000 BCE, humans developed sufficient knowledge and technology to settle in one area, rear animals and plant crops. This development of farming was a major advance in the welfare of humankind. This new and more efficient way of producing food provided humans with a food surplus large enough to allow them specialize in areas such as metalwork, tanning, weaving, dying, and trading. These occupations generally required a water source, and small industries formed along the banks of rivers. Markets naturally sprang up where people congregated. Markets were followed by shops, villages, towns and cities. This was the birth of civilisation and it occurred in the Fertile Crescent that is located in modern-day Iraq.

As towns and cities grew and became more prevalent, people interacted with one another with greater regularity. Trade outside of the binds of kinship became more common. The concentrated wealth of cities, towns and regions also became targets for plundering gangs of bandits. The rise in transactions (particularly impersonal transactions), and the need to secure possessions, led to the rise of central

government. Government, in this form, was largely feudal. The leading warrior in a geographical area generally became king or lord, with his prominent followers and supporters forming a hierarchical aristocratic system of landholding. Further down the social order were peasants and serfs. The economy was still predominantly agricultural. The social contract, such as it was, consisted of the king and his barons providing protection and governance to the ordinary peasant or serf. The peasants or serfs payed a portion of their income in taxation and provided their services as foot soldiers in times of unrest. Social mobility was uncommon; people generally died in the same economic condition they were born into. The rule of law in this kind of system could be at the whim of the king or the local lord. Individual rights were generally not well respected or protected in this form of government.

The “Classical” Greek and Roman Civilisations made some important advances in governance. The concepts and practices that emerged in those civilisations remain important in protecting and encouraging economic activities. Examples include citizenship, democracy, the separation of powers, constitutions, public service, welfare payments, public works, and trial by jury. However, the fall of the Roman Empire in 476AD led to a long period called the “Dark Ages,” where there was little advance in human knowledge or welfare until the dawn of the Renaissance and the Age of Exploration in the 15<sup>th</sup> century. The “Re-birth” of interest in knowledge, learning and scholarship, amongst other things, helped set the European economies on an upward trajectory. Scientists, philosophers and scholars like Copernicus, Kepler, Galileo, Da Vinci, Hume, Descartes, Bacon, Newton, Locke, Machiavelli, Hobbes, Rousseau, Kant, Wollstonecraft, and Spinoza led humankind out of the darkness and into the rational and scientific foundation of the “Enlightenment”. The notion that individuals had natural rights, free of a feudal lord or local bishop, was an important step in the development of a modern economy. With individual rights and the concomitant restraint of power, ordinary people were free, relatively speaking, to work hard, innovate, save and invest, and, importantly, retain the fruits of their ingenuity and work. This, in general, had an enormous impact on the incentive structure of society.

Several Enlightenment thinkers wrote predominantly on economic matters. Adam Smith, James Mill, his son John Stuart Mill, John Baptiste Say, Thomas Malthus and David Ricardo all advanced our knowledge and understanding of the economy. Adam Smith, the “father of modern economics,” wrote his great work “The Wealth of Nations” partly in response to two different existing schools of thought known as the “Mercantilists” and the “Physiocrats”. Mercantilism was an alliance between government and business, and its foundational belief was that government should manage the economy with the aim of increasing “national wealth” and the power and position of the country. The mercantilists generally equated power and wealth with the accumulation of gold. This gold could then be used to fund a large army. The economic role of government was to encourage the production of domestic goods, limit domestic consumption, and discourage imports through the imposition of tariffs. Industries that exported goods contributed to the wealth of the nation, while those that imported goods detracted from it. From a policy perspective, this led to certain export industries being favoured through the granting of subsidies and the

awarding of royal monopolies. Mercantilists supported colonialism because it secured additional “free” resources of the colony that could be used by home industry to increase the amount of accumulated gold. Their thinking was influenced by the notion that what was advantageous to the military strength of king was advantageous to the country and that accumulated gold could increase that military strength. Of course, the key point the mercantilists missed is that the accumulation of gold bullion does not actually add to the productive capacity of the nation or increase the welfare of the individuals of the society.

The Physiocrats, led by Francois Quesnay (1694-1774) the court physician to Louis XV, believed that the wealth of the nation was solely derived from agriculture. They divided society into three groups: farmers as the “productive class”, industrial workers as the “sterile class”, with landlords & government as the “proprietor class”. They argued that farmers were the source of wealth and therefore the only productive class. The other “unproductive” classes were superimposed on the productive class and, consequently, appropriated some of agriculture’s “fundamental” production. The Physiocrats believed in the notion of a “natural order”—unchanging natural laws governed all economic activity, so governments should not interfere in the economy by imposing tariffs on trade. The Physiocrats coined the phrase *laissez-faire, laissez passer* (Let things be the way they will) as their battle cry for free trade and the non-interference of governments in the workings of the competitive market.

Smith rejected the Mercantilists view on the intervention of government in the market and embraced the Physiocrats’ *laissez faire* view of free trade. He did not, however, support their belief in the sterility of manufacturing. In *The Wealth of Nations* Smith argued for a limited but definite role for government. He also held that competition in the market and the profit motive would, in addition to leading individuals to pursue their own private interest, also serve the public interest. Smith set out his economic rationale for government intervention in the economy. He stated that:

The first duty of the sovereign, that of protecting the society from the violence and invasion of other independent societies ... The second duty of the sovereign, that of protecting, as far as possible, every member of the society from the injustice or oppression of every other member of it, or the duty of establishing an exact administration of justice ... The third and last duty of the sovereign or commonwealth, is that of erecting and maintaining those public institutions and those public works, which though they may be in the highest degree advantageous to a great society, are, however, of such a nature, that the profit could never repay the expense to any individual, or small number of individuals; and which it, therefore, cannot be expected that any individual, or small number of individuals, should erect or maintain

We see from the above that Smith argues for the protection of individual property rights in society from both foreigners and fellow citizens. Further, Smith recognises that in cases where the market fails to provide a good that would be advantageous to

society then the government should produce that good. Smith's argument in *The Wealth of Nations* for a limited role of government and for the pre-eminence of markets was hugely influential on the economists that followed and, consequently, on government policy during the 19<sup>th</sup> and early 20<sup>th</sup> century.

It was not until the Great Depression of the 1930s that attitudes towards the role of government in the economy fundamentally changed. The unemployment rate in the USA reached a staggering 25%, and production fell by one-third from its peak in 1929. The standard policy advice from economists that the market would adjust to full employment in the "long run" and that any government intervention would be counter-productive was not tenable in the face of such obvious and enormous human suffering. The British economist John Maynard Keynes, writing in response to the Great Depression in his great work "The General Theory of Employment, Interest and Money" (1937), argued that government could intervene in the economy to help it to recover faster. He famously responded to the argument that markets would adjust in the long run with: "In the long-run we are all dead". Keynes's argument for government to intervene to stabilize the economy laid the foundation for Macroeconomics – the study of the economy as a system.

Keynes argued that when an economy slumped, people's confidence would be shaken and they would stop spending. Further, investors' "animal instincts," as he so famously called them, would be spooked by the downturn, and they would stop investing. This led to a vicious downward spiral that exacerbated the initial slowdown. Keynes believed that in a time of economic slowdown the government should increase its expenditure and reduce taxation. Consumers and investors would notice the increased economic activity and the greater amount of money in their pay packet. As a result, the vicious circle above would be transformed into a virtuous circle and the economy would recover in a shorter timeframe. The corollary of the above policy is that when the economy is booming and in danger of becoming unbalanced, government should reduce spending and increase taxation, slowing the economy to a more sustainable pace. The inability of politicians to rein in spending is the key failing of Keynesian economics. In the decades after the Second World War inefficient government expenditure increased, leading ultimately to high unemployment, high inflation and low growth. These problems led to the rise of "supply-side" economics, which advocated the privatisation, deregulation and liberalisation of the economy. These policies were first popularised by the Reagan presidency in the US and the Thatcher government in the UK.

In his 1959 textbook on public sector economics, Richard Musgrave suggested a means of thinking about the role of government in the economy that essentially codifies the lessons learned from history. He divided the economic roles of government into three branches: the allocation branch, the stabilisation branch and the distribution branch. The allocation branch deals with how the government allocates resources in the economy through its purchase of goods and services, like education and healthcare. This branch is also concerned with the effect that government efforts to raise money, through taxation, to purchase goods and services has on the allocation of resources. The distribution branch is concerned with the

distribution of the goods and services in the economy. The stabilisation branch is concerned with keeping the economy at full employment with stable prices. The stabilisation role is studied in macroeconomics modules.

In some textbooks from the 1990's and onwards, you will sometimes find a fourth branch or role of government: the regulatory branch. This reflects the rise in Institutional Economics and the recognition of the importance of government as an adjudicator in the economy with regard to contract and property disputes. The government in this role establishes, maintains and protects the incentive structure of the economy. If contract and property disputes are settled fairly and there is little corruption in an economy, people will feel secure and be incentivised to work hard, save and invest. This helps increase the level of production in the economy. If, on the other hand, friends or relatives of powerful government officials are favoured in contract disputes or the awarding of state contracts, people quickly realise that there is little benefit in hard work and are discouraged from undertaking such.

### **1.3 Public Sector Economics**

Economics is the study of the allocation of scarce resources to satisfy wants and needs in society. It is easy to recognise that humans have wants and needs. People need food, clothing, housing, healthcare, education, entertainment, etc. The production of these goods requires the use of resources. For example, the production of a house requires sand and cement and the human resources of carpenters and bricklayers. To help build the house, the workers use machines and tools. The workers are generally employed, and the machinery owned, by another person who co-ordinates the production of the good. We see from the above that there are different types of resources, with different functions in the production of the good. Economists classify these resources, the "Factors of Production," into four categories as land, labour capital and enterprise.

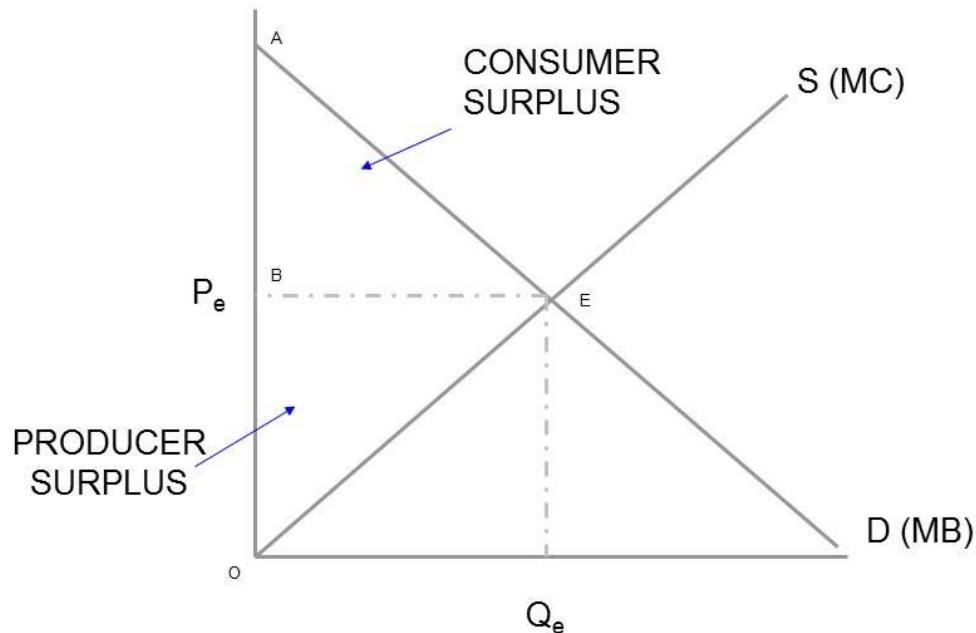
A key aspect of the study of economics is the examination of how people's wants and needs are communicated to the producers of goods. There are two main mechanisms that economics focuses on: the market and government. Economists disagree on the role and performance of both of these mechanisms in delivering goods to the people. Both have advantages and disadvantages. One of the aims of this course is to give you the appropriate knowledge and tools to assess the merits of both mechanisms for yourself.

### **1.4 The Market and Efficiency**

The market, when certain conditions are met, has many advantages. Chief among these is that it is efficient. This means that it delivers the maximum amount of goods given the resources available to the people who demand them. Resources are not wasted. Those who value the goods highest receive them. Efficiency, at first glance, may seem an ordinary and mundane idea. It is, however, enormously important with

regard to the quality of ordinary people's everyday lives. Think of a properly functioning economy whose people are fully employed. They are able to exchange the goods and services they produce for a full range of goods they want. With no waste, there are more goods and services to consume in society and people's well-being in general is higher. In contrast, an economy where a lot of people are unemployed does not produce the full amount of goods and services that it potentially could. Resources are underutilized and, consequently, go to waste. There are less goods to go around than if the population was fully employed. We will examine efficiency in greater detail in Lesson 7, but we will introduce it below using the supply and demand model.

**Figure 1.1 Supply and Demand Model**



The diagram above represents a typical market. The different prices that could be charged for the good are represented on the vertical line (called the y-axis). The different quantities of the good that could be bought or sold are represented on the horizontal line (called the x-axis). The other two lines that criss-cross on the diagram are called the demand curve and the supply curve. The point where the curves intersect is called the equilibrium point, "E". It shows the price charged in the market and the quantity of the good produced.

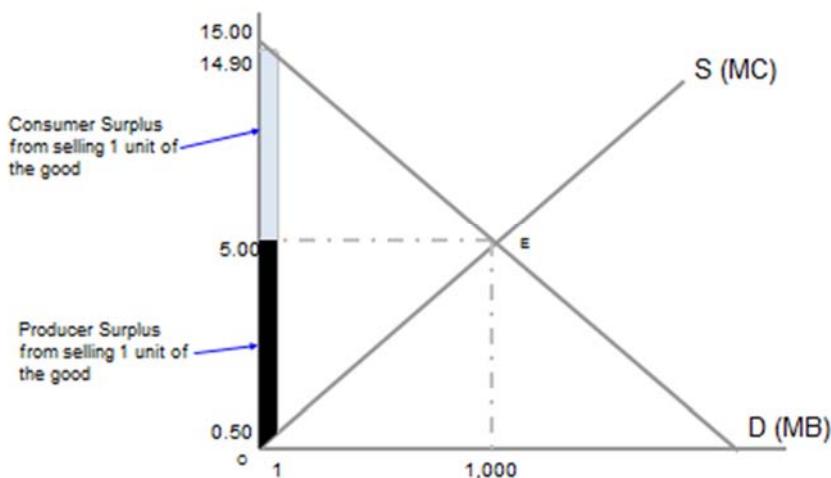
A demand curve indicates the quantity of a good that people are willing purchase at each price. The demand curve is downward sloping because, usually, as the price of

a good decreases people buy more of it. In deciding how much of a good to demand, consumers assess what extra (marginal) benefit or welfare they will get from buying that last unit of the good (for this reason demand curves are often called marginal benefit curves). They will buy the good if the marginal benefit they obtain from the good is higher than the price they have to pay for the good. The difference between the marginal benefit of the consumer and the price paid is called the consumer surplus. It is indicated above by the triangle ABE

A supply curve, on the other hand, shows the amount of a good firms' are willing to supply at each price. It is usually upward-sloping because firms are willing to supply more of a good as the price increases. In deciding whether to produce an extra (marginal) good, the firm will examine the price it receives for the good and the marginal cost of producing that good. If the price is greater than the marginal cost then the firm will produce and sell the good. The difference between the price received and the marginal cost incurred is called the producer surplus. In the diagram above it is equal to the triangle BEO.

In the diagram below, we have added some numbers to help clarify our explanation. We see that the equilibrium price for our good is €5.00 and the equilibrium quantity is 1000. The demand curve touches (intersects) the y-axis at €15.00. This is this price that is so high that not one person would buy the good if this was the price that was charged. At the bottom of the diagram, we see that the supply curve intersects the y-axis at the price of zero (0). This indicates that at a price of zero, no firm would be willing to supply the good.

**Figure 1.2 Supply and Demand Further Explained**



If we look at the point on the x-axis that represents one unit of the good, we see, from the demand curve, that one person would be willing to pay €14.90 for that unit of the good. What they are saying by doing this is that the value they get from that good is worth €14.90 to them in welfare terms. This is the marginal benefit they would receive from consuming the good. On the other hand, we see a firm is willing to supply one unit of the good for 50c. This is the (marginal) cost they incur for producing the good. However, we know that the price that prevails in the market is €5.00. Calculating the benefit that both the consumer and producer get from the exchange, we see that the net benefit that the consumer gets by buying the good is  $\text{€}14.90 - \text{€}5.00 = \text{€}9.90$ . The net benefit that the firm receives is  $\text{€}5.00 - \text{€}0.50 = \text{€}4.50$ . Adding these together we see that by bringing two members of society together in a market and allowing exchange to occur increases their welfare by a total of €14.40.

We can continue along this line of reasoning by calculating how much welfare improves if we exchange a second or third unit of the good. Each time we see welfare improves by a smaller amount. If we keep going, we see that we eventually reach a point where the change in welfare due to exchange falls to zero. At this point the buyers and sellers are indifferent or neutral as to whether they will engage in the exchange. This is the equilibrium point "E" of the market. If you look at the diagram, you can see that the maximum amount of welfare that can be achieved has been achieved by allowing the market to work on its own. This is a very important conclusion. If, for example, government ordered that 1,250 units of the good be produced, we see that welfare would be reduced because the marginal cost of producing the extra 250 goods would be greater than the marginal benefit that those who consumed the extra production received. Simply, the cost in welfare to the owners' of the firm is greater than the gain in welfare by the consumers.

From our simple example above we see that the "free" market allocates the resources in society to their highest values as determined by consumers. This is efficiency. However, as we will discuss over the rest of this course, in order for a market to be efficient it must comply with certain conditions.

## 1.5 Market Failure

The conditions that a market must meet in order to be efficient are quite restrictive. When a market doesn't meet these conditions *market failure* is present and the government may intervene to try and improve the efficiency of the outcome. There are several market failures. We will spend some considerable time in this module examining these market failures and suggesting ways in which government policy may improve the situation. It is important to recognise that government cannot always improve the situation. Further, the good intentions of policy can make the situation worse. We will briefly consider the most common forms of market failure in what follows.

The first condition that a market should meet is that no buyer or seller in the market can influence the price of the good. In economic terminology, the buyers and sellers

are price takers; they do not have market power. If there is only one buyer or one seller in a market, they can name their price. Those working in a busy market, however, will not get away with selling their goods at a price higher than any of the other traders. Competitive markets generate efficiency. Under perfect competition the pursuit of self-interest by profit-maximising producers will also promote the public interest by yielding an outcome in which no one person can be made better off without making someone else worse off, an outcome known as Pareto-efficiency or optimality. As a student you will come across Pareto efficiency in the textbooks. It is essentially another way of stating that there is no waste in using the resources and that those with the highest valuation of the goods receive them. If this wasn't the case, then a rearrangement of the resources to produce more goods could make everyone better off.

Imperfect competition in markets leads to losses of efficiency. Monopoly, the extreme form of imperfect competition, is associated with higher prices and lower output than competitive markets. Monopoly is *allocatively inefficient*, because it entails production where the consumer's willingness to pay is not equal to the cost of an extra unit of output. Consumers willing to pay more than the cost of the extra unit of output are not supplied. Monopoly is also *productively inefficient* because suppliers can charge a price above costs and, due to barriers to entry, will not face competition from a competitor who could steal their business by being more efficient and thereby able to charge a lower price. Governments may intervene in such circumstances to prevent abuses of dominant position and to break down barriers that may exist against potential entrants to the market.

However, intervention to promote competition in certain uncompetitive markets may be inappropriate due to technical conditions. Perverse as it may seem, a monopoly may sometimes be the most efficient way of structuring a market. Telecommunications, electricity, natural gas and water are examples of industries where there are cost advantages associated with large-scale operation. Such industries are known as natural monopolies. In a natural monopoly the advantages of producing on a large scale may allow a single firm to produce the total industry output at lower average cost than a number of competing firms. In such circumstances there may be a trade-off between the allocative inefficiency associated with monopolies and the scale economies generating lower costs. Having more than one water pipe network or electricity grid, or having many competing networks of telephone cabling, may be inefficient. In such cases the appropriate government intervention would be to regulate the conduct of the natural monopoly rather than to promote competition. We examine this market failure in detail in Lesson 5.

A second cause of market failure is a lack of complete information. In order to make an optimal decision a consumer or producer must have full information about the good they are buying or selling and about the ability of the other party to the exchange to honestly fulfil their side of the deal. Information can be costly to acquire, and parties to the exchange may not be adequately knowledgeable to accurately weigh up the costs and benefits of the transaction. For example, how do you know if the doctor you see when you are sick has the competency to treat you

properly? Similarly, how do you know if the drug she prescribes is safe? You can already see clearly see how the government intervenes in this type of market. Government may intervene to improve efficiency in such markets by issuing information about health and safety or restricting who can offer certain services by licensing certain professions and thereby inform consumers of the standards of service to expect. These interventions may seem obvious and simple, but there are complexities in the regulation of these markets that are not evident at first, particularly due to the fact that any limitation on entry to a market confers monopoly power on those allowed to practice in it. Closely connected to the information market failure are "incomplete markets". For example, private markets may fail to provide many types of insurance. Two forces can work together to deter a market in insurance: that the people wishing to insure are those at greater risk (called adverse selection), and that people, once insured, may make less effort to avoid the insured event (called moral hazard). Government may wish to intervene where some insurance markets are missing, e.g. providing unemployment insurance against loss of income.

A fourth cause of market failure arises in situations where the activities of consumers or producers have an effect on others not engaged in the transaction. These effects are called externalities and may be positive (e.g. an increase in your neighbour's house price due to your prize-winning garden) or negative (e.g. where a producer pollutes the environment). Markets will tend to under-produce goods and services that confer positive externalities (because inadequate emphasis is laid on the social benefits) and over-produce goods and services which produce negative externalities (because inadequate emphasis is laid on the social costs). To correct these inefficiencies governments may intervene by, for example, subsidising the commodities that confer positive externalities and taxing the commodities that produce negative externalities. Closely related to the issue of externalities is the existence of transactions costs, the costs of using the market. For example, sometimes there are costs involved in identifying who is doing the polluting, factory A or factory B? There can be further costs in identifying the extent of the damage, in negotiating a solution or policy and in observing and implementing the solution or policy. If these costs are too high then transactions may not take place and the market will fail. We examine this type of market failure and potential solutions.

A fifth cause of market failure arises with goods and services such as street lighting and defence. Goods and services of this type have two important properties: (i) one person's consumption does not deplete the amount available for others (called the non-rival property) and (ii) it is logically impossible or punitively expensive to exclude someone who does not pay from enjoying the benefits (called the non-excludability property). Goods possessing these properties are termed public goods. The free market will not provide public goods because consumers, knowing that they cannot be excluded from their benefit, will "free-ride" rather than pay.

In this brief survey of sources of market failure the emphasis has inevitably fallen on failures and their implications for efficiency. The market may also fail to contribute to greater equity in a society, and governments may intervene in markets in order to

redistribute income. Our focus, however, is on efficiency and effectiveness, and limitations of space preclude consideration of equity at this juncture.

## **1.6 The Individual and Behavioural Economics**

We saw above that, in the presence of market failure, inefficiency occurs. This provides justification for government to intervene in the market. In the above material, however, “standard” neo-classical economic theory is used, which assumes that individuals have the capacity and information to make choices that maximise their “utility”. For quite some time, economists and others have questioned this assumption’s accuracy.

To tease this out a little further we have to ask what the function of theory in a social science is. This is a difficult question to answer. For our purposes we should think of a social science theory as a device that provides a framework with which we can more easily understand the social world. A social science theory is a simplification of the social world. Economic theory does this through identifying the key economic units in the social world and then making simplifying assumptions about how that unit behaves. These simplifying assumptions are useful when they clarify our understanding of the social world. However, they may be an inaccurate simplification and, consequently, distort or misrepresent the behaviour we are trying to understand and explain. A crucial element of academic activity is to empirically test existing theory to see if it is an accurate and clarifying explanation of the social world we are trying to understand.

Economics assumes that the individual consumer acts as a “rational agent”. Without going into the technical details, this means it assumes an individual’s behaviour is rational; that she knows exactly the utility/pleasure she gets from a particular good and that she spends her budget to maximise her utility. Further, it assumes that she is consistent in her choices, that she carries out her intentions, is unaffected by emotions, is not swayed by irrelevant factors or social norms, can make consistent judgements about future choices and can make complex calculations to decide on her best choice.

We can see from the above that the assumption of rationality simplifies the complex human into a unit that maximizes her utility given the choices available. However, are these acceptable given that the function of an assumption is to simplify without distorting? The answer to this is a qualified yes. When we examine behaviour “in aggregate” we see that individuals are generally rational and they do try their best to maximize their utility. Many empirical tests of standard economic theory have shown this and have contributed enormously to our understanding of the economic world.

Sometimes, however, individuals consistently behave in a manner that is different to the rational agent assumption, and this behaviour leads to outcomes that are materially different from the outcomes predicted by the theory. This type of

observation is a signal to theorists to examine and further develop that particular area. Consequently, the school of Behavioural Economics was born. It uses the insights of psychology to understand and explain how real people makes choices rather than rely on the assumptions of the rational agent construction. Behavioural economists examine why people's actions deviate from the predictions of the standard rational model.

The rational agent above appears almost to behave in a superhuman or robotic fashion. Everyday observation tells us that humans are emotional, impulsive, influenced by social settings, contexts and trends; that our capacity to figure out the many facets of different products is limited. Behavioural economics examines these attributes of our behaviour and assesses if there are consistencies that can be modelled so that we can better understand human behaviour and, from a policy perspective, reach better societal outcomes.

Looking now at the theoretical development of behavioural economics, we see that Nobel prize-winner Herbert Simon first questioned the breadth of the rational agent model by developing the concept of bounded rationality. The concept posited that while individuals are rational they are limited in their capacity to formulate, process and decide on the information necessary to reach a fully rational decision. He believed that individuals were "satisficers" rather than optimizers; they seek a satisfactory solution rather than an optimal one. As you can see the concept of bounded rationality takes account of the fact that purely rational decisions are often not feasible in practice due to the intractability of many everyday decisions and the limited computational capacity of ordinary people to process them.

Daniel Kahneman and Amos Tversky made huge contributions to the development of Behavioural Economics, particularly in their conception of two systems of thought operating simultaneously in the human brain. "System 1" thinking is fast, impulsive, emotional and reactionary. "System 2" thinking is slow, deliberative, analytical and controlled. Each system plays an important function in our lives. System 1 (fast) developed because we are boundedly rationally. It takes shortcuts to an action on receiving various signals without stopping to carefully consider every situation. It developed as part of our evolution over thousands of years, to help us survive and prosper. System 1 developed as a response to dangerous situations, such as being attacked by a wild animal; to stop and think would have meant death or a serious injury. Over time, the use of System 1 expanded to include routine and mundane tasks that could be completed on "auto-pilot" using the minimum amount of brain capacity necessary. This allows us to do far more tasks in a period of time than if we stopped to think every time. System 1 thinking is efficient. The function of System 2 thinking is different. It is slow and deliberative. It allows us to think abstractly, make complex calculations and solve difficult problems. In using System 2, we can advance humankind through invention and technological innovation. However, as you can imagine, System 2 thinking is difficult and costly because it requires considerable effort.

This leads us to the essence of Behavioural Economics. We can see from the above that the rational agent model of traditional economic theory is similar to System 2 thinking, but the rational agent model doesn't take account of the problems humans have in engaging in complex thinking. Consequently, we engage in System 1 type thinking a lot of the time. This comes at the cost of human beings developing shortcuts or rules of thumb known as "heuristics". As you can imagine, these heuristics can be enormously useful because they allow us to get much more done in a day and often save us "instinctively" from dangerous situations. However, there is also a downside. System 1 thinking does not conduct a full cost/benefit analysis of every situation but relies on predictable shortcuts. This means that it can bias our behaviour in predictable ways that may not always lead to the best outcome.

The study of Behavioural Economics has identified many heuristics and biases that can be useful but that can also work in ways detrimental to our long-term utility. In the material that follows, we discuss a selection of policy areas where we identify the limitations, heuristics and biases that are present and outline policy applications that can be used to reach a better outcome.

### *Pension Policy*

Most people know that they should take-out a pension that will guarantee them a reasonable income in their old-age. However, many people fail to take out a pension. If people followed the rational agent model this would not be a problem. There are a number of psychological reasons that behavioural economists have identified why people fail to take out a pension. People tend to prefer immediate to future consumption. Further, when faced with a complex decision people respond by procrastinating and not making a decision at all. This type of behaviour shows a "status quo" bias. A policy response that has been successfully used is to automatically enrol employees in pensions. Enrolment now becomes the status quo option. People now have to consciously make a decision and go to the trouble and expense of opting out of the pension. The empirical evidence shows that where the "nudge" of automatic enrolment becomes the "default", the take-up of pensions remains significantly higher.

### *Health Policy*

As before, people tend to prefer immediate to future benefits. This explains why we often hear the phrase "The diet starts tomorrow". We continue to smoke, drink and eat to excess because we tend to underestimate the costs of doing so. Habit forming towards healthy options in childhood is an important means of curbing unhealthy choices in later life. Further, social norms about acceptable behaviour can have a significant impact on outcomes. Our individual behaviour is influenced by what is regarded as generally acceptable in society. While smoking in the vicinity of another person was once acceptable, the social norm that presently prevails is that one should not smoke in the company of a non-smoker or in someone else's house. We can see here that a mixture of health education and regulation has changed attitudes towards a harmful activity. It was once relatively acceptable to drink and drive. Due to

advertising campaigns and rule changes this is no longer the case. Social norms can obviously work in the wrong direction. Is the social attitude that currently prevails towards alcohol healthy? What could be done to change it?

Social norms have also been used to encourage people not to miss medical appointments. Communications that state the cost of a missed appointment and how few people actually miss appointments have resulted in fewer missed appointments. In addition, texts sent prior to appointments help increase the rate of attendance.

#### *Environmental Policy*

Evidence shows that individuals are reluctant to purchase energy efficient products or adopt domestic energy efficient practices in our homes, despite the fact that they would save money in the longer term. Difficulty in working out the benefits, procrastination, delay of rewards and the immediate cost are all posited as being reasons for the poor take up of energy efficient products and practices.

#### *Consumer Protection*

A further interesting area where policy can make a difference is in Consumer Protection. Consumers find it difficult to assess complex products. This difficulty is exacerbated when there are many complex products in one market. This complexity tends to stop consumers from making a consumption decision or from switching to a new product. This dampens competition in the market. Regulations can be introduced to simplify products and to force firms into using standard comparison mechanisms.

#### *Policy and Behavioural Economics*

Behavioural Economics brings a new set of insights and tools into the area of public policy. The integration of psychological insights into economics has helped us to better understand the human condition. The material that we discuss above offers a brief but comprehensive oversight of the area. It provides us with the basis upon which to further develop our understanding of the area and the design of policy. The human mind is a fascinating and complex area and, with a little thought and research, a simple policy response can be designed to improve societal outcomes.

### **1.7 Government Failure**

As we draw this lesson to a conclusion, we briefly examine the concept of government failure. From reading the above, you are beginning to get an idea of the complexity of the economy and the role of government in it. Government has an enormous range of legitimate activities that it should be involved in (alongside pressures to be involved in areas that it should stay clear of). This issue is further exacerbated by the fact that it is often difficult to locate the boundary between what the government should be involved in and what it shouldn't. As we saw above,

government should attempt to intervene where there is market failure. However, government intervention can fail to reach the socially efficient outcomes and, further, can make the situation worse.

Government failure can occur for a number of reasons. First, governments often cannot collect the information necessary in order to form an efficient policy. The State is often required to make decisions where it does not have a set of full and complete information relevant to the policy area. The consequences of actions are often complicated and difficult to foresee. For example, as we will see in Lesson 6, how can a government gather sensitive commercial information from a telecommunication company in order to set a fair and efficient price? This is practically impossible to do but the government must “muddle through” to some sort of solution.

Second, the government has limited control over the response of private individuals to its policy. Citizens may disagree with a new tax or charge and may refuse to pay it. As we saw when we discussed behavioural economics above, they citizens may not respond to policy in a way that is in their own best interest, or they may not fully understand what the government is trying to do.

Third, politicians and public servants may have different goals other than efficiency or equity. The politician may only be interested in being re-elected and, consequently, will concentrate only on short-term projects that solely benefit their own constituency to the detriment of the country as a whole. Civil and public servants may be interested in maximizing their salary and perks, minimizing the amount of work they have to do, or pushing their own agenda rather than that of the government.

Fourth, government policy may be usurped by “rent-seeking” special interest groups. Here, powerful groups of citizens or a wealthy individual citizen may be able, through their ability harness a significant number of votes or through electoral contributions, to have policy enacted that is favourable to their specific interests but detrimental to the country as a whole.

We see from the above that inefficiencies can occur from both market and government activities. It is important when designing policy to not only understand the failures of the market but to be realistic in our assessment of what the government can achieve given its limitations.

## 1.8 Conclusion

This lesson introduced you to the subject of the Public Sector Economics. Having studied this lesson, you should have a solid understanding of how the economic role of government emerged. You should be able to identify and define the allocative, distributive, stabilisation and regulatory roles or branches of government. We introduced the important concepts of market failure and efficiency. We will examine

these in greater detail in later lessons. From there, we acquainted ourselves with a basic understanding of Behavioural Economics and how it related to policy design. Finally, we briefly discussed the limits of government intervention and recognised that anyone hoping to design effective policy should be realistic about what can be achieved. This introductory lesson has offered an elementary, broad view of the material we shall cover in greater detail in the coming lessons.

### **Student Activities**

1. Describe the evolution of the economic roles of government.
2. Define and explain the concepts of producer and consumer surplus.
3. Define and explain the concept of efficiency.
4. List and explain the various market failures.
5. Understand the basic concepts of Behavioural Economics and its role in policy design.
6. Understand and discuss the concept of government failure.

## **2. Taxation**

### **Learning Objectives**

On completing this lesson and the associated reading, you should be able to:

- extend the analysis of efficiency into the area of taxation
- understand incentive effects, tax incidence and tax burdens
- understand the exchequer effects of public projects.

### **2.1 Introduction: The Function of Taxation**

Taxation is a method for governments to raise revenue by way of charges on persons or firms. Taxation can be collected nationally or locally. Governments use a variety of means to finance their expenditures. A selective list includes taxation, borrowing, public services charges, profits of state-owned industry, and sales of state assets. Of these, taxation is generally the predominant source of finance, although in times of economic uncertainty or poor fiscal management, borrowing can become a sizeable source of government finance.

Governments collect taxes for two broad reasons. First, as mentioned above, taxes provide revenue to run the state, *i.e.* to pay for the provision of public services and infrastructure and to fund redistributive policies. Second, taxation is used by government as a corrective device to alter the behaviour of individuals, firms or the economy as a whole. For example, taxes can be used to discourage certain activities, such as smoking, alcohol consumption or the emission of carbon. Alternatively, taxation policy can be used in the form of exemptions to encourage certain activities such as film production. Finally, taxation policy can be used to stimulate or curtail aggregate demand across the whole economy through increases or decreases in the general level of taxation.

The role of taxation in providing a stable economic environment stems from Keynesian economics. Keynes's central tenet is well known: that economies could be in balance at a level less than full employment and that governments, through tax and spending policies, could regulate aggregate demand to provide full employment. However, quick adjustments to government spending are not easily accomplished (especially cuts in government spending), and in the countries that pursued Keynesian policies taxation policy bore an unequal share of the burden of government intervention. As the shortcomings of Keynesian economics became evident during the 1970s, the role of taxation as a tool of government intervention declined. Instead, under supply-side thinking, the emphasis shifted to reducing the importance of the state in economic activity and a reduction in the general level of taxation. However, since the global economic crisis of 2008, Keynesian economics has regained much credibility.

The redistributive role of taxation is achieved through taxes on the possession and transfer of wealth and by progressive taxes on incomes. Redistribution also occurs through tax measures for regional policy. Ireland, for example, has used a variety of concessionary tax measures to influence investment in less developed regions. We see here also that taxation policy can be used to encourage activities that the government believes are desirable for certain social or economic reasons.

Finally, there is the role of taxation in correcting misallocations of resources. The unfettered market may, for instance, allow the overproduction of goods with negative externalities. A negative externality occurs where the economic activities have social costs in excess of private costs. Simple examples of negative externalities are carbon emissions, excessive noise from a neighbour's house, and traffic congestion. Corrective taxes can be imposed on motor vehicles, petrol, tobacco and alcohol. In practice, corrective taxes may increase the complexity of the tax structure and may be difficult to calculate accurately. In many countries governments have used regulation along with or in preference to taxation to correct externalities. We examine the taxation of pollution, etc in a later lesson.

## 2.2 Criteria for Tax Systems

Adam Smith first set out the criteria or canons of a good taxation system in his seminal work *An Inquiry into the Nature and Causes of the Wealth of Nations* (1776). These criteria have generally been accepted with only a small amount of amendment in the intervening years.

The generally agreed characteristics of a "good" tax system are:

- *Efficiency*: a tax system should not interfere with the efficient allocation of resources.
- *Fairness*: a tax system should be fair in its treatment of taxpayers.
- *Simplicity*: a tax system should be easy and relatively inexpensive to administer
- *Flexibility*: a tax system should be capable of responding easily to changed economic circumstances
- *Responsibility*: a tax system should allow taxpayers clearly to perceive what they are paying so that they can indicate their preferences in the political process

It is generally agreed that the criteria of efficiency, equity and simplicity are the most important. The most authoritative treatment of taxation in Ireland—the Commissions on Taxation Reports (1982 & 2009)—particularly emphasized their importance and, in general, you will find that textbooks concentrate most of their attention on the aforementioned three criteria. It must be noted, however, that in the aftermath of the 2008 economic crisis the Irish taxation system displayed a distinct lack of flexibility. The taxation system had been adjusted so that its reliance on relatively stable forms

of taxation such as income tax had been reduced, and it had become overly reliant on unstable forms of taxation such as stamp duty and capital gains tax.

### 2.3 Efficiency

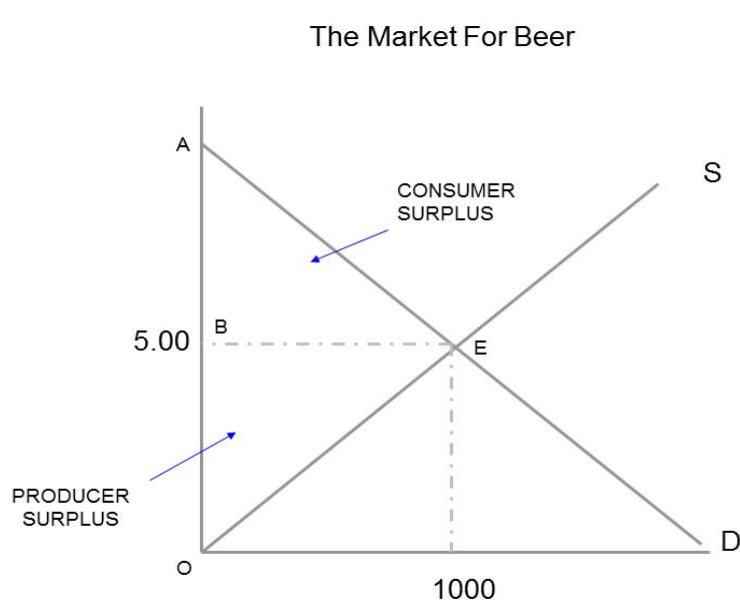
Taxes cause people to change their behaviour. In the absence of a tax, people generally behave in the way that optimizes their welfare. When a tax is introduced, people adjust their behaviour and consume a different quantity of the taxed good than they would have otherwise chosen and consequently, their welfare is usually reduced. Taxes, for the most part, have a disincentive effect. High taxes tend to discourage work, savings, investment, risk-taking and enterprise and thereby cause departures from efficiency and reduce national output.

Taxation distorts the working of the market. When a tax is levied, the burden of paying falls on the taxpayer. This is the first form of burden placed on the taxpayer; however, because they are also induced to change their behaviour, a second form of burden, known as the excess burden, is placed on the taxpayer. The excess burden of a tax refers to the welfare loss caused by the imposition of the tax over and above the revenue that the tax generates. The distortion of choices caused by taxation is termed the "excess burden of taxation". Such welfare losses are caused by inefficient allocations of resources in the market. Excess burden is also known as deadweight loss or the tax wedge.

#### *Excess Burden*

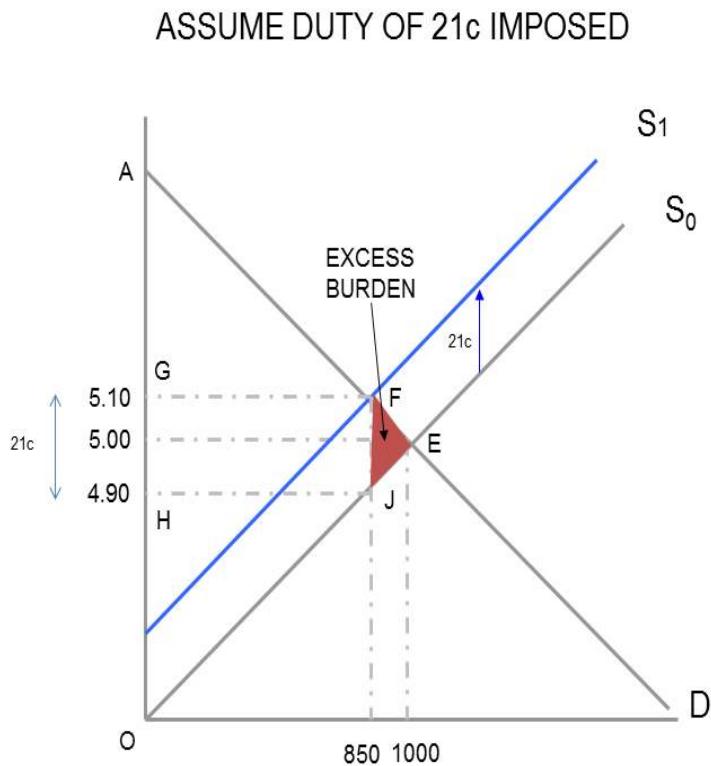
We can illustrate the concept of excess burden using supply and demand analysis.

**Figure 2.1 The Market for Beer**



Examining the diagram above, we see a market for beer prior to the imposition of any tax. The equilibrium price is €5.00 a pint and 1,000 pints are sold. This market is efficient since it maximizes welfare at point "E". We see from the above that the triangle "ABE", which measures consumer surplus (the measure of consumer welfare), is the largest it can be, and the triangle "BEO," which measures producer surplus (the measure of producer welfare), is also the largest it can be. The government now decides to introduce a tax on beer of 21c that the producer must pay to the government. We see from diagram 2 below that this has the effect of shifting the supply curve upwards by the vertical distance of 21c. This is represented by the shift in the supply curve,  $S_0$  to  $S_1$ .

**Figure 2.2 Duty Imposed**



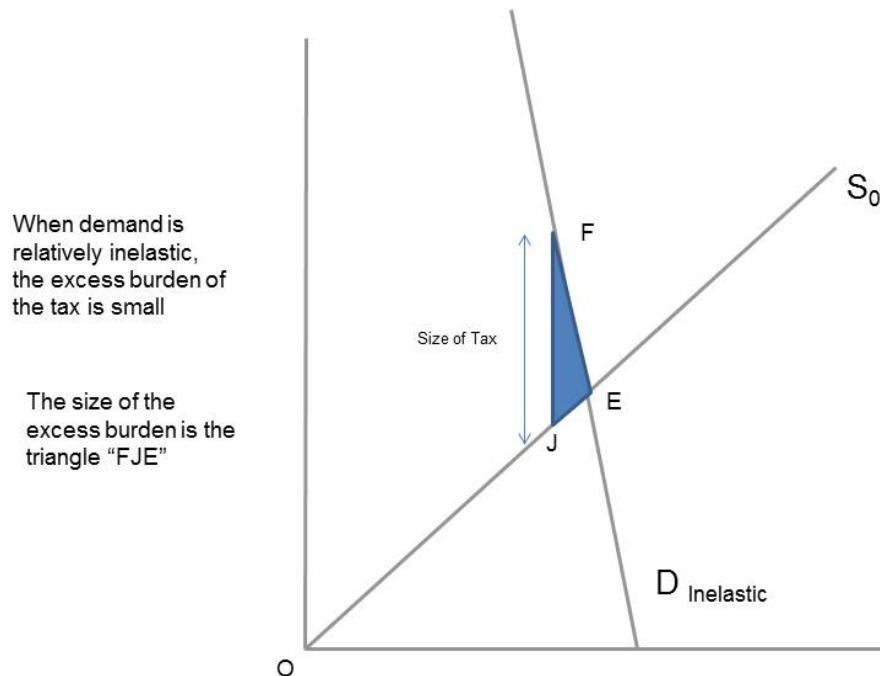
The equilibrium point in the market is now where the curves D and  $S_1$  intersect at point F. We see at this point that the equilibrium price for a beer is now €5.10 with 850 pints bought. The amount raised by the tax is 21c multiplied by 850 pints, which equals €178.50, which is represented by the rectangle "FGHJ". This is the "burden" of the tax. Note that the consumer surplus is reduced to triangle "FGA" and the producer surplus is reduced to the triangle "OHJ". We see from the reduction in consumption of beer from 1,000 to 850 due to the tax that there is a loss in welfare which amounts to the triangle "FEJ". This is the excess burden or deadweight loss of the tax. (You can also now see why it is often called the "tax wedge").

It is informative to examine Figure 2.1 above and establish the size of both the producer and consumer surplus, and then examine Figure 2.2 and establish that the surplus from the trade due to the imposition of the tax has been reduced by the amount of the triangle "FEJ". (Of course, the yield (or burden) of the tax represents a transfer of surplus to the beneficiaries of the tax spend).

### *Magnitude of Excess Burden*

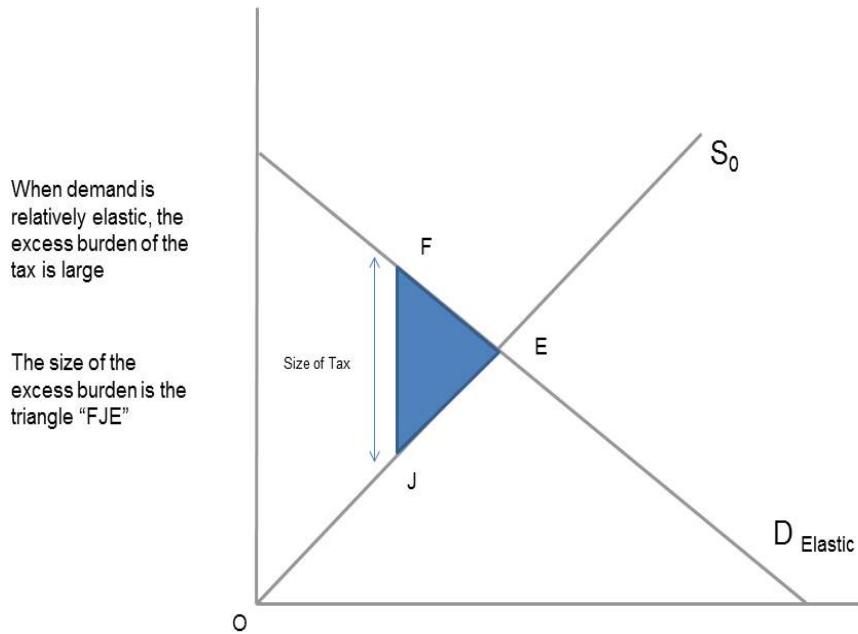
The next question of course to ask is what determines the magnitude of the excess burden? It depends on three factors: the size of the tax, and the elasticities of demand and supply. This is not surprising if you look at the diagram above: The size of the tax determines the height of the excess burden "triangle," so the bigger the tax the bigger the excess burden. The price elasticities determine how much the quantity supplied and demanded respond to the change in price due to the tax. (The price elasticities determine the slope of the supply and demand curves and therefore the angles of the triangle.) Looking at the two diagrams below we see that when we adjust the price elasticity of demand, the size of the excess burden changes. (Note also that similar changes occur when we change the elasticity of supply.)

**Figure 2.3**



It is important to note that the size of tax is the same in both diagrams.

**Figure 2.4**



From the above we see that elasticity has a major impact on the size of the excess burden. We see that goods that are highly elastic in supply and demand will have large excess burden and that goods that have low elasticities will have small excess burdens. It also has interesting implications for taxation policy design. It is obvious that the policymaker should keep the burden of taxation as low as possible. This has two implications: government should tax goods that have low elasticities and the tax base should be as broad as possible. We know from our earlier study of elasticity that the broader the definition of the good the lower its elasticity will be. In summary, efficient taxes are generally set where there is a negative relationship to the good's elasticity. Simply, lower taxes where the elasticity is high, and higher taxes where the elasticity is low.

An interesting case with regard to the effectiveness of policy arises where addictive substances such as alcohol and tobacco are taxed. Often, the reason given for taxing them is that the increase in price will lead to a drop in the quantity consumed. However, as addictive substances are inelastic by their very nature (consumers find it very difficult to cut back consumption even when price rises), we see that the tax, while it has a relatively small excess burden, is not very successful in achieving the policy goal of consumption reduction. However, a high tax without a falloff in consumption has the advantage of garnering a large and stable tax-take. You can see now why alcohol and cigarettes are known as the "old reliables" when it comes to budget day and the government needs to raise revenue from somewhere.

We see from the above discussion that taxation, in as much as is possible, should not affect the choices made in the economy. This is known as tax neutrality. Tax neutrality aims to minimize the excess burden or deadweight cost of the taxation system. Neutrality would mean that the tax system does not distort the tradeoffs between work and leisure, between different types of work, different goods, between different types of investment and so forth. When discussing neutrality it is important to recognize that taxes can sometimes “distort” behaviour in a manner that is advantageous to society. For example, if we wish to discourage pollution then it may be a good idea to tax it. Corrective taxes may therefore replace efficiency losses with efficiency gains. We examine this in greater detail in the lesson that deals with externalities.

## 2.4 Equity or Fairness

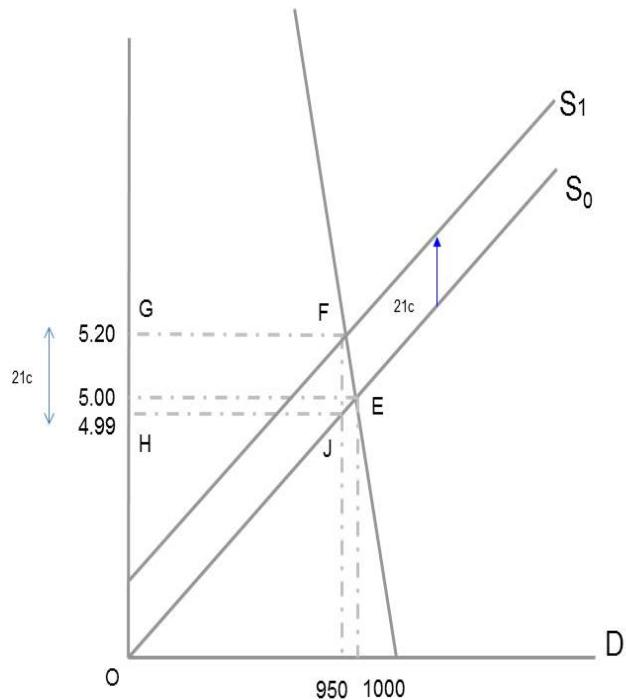
Few would dissent from the idea that taxes should be fair. Equity is required not only by considerations of social justice but also on the practical grounds that perceived inequities may lead to evasion. The observant reader will have noticed in our beer example that even though it is the producer who is liable to pay the tax, they are able to pass on some of the tax increase to the consumer. This obviously has equity implications because the policymaker, in assessing the overall equity of the taxation system, should be aware of who is actually paying the tax levied. We examine tax incidence immediately below and we then progress to discuss the different types of equity.

### *Tax Incidence*

The shifting of a tax is the transfer of the burden of paying a tax from those who are legally liable obliged to pay for it on to others. When a tax is shifted, those liable for its payment succeed in recouping some of the fall in their income caused by the tax through changes in the price of the item taxed. The incidence of the tax is the distribution of the burden of paying it. The “formal” legal incidence of the tax may be the responsibility of the producer but the “effective” incidence of the tax is shared between the producer and the consumer.

This further leads us to the question of what determines the actual incidence of the tax. Having read the above material on excess burden, you can probably guess that tax incidence is determined by the elasticities of demand and supply of the good. A simple example will best illustrate. We continue the example used above, where the government imposes a tax of 21c on the producer of beer. We saw that the burden of the 21c tax was shared nearly evenly between the consumer and producer of the good. In the diagram below, we adjust the elasticity of demand of the consumer to make their demand more inelastic.

**Figure 2.5**



We see from the above diagram that due to the “increase” in the consumer’s inelasticity, the producer is now able to pass 20c of the tax while the producer only pays 1c of the 21c. We should also recognize from the above that taxes may be shifted forward or backward. Indirect taxes, for example, might be shifted forward by retailers to consumers in the form of higher prices, or backward to manufacturers in the form of lower prices. The latter effect occurs if, as a result of lower demand resulting from the indirect tax, suppliers cut prices in order to boost sales. This backward shifting will place a burden on shareholders if profits are reduced or on workers if there are layoffs. Hence the incidence of indirect tax is not solely on the consumer.

We can envisage many other instances where the burden of taxation can be shifted. If employers are required to increase their social insurance contribution for employees there may be less demand for labour and a fall in wages. This would mean that part of the tax was shifted onto employees in the guise of lower wages. In a similar vein, we can easily imagine how the burden of other taxes such as corporation tax and property tax can be shifted.

#### *Horizontal and Vertical Equity*

The literature on taxation distinguishes two concepts of equity. Horizontal equity requires that people in the same circumstances should be treated equally for tax

purposes, while vertical equity requires that people in different circumstances be treated differently, with the better-off paying proportionately more tax. A tax where the proportion of income given to tax rises as income rises is known as a progressive tax. A regressive tax is one which takes a higher proportion of the incomes of poorer people.

Discussions of equity in taxation have given rise to two opposing ideas of fairness. Firstly, the ability-to-pay principle, which is consistent with vertical equity, requires the better-off to pay higher taxes. Secondly, the benefit principle requires those who derive benefits from public goods or services to pay taxes accordingly.

The benefit principle is based on the belief that people should contribute according to their level of consumption of public goods. It attempts to link the cost per unit provided to the marginal benefit the consumer receives from consumption and is willing to pay for. It is, therefore, similar to the market mechanism which determines both the amounts demanded and the prices paid in a market. As we will learn when we study Public Goods in Lesson 3, there are advantages in forcing the consumer to reveal their preference for the amount of a good they consume because it induces efficiency. The benefit approach is therefore used where the provision of public services closely resemble the private market. We can see that the benefit principle is the reasoning behind the introduction of bin and water charges, toll charges on roads, and city and town parking charges. We can see that it is more difficult for government to apply a charge for services like national defence, weather forecasting, road cleaning, general state administration, etc. Proponents of the benefit principle argue that charging for public services that closely resemble a private market makes delivery of those services more efficient and reduces other taxes. They further claim that re-distributional issues are better dealt with by increasing direct payments to citizens in poverty.

The ability-to-pay principle generally finds more favour than the benefit principle in Ireland; the Commissions on Taxation specifically favoured the ability-to-pay approach. The ability-to-pay approach effectively means that government decides on annual expenditure and this in turn determines the need for tax revenue. This approach contrasts with the earmarking of taxes under the benefit principle.

The ability-to-pay approach has a number of associated drawbacks. The payment of higher taxes by the better-off may lead to disincentive effects and reduced efficiency, for example, a businessperson may not grow their firm beyond a certain level because most of their extra effort is paid to the taxation authority.

A more fundamental problem arises with the conception of ability-to-pay. Should a person's ability to pay be assessed on the flow of new economic resources to them in the tax period, *i.e.* their income, or the stock of economic resources they hold during the period, *i.e.* their wealth. We see that this problem arises in relation to property, asset or land taxes. A person may be rich due to their holdings of property, land, works of art, etc. but might not have ready cash to meet the tax liability. One could argue that this is no excuse for a wealthy person not to pay tax.

In a similar fashion, two people may have the same income-earning potential (e.g. two doctors of similar qualification) but one may earn less by choosing to work less hard. In such cases it might be argued that potential to earn, not just actual income, is a relevant aspect of ability-to-pay. Taxing people on their wealth may have efficiency benefits in that if a cash-strapped land-owner is forced to pay tax, they may be incentivized to work their land more efficiently or sell it to someone who can use it efficiently. In the same vein, the laid back doctor may be forced to use his skills, likely acquired through publicly funded training, to greater economic effect. In reality, however, income is largely the metric upon which ability to pay is judged.

## **2.5 Simplicity of Administration and Compliance**

Taxes impose costs on the public sector, in the form of administrative and collection costs, and on the private sector, for both individuals and firms, in the form of advisory fees, time spent on maintenance of records, time spent on calculation of taxes due and so forth. Both types of costs are compliance costs though in what follows we will use the general convention of referring to the public sector costs as administrative costs and the private sector costs as compliance costs.

Administrative and compliance costs will vary with such factors as the complexity of the tax system and the nature of record-keeping requirements. Collection costs will increase with the number of collection points - a factor which makes customs duties and taxes on capital transfers costly to collect. Costs of administration and compliance will also vary with tax structures and rates of tax. Value added tax, for example, tends to have relatively high costs of compliance and collection, but these costs would decline with a change in structure which raised the threshold of annual turnover for VAT registration.

Administrative costs may be greater for some income categories than for others. For instance, the administrative costs associated with taxes on capital may be larger than those associated with taxes on labour. Indeed, the cost of administration is a key consideration in judging whether or not it is worthwhile to levy a tax. For example, a wealth tax, no matter how desirable on grounds of equity, may be uneconomic as a result of the costs of administration. It is also recognized that property taxes, due to the need to assess valuations of the asset, are relatively expensive to administer.

The greater simplicity associated with reduced administrative and compliance costs is generally welcomed. The trend nowadays is towards tax systems with just a small number of broadly-based taxes charged at moderate rates. Such trends reduce both the opportunities and the incentives to avoid payment of taxes. Less time is devoted by individuals and enterprises in complying with the tax system and less skilled effort is diverted to tax avoidance work. Another modern trend, but one which is less consistent with the reduction of compliance costs, is the movement of tax administration toward self assessment, a movement very much in keeping with the privatization of public services.

Tax systems will have a balance between administrative and compliance costs. The Commissions on Taxation noted arguments for and against shifting the balance away from compliance costs toward administrative costs. The Commission noted that compliance costs are generally regressive and are likely to be resented by taxpayers whereas administrative costs are easier to calculate and are more amendable to public scrutiny. Such arguments tend to favour reduced compliance costs. On the other hand, as is the case with PAYE, the use of the private sector to collect the tax can be a cheaper option.

Before ending this section it may be useful to clarify a possible source of confusion about the discussion of costs of taxation. In this section we have discussed the costs associated with administration and compliance. In contrast, economists often go beyond this to discuss the costs imposed by tax on economic welfare. In order to understand this approach it is necessary to realise that revenues collected from taxes can only accurately measure the burden of tax where the tax causes no change in economic behaviour. But, as we have already seen, taxes will generally alter economic behaviour and cause distortions as taxpayers attempt to reduce tax liability. The burden of tax will then exceed the tax paid and this excess burden, or deadweight loss, is a measure of inefficiency in taxes.

## **2.6 Local Taxation**

There are well-known arguments for and against local government. Taking first the case against, it is argued that central government is best situated to allocate goods such as education, health, justice and transportation. This is not just because of the need for national minimum standards but because these goods generate positive and negative externalities or spill-over effects. Pursuing this logic it can be argued that a local government may overproduce goods which cause costs outside the local jurisdiction: an example is local government support for industries which cause pollution in adjacent local jurisdictions. Moreover, it is easy to see that central government has advantages over local government both in using fiscal and monetary policies for macroeconomic stabilization purposes and also in ensuring equal treatment by the fiscal system regardless of location, for distributional purposes.

Among the classic arguments in favour of local government are that it is cheaper to deal with local matters at source and that local government is more sensitive than central government to local preferences. Such arguments can be easily extended. At the extreme, local government independence could lead to a great contrast in the types of goods and services provided by different local governments and thereby cause movements of people to the local jurisdictions which best satisfy their wants. This is desirable inasmuch as consumer satisfaction is improved by the free exercise of choice but may have the disadvantage of leading to concentrations of rich and poor people in different local jurisdictions.

The foregoing gives a flavour of the arguments for and against local government. It also suggests that it is best that there is some mix of central and local government, which in turn requires a mix of central and local financing.

Local jurisdictions vary both in terms of their expenditure requirements and their capacity to pay tax. To some extent, grant aid by central government to local government is intended to diminish the horizontal inequities between local jurisdictions.

In situations where central government redistributes between local jurisdictions it is necessary to assess whether local governments have their own redistribution policies. If local governments have redistribution policies it is necessary to judge whether they are in conflict with, or complementary to, central government's redistribution policies. With this in mind a case can be made that central government alone assume the distribution role and that additional spending by local governments be related to benefits received rather than ability- to-pay.

The ill-fated poll tax in Britain can be viewed as a local tax based on the benefit principle rather than the ability-to-pay principle. The failings of the poll tax are beyond the scope of this manual, but we might note that Bramley, Le Grand and Low (1989) have argued that poll tax payments were not in fact closely related to the benefits received. More importantly, looking beyond the poll tax, it is difficult to foresee a situation where there can be a confinement of the distribution role only to central government with local government spending being purely related to benefits received.

An interesting perspective on central-local relations can be gained within the EU context. On the one hand, the EU is in favour of subsidiarity, namely the taking of decisions at the lowest possible level. On the other hand, as the EU develops, and with the possibility of an economic and monetary union, member states will become more integrated and the efficient operation of macroeconomic policy will create a tendency towards a Union-wide policy. In such a scenario member states with limited independence have similarities to local governments.

Developments in local taxation in the EU and other European countries provide some lessons about the level and choice of local taxes.

## **2.7 Tax Policy Making**

At the outset of this lesson we examined the functions of taxation, namely the raising of revenue for government, the provision of a stable macroeconomic environment, the redistribution of income and the correction of resource misallocation.

The raising of revenue is geared to the government annual budgetary cycle and is, therefore, subject to short-term influences. The other functions are more long-term in nature.

Short-term considerations tend to predominate in tax policy-making. This was particularly the case in the past in developed countries where Keynesian demand-management policies emphasized unbalanced budgets with tax as the main instrument of demand management. Consequently, budgets were dis-unified, in the sense that considerations of tax tended to be separated from considerations of expenditure. Moreover, tax policy tended to be particularly associated with short-term policy.

Even under the more recent supply-side policies, which emphasize the reform of the tax structure in the interests of improved efficiency, there is still an almost inevitable linking of tax policy to the annual budgetary cycle and to short-term economic and political developments. Tax reform, therefore, may easily become a slow and piecemeal affair.

To argue thus is not to underestimate the short-term difficulties encountered in the annual budgetary cycle. Spending levels are determined in negotiations between a country's finance department and the other departments of government. Once set, the spending levels can constitute somewhat of a moving target, with actual spending depending on such variables as the take-up of welfare benefits.

In raising revenue, finance departments have the advantage of central control. Other government departments, or indeed parliament, do not propose tax measures; though, of course, parliament can oppose tax measures. Finance departments also have the advantage in tax affairs of making decisions which are to a great extent free from public scrutiny. This is justified both in terms of the need to be free to make last-minute adjustments and in terms of the need to prevent speculators making money.

But even with this central control in tax affairs, it may be difficult to meet tax revenue targets. Income tax revenue, to some degree, depends on trends in incomes; VAT receipts depend on consumer spending, which in turn may critically hinge on consumer confidence, and customs revenue depends on the performance of merchandise imports. These influences are, to varying degrees, difficult for governments to control.

The foregoing discussion emphasizes the importance of short-term considerations in the formulation of tax policy. Of course, there are many other problems. Tax policy may, for example, be used to allocate resources toward more productive sectors, and away from less productive sectors, of the economy. This may, however, run counter to equity considerations. It may be necessary, therefore, to strike the best balance between efficiency and equity considerations.

Tax policy-making is also confronted by the problem of tax concessions extracted by interest groups. These concessions may be politically difficult to reverse not least because they may affect the prices of assets. The term "tax capitalization" is used to describe the building-in of a tax concession to capital values. For example, a mortgage interest relief policy could increase the demand for housing and thereby

raise house prices. The abolition of mortgage interest relief would create political problems if it reduced house prices and created dissatisfaction among house-owners.

The problems confronting tax policy-makers are present to a greater or lesser degree in Ireland. Tax reform may require new and different taxes, such as property taxes, water charges or reduced tax relief. As we have seen, these can be very unpopular with certain sections of the public.

Since the advent of the single European market and its associated approximation of tax rates, there has been a limit to the discretionary adjustments that governments can make to taxation. In addition, the criteria which economies must meet in order to stay within the EU determined budgetary constraints to ensure the health of the single currency, the Euro, curtail the ability of individual governments to vary their taxation policy. These Maastricht or convergence criteria include the need to keep budget deficits below three per cent of GDP and the need to keep the ratio of debt to GDP at, or below, 60 per cent. Such criteria can be achieved in part by expenditure control or economic growth. Taxation, however, clearly has an important role to play.

## **2.8 Taxation and Project Evaluation**

Some of the lessons that follow deal with project evaluation. The evaluation of projects raises important issues about the treatment of net revenue or net costs to the exchequer resulting from such projects. This is a complex area, partly because there is sometimes a lack of clarity about the distinction between gross flows to and from the exchequer, net flows to and from the exchequer, and the "real" net benefits. Take the example of an evaluation of public training services. If trainees find employment, they will lose unemployment benefit, and gain a gross wage, out of which they will pay direct taxes (income taxes and social insurance contributions); at the same time, taxpayers will gain to the extent that their direct taxes are lower. While this simplified example does not pick up all of the financial flows, it does bring out the difference between the key net benefits (in this case represented by the additional gross wages of trainees who find jobs) and the gross financial flows.

The net financial flows usually mean that there is a net financial cost to the exchequer to ensure that a project occurs. Take the case of a transport project. Having counted up all the benefits and costs (which can include the government as a direct beneficiary, e.g. lower transport costs associated with government transport use), the project may need a government subsidy if it is to go ahead. In other words the means used to finance a project must be taken into account. In the case where a net government payment is needed, that will involve additional taxation and the "real" costs for the economy of the levying of that taxation have to be taken into account. This means that in the case where an increased subsidy needed for a project to occur is exactly balanced by increased tax revenue, there could still be an additional real burden on the economy.

Some of the flows to and from the exchequer will not affect the net benefits of a project directly, although they will have implications for the distribution of income. Often the distinction between the income distribution implications of the financial flows and the "real" economy effects working through the burden of taxation is not made with sufficient force. There is a need to distinguish between the initial incidence of taxes and benefits and the final one (dealing with the ultimate beneficiaries and bearers of costs). The latter could be quite different from the former.

There are a number of ways of dealing with this problem. One is to work out the financing implications, followed by the taxation implications and then go back to adjust the net benefit calculations. Another way is to put a limit on the government budget- as a result, not all projects with a positive net benefit would be accepted but those showing a certain minimum benefit-cost ratio would be accepted.

### **Student Activities**

1. Distinguish between tax incidence, the excess burden of taxation and the incentive effects of taxation.
2. List the main distortionary effects of taxation.
3. Choose any public sector project (e.g. a road, a hospital, a school or a training programme) and list the flows to and from the exchequer.

### **Supplementary Reading**

This lesson provides *very* important background to subsequent lessons in the Economics course. You should be sure that you understand the concepts covered in the lesson and re-read any sections that are unclear.

You should also try to read:

- Commission on Taxation, Reports 1982-1985 & 2009, Dublin: Stationery Office.
- Collins, M., 'Taxation' in O'Hagan & Newman (eds.): *The Economy of Ireland, - National and Sectoral Policy Issues*, Dublin: Irish Management Institute, Twelfth Edition, pp 87-111, 2014.

### **3. Public Goods**

#### **Learning Objectives**

When you have studied this lesson and any associated reading, you should be able to:

- explain the characteristics of public goods
- compare and contrast different types of public goods
- describe the optimal provision of public goods
- explain the practical problems of the provision of public goods.

#### **3.1 Introduction**

When you purchase a cup of coffee, it has two essential characteristics that ensure there will be both demand and supply for it in the marketplace. Firstly, it has the characteristic of excludability and, secondly, it is rival in consumption.

Let us examine this further. Your cup of coffee is served to you in a cup. You have purchased it and you have the exclusive rights to its consumption (unless you wish to waive these rights and give the coffee to someone else). You can easily exclude all others from the consumption of your cup of coffee. This is the characteristic of excludability. Secondly, once you have consumed the coffee no one else can consume it. It is no longer available to others. The cup of coffee is rival in consumption. A cup of coffee is a private good. It has the characteristics of excludability and rivalry in consumption.

We now look at goods that have the characteristics of non-excludability and non-rivalry. These goods are called public goods. The most commonly cited public good is national defence. Once a country is defended, all individuals are protected within its borders. The good is non-excludable. If it is provided for one individual it is provided for all. If a pacifist objects to national defence and refuses to pay his taxes, he cannot be excluded from its benefit. Secondly, as another child is born within the country, the cost of providing national defence does not increase. This child's consumption of national defence does not affect the amount of defence consumed by anybody else. The cost of protecting one extra person is zero or in economic terms the marginal cost is zero. This is the characteristic of non-rivalry in consumption. Consider allowing another person a cup of coffee, it has a definite extra cost.

#### **3.2 The Characteristics of Public Goods: Non-Excludability and Non-Rivalry**

We shall now examine the properties of non-excludability and non-rivalry separately. It is rare to find goods with complete adherence to both characteristics; however, many goods exhibit degrees of non-excludability and non-rivalry in consumption.

### *Non-Excludability*

A good is non-excludable when, once the good is supplied for one person, it is either impossible or prohibitively expensive to exclude other people from consuming the good. For example, a ship passing a lighthouse cannot be excluded from the benefit the lighthouse provides; similarly, street lighting provided by one rich individual to ensure his family's safe passage home cannot exclude others who use the illuminated streets from benefiting. In the case of the lighthouse, if a private company provided the service, it has the option of switching off the lighthouse, provided it is sure that none of its paying ships are in the vicinity. This, however, would involve monitoring costs that could make it so prohibitively expensive that the private supplier would not make a profit.

If exclusion is impossible then use of the price system is also impossible. Consumers have no incentive to pay because, if someone else pays, they can enjoy the good for free. This is called free riding. If the good was a cup of coffee (private good) individuals could easily be excluded from enjoying the good if they did not pay for it.

The price mechanism rations ordinary private goods. However, as we have seen, due to non-excludability the price mechanism fails to do this job for public goods. We can deduce from this that the outcome of a competitive market for a public good will not be Pareto efficient. Let's return to the example of national defence. Assume everybody values their security, but the government does not provide it. Is there a market opening for a private firm to provide national security? In order to provide the service, it would have to charge a fee. However, once the service is provided everybody benefits from it regardless of whether or not they have contributed. Individuals, therefore, have no incentive to pay for the services voluntarily. The individuals who prefer not to contribute in the hope that others will are known as free riders. The free-rider problem means that either a public good will not be supplied at all or it will be undersupplied. The free-rider problem may be overcome by the use of taxation. The result is not Pareto efficient because everybody can be made better off by its provision. However, because of free riding either the good will not be supplied at all or it will be undersupplied.

### *Non-Rivalry*

A good is non-rival if the consumption of one person does not affect the quantity available for consumption by others. All users consume the same unit. The marginal cost of an extra user is, therefore, zero. Consider the example of a radio broadcast: assuming that everyone already has a radio, the cost of another person listening in is zero. Once the broadcast is supplied to one person it is supplied to all.

To further illustrate and isolate the issue of non-rivalry, let us examine a good with the property of non-rivalry but also with the property of excludability. Consider a television signal beaming a programme into the nation's homes. Again we assume that everyone already has a TV set and that the electricity costs are zero (or as near to

zero that it does not matter). The good is non-rival. If one person looks at the TV, it does not affect the enjoyment of anyone else looking at the programme. The marginal cost of an extra person watching the TV show is zero, i.e.  $MC = 0$ .

The TV station supplying the good can exclude individuals from watching the show by using signal scramblers. If they can exclude individuals the price mechanism can work. However, from the point of view of economic efficiency, charging for a non-rival good is inefficient. If a price is charged, some people will not consume the good, even though the marginal cost of their consumption is zero. Charging results in underconsumption. There remain consumers with positive marginal benefit while their marginal cost is zero. Efficient consumption occurs where the  $MC=MB$ . The marginal cost in this case we know is zero, so consumption should continue up until the point where  $MB$  is zero. This does not occur if a price is charged. The outcome is inefficient due to the underconsumption caused by charging.

We run into a fundamental problem here. If there is no charge for the non-rival good, there is no incentive for a private firm to supply it. Individuals exhibit a positive marginal benefit from its supply. If it were supplied there would be a Pareto improvement. The inefficiency here results from undersupply.

A non-rival good either exhibits underconsumption or undersupply. Neither is Pareto efficient.

### 3.3 Impure Public Goods

Having examined the qualities of non-excludability and non-rivalry above, it is obvious that many goods exhibit different degrees of both qualities. It is informative to examine different goods with different degrees of each quality.

1. Cup of Coffee: As seen above, this is a private good. It is excludable because it is sold in a mug to the individual who pays for it. It is also rival in consumption, since once an individual consumes it, no other person can enjoy the benefits of it.
2. National Defence: Again, as discussed above, this is a public good. It is non-excludable because once the country is protected any one individual cannot be excluded from the benefit of the protection. Secondly it is non-rival in consumption because each individual is protected to the same degree.
3. Golf Course/Club: This type of good is sometimes known as a club good. It is excludable because only members who have paid a fee are allowed to use the course. It is non-rival in consumption because the members of the club are limited in number to ensure that each person has access to the facilities.
4. Congested Roadway: On a congested roadway, there is rivalry in consumption because one vehicle's use of the roadway imposes a cost on the other vehicles by increasing the journey time. The roadway is non-excludable since any vehicle has free access to the roadway.

We see from the above that there are many different goods with varying degrees of excludability and rivalry in consumption.

### **3.4 Optimal Provision of a Public Good**

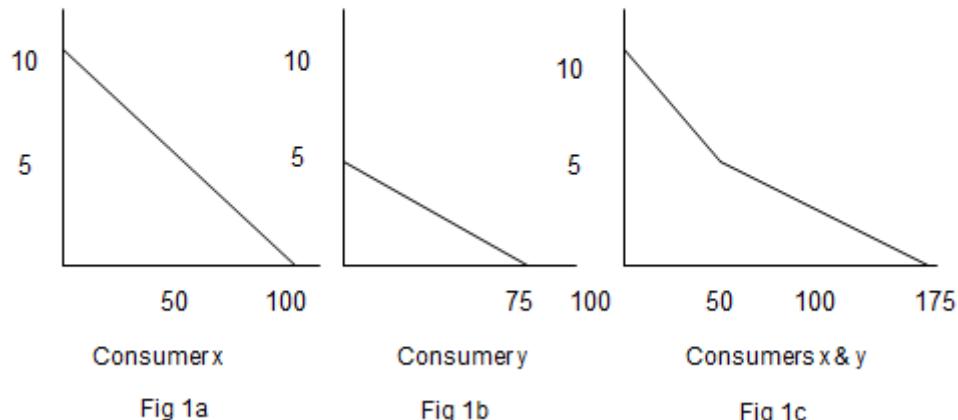
A competitive market for a private good results in a Pareto efficient allocation of resources. In examining the appropriate efficiency conditions for a public good we see that, unless we take account of non-rivalry, the result will not be efficient.

This can be illustrated quite easily. The value that each individual places on the quantity of a particular good is illustrated by their marginal benefit (MB) curve. With a private good, consumption is rival. Each unit produced will go to one person. As more of the good is demanded so more needs to be produced. At each price each individual will demand a certain amount of the good. To discover the marginal benefit for the market as a whole, we add the amount that is demanded at each price for every individual in the market. This horizontal summation of the individual marginal benefit curves yields the overall value that consumers place on the good. This is known as the collective marginal benefit curve.

For example, the marginal benefit curves in Figure 3.1 show that at a marginal benefit of €10 consumer X buys one unit (Figure 1a). Consumer Y at this stage is not willing to purchase any units at the price set (Figure 1b). At a marginal benefit of €5 consumer Y buys one unit. We also see that when X has consumed 100 units of the good his marginal benefit of the good is zero while Y only has to consume 75 before his marginal benefit is zero. To calculate the collective marginal benefit curve (Figure 1c) we add together the amount demanded at each level of marginal benefit. So, for example, at €5 of marginal benefit, Consumer X is willing to consume 50 units, while Consumer Y consumes 1 unit of the good. This is reflected in the collective marginal benefit curve. We see also that where marginal benefit is zero, quantity demanded is 175 on the collective marginal benefit curve.

**Figure 3.1**

## A Private Good – Horizontal Summation

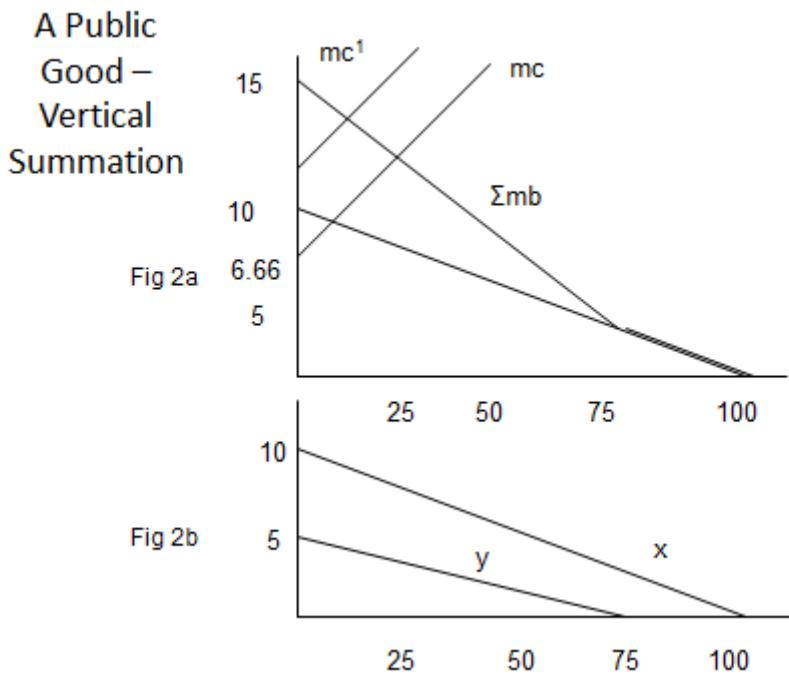


Public goods are non-rival in consumption. Once the good is supplied, it is supplied in the same quantity to all consumers. All consumers benefit. In order to find the aggregate marginal benefit to consumers of a public good, it is necessary to examine each quantity provided and sum the individual benefit that each individual receives at that level of output. In this case we vertically sum each individual marginal benefit curve.

Looking again at our two marginal benefit curves for individuals X and Y (see Figure 2.), we now assume the good in question is a public good and therefore non-rival in consumption. Each unit of the good that is produced will benefit both X and Y (not necessarily by the same amount). The marginal benefit of unit 1 is €10 for consumer X and €5 for consumer Y. The total willingness to pay is therefore €15. At 50 units of production, consumer X has a marginal benefit of €5, while consumer Y has a marginal benefit of €1.66. Once 75 units are produced, only consumer X has a positive valuation of the good and is willing to pay for more units of the good.

To find the collective marginal benefit curve for the public good, we look at each level of output and add the consumers' marginal benefit at that level of output. For example, at output level 1, the collective marginal benefit is €15, at 50 units it is €5 (consumer X) + €1.66 (consumer Y) = €6.66.

**Figure 2**



A public good, as we know, is non-rival in consumption, so the collective willingness to pay of all the individuals consuming the good (i.e. the vertical sum of the individual marginal benefits) should equal the marginal cost of the good. The optimal level of provision of a public good is  $\Sigma MB = MC$  (point E on Figure 2a).

We can see now how easy it is for the public good to be underproduced or not produced at all. If consumer Y free rides on consumer X, the level of production will fall to point F on the diagram. If the marginal cost curve was  $MC^1$ , we see that the good would not be produced at all.

### 3.5 Paying for Public Goods

According to the examples given above there is little incentive for private firms to provide public goods. However, the examples also show that there are often considerable positive benefits to be gained by the provision of these public goods. The government, with its ability to impose involuntary taxation, steps into the breach to provide public goods.

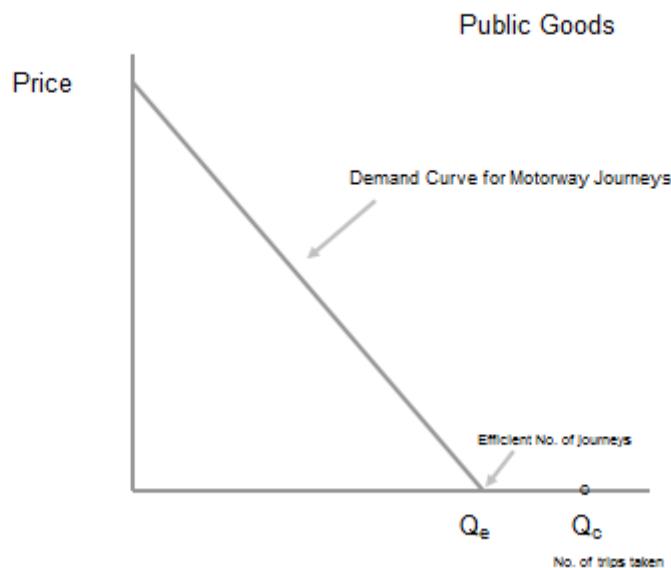
There are very few (if any) pure public goods. Most public goods exhibit varying degrees of non-excludability and non-rivalry in consumption. Take a motorway, for example, it is non-rival in consumption up until it becomes congested and it is non-excludable unless tolls can be charged in an inexpensive manner.

We know that if a good is non-rival in consumption, the cost of supplying the good to another person is zero. In economic language, the marginal cost is zero. This

means that the MC curve is the x-axis on the graph and, furthermore, that the marginal benefit curve intersects the MC curve where the price is zero. This is an important result. It means that the optimal charge for a non-rival good is zero.

Figure 3 displays the marginal benefit curve for the motorway. Note position  $Q_c$  on the x-axis. This is the quantity of traffic at which the motorway becomes congested. This is beyond the intersection of the marginal benefit curve and the x-axis. At the present level of demand for the motorway's services, it remains a non-rival good.

Figure 3



In supplying the motorway the government has a number of options. It can supply the good at zero direct cost to road users. This result is efficient from the point of view of the motorway; however, the road must then be financed completely by taxation that may be distortionary and inefficient. There may also be income distribution issues whereby the motorway is only used by rich people travelling to their weekend holiday resorts.

To overcome these issues, governments often charge user fees. These are generally seen as a more equitable way of raising revenues, since those who use the good the most, pay the most.

Government faces a complicated choice of toll level. It could charge the amount required just to cover the costs of construction, or it could behave like a private firm and maximise profits (unlikely) where  $MC=MR$ , or it might recognise that, in charging a toll (required to cover the financing costs), many journeys whose benefits exceed the social cost will not be taken. It may therefore charge a toll that doesn't even cover the financing costs. The government, in making these decisions, takes into consideration two benchmarks. It weighs equity considerations – the principle that those who benefit from the motorway should bear its costs – against efficiency

conditions. The distortions arising from the underutilisation of the motorway would need to be compared to the distortions associated with the alternative ways of raising funds.

### **3.6 Preference Revelation**

At what level does a government provide a public good? With a private good the price mechanism indicates to the private firm what it should produce. For a public good, as we have seen, the price mechanism doesn't work (to varying degrees depending on the good).

Government raises taxes or charges fees in order to finance public goods, but how can it judge the Pareto efficient level of production? The government is effectively like a blind person groping and feeling its way towards a solution. It relies heavily on expressions of need from consumers of public goods in order to determine its level of supply. Consumers quickly realise that a truthful expression of their needs may not be the best strategy. Consequently their response is determined by whether or not they believe their payment for the good will be decided by their stated valuations.

Consider first where there is no link between payment and consumers' expressed valuation. If consumers face the same tax bill regardless of their valuation, they may under- or overstate their valuation in order to influence the outcome. A consumer who likes public art may exaggerate their valuation in order to try and ensure its provision, while a consumer who is indifferent to public art may express their dislike of it in order to ensure its non-provision.

Secondly, consider the situation where there is a link between a consumer's payment and their stated valuation. This is similar to the free-riding problem. Even those who place a high valuation on the provision of the particular good will be inclined to underestimate the value they place on it in order to reduce the amount they have to contribute.

In the two cases described above we see that there are inherent incentives for consumers not to reveal their true preferences. This results in the wrong signals being sent to government and consequent inefficient levels of public good being provided.

### **3.7 Are Public Goods Ever Provided Privately?**

There are a number of situations where public goods are provided privately.

### *Community Behaviour*

In the analysis above we assumed that individuals acted out of narrow self-interest (consider free riding). However, we all know that this does not reflect fully the complexity, and often the generosity and kind-heartedness, of human behaviour.

In small, tight-knit communities, the problems of free riding and “truthful revelation” may be insignificant. Individuals can immediately see the collective benefit of their actions. They may also be less inclined to shirk their responsibilities, free ride or be untruthful in their valuations when they personally know everybody involved. Public goods such as community activities fall into this category.

### *Charity*

Charities can often fill the gap where a private market has not emerged. Sometimes this can be due to tradition. A sea-rescue service is a public good. It is non-excludable (imagine being in a lifeboat, finding two people on a raft in need of rescue, could you leave behind the person who hasn't paid their subscription?) and non-rival in consumption. Sea rescue has by and large been funded by voluntary contribution.

### *Club Good*

The formation of a club (as mentioned above) is another solution to the problem of the optimal provision of a public good. The good has to be excludable in some form so that a price can be charged and free-rider problems can be prevented. A golf club is an obvious example. The golf course is non-rival up to a point. The members jointly fund the operation of the club, reducing the cost to members. The optimal allocation is reached when the marginal cost (encroachment on your enjoyment of the course due to the number of other members) equals the marginal benefit (lower costs due to the sharing of costs by members).

### *Complementary Good*

A private firm may be willing to provide a public good when it is sold in conjunction with a private good. The joint sale of the private good with the public good allows the firm to enforce excludability and therefore charge a price. The renting of sun loungers on a beach is an example. The sun loungers are excludable while the beach is not. The price charged for the sun lounger can be used to cross-subsidise the provision of a clean and safe beach.

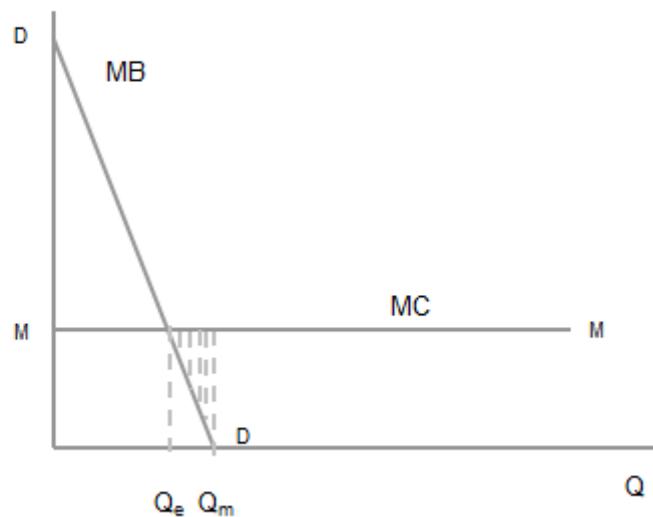
## **3.8 Provision of Impure Public Goods and Merit Goods**

Many goods that the government provides are not pure public goods. They have, to a lesser or greater degree, the properties of non-excludability and non-rivalry in consumption. Such goods are called mixed or impure goods. Because they are supplied by the government they may appear to be private goods, but their benefits

accrue to all and are therefore non-excludable. Education, for example, appears on first glance to be both excludable and rival in consumption, yet we all benefit from living in an educated economy, as the result of better economic growth amongst other things. These benefits are non-excludable. We benefit from them whether we like it or not. Further reasons for its public provision are its social and distributive purposes.

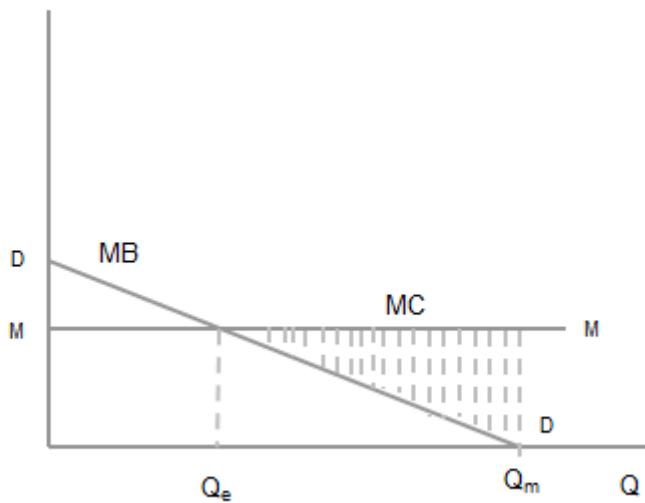
When a government provides a mixed good, it faces the dilemma of whether it should charge a fee for its use and, if so, what level of fee it should charge. Many of these goods have a significant marginal cost. They are rival in consumption. If the marginal cost to the consumer is zero then the consumer will consume that good up until his marginal benefit is zero. However, there is a significant marginal cost but this is met by the taxpayer. The outcome is not Pareto efficient. A good that is supplied free of charge will be over consumed and therefore we have a resulting loss in welfare. In Figure 4 we see that the good has a marginal benefit curve, DD, and a marginal cost curve of MM. The efficient level of consumption is at point  $Q_e$  where  $MB=MC$ . However, if the government supplies the good to the consumer for free, the consumer will continue to consume the good up until the point where he or she no longer gains any satisfaction from its consumption. This point is where  $MB=0$ , the point of intersection with the x-axis, point  $Q_m$  in Figure 4. From point  $Q_e$  to  $Q_m$ , the marginal cost is greater than the marginal benefit. The shaded triangle measures the welfare loss from excessive consumption.

Figure 4



In certain cases, such as water consumption, the welfare loss may be quite small, as in Figure 4. However, in other cases such as waste disposal or certain medical services, the welfare loss may be very large (see Figure 5) and hence the government generally charges for these goods so that consumers' behaviour reflects the true cost to society.

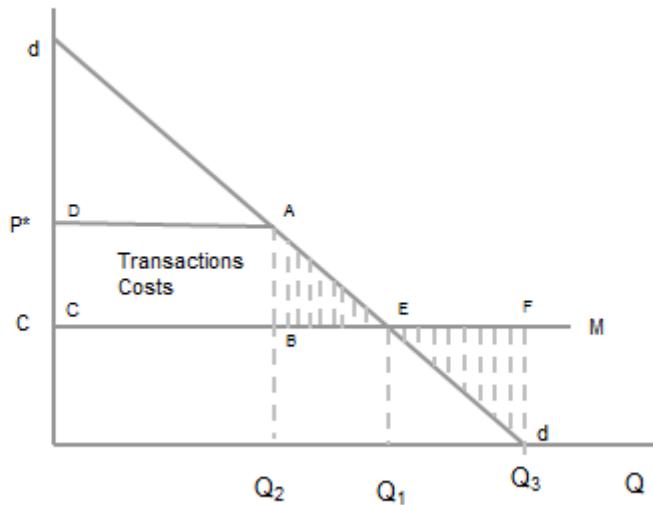
Figure 5



For certain goods, the costs of running the market are quite large. In economic terms, the transactions' costs are high. In this situation, it may be more efficient for the government to produce the good publicly and to finance it through general taxation. Many insurance markets have high transactions' cost. For example, the costs and uncertainties of determining the premium that a person should pay for unemployment insurance (and subsequently if they claim, that they are really unemployed or are just shirking) are so large that a private company would be unwilling to enter this market

Consider Figure 6, the good has demand  $dd$  and constant marginal costs of production of  $C$ . However, in order to sell the good the firm has to spend an amount equal to  $DC$ . This raises the price to  $P^*$ . This increase in price causes the quantity to fall from  $Q_1$  to  $Q_2$ . The loss in consumer surplus is equal to the shaded triangle  $ABE$ . Now consider if the government were to provide the good for free. The area  $ABCD$  would be saved, as transactions' costs are not now incurred. As consumption increases to  $Q_1$ , there would also be a gain in consumer surplus of  $ABE$ . However, because the good is now provided free of charge the consumer will continue to consume up until point  $Q_3$ . The shaded triangle  $EFQ_3$  reflects this cost of overconsumption. To estimate whether the good should be provided publicly with no charge, we must compare the savings in transactions' cost plus the increase in consumer surplus as the result of increased consumption, against the loss from excessive consumption plus distortions created from the extra tax raised to fund the provision of the good.

Figure 6



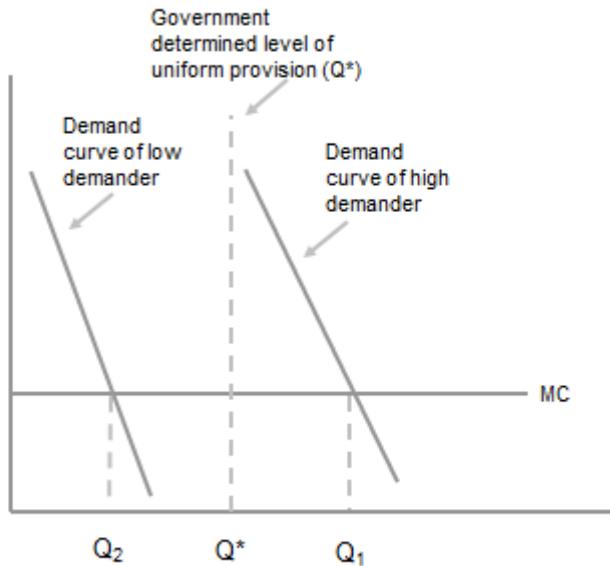
### 3.9 Rationing of Public Goods

From the above discussions, we see that overconsumption is a problem for many goods provided publicly. One solution is to attempt to limit consumption. In effect, the government tries to ration the provision of the good. The price mechanism is one form of rationing system. We have examined this mechanism above and noted its shortcomings with regard to public goods. We now look at some alternatives.

#### *Uniform Provision*

Uniform provision is another commonly employed rationing system. With uniform provision, the same quantity of the good is supplied to everyone. This is particularly relevant to merit goods such as education, where some minimum provision is deemed necessary for everyone. With a set uniform level of education we see that some individuals would like to consume less than provided, while others may wish to consume more. This is the major disadvantage of uniform provision. It doesn't adjust to individuals' preferences. Consider Figure 7, again we assume a constant marginal cost of production. The government decides to provide a set level of education at  $Q^*$ . If the good was privately provided consumer 1, the high demander, would purchase amount  $Q_1$ , while consumer 2 , the low demander, would purchase amount  $Q_2$ . At level  $Q^*$  the high demander is consuming less than he or she would like, while the low demander is consuming more than he or she would like. The high demander may be able to supplement his or her amount by purchasing private tuition but the low demander cannot adjust his or her level of consumption. This is obviously inefficient. However, the government in its paternalistic view may deem it necessary that everyone receives this level of education.

Figure 7



### *Queuing*

Another form of rationing that is used extensively is queuing. This is most obvious in the health service. Instead of government charging people in money terms it charges through waiting time. The normative judgement is made that ability to pay is not a desirable basis upon which to ration scarce medical resources. Queuing has some merit in that those who genuinely need medical help would be willing to pay the price in time and wait for treatment. Consider, a person who comes to A & E with a non-time-urgent complaint that could easily be treated by a general practitioner. They are less likely to stay for treatment if they have to pay in the form of a considerable waiting period. However, queuing presents a problem. Is time cost an appropriate basis on which to judge need? A busy working individual may desperately need treatment but be unable to take the time off work, while an unemployed person with plenty of time and little need for the treatment may actually receive it.

### **3.10 Conclusion**

Public Goods represent one of the classic market failures. We have seen how the characteristics of non-rivalry change the efficiency conditions for the level of production and how non-rivalry causes the price mechanism to fail. (You can consume the good without paying for it.) This causes problems of undersupply and underconsumption. Correcting these failures is not a simple matter. While we have seen that there is some scope for private sector correction, it falls mainly to the public sector to intervene and attempt to solve the problem. Again, the gathering and interpretation of the information needed to provide these goods is the largest problem to overcome.

## **Student Activities**

1. Describe in detail non-excludability and non-rivalry in consumption as they apply to public goods
2. Make a list of goods with varying degrees of non-excludability and non-rivalry. Describe how each good is provided in society. Is the provision efficient?
3. How are different types of impure public goods provided?
4. Discuss the significance of free riding in the provision of public goods
5. Describe the optimal provision of public goods

## **4. The Economics of Regulation: Externalities**

### **Learning Objectives**

On completing this lesson and the associated reading, you should be able to:

- understand the role and breadth of regulation in economics
- define what an externality is
- understand the importance of property rights with regard to externalities
- understand Ronald Coase's contribution to understanding externalities
- understand the nature of Pigouvian taxation
- explain the different solutions to the externality problem
- understand why resources such as common fishing grounds are overused.

### **4.1 Regulation – An Introduction**

We saw in Lesson 1 that over time patterns of behaviour emerge in a society that give humans a certain degree of certainty and the ability to interact with one another. These patterns are essentially social norms, rules and regulations and they evolve according to criteria, such as fairness, equity, efficiency, the common good or the benefit of the powerful.

Social norms, such as personal hygiene, the use of coarse language or giving up your seat to an elderly or infirm person are generally informal rules of society that do not need to be written down for most situations. However, as you can already imagine there are situations where certain norms need to be formalized into rules, for example, employees handling food for public consumption need to meet certain regulatory hygiene standards. We see here that different levels of social response are needed for different situations. A quiet, tactful word by a family member, a friend or manager is generally enough to deal with most situations of inadequate personal hygiene, however, where a person's job involves handling food that is consumed by thousands of people, the consequences of poor hygiene could be a public health crisis and consequently, a more formal regulatory response is advisable.

Regulation occurs in all facets of our everyday life. It may be private. We have rules and regulations within the family unit or individual firm. We subject ourselves willingly to the private regulation of our local GAA or golf club. Public regulation involves rules set by government. When social norms or private regulation are inadequate or unjust government can intervene to rectify matters. Notice that if the natural rules of justice are not followed in the workplace or a sports club, a party can always appeal to the courts.

Economics, as we saw in Lesson 1, is the study of how scarce resources are allocated. Regulation determines what can and cannot be done with particular resources and consequently, affects how resources are allocated and who benefits. Simply,

regulation is essentially economic in nature. Setting regulations in a modern complex society is difficult. How does the government ensure that the voices and views of all the people affected by new regulations are heard and that the final result is fair and efficient? Unequal power among the party's affected by regulations may lead to problems, inefficiency and inequality.

The nature of regulation has changed over time and continues to evolve. To get a clearer understanding of this we need to refer back to Lesson 1 and the development of the economic roles of government and remember that the 20<sup>th</sup> century was the century of the development of the welfare state and its development reflects strands of change that have been on-going for hundreds and in some cases thousands of years. Prior to the development of the welfare state, social issues were regarded as being generally outside the remit of government. Universal suffrage, the economic depression of the 1930s, the rise of socialism and the development of macroeconomics as a distinct branch of economics, firmly entrenched social issues as being the responsibility of government.

This was the beginning of the era of "Big" government, where it was believed that almost any problem in the economy could be solved by government intervention. This school of thought gathered momentum at the end of World War II and its intellectual hegemony lasted until the advent of Thatcher and Reagan in the late 1970s and early 1980s. Government ownership was seen as the most effective and least costly method of regulating monopoly problems. Regulation though was not the sole reason for government ownership. Governments intervened in cases where they believed it was in the national interest for the economy to have a particular industry and the private sector was unwilling or incapable of taking the risk, or developing the industry. Governments also intervened in the belief that they could preserve jobs. Further, in certain cases, nationalisation of transport, utilities etc. occurred as a result of the failure of the private firms to run these industries efficiently.

However, Government generally ran these firms without a clear conception of its role as owner, manager, employer, or regulator. This led to these industries being used for many different purposes, and often least of all to produce the goods or services they were supposed to produce. This lack of clarity surrounding the role of nationalised industries allowed them to be used for political advantage and consequently, enabled vested interests to capture any "rent" that could be extracted from them.

The economic problems of the 1970s indicated to electorates that change was needed. This change came most evidently with the election of both Ronald Reagan and Margaret Thatcher. Also at this time, the centrally planned economies of the communist world were beginning to crack under their inherent structural failings. "Free market" thinking claimed dominance. The 1980s was the era of supply-side economics: privatisation, deregulation, and liberalisation of markets and trade. The intellectual underpinning of most of this change came from the University of

Chicago. The limits of this type of “minimal government” thinking were exposed in the aftermath of the 2008 financial and economic crisis..

Around this time, awareness was rising and theoretical advances were made in relation to two other market failures that have significance with regard to regulation. Due to economic and population growth, environmental degradation and climate change are issues that need to be dealt with increasing urgency. As we will see below, Ronald Coase’s work provided us with an innovative and insightful theoretical basis upon which to develop the most effective policy responses to tackle environmental issues. The second area where we have seen major theoretical advances and significant change is in relation to markets where one party to the transaction has less information than the other. These theoretical advances occurred at a time when faith in the self-regulation of professions was damaged by several scandals, the most memorable involving Dr. Harold Shipman.

In the remainder of this lesson, we will firstly briefly outline the three main areas that are dealt with through regulatory policy. We then study in detail the problem of externalities and show that the work of Ronald Coase provides a solid framework upon which to design policy responses to externality problems and indeed all problems that involve regulation.

Regulatory policy generally exists to rectify three types of market failure: monopoly power, informational asymmetries and externalities. In the following sections we briefly introduce each market failure where properly designed regulation can move the outcome towards one that is more efficient. We then move to discuss the externality market failure in detail.

## **4.2 Monopoly Power**

Monopoly power exists when only one firm supplies a market or if the suppliers of the market collude in maintaining higher prices than would have existed if they had acted independently of one another. Welfare is lower where there is monopoly power because there is (a) allocative inefficiency – price (marginal benefit) exceeds marginal cost. To explain further, we see that some buyers do not consume whose marginal benefit exceeds the marginal cost, therefore society could produce more of a good where people would get more value from it than it costs to produce. From this you can see that welfare could be increased in society. There is also (b) productive inefficiency, as monopoly does not minimise costs and due to the lack of competitive pressure monopolists may waste profits. Competition is preferred because it is efficient in both the allocative and productive sense as it brings prices closer to costs, it minimises these costs. Consequently, perfect competition, maximises the welfare of society.

We see from the above that regulation that brings the market outcome closer to the competitive level can, therefore, improve welfare. (It must also be remembered that regulation can do the opposite.) Competition regulation makes anti-competitive

behaviour illegal and therefore actively encourages industry towards the competitive ideal and welfare improvement.

### **4.3 Information Failure**

For consumers to make the optimal choice & maximise their welfare when purchasing a good or service they must have complete information. Where one party to a potential trade has more information than the other party there is said to be asymmetric information. Obviously, the party in the transaction with less information is at a disadvantage and this can lead to a sub-optimal outcome for them. In extreme cases of asymmetric information, the market may collapse because the party, with the informational disadvantage may not be willing to risk entering a transaction. Ultimately, the transactor with the informational advantage may also lose out because he is not able to sell his product at the price it is worth. This area has implications for many important policy areas such as the regulation of banking, the regulation of health professionals and the provision of social insurance.

### **4.4 Externalities**

When you walk down a road and you inhale the fumes emanating from the traffic, you are experiencing an externality; when you are trying to sleep late on a Saturday morning but your neighbour is mowing the grass you are experiencing an externality; if you live on the top floor of a block of apartments and rarely have to turn your heat on due to heat seeping up through the floorboards from your neighbours heating systems you are again experiencing an externality. The first two examples are negative externalities while the last is a positive externality. An externality occurs whenever someone takes an action that affects your welfare but for which you do not receive compensation (negative externality) or do not pay for the benefit (positive externality). We discuss externalities in detail in this Lesson.

When consumers decide to purchase a good, they can choose the amount of the good they want to buy, or even if they want to buy the good or not. For example, if you are in the supermarket, you can decide whether you want to buy bread or not. You can also choose if you want to buy a small or large loaf. However, when a neighbour starts cutting the lawn with a noisy lawnmower early on a Saturday morning or plays music late into the night affecting our sleep, you are experiencing what economists call an *externality*.

An externality occurs whenever an individual or firm undertakes an action that has a direct affect on the utility or production possibilities of other agent(s) for which the former chooses without regard to the latter's utility or production function. It is an action that is outside the price mechanism and is consequently inefficient and a market failure.

There are other actions that can indirectly affect our utility. (These are sometimes known as pecuniary externalities). This occurs when the actions of others affect us through the price mechanism. For example, another person bidding for the dream home we wish to buy has an indirect affect on our utility function by pushing up the price (and therefore reflecting its scarcity). These actions are within the price mechanism and consequently, efficient.

Externalities arise when property rights are ill defined. Property rights are the bundle of entitlements defining the owner's rights, privileges and limitations for use of the owned resource. We normally tend to think of economic goods as physical units: a kilo of sugar, a shirt, a car, a house on a demarcated piece of land, etc. However, following the commonplace practice of lawyers, it is informative to think of what is bought and sold as a bundle of rights. An example will clarify. When you buy a house, what does that purchase mean? You have the right to live in it, but do you have the right to change its use to a night club or a nuclear power plant? Do you have the right to make noise when converting the attic to an extra bedroom, while cutting the grass, by playing loud music every weekend when you come home from the pub or when celebrating your 50<sup>th</sup> Birthday?

Property rights that are completely defined will produce efficient allocations in a well-functioning market economy. They have the following attributes.

1. Universality

All resources are privately owned and all entitlements are completely specified.

2. Exclusivity

All benefits and costs accrued as a result of owning and using the resources should accrue to the owner exclusively either directly or indirectly by sale to others.

3. Transferability

All property rights should be transferable from one owner to another in a voluntary exchange.

4. Enforceability

Property rights should be secure from involuntary seizure or encroachment by others.

Externalities can be positive or negative. A positive externality is an action that confers a benefit on others while a negative externality confers a cost on others. Examples of positive externalities include the enjoyment we take from another person's well-kept garden or where bees from an apiary pollinate the apple trees of an orchard. A person lighting up a cigarette next to a non-smoker or, as we said above, a neighbour playing loud music late in to the night are examples of negative externalities.

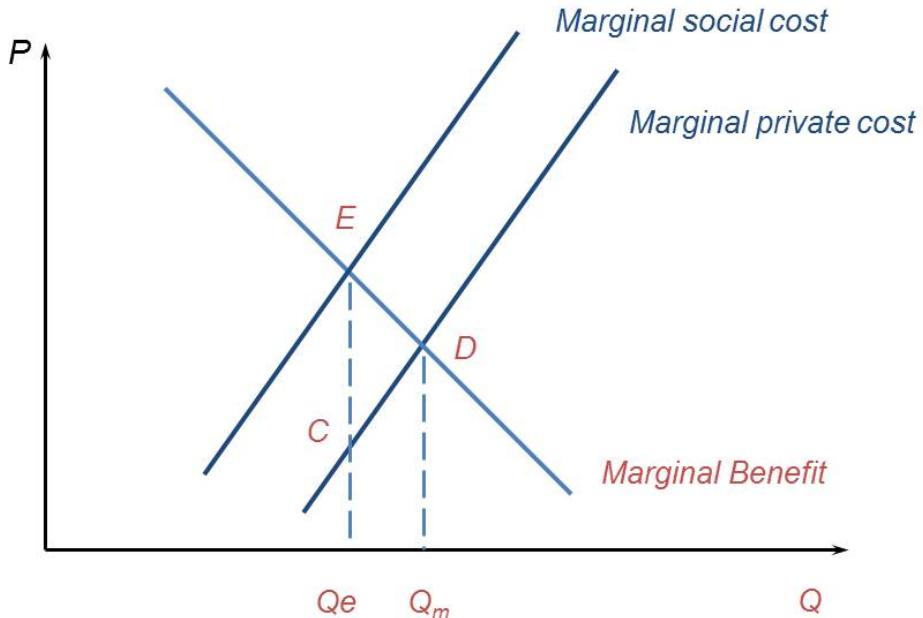
Markets affected by externalities result in inefficient resource allocations. Levels of production as well as resources directed at controlling the externality will be inefficient.

Traditionally, following the lead given by the neo-classical economist A.C. Pigou, externalities were analysed using the conventional supply and demand framework. We know that in the absence of externalities (and other market failures) the market equilibrium is efficient. The demand curve reflects the individual's marginal benefits from the consumption of an extra unit of the commodity and the supply curve reflects the marginal costs of producing an extra unit of the commodity. At the point of intersection, the marginal benefit equals the marginal cost. This represents an efficient outcome (in the absence of an externality).

However, with a polluting factory (a negative externality), the factory's supply curve reflects only the factory's private marginal costs and not society's marginal costs. The social marginal cost curve includes all the costs of the activity (the firm's private production costs and the pollution costs). Therefore, in a situation with a negative externality, the marginal social cost curve lies above and to the left of the private cost curve (see Figure 4.1 below).

**Figure 4.1**

## Negative Externality



From the diagram, we see that the social optimum (Pareto optimum) occurs at point "E" where the marginal benefit curve and the marginal social cost curve intersect. However, there is no reason why the firm should produce at this point. It will

produce at the point of intersection of its own private cost curve and the marginal benefit curve (point E on the diagram). We see that the presence of a negative externality results in excessive production. The solution posited by Pigou was that a tax should be levied on the producer that equalled the cost of the externality. In the diagram above, the tax levied should be equal to the distance EC on the diagram, which is the vertical difference between the marginal private cost and the marginal social cost.

Similarly, where there is a positive externality, the private demand function (e.g. the demand for education) will be to the left of and below the marginal social benefit function, yielding consumption less than the level that is socially optimal.

In summary, according to neo-classical analysis, negative externalities lead to the overproduction of goods while positive externalities lead to the undersupply of goods.

### *Solutions to Externalities*

As we saw above, externalities cause inefficiencies in the economy. Is there anything that can be done to improve the situation, either through private or public policy action?

As we saw above, using the traditional neo-classical analysis, a private firm causing an externality will produce at the equilibrium point where supply equals demand. Pigou pointed out that the firm's supply curve only reflected the firm's private costs and neglected to take into consideration the "external costs" it imposed on society. (Externalities in the early literature were referred to as "external costs.") Pigou's solution was to estimate the cost of the externality on society and to charge the firm a tax equal to the cost the firm imposed on society. The firm's external cost would not be internalized within the cost structure of the firm. This has the effect of aligning the firm's private cost with the social cost. The firm will now produce at the efficient level of production for society.

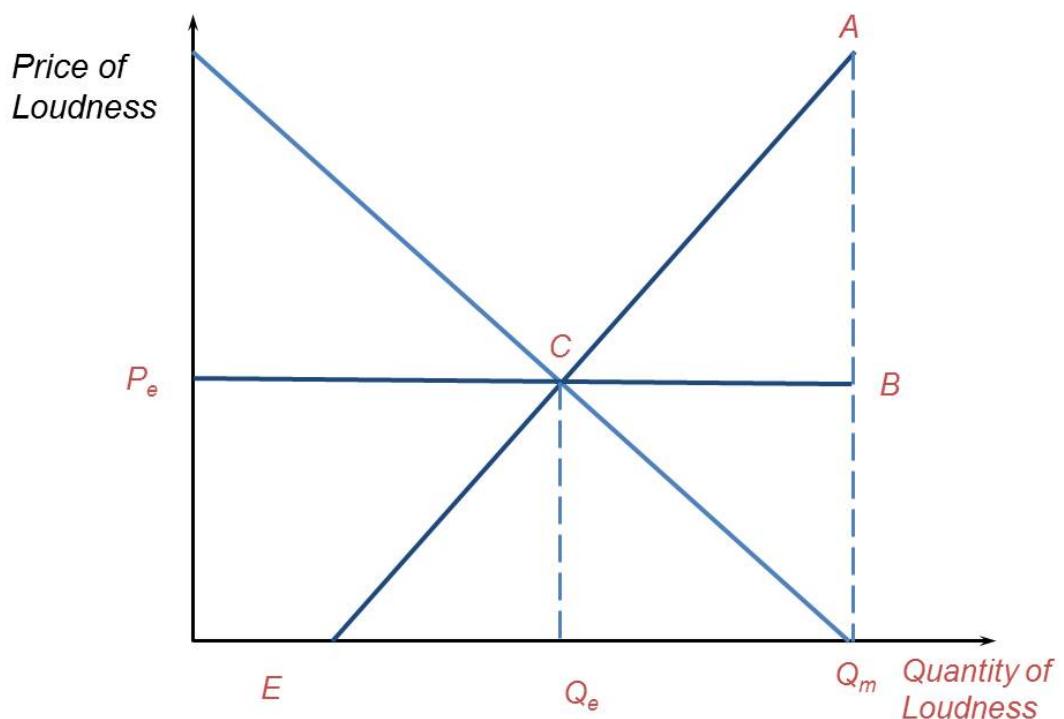
### *Coase's Response to Pigou*

Nobel Prize winning economist Ronald Coase in one of his seminal articles, "The Problem of Social Cost" (1960), wrote a devastating critique of Pigou's neo-classical approach to understanding externalities. Coase was an extremely innovative thinker who examined and challenged the conventional wisdom of established economic theories. His subtle, but radical, thinking was misinterpreted for many years. As he stated (1990; 1) in the twilight of his career: "My point of view has not in general commanded assent, nor has my argument, for the most part, been understood"

Coase started his paper "The Problem of Social Cost" with an abstract example similar to the one we shall now examine. We consider a situation where we have two neighbours living in a country setting. One neighbour, an ageing rocker, likes to play his music loudly. The other, an ageing hippie, enjoys meditating in the peace

and tranquillity of his garden. A problem obviously arises because, using Pigou's analysis, the music enthusiast doesn't bear all the costs of his action. In Figure 4.2 below, we see that the music enthusiast will choose quantity of noise  $Q_m$ . The music enthusiast's marginal benefit curve displays the value he places on loudness. We assume that the marginal cost to him of playing the music is zero (we ignore electricity costs etc. for simplicity). The music enthusiast does not consider the welfare of his neighbour. The marginal cost curve of the meditating neighbour shows the level of money per decibel that he would be willing to pay in order to have tranquillity.

**Figure 4.2**



The music enthusiast chooses noise level  $Q_m$ . The efficient level of noise is at level  $Q_e$ . How can efficiency be restored?

We see that if the meditating neighbour were to negotiate with the music enthusiast and offer  $P_e$ , he would be willing to reduce loudness to  $Q_e$  in return for the payment.

From the diagram, the music enthusiast loses benefit  $CQ_mQ_e$  but gains revenue  $CBQ_mQ_e$  (which is larger). The music enthusiast is better off. Similarly the meditating neighbour is also better off. Although he paid  $CBQ_mQ_e$ , he gained  $ACQ_eQ_m$  (which is also larger). Both parties are better off through the negotiation and furthermore cannot be made any better off. We therefore have a Pareto efficient outcome.

Our examination of individual negotiation raises two important issues: (a) should the property right necessarily belong to the person who gained or seized it first (in our example, the music lover) and (b) does negotiation always lead to an efficient solution?

From the above example we see that the property right is naturally allocated to the party who can most easily seize it. However, the meditating neighbour may feel that he has a natural right to tranquillity and take the music enthusiast to court.

### *A Legal Solution?*

The court must now decide whose right is pre-eminent. From the perspective of economics, we ask: will the court decision be efficient? Coase showed in his initial abstract argument, using the neo-classical assumption (Pigou) that transaction (negotiation) costs were zero, that the court can allocate the rights to either party and an efficient allocation result. The only effect of the court's decision is to change the distribution of costs and benefits among the parties involved.

We have already seen in Figure 4.2 above that if the music enthusiast has the property rights to the level of noise in the neighbourhood that the efficient level of noise is reached at price  $P_e$  and quantity  $Q_e$ . Suppose now the meditating neighbour is granted the rights to the level of noise in the neighbourhood by the courts. Without consideration, for any music loving neighbours in the vicinity, he will expect no noise in the neighbourhood. The music enthusiast obviously values the enjoyment he gets from playing music loudly. Consequently, it is in his interest to approach his neighbour and offer some compensation for the ability to play music. The meditating neighbour will weigh up the benefit of receiving the compensation against losing some of his serenity. From the diagram, we again see that the optimal and efficient level of noise is at  $Q_e$  with compensation at  $P_e$ . We see that the only difference in obtaining this efficient level of noise is the allocation of compensation across parties. An important point to note in this example is that the very existence of the inefficiency triggers pressures for improvement and that the pressure for improvement doesn't necessarily depend on the original assignment of property rights.

In light of the above example, we are able to state what has come to be known as the "Simple" or, for reasons that will soon become obvious, "Stigler's" Coase Theorem. It states that where an externality exists and the affected parties can negotiate at zero cost (i.e. there are no transactions costs), the parties will negotiate to an efficient solution regardless of the initial choice of property right.

The implications of the "Simple" Coase Theorem are striking. We see from the above that it doesn't matter from an efficiency perspective if the music enthusiast or the meditator is granted the property right to the level of noise in the environment because they will negotiate to an efficient solution. The implication is that there is no need for government policy on externalities other than to allocate and secure the

property rights. Private citizens will negotiate to an efficient solution without the guiding hand of government.

This “version” of Coase’s work was promoted by the “free market” economist George Stigler in his 1966 textbook, and it was the one accepted by most economists for the next three decades. However, while Stigler’s interpretation of Coase’s work is simple and elegant, is it an acceptable and complete analysis of the problem of externalities? As we shall see, Stigler’s interpretation of Coase’s work was wholly inadequate.

#### **4.5 The Assumption of Zero Transactions Costs**

Economists had traditionally assumed that the cost of conducting a transaction was zero or as close to zero as made no material difference. So when Stigler read Coase’s work and encountered the first example, he would have witnessed an economist engaging in a standard analysis. However, if Stigler had paid closer attention to Coase’s later examples in “The Problem of Social Cost” he may have realised that Coase was trying to highlight the importance of “transactions costs” and that he only used the earlier example, featuring zero transactions costs, as a means to highlight their actual relevance in later examples.

At this stage we should clarify that “transactions costs” are any costs incurred by the parties to a transaction in conducting that transaction. They are the costs of exchange. If we examine this a little further, we see that any exchange has three stages. Firstly, an exchange partner has to be located so that the transaction can take place. This involves finding a party who wants to buy what you are selling or selling what you want to buy. Secondly, the terms of the transaction must be negotiated and agreed. Finally, after successful negotiations, the exchange must be monitored and enforced. These three stages of transactions costs can be described as search, bargaining, and enforcement costs.

Looking now at the type of transactions cost that someone dealing with an externality is likely to face, we see that they may come up against the *public good/free-rider* problem. Many externalities involve the “provision” of a public good such as clean air, clean water, or a quiet environment. We know that a public good has the attribute of non-excludability. Consequently, it may be very expensive or impossible to exclude an individual from enjoying the benefit of these goods.

If, to continue our example from above, another meditator moves into the area where the music enthusiast lives, it will pay him to feign indifference to the noise when our first meditating neighbour seeks a contribution to the cost of keeping the noise level down. This is known as the free rider problem. Alternatively, if the new neighbour discovers that one of his neighbours dislikes noise, he may purposely play his music system loudly in order to extract a payment. These results are not efficient. Obviously, the greater the number of participants, the greater will be the costs of reaching agreement. Sometimes we witness negotiated settlements in small stable

communities where peer pressure may be enough to ensure people behave as commonly agreed. However, on the other hand, we often witness cases of unequal power, where one party is a single, highly organised and wealthy industry while the second party is a diverse, poorly organised and loose community grouping. This has distributional as well efficiency aspects, as the poor may be denied access to information.

This leads us to our second major problem where parties to the negotiation have imperfect information. How can the parties decide the terms of the agreement or the level of compensation when the issues in question are complex in nature and still disputed by experts?

Where you have a large number of individuals involved and/or with different levels of information and wealth, the cost of getting everybody together and negotiating an outcome are considerable. If you think of a major purchase you made—that of a house or a car—you will further question the assumption of zero transactions costs. However, the important question to answer is: if transaction costs are not zero, do they have a material effect on the efficient outcome of the transaction?

#### **4.6 Coase and the Reciprocal Nature of Externalities**

We shall now examine Coase's work in greater detail. We can see from the above that it is likely that transaction costs could be considerable. Coase wants to establish if such costs would have an effect on the outcome. The analysis that follows uses several simple numerical examples to illustrate the various elements of Coase's thinking. We will start with a numerical example that assumes zero transactions cost. This will help revise and affirm our earlier discussion. We shall then advance to examples that do not assume zero transactions costs and which fully explain the breadth of Coase's thinking.

Coase used an actual legal case that had been heard, the outcome of which he disagreed with. The case involved a doctor and a confectioner. The doctor complained that his ability to conduct his business was disrupted by the noise of a machine used by the confectioner in the adjoining building. The traditional economic and legal position towards such a situation was simple and clear. The noise of the confectioner's machine was harming the doctor's livelihood and should be restrained. Coase's key insight was that the traditional view completely overlooks the reciprocal nature of the problem. The confectioner's noise does indeed harm the doctor's livelihood, but if we restrain the noise from the confectioner's machine we harm the confectioner. In such a situation, there will be harm to someone, no matter what the outcome. The key point to address is whether the harm caused to the doctor by the noise is greater than the harm caused to the confectioner by restraining his use of the machine. *This is strictly an empirical issue.* The common interest of each party can be served by avoiding the larger of the two unpleasant outcomes. We see, like the earlier example, a central issue is who owns the property right to the level of noise in the area.

We will now demonstrate, using a series of numerical examples, the impact that transactions costs have on exchanges in an economy.

### **Example 1**

We firstly imagine a situation, like the earlier example, with zero transactions cost, where the confectioner uses his machine, bakes some cakes, and sells them for €40. Due to the noise, the doctor has to cancel his appointments and, as a result, loses €60 in income. Assessing the outcomes under the different legal rules that are available, we see that there are two legal rules that can apply in this case. Firstly, a “Doctor’s rights” scenario, where the doctor has the right to determine the level of noise and, consequently, the confectioner must pay compensation if these rights are breached. Secondly, a “Confectioner’s rights” scenario, where the confectioner has the right to determine the level of noise and the doctor must pay compensation if these rights are breached.

We can now examine the various outcomes that are possible.

#### **Doctor’s Rights**

Firstly, if the doctor is given the right to determine the level of noise, we see that the confectioner has two options:

Option 1 – The confectioner continues baking and earns €40. The doctor cannot practice and sues the confectioner for €60 in compensation.

or

Option 2 – The confectioner stops baking and earns €0. The doctor practices and earns €60.

#### *Outcome*

We see from the above, the best option for the confectioner to choose is to stop baking and earn €0 rather than losing €20 after being sued. The doctor is therefore able to practice and earn €60. The total benefit to society, therefore, from the doctor’s rights legal rule is €60.

#### **Confectioner’s Rights**

Secondly, if the confectioner is given the right to determine the level of noise, we see that the doctor has two options:

Option 1 – The confectioner continues baking and earns €40. The doctor cannot practice, but because we are operating under “confectioner rights” the doctor cannot sue for compensation.

or

Option 2 – The doctor pays the confectioner to shut down so that he can practice. The doctor earns €60, out of which he will have to pay a sum “P” to compensate the confectioner for not using his machine. In order to make it worthwhile for the confectioner, the compensation will be greater than €40 he could have earned but less than the €60 the doctor earns.

#### *Outcome*

We see from the above the best option for the doctor to choose is Option 2. The doctor earns an amount greater than €0 that he would have earned if he chose Option 1. A numerical example will help clarify. Let’s say the doctor agrees to pay the confectioner €50. The confectioner gets €10 more than if he baked and the doctor earns €10 more than if he had to shut down.

We see from above that the total benefit to society from the confectioner’s rights legal rule is €60.

#### *Conclusions—Example 1*

We see from the above example that efficiency occurs under the choices induced by either legal rule. This is similar and equivalent to our above example with the meditator and music enthusiast. However, it is important to recognise that the distribution of income is very different. Under Doctor’s rights, the Doctor earns €60 and the Confectioner earns €0, but under Confectioner’s rights, the Confectioner earns €50 while the Doctor earns €10. It is worth stopping and considering the implications of this easily overlooked finding for a moment. It indicates that the setting of rules can have a considerable effect on the distribution of resources in a society. Key related points to consider are how the rules of society are set, whether the system of rule-setting is fair, and the economic implications of the system of rule-setting.

### **Example 2**

In our next example, the confectioner now has access to soundproofing technology, at a cost of €20, that completely stops the sound from his machine. We again consider the outcomes under the different legal rules.

#### Doctor’s Rights

If the doctor is given the right to determine the level of noise, we see that the confectioner this time has three options:

Option 1 – The confectioner continues baking and earns €40, but the doctor cannot practice and sues the confectioner for €60 in compensation.

or

Option 2 – The confectioner stops baking and earns €0. The doctor practices and earns €60

or

Option 3 – The confectioner installs the sound-proofing equipment at a cost of €20, bakes his cakes and sells them for €40. This gives the confectioner a net outcome of €20, while the doctor practices and earns €60.

#### *Outcome*

We see from the above the confectioner will choose Option 3 and install the sound proofing. We see from above that the total benefit to society from the Doctor's rights legal rule is €80.

#### Confectioner's Rights

If the confectioner has the rights to determine the level of noise, we see that the doctor has two options:

Option 1 – The confectioner continues baking and earns €40. The doctor cannot practice but, because we are operating under "confectioner rights," he cannot sue for compensation. The social outcome of this option is chosen is €40

or

Option 2 – The doctor pays the confectioner to install the sound-proofing equipment. The doctor earns €60, out of which he will have to pay a sum "P" to the confectioner, which will have to be greater than the €20 cost of installing the proofing but less than the €60 the doctor earns. The confectioner, of course, bakes his cakes and earns €40. The social outcome if this option is chosen is €80. The doctor earns  $€60 - P$ , while the confectioner earns  $€40 - €20 + P$ , which gives us a social outcome of €80.

#### *Outcome*

We see from the above that the best option for the doctor is to choose option 2. The doctor earns an amount greater than the €0 he would have earned if he chose option 1. In paying the confectioner to install soundproofing, both the doctor and confectioner can work, earning a total of €100 less the cost of the sound proofing, €20. We see from above that the total benefit to society from the confectioner's rights legal rule is €80.

### *Conclusions - Example 2*

Again, we see a situation where efficiency occurs under either legal rule. We see that the parties are able to take full advantage of the sound-proofing solution and the social outcome increases to €80 under either legal rule.

### **Example 3**

We further extend our example to a situation where, as well as the confectioner having access to soundproofing, the doctor, due to a change in planning laws, can now move his office, at a cost of €18, to a room in the building unaffected by the confectioner's noise. We again consider the outcomes under the different legal rules.

#### Doctor's Rights

The confectioner has the following options:

Option 1 – The confectioner continues baking and earns €40, but the doctor cannot practice and sues the confectioner for €60 in compensation.

or

Option 2 – The confectioner stops baking and earns €0, and the doctor practices and earns €60. The social outcome is €60.

or

Option 3 – The confectioner installs the sound-proofing equipment at a cost of €20, bakes his cakes and sells them for €40. This gives the confectioner a net outcome of €20, while the doctor practices and earns €60. The social outcome is €80.

or

Option 4 – The confectioner pays the doctor to move room. He must pay the doctor at least €18 to cover the doctor's moving costs but will not pay more than €20, because he could install sound-proofing at that price. The doctor earns an amount of  $€60 - €18 + P$ , while the confectioner earns an amount of  $€40 - P$ . The social outcome is therefore €82.

#### *Outcome*

We see from the above that the confectioner will choose option 4, as this gives him the best outcome. The social outcome is €82.

### Confectioner's Rights

If the confectioner is given the right to determine the level of noise, we see that the doctor has the following option:

Option 1 – The confectioner continues baking and earns €40, and the doctor moves room at a cost of €18. The doctor earns a net amount of €42. The social outcome is €82.

### *Outcome*

We see from the above that as the confectioner owns the rights, the doctor will respond by moving room at a cost of €18. The confectioner earns €40 while the Doctor earns  $€60 - €18 = €42$ . The social outcome is €82.

### *Conclusions - Example 3*

Again, we see a situation where efficiency occurs under either legal rule. We see that where there are zero transactions costs and the parties are able to negotiate to achieve the most efficient solution to the problem of noise pollution. The social outcome increases to €82 under either legal rule.

Having analysed the above examples we are able to again state the Simple Coase Theorem: *when parties affected by an externality can negotiate on a cost-free basis, an efficient outcome results no matter how the property rights are assigned.*

### **Example 4**

We now further extend our above examples to a situation where the parties still retain both options of sound proofing and changing office but now face transactions costs of €25 when they negotiate with one another. This example crucially moves away from the neo-classical assumption that transactions costs are zero.

### Doctor's Rights

The confectioner has the following options:

Option 1 – The confectioner continues baking and earns €40, but the doctor cannot practice and sues the confectioner for €60 in compensation.

or

Option 2 – The confectioner installs the sound-proofing equipment at a cost of €20, bakes his cakes and sells them for €40. This gives the confectioner a net outcome of €20, while the doctor practices and earns €60. The social outcome is €80.

or

Option 3 – The confectioner negotiates with the doctor to move office at a cost of €18. However, it costs the confectioner €25 to hire a lawyer. The confectioner's return is  $€40 - €25 - €18 = -€3$ . The doctor practices and earns €60. The net social outcome is €57.

#### *Outcome*

We see from the above the best outcome occurs for the confectioner is to choose option 2 where he installs sound proofing. The social outcome is €80.

#### Confectioner's Rights

The doctor has the following options:

Option 1 – The confectioner continues baking and earns €40, and the doctor moves room at a cost of €18. The doctor earns a net amount of €42. The social outcome is €82.

Option 2 – The doctor negotiates with the confectioner to install sound proofing at a cost of €20. However, it now costs the doctor €25 to hire a lawyer. The doctor's return is now  $€60 - €25 - €20 = €15$ . The confectioner bakes and earns €40. The net social outcome is €55.

#### *Outcome*

We see from the above the best outcome occurs when the doctor chooses Option 1 and moves room. The social outcome is €82.

#### *Conclusions Drawn from Example 4*

For the first time we come across a situation where the efficient outcome is not achieved under both rules. We see that under the confectioner's rights rule assignment, the social outcome is €82 when the doctor chooses to move room as his best outcome. Under the doctor's rights rule assignment, the best option for the confectioner is to install the sound proofing, with a resultant social outcome of €80. We see here that the transactions cost of €25, allied with the different assignment of rights, make a difference in achieving the efficient outcome. This was the key point that Coase was trying to make and that Stigler missed. *Transactions costs have a material impact on the outcome of the exchange.* The achievement of the efficient solution depends on the initial assignment of rights. In our example, the efficient outcome is achieved if rights are initially assigned to the confectioner but not when they are assigned to the doctor.

#### *The "Complex" Coase Theorem*

The above analysis now allows us to state what is known in the literature as the "complex" or "real" Coase theorem. It states that:

When there are positive transactions costs, the efficient outcome may not occur under every legal rule. In these circumstances the preferred legal rule is the one that minimises the effects of the transactions costs.

The complex theorem can also be stated as follows:

Efficient laws and social institutions are the ones that place the burden of adjustment to externalities on those who can accomplish that adjustment at the least cost.

#### **4.7 Policy Solutions to Externalities**

What are the implications of the above when designing a policy solution to the problem of externalities? Stigler believed that the assumption of zero transactions was a sound basis on which to make the policy recommendation that there was no need for government intervention; private actors acting on their own will negotiate to an efficient solution. However, as we have seen, Coase pointed out that transactions costs did have an effect.

In standard public sector economics textbooks, policy solutions to externalities are generally divided into two broad categories: market-based (or Private) solutions and regulatory (or Public) solutions. As Friedman (1991) states: "to a considerable extent, what is taught in the textbooks is the theory as it existed before Coase". Although, the situation has improved, a considerable number of textbooks still use pre-Coasean thinking.

Market-based (or Private) solutions are generally listed as items like pollution taxes, marketable permits, private negotiations or internalisation. Regulatory (or Public) solutions include items such as emission standards, control over inputs, e.g. smoky coal, regulation of technology type, etc. The market based- solutions are generally presented as having strong theoretical advantages over the regulatory solutions. However, once you accept that transactions costs are an important factor in determining policy you will find that many of these advantages often fall away.

#### **4.8 Coase's Critique of Pigou**

As we saw above, Pigou believed that the firm creating the "externality" should be taxed. This is the "polluter pays" principle. Pigou recommends levying taxes in proportion to the amount of pollution emitted. When an externality is present, there is a difference between the private cost and the social cost, or between the private benefit and the social benefit. The taxation has the effect of forcing a polluting firm, for example, to consider the pollution as a cost like any other. The firm will of course try to minimise costs. The correctly set tax has the effect of aligning the firm's cost with the social cost of the activity. We therefore, according to Pigou, have an

efficient outcome. However, Coase begged to differ. The following example will explain his reasoning.

### **Example 5**

We continue using the example we developed above. We continue to assume that the confectioner's benefit from baking (and making noise) is €40 and that the doctor loses €60 worth of consultations if the confectioner bakes. The doctor has the option of moving rooms at a cost of \$18, but for simplicity we assume that the confectioner doesn't have access to the sound-proofing technology. The negotiation costs remain at €25.

### **Doctor's Rights**

If the situation is conceived, as it was historically, as a perpetrator-victim scenario, then the confectioner's noise is causing pollution and therefore ought to be corrected. This is the doctor's rights scenario. The Pigouvian solution was to tax the perpetrator. The tax forces the confectioner to "internalize" the cost of his noise and thereby adjust his production to the optimal social solution.

This allows the confectioner the following options.

Option 1 – The confectioner continues baking and earns €40 but must pay a tax equal to the cost of his pollution, which is €60. The net social return is €40.

Option 2 – The confectioner stops baking, earns €0 and avoids the tax. The doctor can now practice and earns €60. The net social return is €60.

Option 3 – The confectioner negotiates with the doctor to move rooms so that he can bake. He earns €40 but his costs are €25 in negotiations and €18 to pay for the doctor to move. Consequently, his net personal return is -€3, with a social return of €57

### *Outcome*

We see here that the confectioner will choose option 2, which allows his best personal return of €0 and a social return of €60

### **Confectioner's Rights**

If we assume that the confectioner has the rights and no tax is levied, the doctor has the following options:

Option 1 – The confectioner continues baking and earns €40, but the doctor cannot practice and consequently earns €0. The social outcome is €40.

Option 2 – The doctor moves room at a cost of €18 but can now practice. His net income is  $\text{€}60 - \text{€}18 = \text{€}42$ . The confectioner continues to bake and earns €40. The social outcome is €82.

### *Outcome*

We see from the above that the best outcome for the doctor is to choose option 2. His private return is €42. The social outcome is €82.

### *Conclusions Drawn from Example 5*

We see from the above example that a Pigouvian taxation solution can leave us in a worse position than if there was no tax at all. Coase has shown us that a Pigouvian solution may not be efficient. This should not come as a surprise following our earlier examples. A pollution tax always taxes the actions of the “polluter”. It is a victim/perpetrator scenario. As we recognised earlier, this type of thinking fails to recognise the reciprocal nature of the problem and that ultimately our policy reaction should be on the basis of avoiding the greater harm. Such efforts are always strictly empirical. This recognition also implies that taxation will not always be inefficient. It happened to be inefficient above because the doctor was the party who was best able to deal with the issue but the tax removed his incentive to do so.

### **Example 6**

To reinforce this point, we shall examine a final example. Suppose the confectioner now has access to sound proofing and it costs €10. The government continues to levy a tax of €60 on the polluter, so we have doctor's rights.

### Doctors Rights

This allows the confectioner the following options.

Option 1 – The confectioner continues baking and earns €40 but must pay a tax equal to the cost of his pollution, which is €60. The net social return is €40.

Option 2 – The confectioner stops baking, earns €0 and avoids the tax. The doctor can now practice and earns €60. The net social return is €60.

Option 3 – The confectioner negotiates with the doctor to move rooms so that he can bake. He earns €40 but his costs are €25 in negotiations and €18 to pay for the doctor to move. Consequently, his net personal return is -€3, with a social return of €57

Option 4 – The confectioner installs soundproofing at a cost of €10 and continues to bake. This gives him a net personal return of €30. The doctor continues to practice and earns €60. This provides a social return of €90.

### *Conclusions Drawn from Example 6*

We see from the final example that the levying of the tax induces the person who can adjust to the externality at the least cost to do so. In the above example, the confectioner can now solve the issue at the least cost. Consequently, the levying of the tax, (de facto doctor's rights) induces the confectioner to bring about the best outcome at the least cost.

### **4.9 Examination of the Different Policy Solutions**

As noted above, textbooks generally provide a list of solutions to externalities. They include solutions such as private negotiation, legal solutions, regulation, pollution taxes, marketable permits, emission standards, control over inputs, e.g. smoky coal, leaded petrol, etc. Following the analysis above we can now see that all the above solutions involve the allocation of property rights and that the optimal design depends on the technological solutions available and the allocation of property rights.

Governments in the past have generally relied on policy solutions such as Pigouvian taxation and direct regulation when dealing with externalities. For example, they have outlawed the burning of particular types of coal, banned smoking in work places, set emission standards for cars, etc. The main advantages of direct regulation are their certainty and simplicity, *i.e.* low transactions costs. For example, with the smoking ban in the work place, one can easily identify the maximum level of externality permitted (zero in this case). However, if a pollution tax is used as the policy, can the government accurately assess the cost of smoking so as to levy an efficient tax?

A major problem with direct regulation is that it may not change the externality in an efficient manner. Regulation is generally applied uniformly to all affected parties. Consider the regulation of pollution reduction. Each individual firm is required to reduce their emission by a fixed amount, but different firms—due to different types of machinery, plant, technology, etc.—will have different costs of compliance. The uniform requirement does not take into consideration the different costs each may face in reducing pollution. It therefore will not reduce the pollution in the most efficient manner possible. Total compliance costs will be greater than necessary.

To illustrate the inefficiency of a uniform regulatory requirement, we will develop the following numerical example. Consider two factories in a similar location, each emitting 100 tonnes per hour of the same pollutant. To simplify, we assume that for technological reasons each firm can only reduce pollution in blocks of 20 tonnes per hour. We also assume that as each firm removes a further block of pollution it costs an increasing amount to each firm.

Table 1 below illustrates the different costs of pollution reduction facing each firm.

**Table 1: Costs of Pollution**

Emmission Reduction	From			
	100 80tn	to From to 60tn	80 From to 40tn	60 From to 20tn
<b>Firm A</b>				
<b>Cost €/tn</b>	0.1	0.3	0.7	1.1
<b>Step Cost</b>	2.0	6.0	14.0	22.0
<b>Cumulative</b>	2.0	8.0	22.0	44.0
<b>Firm B</b>				
<b>Cost €/tn</b>	0.1	0.2	0.3	0.5
<b>Step Cost</b>	2.0	4.0	6.0	10.0
<b>Cumulative</b>	2.0	6.0	12.0	22.0

We see that, for Firm A, the cost per tonne of emission reduction in the 100 to 80 tonne range is €0.1M per tonne. Therefore, to reduce pollution from 100 to 80 tonnes will cost  $\text{€}0.1\text{M} \times 20 = \text{€}2.0\text{M}$ . Similarly, to reduce pollution from 80 tonnes to 60 tonnes, the cost per tonne of reduction is now €0.3M per tonne. The cost of reduction is  $\text{€}0.3\text{M} \times 20 = \text{€}6.0\text{M}$ . Also note the total cost of reducing pollution from 100 to 60 tonnes is  $\text{€}2.0\text{M} + \text{€}6.0\text{M} = \text{€}8.0\text{M}$

If an emissions limit is set at 40 tonnes per hour for each firm, we see from table 1 that this will cost each firm a different amount. The first increment of 20 tonnes costs each firm the same amount (€0.1M per tonne or €2.0M for the block of 20 tonnes). Firm A, however faces a more steeply rising marginal cost of pollution abatement. In reducing pollution from 80 tonnes to 60 tonnes, firm A faces a cost of €0.3M per tonne (or €6.0M for the 20 tonnes) and from 60 tonnes to 40 tonnes it faces a cost of €0.7M per tonne (or €14.0M for that block). The total cumulative cost to firm A of the pollution reduction from 100 to 40 tonnes is €22M.

Similarly, for Firm B, the cost of reduction from 100 to 80 is €2.0M (or €0.1M per tonne), from 80 to 60 is €4.0M (or €0.2M per tonne) and from 60 to 40 is €6.0M (or €0.3M per tonne). The total cumulative cost of pollution reduction from 100 to 40 tonnes for firm B is €12M.

The combined cost of reducing total pollution from 200 tonnes to 80 tonnes is €34M

We now examine how this same result (total emissions reduced to 80 tonnes) can be achieved more efficiently. This could be done by setting each firm a particular emission level. The two firms still emit the same combined total. In this scenario, the more efficient firm B removes more pollution than it did before, with Firm A

emitting an off-setting larger amount. Firm A now removes only 40 tonnes per hour and continues to emit 60 tonnes. Firm B now removes 80 tonnes per hour and emits only 20 tonnes.

With firm A removing 40 tonnes of pollution, its total cumulative cost is €8M, while Firm B removing 80 tonnes, faces a cumulative cost of €22M. The combined total cost of reducing pollution from 200 to 80 tonnes is €30M. This is €4M less than it cost under uniform regulation.

However, there are a number of problems with individually determined emission standards. Equity is obviously a problem. In our example above, Firm B was penalised for being more efficient. It costs rose from €12M to €22M while inefficient Firm A saw their costs fall from €22M to €8M. Some mechanism needs to be put in place in order to transfer income between firms.

Another major problem is information. How does the government gather correct information on the costs of pollutant removal? Firms subject to control may not be forthcoming with the information or they may easily be able to “massage” the costs. Also, the number of firms polluting is also an issue. If there are only two firms the informational requirements may be manageable, however, problems will arise when this rises to ten, a hundred or possibly thousands of units from which to gather information.

It is important also to distinguish between different types of regulation. In the example above we focused on the amount of pollution. This is a performance-based system since the government only cares about the final outcome, i.e. how much pollution is produced, however a lot of regulation has focused on standards, practices and inputs. These are called input regulation. It is preferable to focus on output where possible, as this is the metric you are ultimately trying to control. However, the major argument in favour of inputs, standards, etc., is that they may be more easily monitored and consequently reduce the cost of the policy. For example, it may be difficult to measure the level of smog in a city, but it is fairly certain that if smoky coal is banned, the amount of smog will be reduced.

### *Marketable Permits*

A good example of how Coase impacts on policy design is the case of marketable permits. They are essentially a compromise between a direct regulatory solution and a market-based solution. The problem with a pollution tax, as mentioned above, is that the government has to estimate the tax level that would reduce the pollution to the efficient level. With a marketable permit system the government can set the level of pollution it deems allowable, and the market permit system will then find the most cost efficient level of reduction. The policy design creates new property rights in the “marketable permit” and, consequently, provides a more efficient solution to the problem. We extend the example above to help illustrate.

Consider again the firms in Table 1. The regulator initially decides to issue 80 permits, each allowing the emission of one tonne of pollution per hour. The regulator initially decides to set a price of €250,000. Pollution is now effectively banned unless the firm has a permit. The individual firm is now faced with the choice of buying a permit allowing it to pollute or spending money to reduce pollution. It will choose whichever option is the cheapest.

If Firm A, for example, reduces pollution from 100 to 80 tonnes this will cost it €100,000 per tonne. The permit costs €250,000 per tonne. The firm will choose to reduce its pollution level to 80 tonnes. The firm now looks at the increment from 80 to 60 tonnes. For Firm A to reduce from 80 to 60 tonnes of pollution, the cost per tonne is €300,000, while the cost of the permit is €250,000 per tonne. The firm will choose to purchase the permits, as they are cheaper. It follows that to reduce from 60 to 40 tonnes the price is €700,000 per tonne and from 40 to 20 tonnes the price is €1.1M per tonne. It is cheaper at each increment to purchase the permits at €250,000. We see from this that the firm shall want to purchase 80 permits to pollute.

We find similarly that Firm B would wish to purchase 60 permits to pollute, as its cost of pollution reduction from 60 to 80 tonnes and 80 to 100 tonnes is €200,000 and €100,000 respectively, while from 60 to 40 tonnes is €300,000.

We now come to the crux of the matter. At a price of €250,000, Firm A wants to buy 80 permits while firm B wants to purchase 60 permits. Total demand for permits is 80 plus 60, which equals 140. There are only a total of 80 available.

What happens? The price of the permits is bid up. At a price of €400,000 per tonne, Firm A would demand 60 permits because reducing from 60 to 40 costs €700,000 per tonne, while Firm B would demand 40 permits because its price of reducing from 40 to 20 tonnes is €500,000. The total demand is now 100 permits. Again only 80 are allowed. At, lets say, €600,000, Firm A will purchase 60 units because to reduce below 60 tonnes would cost €700,000 per tonne and firm B would purchase 20 permits. We assume that below 20 tonnes, the cost of reduction rise exponentially. (Our example doesn't work exactly due to the pollution falling in increments).

We see from the above that each firm will reduce pollution to the level such that the marginal cost of pollution is equal to the market price of the permit. The marketable permits ensure economic efficiency in the reduction of pollution. The marginal cost of reducing pollution is the same for every firm.

The main problem with marketable permits is making the initial assignment. The initial allocation has distributive issues. The government may allow firms permits according to their current emissions. However, this may penalise firms who have already undertaken pollution reduction and whose costs of further reduction may be very large. However, we see from the above that governments can design policy so that a more efficient outcome can be obtained.

### *Tragedy of the Commons*

Our final example of externalities concerns common property resources and asks whether their allocation is efficient. Common property resources are those resources within a society to which everyone has open access and use. Examples include fishing grounds, grazing commons, etc. Ownership of these resources is either not defined, or by common practice not exercised. No individual, agent or government department exercises any control over the use of common property resources. When the overuse of a resource threatens to exceed its ability to renew itself, the government typically steps in to act as manager of the resource. This overuse is termed "The Tragedy of the Commons". But why does this overuse occur?

This overuse is due to a particular type of externality, where the externality is imposed in the form of one individual's consumption reducing another individuals' consumption. The individual undertakes an action that has a *direct* effect on the production possibilities of other individuals, which the former individual chooses without regard to the latter's production function. The reduction in the other person's consumption is the cost of the externality. In simple terms, the resource is rivalrous in consumption after a point has been reached but non excludable.

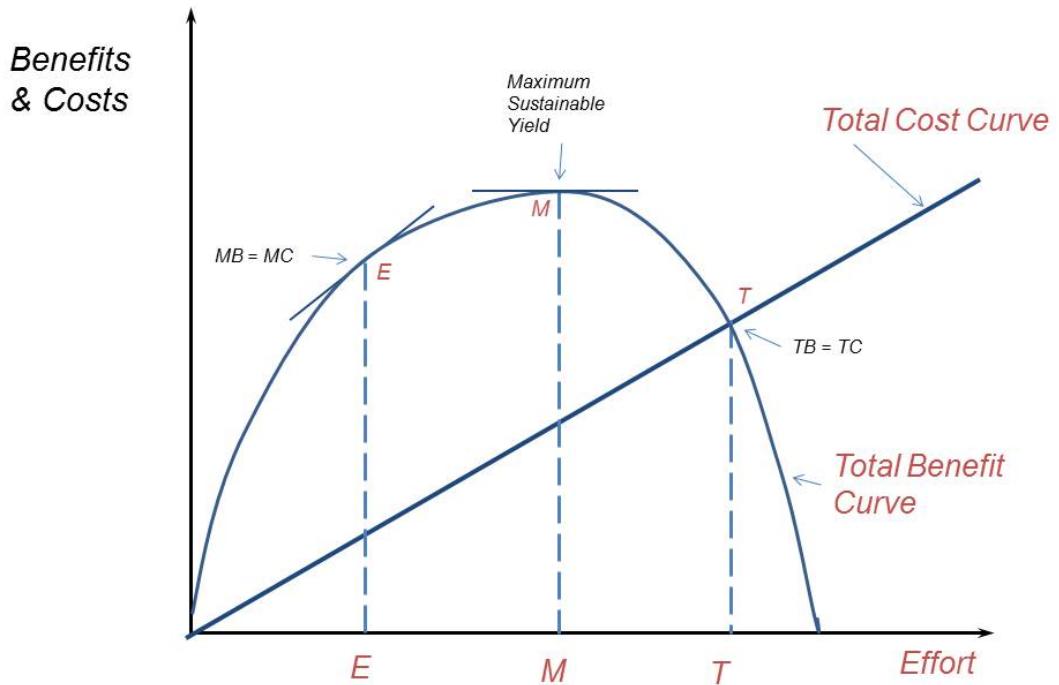
Each individual has the ability to over-consume without having to face individually the full cost of his actions. Each individual free rides on the assumption that others will bear the cost of restocking. This cost is in the form of individuals restricting their activity to ensure replenishment occurs. There is no incentive for individuals to restrict their output, so it will not occur.

We will illustrate using a fishery as an example.

In order to catch fish, fishermen have to put in time and effort. We will define their time and effort as the number of man-hours per year put into fishing. The more man-hours fishermen put in, the greater the amount of fish caught. This occurs up to a point. After this point, some of the fish being taken out of the water include the breeding stock. These are the fish that allow the fishery to replenish itself. After this point the yield per man-hour falls. We see that the total yield initially increases to a maximum and then decreases. The curve has an n-shape. (See Diagram below)

If we assume that the price per tonne of fish is constant, then the total benefit (TB) curve has the same shape as the total catch function. (Our assumption of a constant price is not too unrealistic if our fishery is one of many supplying a large market.)

**Figure 4.3**



We also assume that over the range of effort put in that the individual cost of each man-hour doesn't change. Total costs (TC) therefore increases linearly with the amount of man-hours and marginal cost (MC) is constant.

At which level will the fishery be exploited? There are a number of different possibilities

1. At point "E" on the diagram, the **slopes**<sup>1</sup> of the Total cost and total benefits curves are **equal**. The slope of the total benefit curve is the marginal benefit (MB) and the slope of the total cost curve is the marginal cost (MC). At point "E",  $MC=MB$ . This is the socially optimal point of production. If there was only one owner of the fishery, this is the level that he would fish. (As it is also the profit maximisation level).
2. The maximum level of production where the yield is sustainable is at point "M."
3. At point "T", the total benefit equals the total cost. Here all economic profit has been dissipated through competition.

At which level will the fishery be exploited? If there was only one owner, he would fish as mentioned above at point "E" where  $MC=MB$ . At "E" the level of fishing occurs at a point where the fishery replenishes itself and the owner maximises profit.

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<sup>1</sup> As mentioned above, marginal benefit is the slope of the total benefit curve, similarly for total cost and marginal cost. We can show the level of marginal benefit or cost at any point on the total benefit or costs curves by drawing tangents to these curves. Where the tangents on the cost and benefit curves are parallel (see diagram), the marginal cost and marginal benefit are equal.

However, with no single owner, the level of fishing is a reflection of the incentives of a common resource. No fisherman can ensure that if he maintains his output at a level that allows restocking that others will also maintain their fishing at a sustainable level. In this scenario, it is optimal for each fisherman to extract as much as they can as quickly as they can. The level of fishing will increase until Total benefit equals total cost. Point "T" on the diagram. All potential economic profits have been dissipated and the fishermen are just breaking even.

The inefficiency of point "T" is immediately obvious. The same long-term catch could be exploited with far less effort near point "E". However, as long as there are no controls in place, the incentive to consider the short-term benefit rather than the long term is dominant.

We have seen that the equilibrium for a common resource occurs where  $TB=TC$ . If technology improves, the total cost curve pivots downwards. This implies that as technology improves the fishery is pushed closer and closer to extinction.

#### **4.10 Conclusions**

Externalities cause market failure and inefficiency. We see from the writings of Coase that when negotiation is costly between the parties affected by the externality it does matter how the property right is assigned. In general, the most efficient outcome occurs when the law places the burden of avoiding the harmful effects on the party that can accomplish it at the lowest cost. The implication of this is that policy should be designed carefully and on the basis of as much information as possible.

## **5. Regulation: Monopoly Power**

### **Learning Objectives**

When you have studied this lesson and any associated reading, you should be able to:

- understand the various market structures
- explain the reasons for regulation of monopoly power
- describe the sources of monopoly power
- describe the different schools of thought on controlling monopoly power
- discuss the problems associated with the regulation of Monopoly
- describe in detail the problem of monopoly power
- understand the various policy responses to the problem of monopoly power
- understand the regulation of a natural monopoly

### **5.1 The Economic Rationale for Regulating Monopoly Power**

As discussed in Lesson 1, economic theory tells us that an economy, with perfectly competitive markets, maximises the welfare of a society. Economists, for a long time, have viewed market competition as a mechanism that marshals the resources of society to their most valuable and best uses, with monopoly power, on the other hand, leading to high prices, inefficient outcomes and waste. The “Father of Economics” Adam Smith saw the pursuit of individual self-interest directed and marshalled by competition as a key guiding principle the economy. Smith noted that a person engaged in commerce,

... generally, indeed, neither intends to promote the public interest, nor knows how much he is promoting it ... he intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention. Nor is it always the worse for the society that it was no part of it. By pursuing his own interest he frequently promotes that of the society more effectually than when he really intends to promote it.

He further noted that:

In the restraints upon the importation of all foreign commodities which can come into competition with those of our own growth or manufacture, the interest of the home-consumer is evidently sacrificed to that of the producer. It is altogether for the benefit of the latter that the former is obliged to pay that enhancement of price which this monopoly almost always occasions.

Simply put, Smith believed that the motivating effect of self-interest curtailed by competition helped society towards the best outcome. We saw in Lesson 1 that governments are concerned with ensuring that the resources available to society are used in a manner that is fair and efficient. Further, in Lesson 4, we discussed the foundational aspects of regulation and showed how law and regulation underpin markets and form the basis for a functioning economy. In this lesson, we ask if governments, through regulation, can either shape the structure of markets or change their behaviour in order to bring about a superior welfare outcome.

We know from earlier lessons that economists are primarily concerned with the *efficiency* with which the resources of society are used. However, it is important to recognise that the growth of monopoly power can have dangerous political ramifications too. US President, Franklin Delano Roosevelt, in a 1938 statement to the US Congress on limiting monopoly power said:

The first truth is that the liberty of a democracy is not safe if the people tolerate the growth of private power to a point where it becomes stronger than their democratic state itself. That, in its essence, is Fascism—ownership of Government by an individual, by a group, or by any other controlling private power.

The second truth is that the liberty of a democracy is not safe if its business system does not provide employment and produce and distribute goods in such a way as to sustain an acceptable standard of living.

Society should be concerned about wealth concentrating within a small group of individuals and firms, particularly if that group is using its wealth to ensure government does its bidding and passes regulation that further consolidates monopoly wealth and power in society. A particular concern for societies, from a political perspective, is the concentration of media ownership in few hands. For a political system to function properly it is important to ensure that the people are exposed to a plurality of views on the actions of their government.

In attempting to understand markets, economists have developed “models” of different market structures that are generally observed in real life or that present an optimal outcome. These models help us understand how these different structures behave and assess their desirability from the different perspectives of the consumer, the entrepreneur and the policy-maker. In the material below, we will examine the standard market models. Because we are predominantly concerned with public policy, we will assess each market structure with regard to its efficiency in using the resources of society to meet the needs of the people.

Market structure can be viewed as a spectrum, with perfect competition at one end and pure monopoly at the other. We will see that from a policy perspective perfect competition delivers an “optimally” efficient outcome and monopoly delivers an inefficient outcome. In between are “hybrid” market structures such as “monopolistic competition” and “oligopoly.” These are not “pure” monopolies, but

they exhibit some of the features of a monopoly and the associated reductions in welfare. Consequently, government should intervene if it can improve the situation. It is important to remember, however, that government intervention can not always improve the situation. Later in the lesson we examine the development of the intellectual basis and policy responses to the problem of monopoly.

In the sections that follow we examine the theoretical basis for economic regulation. We shall initially explain and examine the basis of a perfectly competitive market. We will then show that these foundations lead to outcomes that are both allocatively and productively efficient. We will then turn to the basic elements of a monopoly and show how these lead to inefficient outcomes. It should be remembered that the models discussed below are theoretical abstractions and that neither an “absolutely” perfectly competitive market nor a “perfect” monopoly exists in real life. However, it is important to grasp that regulation policy, using the developed theory and appropriate interventions, should attempt to move markets away from the undesirable outcomes and direct them, as close as is possible, towards the ideal.

## 5.2 Perfect Competition

In developing theoretical market models, economists ascribe certain assumed attributes to each different model. These assumptions form the basis of the model and influence the structure, behaviour and outcomes of the market. We shall list the assumptions of the perfectly competitive market below and then proceed to discuss how they influence the model.

The assumptions underlying the perfectly competitive market model are:

1. The goods sold in the market are homogenous (identical).
2. There are many small buyers and sellers.
3. Firms do not face barriers to entry or exit from the market.
4. Buyers and sellers in the market have perfect information.
5. There are zero transaction costs in using the market.
6. No economies of scale exist.
7. Firms maximize their profits while consumers maximize their utility.

As listed above, perfect competition exists where there are a large number of small profit-maximising firms producing an identical (often called homogenous) product. The fact that each individual firm is so small relative to the market means that none of them are able to affect the price in the market through changing the quantity they sell. Firms are called “price takers” because they cannot raise the price they charge in order to increase their profits. If they did, customers would simply go to another firm and buy the good at the lower price, or other firms would enter the market, charge the lower price and take all the existing firm’s customers. (In diagrammatical terms, this means that the firm’s demand curve is a horizontal).

Competition, through the free entry of firms, ensures that the market price is pushed down to the level that just covers the firm's costs. The equilibrium price in a perfectly competitive market just covers the rent, interest, wages and normal profit costs that a firm must incur in order to produce the good (remember, normal profit is the lowest profit that will keep the entrepreneur in production). Equivalently, this means that production in a perfectly competitive firm occurs at the lowest point of the average cost curve. This is called productive efficiency. Competition ensures that only efficient firms survive and there is no waste. There are no super-normal profits, excess rents, superfluous interest payments or excessive wages in the long run.

Perfectly competitive firms can make super-normal profits, in the short run, through finding cheaper, more efficient ways of producing their goods. By charging the same price as before but incurring fewer costs, the firm can make super-normal profits. However, because it is assumed there is "perfect information," competing firms soon learn about the more efficient productive methods, adopt them, and then start lowering prices in order to attract customers away from the other firm. This battle for customers drives prices down to the point where firms again are producing at the lowest possible (productively efficient) point of the average cost curve. You see from this that it is the customer, in the long run, that benefits from any innovation in the market.

Looking at the welfare implications of the market from a different perspective we consider the concept of allocative efficiency. When we think of the market as being a mechanism of converting resources (factors of production) into goods, we see that the "price" that the customer is willing to pay reflects how much they value the good. This is known as the buyer's "marginal benefit" (MB). We know that because the perfectly competitive firm is so small relative to the market that it can sell all its produce at the price determined by the market. As mentioned above, this means that its demand curve is horizontal. Consequently, for each additional good that the firm sells, the marginal revenue is the same as the price. ( $P=MR$ ). On the other hand, the firm, in order to survive, must sell its goods at a price that covers its costs of production (payments of wages, rents, interest, and profit). This is known as the firm's "marginal cost" (MC).

If "society" has resources that can be converted into one extra good at a (marginal) cost that is less than the (marginal) benefit a customer would get from it then the welfare of society could be improved by producing and selling that good. In other words, if the MB that a customer gets from a unit of a good is greater than the MC then welfare can be improved. Firms should produce goods up until the quantity where the marginal cost increases to the point where it equals the marginal benefit, *i.e.*  $MB=MC$ . This is the point of allocative efficiency (resources in society have been allocated in a manner that maximizes the utility of the society). In a perfectly competitive market, the firm will sell goods to the point where the MB of the customer equals the MC. It will do so because it can earn extra profit by doing so. If for some reason it doesn't want to sell the good, another firm will enter and sell the good at a profit. From this we see that a perfectly competitive market is allocatively efficient.

A perfectly competitive firm is both productively and allocatively efficient. Consumer welfare is maximised because consumers acquire the products they want in the quantities they want at the lowest cost that society can produce them. The willingness of the consumer to pay for the good equals the price actually charged, and that price in turn equals the marginal cost of production ( $MB=MC$ ). In this market structure, the entrepreneur's pursuit of profit in the competitive environment maximizes social welfare. This is the gold standard of market structures, against which all other market structures are compared.

We can broaden our understanding of the above through the use of diagrams. In what follows many of the points made above are repeated. By using the diagrams, however, you should gain a deeper understanding of the material.

**Figure 5.1**

### Equilibrium & Efficiency in a Perfectly Competitive Market

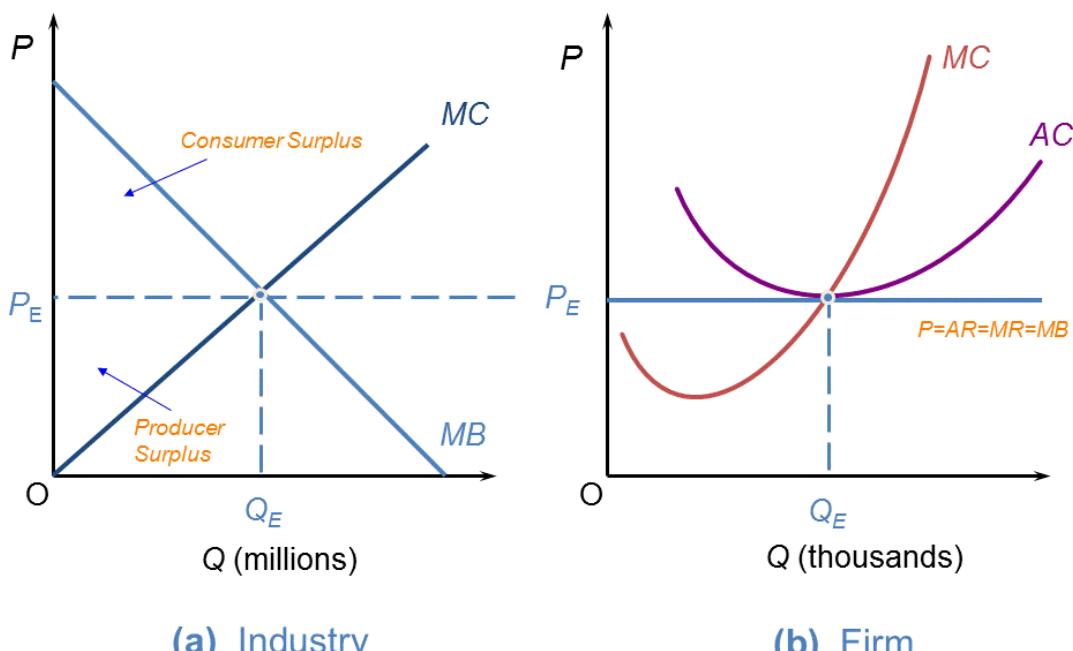


Diagram (a) above shows us the market equilibrium price ( $P_E$ ) and quantity ( $Q_E$ ) in a perfectly competitive **industry**. This market is efficient as both producer and consumer surplus are maximized (see lesson 1). The industry is made up of many small consumers and producers, none of whom are large enough to affect the market price. The market price and quantity are solely determined through the interplay of the force of market supply and demand. We note that the equilibrium quantity in the industry diagram is denoted in "millions". Diagram (b) above shows us the equilibrium outcome for a **firm** in this perfectly competitive market. Note that the equilibrium quantity is denoted in "thousands". This indicates that the size of the firm's production relative to the market as a whole is small. This type of firm is

known as a “price taker” because it has to accept the market price it receives for its produce. Consequently, the perfectly competitive firm’s demand curve is a horizontal line at the price  $P_E$ . To interpret this, we see that the firm is so small that it can sell all the output it wants at the equilibrium price. If it tries to sell above this price, it will sell zero quantity because buyers can buy the quantity of the good they require off another small seller. In addition, the firm will not sell any of its output below  $P_E$  because it can sell all it wants at this price without having to reduce the price.

This ability to sell its entire produce at  $P_E$  has a number of interesting implications: An example will help illuminate the issues. If  $P_E$  is equal to €10, and the firm sells one unit, its total revenue (TR) from the sale of that one unit is €10, if it sells 2 units its TR will be €20, if it sells 5 units its TR will be €50. The firm’s average revenue (AR) is equal to the  $TR/Q$ , where  $Q$  denotes the units of the good sold. In our case if the firm sells 1 unit of the good its AR is €10 divided by 1 which equals €10, if it sells 2 units its AR is €20 divided by 2 which equals €10, and if it sells 5 units the AR is €50 divided by 5 which equals €10. If you picked any number of units sold the AR would still be €10. We see from this that the AR of a perfectly competitive firm is equal to the price charged and is constant.

Also of interest, particularly with regard to profit maximisation, is the firm’s marginal revenue. Marginal revenue (MR) is the increase in revenue that results from the sale of one additional unit of output. We see from the above that at zero (0) units of sales the firm has €0 revenue, but after the sale of one unit the firm’s TR is €10. Marginal revenue is therefore €10. Further after the sale of 2 units the TR is €20 and therefore the MR is €10 and after the sale of three units the TR is €30 and the MR is €10 and so on for any output. The MR of this perfectly competitive firm is €10 and constant. Finally, we examine the marginal benefit MB that a consumer will get from the good. We assume that the price the consumer pays for the good reflects how much the value the good. We see from the above that each consumer pays €10 for the good and consequently, the MB is also constant at €10. This is represented on diagram (b) which shows the horizontal demand curve at price  $P_E$  stating the  $P=AR=MR=MB$

Looking now at the perfectly competitive firms costs, we know from the assumptions that there are no economies of scale. This implies that the marginal cost curve will have to start rising at some stage. Looking at low levels of production on diagram (b) above we see that the MC is below the MR; this means that if we increase production by another unit the additional revenue earned by the sale of the good (MR) will be greater than the additional cost incurred (MC). If the amount of revenue you earn from the last good sold is greater than the additional cost incurred, your profits will have increased by that amount. If you look at diagram (b) above and move rightwards from low levels of output on the left, you see that, initially, the firm is increasing its profits with every extra unit of output. However, as the MC becomes greater than the MR, the firm starts losing profits for each extra unit it sells. Consequently, it makes sense for the firm to produce output up until the point where  $MC=MR$ . This is the point of profit maximisation.

Examining the perfectly competitive firm diagram from an efficiency point of view, we know that a firm is allocatively efficient when it can no longer sell a unit of their good to a consumer where the MB they receive for that good is greater than the MC to the firm. From diagram b above, we see that the perfectly competitive firm sells its good up until the output where  $MB=MC$ . We see here that the PC firm is allocating the resources used to the use that maximizes the consumers benefit. In other words, it is allocatively efficient. To test this, ask yourself whether, if the firm sold one less or one more good than where  $MC=MR$ , it could improve welfare? Reading directly from the diagram, you can see that at one good less than the  $MC=MR$  output, the marginal benefit is greater than the marginal cost, so increasing output by one unit will increase welfare and further is we then increase output by one further unit we see that the marginal cost is now greater than the marginal benefit. This means that to produce this amount, the cost to the producers is greater than the benefit gained by the consumer. Welfare is reduced. So we see that it confirmed that allocative efficiency occurs at the point where  $MB=MR$ .

Moving on to productive efficiency, we know that the firm's profit maximisation point occurs where it's  $MR=MC$ . In the short-run, a PC firm may earn super-normal profit. This occurs because the price (average revenue per unit) the firm is receiving is above the firm's average cost. The firm has no control over this as the firm is a price taker. As discussed above, due to this the firm's demand curve is horizontal and consequently its  $MR$  is constant and equal to the price the firm receives. On the other hand, the firm's  $AC$  curve is U-shaped with the downward part due to fixed costs spreading over a greater quantity and gains from specialisation, with the upward part due to the law of diminishing returns.

Further, you will have noticed that the marginal cost curve intersects the average cost curve at its minimum point. This is due to the mathematical relationship between the marginal and average concepts: if you add an extra (marginal) number and it is higher than the average then the average will increase, if it is less than the average then the average will decrease and if it is the same as the average then the average will stay the same. A numerical example will clarify: If the total cost of producing 5 units of a good is €50, then the average cost is equal to €10. If you produce a marginal good at an extra cost of €16, total costs rise to €66 and average costs rise to €11. If instead the extra good cost an additional €4, total costs rise to €54 and average costs fall to €9. Finally, if the additional good costs an extra €10, total costs rise to €60 and the average doesn't change at €10.

Due to the assumption of perfect information, potential competitors see that with the current market price incumbent firms in this PC market are making super-normal profits. Consequently, new firms will enter the market, increase the supply and drive the price down. Entry will occur until the price is driven down to the lowest point where  $MC=MR$  and the firms can still make a profit. This point is at the minimum point of the firm's  $AC$ , and it is a profit maximizing point because the firm's demand curve is horizontal. This indicates that PC firms are productively efficient because in the long run they produce at the lowest point of their  $AC$  curve due to competition forcing them to keep costs to a minimum.

Again we see from the above we see that a perfectly competitive firm is both productively and allocatively efficient. Consumer welfare is maximised because consumers acquire the products they want in the quantities they want at the lowest cost that society can produce them. The perfectly competitive market structure is crucially important for policy analysis because it is the standard against which all market policies are judged.

### 5.3 Monopoly

The assumptions underlying the monopoly market structure are:

1. There is only one firm supplying the entire market.
2. There are no close substitutes for the monopolist's good.
3. There are barriers to entry.
4. Buyers in the market may not have perfect information.
5. There may be transaction costs in using the market.
6. The monopolist maximizes her profits while consumers maximize their individual utility.
7. Economies of scale may exist.

At the other end of the spectrum to perfect competition is the monopoly market structure. Here, we have only one firm in the market. The firm is the industry. There is no competition because there are no close "substitutes" for the monopolist's good and some form of barrier to entry into the industry exists. The fact that a barrier to entry exists gives the monopolist the ability to charge a higher price than a firm in a perfectly competitive market. This allows the monopolist capture in the form of "supernormal" profit some of the welfare that customers would have received if the monopolist was forced through competition to lower her price. From a welfare point of view, the "supernormal" profit that the monopolist earns is not a reduction in welfare. It is simply a transfer of welfare from one section of society (customers) to another (monopolists).

So why then is the monopoly market structure "welfare reducing"? To see this, we must remember, firstly, that the monopolist is a profit maximizer where she will increase her output up to the point where the extra (marginal) revenue she obtains from the sale of a good equals the marginal cost she incurs ( $MC=MR$ ). Secondly, the monopolist is the only producer in the industry and, consequently, faces the demand curve for the industry as a whole. The industry demand curve slopes downwards because customers will increase the amount of her good they buy if she charges a lower price. In dropping the price in order to attract an extra customer, the monopolist gains the revenue of the extra sale price but loses the difference between the old higher price and the new lower price that she would have got from all her existing customers.

From this we see that the price that the last customer paid (which equals that customer's MB) is greater than the extra (marginal) revenue that the monopolist

receives. This means that at the profit maximizing price and quantity,  $MR=MC$ , the price (MB) she will have charged the customers is higher than her marginal revenue and her marginal cost, i.e.  $MB > MC$ . This means that monopoly as a market structure does not achieve allocative efficiency.

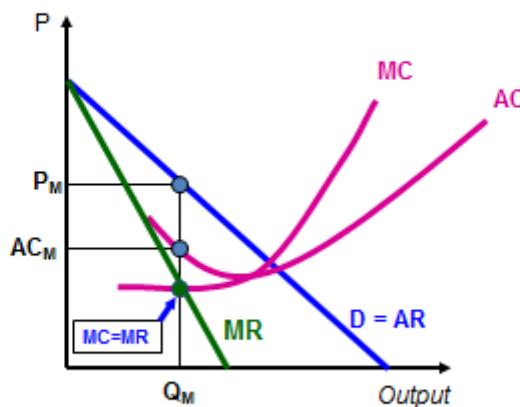
If the monopolist sold an extra unit of the good, the marginal benefit to society would rise by more than the marginal cost and, consequently, welfare would increase. The monopolist will not do this, however, because it reduces her profit. Simply, the incentives of the monopolist and the incentives of society do not align, and, due to her power, it is the monopolist's welfare that takes precedent. In other words, opportunities to increase the welfare of society are being missed because the monopolist charges a price that maximizes her profit and, unlike a perfectly competitive market, this profit maximising level does not occur at society's welfare maximizing level of price and quantity of production.

Further, because the marginal revenue of the monopolist is declining it cannot meet marginal cost at the lowest point (productively efficient level) of the average cost curve. Consequently, the monopolist is not productively efficient either. Due to the fact that there are barriers to entry, competitors, upon seeing supernormal profit, cannot enter the market and compete them away through lower prices and greater efficiency. Consequently, monopoly does not achieve either allocative or productive efficiency.

Again, we can help deepen your knowledge with the use of a diagram.

**Figure 5.2**

### Profit maximisation by a monopolist



By definition, a monopoly consists of only one firm. The firm is the industry. Consequently, the diagram above is simultaneously the diagram of the firm and the

industry. The monopolist, unlike the perfectly competitive firm, is not a price taker; she is a price-maker. She can determine the price she wants to charge. Because there are barriers to entry to the market, competitors cannot enter the market and undercut her profit. The monopolist is a profit maximizer, so she will produce an output and price where her  $MR=MC$ .

As we can see from the diagram above, the monopolist faces a downward sloping demand curve ( $D=AR$ ) because consumers can decide how much or little of the monopolist's good they want to consume. We can also see that the monopolist has a downward sloping  $MR$  curve. We know from our previous discussion that in order to sell more of the good the monopolist must reduce her price. In selling an extra unit of output, the monopolist gains the revenue of the extra sale price but loses the difference between the old higher price and the new lower price that she would have got on all her existing customers. For example, if the monopolist sells 10 units at a price of €10, her total revenue will be €100 (note her average revenue is €10). If she drops her price to €9 and sales increase to 12 units, her total revenue will be €108, (note her average revenue is €9) and her marginal revenue is €8. We can see that this marginal revenue is made up of a gain of €18 from the sale of 2 extra units and a loss of €10 from selling 10 units to the existing customers at the lower price of €9.

From the diagram, we see that the price that the last customer paid is greater than the marginal revenue the monopolist received. We know from earlier that the marginal customer pays a price that just equals the marginal benefit they receive from consuming that unit of the good. We know that the monopolist is a profit maximizer and consequently will produce at a point where  $MC=MR$ . Consequently, with a downward sloping demand curve, the monopolist will charge a price that is greater than the marginal revenue. This means that the marginal benefit the last customer's gains is greater than the marginal cost. We see from the diagram above that if the monopolist produced another unit, the  $MB$  is still greater than the  $MC$ , but  $MC$  is now greater than  $MR$ . This extra unit increases welfare but will not be produced because it reduces the monopolist's profit. Consequently, the monopolist is not allocatively efficient. The incentives of the monopolist and society do not align. Due to her market power, the monopolist's welfare takes precedent. We also note that the monopolist does not produce at the minimum point of her average cost curve and, as a result, a monopoly is not productively efficient either. We see from the above that a monopoly does not maximize the welfare of society.

## 5.4 Monopolistic Competition

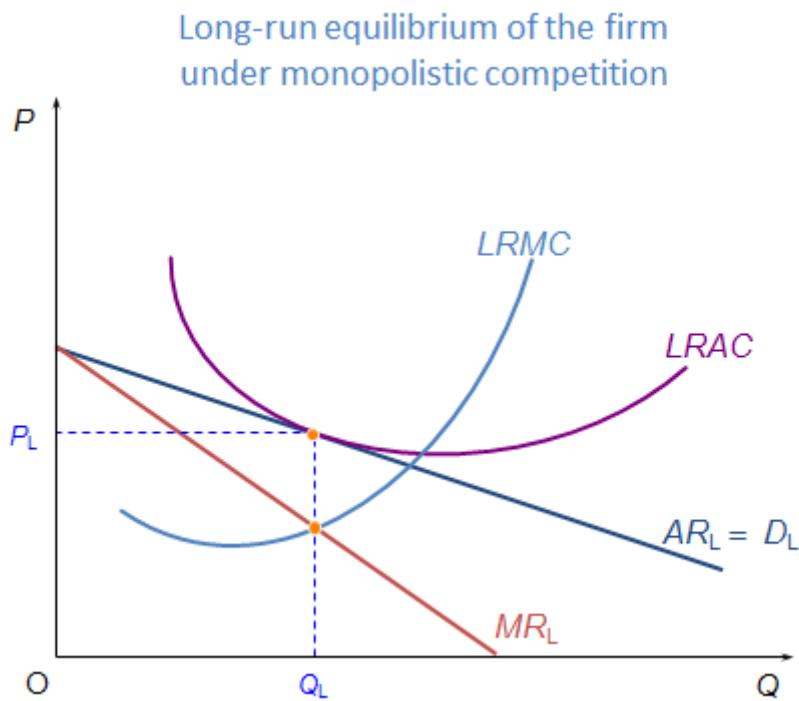
The market structure of monopolistic competition is the first "hybrid" market structure we will examine. As you will see from the assumptions below and from its name it has a mix of both competitive and monopolistic elements. The assumptions underlying monopolistic competition are as follows:

1. There are many small buyers and sellers.

2. Each firm sells a good that is differentiated in some way from the other goods sold in the market. (They are imperfect substitutes for one another).
3. Firms face no barriers to entry nor exit from the market.
4. There can be a small degree of imperfect information in the market.
5. There are low transaction costs in using the market.
6. Firms maximize their profits while consumers maximize their utility.

From the assumptions we see that each producer has a small degree of monopoly power due to the uniqueness of their “differentiated” good. For example, a restaurant with the “best” chicken wings in town has a small degree of monopoly power due to their “secret recipe” that allows them to differentiate their product. Consequently, the restaurant may be able to charge a few euros extra for their wings. If they charge too much, however, people will simply go to a different restaurant. We can see from this that a firm in a monopolistic competition type of market faces a downward sloping demand curve. If they increase price they will lose some, but not all, sales because some customers view the differentiated good as being very different to the other available products. In the short-run this type of firm can earn supernormal profits and will be in a state of equilibrium similar to that of a “pure” monopoly. However, in the long-run potential competitors will notice that firm is earning supernormal profits and will enter the market, selling close substitutes. This shrinks the “pool” of customers available and, consequently, profits are driven down to normal levels. In other words, the entry of the new competitors shifts the firm’s demand curve downwards.

**Figure 5.3**



The diagram above shows the long run equilibrium of a monopolistically competitive firm. The short run diagram of a monopolistically competitive firm is the exact same as a monopolist's. The firm, in the short run, can earn super-normal profit due to their small amount of monopoly power. However, in the long run, potential competitors see these profits and they enter the market. This reduces the size of the firm's market "pushes" its demand curve inwards until the point where the firm is just breaking even. We can see this in the diagram above where the profit-maximising price that the firm charges just covers the firm's average cost and the firm breaks even (remember, average cost includes the firm's normal profit). We see from the diagram above that because the firm faces a downward sloping demand curve, the price it charges ( $MB$ ) will be greater than the marginal cost and also due to the downward sloping nature of the demand curve it cannot intersect the firm's  $AC$  curve at its minimum point. Consequently, a monopolistic competitive firm is neither allocatively nor productively efficient.

## 5.5 Oligopoly

The final market structure that we examine is oligopoly. The term "oligopoly" is really used to cover several different models that explain various types of behaviour. For our purposes, we do not need to examine them in detail, and the discussion that follows deals with the broad parameters of oligopolistic markets. The broad assumptions of oligopolies are as follows:

1. There are a small number of firms in the market.
2. Firms are interdependent on one another.
3. There is imperfect information throughout the market.
4. There are some barriers to entry.
5. There may be economies of scale.

Oligopoly as a market structure has some barriers to entry, where there are a small number of firms operating in a particular market and they believe that their actions affect each other. That is, they are to some degree interdependent on one another. Each firm faces a decision whether they should co-operate or compete with the other firms. Oligopolistic markets exist where the products are homogenous (or standardised) and also where there is product differentiation.

The firms can exert monopoly power by agreeing to either fix their prices at a high level or reduce the amount they produce in order to force the price up. These agreements can be either formal, where actual negotiations take place and an agreement is reached (called a cartel), or they can be informal, where firms establish a pattern of behaviour that is collusive. However, as you can imagine, firms may be tempted to cheat on the agreement by secretly dropping prices or increasing production. Some barriers to entry exist so that a new firm cannot enter and undercut the cartel. As we will discuss below, cartels are illegal but difficult to prosecute. Oligopolists also try to gain some monopoly power by creating "brand loyalty" through product differentiation. Here, firms engage in non-price rivalry

through using strategies such as providing discount coupons, engaging in advertising, or loyalty schemes.

## **5.6 Market Structures—Summary**

From the above descriptions we see that market structure is an important element in determining whether competition works in order to maximise efficiency. Structure refers to the number and size of firms within the market, whether entry is possible, whether the market is innovative or static or whether the product is homogenous (like electricity) or differentiated (like washing power). The level of rivalry or competition between firms depends on how sensitive customers are to price differentials. If the product is homogenous and customers do not incur switching costs between suppliers, then price competition will be more intense.

We saw that the perfectly competitive market structure is both allocatively and productively efficient and as a result is the standard against which all markets are judged and the direction towards which any policy intervention should guide any defective market.

## **5.7 Sources of Monopoly Power**

Having examined the various market structures, we now examine the different sources of monopoly power.

The sources of monopoly power are as follows:

1. Control over an essential resource, ingredient or knowledge.
2. A government monopoly.
3. A government granted monopoly.
4. Legal barriers to entry such as copyrights, patents, licences, etc.
5. Economies of scale.
6. Network Externalities.

Let us look at each source in more detail

### *Control Over an Essential Resource, Ingredient or Knowledge*

A firm may own the only source of a key input in the production process. Being the only owner of a key resource gives the firm power to raise price above marginal cost without losing customers to competitors. For example, in the past, Alcoa (the Aluminium Company of America) was accused by the US authorities of trying to buy up all viable bauxite mines (bauxite is the essential raw material in aluminium production) in order to gain a monopoly position in the aluminium market. A more famous example was the De Beers diamond cartel, which had a near monopoly over the production and distribution of diamonds for most of the 20<sup>th</sup> century. It used its

dominant position in the market to artificially inflate the price of diamonds and bully smaller producers to become part of their cartel. Where a smaller firm refused, De Beers flooded the smaller firm's market with diamonds at low prices so as to force the smaller firm out of business or into the cartel. On occasions where it couldn't control supply (e.g. blood diamonds), it bought up and stockpiled the extra supply so as to maintain a higher price. In recent years, on foot of legal actions taken by different governments and concerns over distributing blood diamonds, DeBeers decided to only distribute diamonds they mined themselves. DeBeers market share has declined from a high of around 90% to around 40%.

#### *A Government Monopoly*

Due to the nature of services that a government provides many of its activities will be monopolistic in nature. A government monopoly occurs where a government agency is the sole supplier of a particular good or service. It's hard to imagine two departments of finance or two national armies competing with one another!! Further, government often provides services where due to market failure the private sector is unable to meet society's needs.

#### *A Government-Granted Monopoly*

A government-granted monopoly occurs where the government grants exclusive rights to a firm or firms in providing a particular good or service. Dublin Bus, for example, is the monopoly supplier of bus services in the greater Dublin area. In the past, it was much more usual for the state to regulate monopoly power by licensing certain firms to operate a market that exhibited economies of scale or network externalities. For example, and to name but a few, "Semi-State" firms like Aer Lingus, ESB, CIE, Telecom Éireann all had monopolies in the supply of air transport, electricity, bus and rail transport and telecommunication respectively. As we will see below, these firms had little incentive to operate efficiently and often provided poor and expensive products and services.

#### *Legal Barriers to Entry (Copyright, Patents, Licences, etc)*

The government, through the legal system, may grant certain firms and professions monopoly powers to encourage innovation and creativity or to increase consumer protection. If, for example, a drug or telecommunications firm spent a huge amount of money on researching and developing a new drug or technology and could not rely on the government to provide protection of copyrights or patents then a firm that has spent nothing on R&D could copy the innovation, under-cut the innovative firm on price and put them out of business. From society's point of view it is worthwhile to provide innovators and inventors a degree of monopoly power so that they can recoup the cost of their research and development.

Governments may also give monopoly power to certain professions through licensing. This is to ensure that those providing services that could be potentially dangerous or severely financially damaging are trained to a certain level of skill,

proficiency and knowledge. In order to be a doctor or solicitor, for example, one must have passed certain exams and reached a certain level of proficiency to practice. Licencing increases the level of quality we can expect, but it also creates barriers to entry, dampens competition and confers a degree of monopoly power that allows certain professions the ability to charge higher prices. We shall examine this issue in much greater detail in Lesson 6.

### *Economies of Scale*

Economies of scale are cost advantages that large firms gain because of their size. They exist when an increase in the scale of production causes a decrease in the long run average cost structure of the firm. This phenomenon is also known as “increasing returns to scale” and is prevalent in industries that have large fixed costs. This means that as a firm gets bigger, its unit cost of production declines because the fixed costs are spread over a larger amount of production. Consequently, a smaller firm will always be at a cost disadvantage because it will not benefit to the same degree as the larger firm from the increasing returns to scale. The larger firm can sell its goods at a cheaper price and so threaten the survival of the smaller firm.

Markets with increasing returns to scale that sell “differentiated products” can have some degree of competition, as the consumer’s preference for, and willingness to pay a higher price for, different products keeps smaller firms in business. The drinks industry has both differentiated products and increasing returns to scale. The big brands like Guinness, Heineken, and Budweiser have huge costs advantages, but some consumer’s preference for, and willingness to pay higher prices for, craft beers allows them to survive (with difficulty, it must be said) in the market.

Where the product is “homogenous” or undifferentiated and increasing returns to scale are evident, we have what is known as a “natural monopoly”. Here, a single firm is able to serve the entire market demand at a lower cost than any combination of two or more smaller firms. A good example of a homogenous product would be electricity; with no possibility to differentiate or identify the product through taste or quality, consumer preference is irrelevant and price is the sole factor in decision-making. Consequently, the larger firm will prevail and the smaller will go out of business and we are left with a monopoly.

### *Network Externalities*

Network externalities occur when the value of a good or service increases because other people are using it. Would you use a telephone or social media network where you are the only subscriber? You can see from this that the more people that are connected into the network, the more likely you are to join it. This makes competing goods or services with lower levels of adoption unattractive to new customers. Consequently, a market with strong network effects will in all likelihood be a monopoly.

We see from the above that there are several different sources of monopoly power with various welfare consequences. The build-up of monopoly power can occur over time and outside government policy due to innovation, market and practice, economies of scale, and network effects. It is essential for government to keep a watchful eye on these types of developments and intervene where necessary. An early policy intervention can halt the creation of a serious problem. Where government policy is necessary to the creation of the monopoly—such as in the regulation of professions, intellectual property law, licensing, etc—it is essential that the government does not allow itself to be captured by those who can benefit from the type of policy it creates.

## **5.8 Theories on Government Policy on Monopoly Issues**

### *The Structuralist School*

Traditional competition policy has its basis in what is known as the structuralist school. This school is dominated by what is known as the structure conduct performance (SCP) paradigm. The SCP paradigm argues that market structure determines conduct, which in turn determines performance of the market in terms of price and efficiency. Structure is mainly viewed as being determined by the number and size of firms in the market. Therefore, a market with a lot of small firms, with no firm dominating in market share, is deemed to be the most socially desirable. Conversely, SCP views a market that is dominated by one firm, as measured by market share, as being most likely to increase prices and reduce output and therefore welfare. With structure being to the forefront of importance, most competition policy focuses on firm size and number within a market as the source of most problems.

### *The Chicago School*

The Chicago School has consistently questioned the validity of the basic tenets of the Structuralist School. It showed, amongst other things, that the direction of determination does not necessarily flow from structure to conduct to performance. It has shown that price/profit can affect conduct, which can in time change structure. The Chicago School believes that a firm may be dominant precisely because it is the most efficient. In effect, to punish it amounts to a punishment of efficiency. It also believes that potential competition and the threat of entry can make a monopolist behave competitively.

The basis of the Chicago School's credo is that very little can be inferred from a concentrated market structure. It is preferable to concentrate directly on market power by examining both price rivalry and barriers to entry. However, competition regulation still relies heavily on market structure as its main focus of guidance.

## **5.9 Note on Government Responses to Monopoly Problems**

As we saw previously, monopoly problems in a market lead to sub-optimal welfare outcomes. Government policy responses to this problem take the form of two separate but related strands. Where a rule change can move the market closer to the competitive market ideal by altering the structure or conduct of a market this is usually dealt with through competition law. Most governments appoint a dedicated agency to monitor and enforce the law to ensure an economy with competitive markets. Secondly, where it may not be advantageous to encourage competition due to economies of scale, we have what is known as a “natural monopoly,” and the regulation of these natural monopolies is usually undertaken by sector specific regulators.

## **5.10 Competition Law**

As mentioned above, competition law endeavours to move markets towards more competitive and welfare enhancing outcomes. Competition law in any one country normally consists of a suite of legislative “Competition Acts” and a specialist agency to investigate cases and bring prosecutions. In the material that follows we examine the elementary elements of competition policy.

In markets we generally see that anti-competitive conduct may be undertaken by a firm acting alone or in unison with other firms. We shall deal firstly with firms acting in unison and then with single-firm abusive behaviour.

### *Collusion - Collective Anti-Competitive Behaviour*

In understanding collective firm behaviour the first distinction of importance is between firms at the same level of the supply chain and firms at different levels of the supply chain. For example, two sawmills cutting wood into planks are operating at the same “horizontal” level of the supply chain, while the firm that actually cuts down the trees is operating “vertically” upstream of the saw mills. A “Horizontal agreement” is the term given to agreements between firms at the same level of the production chain, while “vertical agreements” refer to those between firms at different levels of the production chain.

#### Horizontal Agreements

Sometimes firms conspire to enter into “Horizontal agreements” to fix prices. For example, oil companies may agree to set an agreed price for petrol at all their stations. Firms can also agree to “carve up territory,” where competing firms choose specific, exclusive territories to sell their good and agree not to sell their goods in each other’s territory. This gives each firm an effective monopoly in their territory and allows them to increase prices and reduce quality. As you can see the above are to the detriment of the consumer, damaging to economic efficiency and are illegal “per se”. This means that they are by their very nature an offence. Some types of

horizontal agreement, however, such as those agreeing industry standards (e.g. accounting regulations), exchange of information (drug company co-operation on research) or the operation of networks (mobile phone network sharing) produce the conflicting effects of increased efficiency but dampened competition. These are generally dealt with on a case by case basis by the country's competition authority where their advantages and disadvantages are assessed on "a rule of reason" basis.

### Vertical Agreements

Vertical agreements occur where an "upstream" and "downstream" agree to restrict their operations with other firms. Vertical agreements can improve efficiency but can dampen competition. For example, a fast-food firm agreeing to only sell one particular brand of cola is an example of a vertical agreement. In supplying only one brand, the firm saves money on storage and counter space and some of these savings can be passed on to the consumer. Does consumer welfare hugely suffer if only one brand of cola is available in a particular fast food restaurant? Another example of a vertical agreement is where a car dealer agrees to only sell and service a particular brand of car. This allows the dealer to specialize in particular parts and knowledge and improve efficiency. Competition is dampened but, similar to the restaurant example above, there is little to stop the consumer shopping elsewhere.

Due to the conflicting effects of improved efficiency against reduced competition, competition regulation generally uses a "rule of reason" approach to vertical agreements due to their unclear net effect on the consumer. This generally consists of examining the vertical agreement to evaluate, firstly, if there is a real efficiency gain and, secondly, if the agreement is the least restrictive necessary to achieve that efficiency.

### *Dominance - Single Firm Anti-Competitive Behaviour*

Firms that have market power due to the reasons discussed earlier can abuse their dominant position. Competition law generally focuses on conduct by dominant firms that restricts or prevents competition. Activities that unfairly raise rivals' costs, put rivals at an unfair disadvantage or otherwise prevent efficient firms from entering the market are generally illegal.

### *Competition Regulation That Affects Market Structure*

Where it is judged that competition law affecting conduct is insufficient to bring about long term welfare improvements without continuous and costly monitoring by the competition authority, competition regulation may act to change market structure. Competition law can affect market structure in two ways, either by breaking up the dominant firm or by not allowing mergers or acquisitions to occur that would lead to a concentrated market structure.

### **5.11 Breaking up Monopolies and Mergers and Acquisitions**

Breaking up a private firm because of its monopoly power is an extreme measure. It is rarely used in practice and its implementation is very time consuming and expensive. There have been a number of break-ups in the USA, including AT&T, Standard Oil and, more recently, a court ruling, which was overturned on appeal, to split up Microsoft. Despite its severe nature, it sometimes may be necessary to break up a private firm. It must be the case that no restriction on conduct is sufficient to achieve the same result. Second, it must be possible to break up the firm efficiently.

A merger is disallowed where it creates or strengthens a dominant position to the extent that competition is significantly impeded. In practice, EU interpretation of this rule prevents mergers that put one firm above 40% of market share or that put two above 80%. EU merger policy is firmly grounded in the SCP paradigm. US policy relies more on measuring market power directly in terms of the level of price rivalry and barriers to entry.

We see from the above that government has several wide-ranging powers to deal with monopoly problems. It is important to realise that competition in markets is hugely important to the advance of technology and human welfare. If a market is competitive, it means that the only way a firm can earn super-normal profit is to innovate, develop new more efficient products and sell them. We know from our examination of theory that these profits are only sustainable in the relative short run as other firms try to bid away those profits by copying the innovative firm or by inventing a new good that replaces the current one. We saw above that when this happens it is the consumer and society that benefits in the long run.

### **5.12 Regulation of Natural Monopoly**

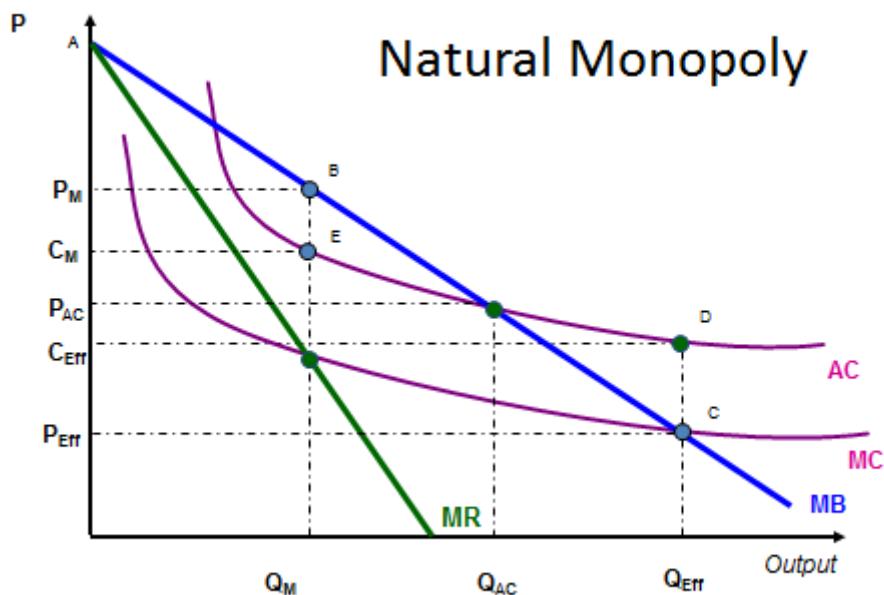
As discussed above, in some cases competition may not lead to the most efficient output due to certain attributes of the industry. A “Natural Monopoly” occurs where there the industry exhibits strong economies of scale (also known as increasing returns to scale or (IRS)) and produces a homogenous product. Natural monopoly occurs when it is most efficient for one firm to supply the market as a whole. Entry and competition are therefore undesirable.

Economies of scale simply mean that as the quantity produced rises, long-run average costs of the firm falls. A simple example is where you have high fixed costs and low marginal costs. As quantity becomes larger the fixed cost is spread over that larger quantity and average fixed cost falls. The long-run average cost consequently falls as quantity increases. So we see that as a firm with IRS increases production levels, the cost per unit falls. In the case of a market where the demand for the good is 100 units and the industry is faced with large IRS in producing that good, it may be better to have a single firm producing the product cheaply than to have two firms producing it at a higher cost.

IRS alone is not sufficient to ensure the existence of a natural monopoly. Industries such as brewing and software, for example, have high fixed costs and low marginal costs but are not natural monopolies because consumers' desire for variety prevents firms from maintaining a dominant position over the long run. Natural monopoly requires a product that is homogenous. A final stipulation of a natural monopoly is that it is non-contestable in the sense that entry of another firm will increase costs without any improvement in quality.

Industries that require a physical network to provide a good or service generally have some elements that are naturally monopolistic. Services such as electricity, gas, railways, telecommunications, sewage and water, are naturally monopolistic. However, it is important to realise that all elements in the provision of, for example, electricity are not monopolistic. Electricity generation is not monopolistic, while the electricity supply grid is. From the list above we see that natural monopoly occurs in many industries that provide essential inputs to the economy, e.g. electricity, gas and transport. This makes their regulation all the more important.

**Figure 5.4**



We see from the diagram above that the industry has a cost structure with increasing returns to scale. Consequently, the firm's average cost curve declines as output increases. We know from above that if the average costs are declining then marginal costs must be less than them. We see from the above that if the firm was a private monopolist, it would produce where  $MC=MR$  and charge a price of  $P_m$  and produce a quantity of  $Q_m$ . We can see from this that the firm would make a supernormal profit equal to the rectangle  $P_mC_mBE$  and consumer surplus would amount to  $AP_mB$ .

The welfare maximizing output occurs where  $MB=MC$ . We can see from the diagram that this occurs at point C, at the lower price of  $P_{Eff}$  and  $Q_{Eff}$ . Welfare under this regime is equal to the larger triangle  $AP_{Eff}C$ . The problem with operating at this price and level of production is that even though it maximizes welfare, it is a level of production at which the firm makes a loss because the average cost is higher than the marginal cost due to the increasing returns to scale. The size of this loss is equal to the rectangle  $C_{Eff}P_{Eff}CD$ . We will examine the various policy responses to this issue below.

### *Regulatory Reform of Natural Monopoly*

The regulatory reform of state monopolies has been to the forefront of policy change since the early 1980's. It consists of three main areas: structural changes, liberalisation of markets and regulation of conduct.

Structural change involves the vertical break-up of former state monopolies into their competitive and natural monopoly elements. For example, electricity firms were generally broken up into three separate elements, (1) Generation, (2) Transmission, and (3) Distribution. Generation is the actual production of electricity in electricity generation stations. Transmission involves the movement of the generated electricity through a network of high voltage power lines. Distribution involves transforming the high voltage electricity to lower voltage electricity suitable for domestic use and supplier it homes and businesses.

The generation and distribution of electricity are competitive markets but transmission is naturally monopolistic. The structural reform involved separating each element into independent units. The generation and distribution markets were then "liberalised" and competitors were allowed to enter into the market and offer their services. The transmission network, as a natural monopoly, generally remained in state ownership and is usually regulated by an independent

As you can see from the above, liberalisation refers to the opening up of markets to competition, both by allowing entry and ensuring that the incumbent does not abuse its dominant position to prevent the entry of efficient firms. For example, the liberalisation of the phone market has facilitated the entry of many firms into the market. Regulation of market conduct focuses mainly on controlling price to ensure that the incumbent does not abuse its dominant position.

A sectoral regulator is generally appointed by government to ensure that the market in question is conducted so as to maximise efficiency. Regulatory offices are kept at arm's length from government to ensure their independence. This action attempts to insulate the regulator from political pressure. An independent regulator also has a number of advantages over judicial decision-making. Firstly, the regulator is dedicated to the particular industry. It therefore can develop and recruit expertise in its particular industry. A regulator can act in advance of, rather than in reaction to, developing circumstances within an industry and it can also deal with problems more cost-efficiently. The regulator builds up a store of knowledge of the financial

details of the industry. However, a regulatory office can still be subject to regulatory capture by the industry.

### **5.13 The Roles of an Economic Regulator**

In Europe, natural monopolies were traditionally “regulated” through state ownership. In the US, these industries tended to be privately owned but regulated by a sector specific regulator. The reforms, discussed above, have meant that the sectoral regulator has now become common place in the Irish policy domain. The question we now ask: is what is it that the regulator actually does?

A regulator generally has three functions: Firstly, as we saw previously, a monopolist left to their own devices will charge customers a price that is too high. As a result, the regulator must set the price that the monopoly can charge their clients. We examine this kind of pricing in detail below. Secondly, natural monopolies are often “network industries” such the electricity market example we discussed above. The network firm has to charge an access fee for the use of their network. Again, because the network is a monopoly, if left to its own devices, it would charge a non-optimal price. Further, sometimes the network owner also supplies upstream or downstream services and, as a result, the regulator also has a role in ensuring the network owner does not abusing their position by allowing their other divisions have favourable access or cheaper prices. The regulator must establish a price that the network provider can charge the vertically integrated firms for access to its network. If the price is set too low, the network will not be able to invest in its maintenance and modernisation. If the price is too high, ultimately the network will earn monopoly profits and the price charged to consumers will not be socially optimal. In reality, it is extremely difficult for a regulator to establish the true cost of providing network access. The regulator must do the best she can.

Thirdly, a monopolist, by definition, is the sole supplier of the good in the market. The consumer has no choice but to consume the monopolist’s offering. As a result, the monopolist may be tempted to skimp on quality in order to increase profits. Several of the regulated natural monopolies are essential economic goods such as water, electricity, postal services, telecommunications, transport, etc., so it is essential that the regulator ensures they are of good quality. Finally, regulated firm may be tempted to only supply the parts of the market that are most profitable. The regulator is often mandated to ensure that the monopolist does not engage in this “cream-skimming” or “cherry-picking” activities and ensure that the supply is to whole market.

#### *Price Regulation*

The government or regulator has several options when it comes to price setting. When it was standard policy for natural monopolies to be state owned, the government generally priced services at the theoretical welfare maximizing marginal cost level ( $P_{Eff}$ ). As noted above, the state-owned firm would make a loss at this

pricing level so it was common practice for the government to pay a “subvention” to the firm of the amount equal to the rectangle  $C_{Eff}P_{Eff}CD$  from general taxation.

A second pricing strategy is the “two-part tariff”: the customer is charged a fixed fee and pays a price per unit of the good consumed. The price per unit is charged at marginal cost and the fixed charge makes up the loss incurred by pricing at this level. The regulator decides upon the fixed charge by estimating the loss (rectangle  $C_{Eff}P_{Eff}CD$ ) and then dividing that figure by the number of consumers in the market. Using this method the government does not have to subvent the industry from general taxation because the loss is made up from the fixed charge. This method is seen as being more equitable because only those who use the service pay for it.

A third pricing methodology is to allow the industry to price at breakeven. The firm could charge a price ( $P_{AC}$  in the diagram) that equalled average cost and the firm would breakeven. The regulator was prepared to accept some welfare loss in order to avoid subventing the industry.

Another means of regulating natural monopolies that was popular in the USA was “rate of return regulation”. The regulated monopoly was allowed a certain rate of return on its invested capital that was set by the regulator. For example, if a regulated firm had €10m in capital on its books, the regulator might allow a 5% return on capital. This allowed the firm to set prices so that it made a profit of €500,000 or 5% of €10m. This led to a problem known as “gold-plating,” where a firm would unnecessarily increase its capital base so that it could justify greater profits.

A key problem of regulated monopolies, one that became ever-more obvious through the 1970s, was that without competition firms had no incentive to be efficient. Over time, many commentators, politicians and citizens noticed that the costs of the regulated monopolies kept increasing year on year. Harvey Leibenstein recognised and named this type of inefficiency as X inefficiency. Consequently, a British economist Steven Littlechild introduced the RPI-X method of pricing regulation. The regulator using this method would allow an increase that matched the increase in inflation as measured through the retail price index (RPI) but subtract a reduction (X) that the regulator estimated as the amount of efficiency that the firm could introduce over the period.

We can see from the above that the key problem for the regulator is obtaining sufficient information to enable it to set the price accurately. Without the discipline of competition to curtail costs, the inclination of the monopolist is to allow costs to increase, and without competition it is impossible to know exactly what the competitive price is. The introduction of RPI-X pricing explicitly recognises that the firm should always be striving to improve efficiency. However, the regulator is reliant on information provided by the industry and has enormous difficulty in assessing the accuracy of that information.

## **5.14 Conclusion**

Monopoly power is a serious problem in modern economies. If it is allowed to take hold it can stifle the economy of innovation, competitiveness and economic growth. In the extreme it can threaten the stability of society. Over the last 40 years, regulatory reform has helped transform the Irish economy. Through focused regulation, core industries of the Irish economy that were once inefficient, over-staffed, and un-responsive have transformed into vibrant consumer-focused service firms that offer good value for money.

General monopoly regulation in Ireland is conducted by the Competition and Consumer Protection Agency, while the various natural monopolies are regulated by several sector specific statutory agencies. We saw in the material above that these bodies have a wide range of powers, and authority to investigate and resolve issues of monopoly in the economy.

### **Student Activities**

1. Explain the various market structures.
2. Discuss why perfect competition is the “Gold standard” from a policy perspective
3. Explain the economic rationale for regulating monopolies
4. Describe the various sources of monopoly power
5. Why is competition sometimes undesirable?
6. List and discuss the various anti-competitive activities a firm can engage in
7. Describe the activities of a “Competition Authority”
8. Why are economic regulators necessary?
9. What is a Natural Monopoly?
10. Describe the pricing methodologies available to an economic regulator

## **6. Regulation: Informational Asymmetry, Adverse Selection and Moral Hazard**

### **Learning Objectives**

When you have studied this lesson and any associated reading, you should be able to:

- explain the market failure of asymmetric information
- explain the concept of moral hazard
- explain the concept of adverse selection
- discuss the private market responses to moral hazard
- discuss the private market responses to adverse selection
- outline the regulatory responses to moral hazard
- explain the regulatory responses to adverse selection
- understand the problems encountered with regulatory policy
- explain the concept and problem of rent-seeking.

### **6.1 Introduction**

For consumers to make an optimal choice and maximise their welfare when purchasing a good or service they must have complete information. Where one party to a potential trade has more information than the other party there is said to be asymmetric information. Obviously, the party in the transaction with less information is at a disadvantage, and this can lead to a sub-optimal outcome for them. In extreme cases of asymmetric information, the market may collapse because the party with the informational disadvantage may not be willing to risk a transaction. Ultimately, the transactor with the informational advantage may also lose out too because he is not able to sell his product at the price it is worth.

As we discussed in lesson 4, the property rights inherent in any economic good are a bundle of entitlements that define the owner's rights, privileges and limitations for use of that good. Many goods in a modern economy are complex in nature, long-lasting and expensive. When we think of it this way, we can see that it is difficult for the transactor to know beforehand what exact bundle of rights they are buying and where do particular responsibilities lie. How long should the good last? What level of quality of different parts should they expect in the product? Does the seller of the good have information that if known to the buyer would have an impact on the price agreed? Could the new good damage property already owned? For example, what impact will a new software package have on the stability of your operating system? We can see that due to the complexity of goods produced, asymmetric information is ubiquitous in a modern economy. We can illustrate this more clearly by comparing two products with very different levels of complexity and asymmetric information: an apple and a healthcare intervention.

When you purchase an apple, you do so because you are hungry and you decide that an apple is the product that will satisfy that hunger. In the shop, you are easily able to assess its quality by examining it and you can easily find out its price before buying it. You can assess whether it is good value or not because you have bought many apples before. If the apple is too expensive you can easily go to another shop. If, having bought it, you find that it is rotten to the core, you can return to the shop and ask for another or your money back. If you are too far away from the shop to return it, the cost of having to throw away your inferior product is not substantial.

Now consider the case of a healthcare intervention. First, you may not even *know* that you require healthcare. Conditions such as diabetes, depression, hypertension, and cancer may go unnoticed for a considerable period. Second, you do not know *when* you are going to require healthcare. Third, you cannot easily *assess* the quality of healthcare you are receiving because (a) it is complex and (b) you may not be in a fit state to make an assessment (you may be unconscious). The assessment of price and quality is difficult because, generally, you do not purchase the same type of medical service frequently, e.g. how many times do you have a broken leg mended? Can you shop around for a better price? Even if you can, how do you know that you are getting the proper treatment or that your doctor is competent. Your GP has a certain amount of monopoly power over you because she has built up a store of knowledge in relation to your medical background. There is a large cost involved in moving to a different surgery because it will take time for the new doctor to build a complete assessment of your health. Finally, once you have received treatment, can you easily assess the quality of the treatment? The cost of a poor service may be substantial. You could be permanently debilitated or even dead!

You can see from the above that informational asymmetry may be severe. Can the market overcome these problems on its own or is regulation required? From your experience of dealing with the above, you should already have some of the answers.

## 6.2 Adverse Selection and Moral Hazard

The pioneer in this area was George Akerlof, who in his paper "The Market for Lemons" discussed the problems of the used car market. A "lemon" is a slang term for a poor quality used car. How can a potential buyer of a used car assess its quality? Sellers of lemons can easily conceal their poor quality, pass the car off as a "peach" and extract a price for the car that is much greater than if the buyer knew for example, the car had been in an accident and was completely unsafe. Consequently, buyers may be forced to assume that all used cars they look at are lemons and offer only a very low price. A seller of a car that is genuinely of good quality may not then be able to achieve a fair price for their car. In extreme cases the market may collapse because transactors cannot observe quality and the value of the good is non-trivial to the extent that people are not willing to take the risk to lose that amount of money.

This type of market failure due to asymmetric information is known as *adverse selection* and it generally occurs before the transaction is agreed. The transactor with

informational asymmetry tends to “adversely select” the poorer quality product because they cannot fully assess the quality of the good.

The second type of major informational asymmetry is known as *moral hazard*. Moral hazard generally involves the use of informational asymmetry after the transaction has taken place. Moral hazard arises when an individual acts differently because they will not face the full cost of their actions. The term originates from the insurance industry, where moral hazard is a significant issue. In an insurance contract the insurance company agrees to protect the policyholder from the cost of a particular risky event, such as a car crash, happening. The policyholder may take unobservable actions that increase the probability of making a claim (for example, not locking their car because it is insured.) This is known as moral hazard.

We saw above that markets will function poorly or may completely collapse where asymmetric information is present. The parties in a market where this type of problem exists will obviously look for a solution as it is in their interest. They can look to government for a regulatory solution or they can use various mechanisms that help solve the problem.

Before moving on further it is helpful to think more deeply about adverse selection and moral hazard. Adverse selection generally occurs before the transaction is entered into. Consequently, it is primarily concerned with some form of hidden characteristic that one of the transactors has, e.g. the seller of a used car is trying to hide the characteristic that the car has done more than 100,000 km than it presently says on the clock! To improve this type of “hidden characteristic” situation, the economic relationship needs to be designed so as to transfer information from the informed party to the uninformed party. Moral hazard, on the other hand, generally occurs after the transaction has been entered into. The divergent incentives and hidden action of a market participant is the problem. Consequently, if it is actions that cannot be observed then economic incentives are the problem. These differences inform the likely solutions to both problems

### *Signalling – Adverse Selection*

As we saw above, adverse selection occurs where the uninformed party in a potential transaction cannot directly observe characteristics of the good on offer that may be hidden. How can the potential buyer of a used car distinguish between a second hand car dealer that is reputable and one that is not? In this situation, the informed side of the bargain must send a credible signal to the uninformed side that the good they are selling is of good quality. There is nothing to stop an unscrupulous car dealer from claiming their car is of high quality, so the honest dealer must provide a signal that is costly to fake.

An honest car dealer can offer a potential purchaser a 12 month warranty to fix the car if anything goes wrong with it. What the car dealer is saying here is that, as a mechanical expert, he has examined this car and he is so confident that it is of good quality he will fix anything that goes wrong with it in a 12 month period. This is

what is known as a costly signal. It costs money to make. A car dealer selling a poor quality car knows that it will be very costly to give such a warranty and will not offer one. A wise buyer will infer from the lack of warranty and adjust the price they are willing to pay for the car accordingly. What is to stop a dishonest car dealer from offering a warranty and then skipping town? Honest car dealers respond to this problem by sinking costs into their showroom and by building a reputation for honesty over time.

There are many examples of signalling in the economy. Potential employees signal to employers that they are hard-working by studying hard in school and by obtaining third-level qualifications. Food producers will enter trade competitions and/or to disclose the ingredients they use in order to signal customers that their products are of the highest quality. Restaurants are happy to be reviewed by critics and customers to show that they provide quality food and service.

#### *Incentive Alignment – Dealing with Moral Hazard*

Moral hazard occurs because the incentives of the two parties to the transaction are divergent. Parties enter into a transaction to exchange something they value for something else they value more. Each party receives a benefit and incurs a cost in the transaction. As discussed above, due to the nature of some complex transactions, sometimes it is difficult for one of the parties to observe or even understand if the other party has fulfilled their side of the bargain. Consequently, moral hazard is concerned with actions carried out by one party that are unobservable by the other.

There are many examples of moral hazard in the economy. When you hire someone to fix your car, how do you know if they replace and charge you for parts that do not need to be fixed? If you have a building insured against fire damage you may not take all the precautions necessary to ensure it does not burn down. It is hard to imagine that an individual would burn their family home down, but it is a reasonably well-known fact that if a commercial building burns down the insurance company will always check to see if the business was failing and whether an insurance claim is conveniently being used as a means for the owner to extricate himself from a financial burden.

The above fire insurance example gives us an idea of the different levels of moral hazard. In relation to an insured family home, a significant risk to the insured remains in that, if the house burns down, the insured will lose many sentimental items such as family photos, inherited objects, etc., whereas with the business premises the owner loses stock and the building. Simply put, there is a significant amount of risk shared between the insured and the insurance company with regard to the family home. With regard to the business premises, however, practically all the risk is borne by the insurance company. In relation to the house, both parties' incentives are aligned in that neither of them wants to see the house burn down. In the case of the business premises their incentives strongly diverge.

The above strongly indicates how private solutions to moral hazard emerge. The party with the informational asymmetry should seek to design the transaction agreement so as to align incentives as much as possible. Insurance companies do this in two similar ways. First, they introduce an element of co-insurance into the contract. This means that the insurance company will only pay part of the bill when the insured makes a claim. For example, a health insurance firm may only pay 80% of the bill for certain procedures such as hip replacements. Second, the insurance company introduces a deductible clause in the contract that stipulates the insured has to meet the cost of the damages up to some fixed limit. For example, if you have a claim on your car insurance of €1,500, the insurance company will only pay €500 of your claim and you have to meet the cost of the first €1,000. These mechanisms go some of the way to solving the problem of moral hazard.

Another means of incentive alignment occurs when an employer pays an employee on a performance basis. Most large firms are not managed by their owners but by hired managers. The firms' shareholders obviously want to maximize the value of their investment, but managers are motivated by the size of their salary, the prestige of the post, the trappings of office, their expense account, etc. Again we see a situation where the incentives to the parties of a contract are divergent and there is the possibility of hidden action. The owners in this case can help align the incentives by offering share options to management. This means that if the share price rises both the owners (shareholders) and the management benefit. As several scandals have shown, management may engage in the illegal hidden practice of boosting the share price through false accounting, etc. Similar mechanisms aligning incentives between employees and employers include paying salespeople a percentage of their sales and paying workers on a "bit-rate" basis, where they are paid according to the amount of work they have physically done (e.g. fruit-pickers being paid per kilo of fruit they pick rather than receiving a wage).

From reading the above you may already have figured out that private solutions may not always be enough to ensure an optimal outcome. In this section we discuss governmental responses to problems of asymmetric information. We divide the responses based on adverse selection and moral hazard

### **6.3 Regulatory Responses to Problems of Adverse Selection**

We saw above that the response of private transactors to the problem of hidden characteristics is for the informed party to send a credible signal to the uninformed side. The signal is credible only if it is costly to carry out. For example, a reputable used car dealer will only offer a 12-month warranty because he knows the quality of the car and knows that, on balance, little will go wrong with the car within the warranty. The reputable car dealer also signals to potential buyers that he is in business for the long-term by sinking money into his premises to show that it would cost him a significant amount of money to leave the business. He wants to show that he is not a "fly-by-night merchant". Where a private signal is not adequate, the government intervenes and uses its knowledge and resources to help establish,

regulate and verify the hidden characteristics of the informed party to the transaction.

The level and type of government involvement in regulating, controlling and verifying the claims of transactors depends on the potential for damage, the permanence or remediability of that damage and the specificity of the area,. For example, how does a person seeking medical services distinguish between suppliers of low and high quality services? The establishment of reputation or the provision of information is of limited applicability because the uninformed party (the patient) does not have the required knowledge or capacity to judge the quality of the service provider. A poor quality intervention could permanently damage or disfigure a patient and it may not be possible to reverse the damage. An informed and knowledgeable independent entity is required to verify the claims of the informed side. This function normally falls to government.

Where the consumer can assess and evaluate the required information, and where there is little chance of significant or permanent damage, the appropriate regulatory response to adverse selection is to require the producer to disclose certain information. For example, food producers must provide specified information of the ingredients contained in their produce. It is relatively easy for a consumer to find out how many calories they need a day and then use the information provided to figure out how much they should eat. However, can a patient figure out which is the best treatment for their diabetes or heart disease?

The required information disclosure restrains the manufacturer from “adversely selecting” high fat and high sugar content ingredients for their products. If the producer has to accurately state ingredients and calorie count they are somewhat incentivised to develop healthier products. Similarly, restaurants are required to display their menus and prices outside the door; pubs, a price list within their premises, while the sale of insurance and investment bonds requires that the consumer’s attention is drawn to a considerable amount of information.

Where there is a significant chance of serious or permanent damage, the regulatory response is more directive and controlling. Further, significant expertise, knowledge and information are often needed to regulate a specific area and, consequently, a sector-specific regulator is required. Examples include The Medical Council, The Central Bank of Ireland and the Food Safety Authority.

Where a high level of skill is required and there is a possibility of serious and/or permanent damage, the regulatory response has been to outlaw specified listed activities and then licence certain individuals or firms, who have completed specified training, to carry out these activities. The law protects certain titles, such as Physiotherapist, Dietitian, and Dispensing Optician to name a few. Less restrictive regimes can involve a governing body (often a public body) certifying that a person has a certain set of skills or knowledge of a particular area, but the law does not prevent individuals without these qualifications from practising.

The above regulatory regimes tend to cover specific professions or industries. More general provisions are required in the areas of health and safety and consumer protection. Generally, fixed standards are set and minimum acceptable levels of behaviour are mandated. For example, electrical goods must meet minimum safety standards and food for human consumption should be labelled accurately.

Students are often surprised that government “allows” unqualified people to practise in certain areas or industries. Consider the example of alternative medicine. However, a little thought shows that the government cannot individually regulate every service offered. Ask yourself the following questions: Should a government body regulate masseurs? Should former fashion models or celebrity chefs be allowed to offer dietary advice? Do you need to be a qualified accountant to do the books of a small business? Have you ever offered medical or financial advice to your friends or family?

You will realise a number of things from thinking about these questions: Regulation is hugely complex. There is often great difficulty in deciding what exclusively should a regulated profession be allowed to do and what a lesser qualified person can do. Celebrity chefs or fashion models can help greatly in conveying a healthy eating lifestyle to a broader audience, but dieticians can and do criticize lesser qualified people when they offer bad advice.

Further, once you limit people from practising in a certain area, monopoly power is accorded to those that are allowed practice. We know from Lesson 6 that this generally results in higher prices and lower quantities of the service provided. We can see clearly that there is an opportunity cost to restrictive regulation. The aim of licensing is to provide the benefit of a higher quality service; the cost of licensing is the increase in price and reduce quantity.

A further problem of regulation is that it can stifle creativity or stop innovation. Regulated professions can become dominated by certain ideas, methods, individuals or ways of approaching a problem. Areas like alternative medicine allow possible treatments to emerge from different cultures or from different methods. For example, mindfulness meditation as a treatment for depression emerged from Buddhism and has been shown in clinical trials to be as effective as anti-depressant medication. If alternative medicine was prohibited it would be more difficult for new treatments to emerge.

If the government were to individually regulate every branch of alternative treatments it would give the state’s credibility to a profession or practice that may not be worthy of it. Practitioners of many marginal types of practice or intervention have lobbied the government for an individual body to be set up to regulate and set standards for their particular area. In a sense, what these practitioners are asking for is the use of the credibility of the state to signal to potential customers that they offer a credible and effective product. The state is, correctly, very reticent in setting up a body to individually regulate a particular area. What is often underestimated or

forgotten is that “ordinary” criminal and civil law are effective in this area and are still the best solution to any issues that arise.

Finally, as we discuss below, agencies that regulate a particular area are prone to regulatory capture and rent-seeking. This occurs where the agency regulates for the benefit of the profession or industry and not the public.

#### **6.4 Regulatory Responses to Problems of Moral Hazard**

Moral hazard is hidden action that occurs because the incentives of the two parties to the transaction are divergent. Private solutions may not be adequate because the informational asymmetry may be too severe or it may be too costly for the uninformed party to rectify after the event.

In most professional transactions the parties are unequal in knowledge and consequently exposing the uninformed party to exploitation. A health practitioner may offer the wrong treatment or botch a procedure. The patient often may not even realise that they have been exploited or mistreated. This is a very difficult situation since professional colleagues may be unwilling to testify or even report poor practice.

The traditional regulatory response was one of “self-regulation.” However, after several scandals and cover-ups were exposed, government has moved to regulate these areas through a framework of “meta-regulation” that includes some elements of self-regulation but also includes elements of governmental regulation and control. Professions such as medicine, where a large body of information and skill remains unique to the profession, will always pose significant regulatory challenges. The regulatory regime needs to be independent to maintain credibility but must rely heavily on information from the profession, which cannot be independent by definition. The solution has been to mandate lay majorities on “fitness to practice” panels. This provides a level of independence while providing for the necessary expertise.

The normal market response to an uncertain world where incidents can happen that are costly is insurance. Sometimes the problem of moral hazard is so severe, however, that the market fails to function adequately or fails completely. In these types of scenarios, people and society are potentially faced with a severe drop in welfare. Several important markets such as health insurance, employment insurance and financial markets have severe moral hazard issues.

For example, health problems can strike at any time and can be enormously expensive to treat. Medical interventions can be expensive due to their inherent complexity, the high level of skill required, their resource intensity, and the inherent monopoly problems in their provision. Private health insurance markets exist but the cost may be outside the budget of many citizens. Moral hazard is a particular problem in health insurance due to the private nature of health interventions and the fact that interventions are so complex that not even the practitioner, let alone the

patient, may not have the ability to judge the efficacy of the treatment. Since the patient cannot judge the efficacy of the treatment they have to rely on the practitioner (the supplier) to determine their demand for the good. Patients can be open to overtreatment, especially if it is in the practitioner's material interest to do so. Further, the patient will not act as a brake on the supplier because they do not directly face the cost of the treatment because they are insured and the insurance company will find it difficult to control costs due to the private nature of the intervention.

The regulatory responses to the above problem are multifaceted. Regulators could intervene to curtail the level of moral hazard in the private health insurance market. Alternatively, governments can opt for state provision of healthcare and control moral hazard through the use of budgets. State provision can also deal with the problem of unequal access to healthcare. State provision of unemployment insurance is necessary because the private market does not exist due to moral hazard. The problem still exists, but society makes the value judgment that unemployment insurance should be provided even if the private market will not do so.

Another regulatory response to control moral hazard is price regulation. As a form of regulation it has largely fallen out of favour due to difficulties in gathering the required information to determine the regulated price. However, where the informational requirement is low, regulated prices can work. For example, passengers sitting into a taxi may be subject to the hidden action of an extended journey or claims by the driver that an overpriced fare is the normal one charged. The introduction of metered journeys and regulated fare adequately overcome these problems.

A further area where moral hazard can have serious consequences is in areas such as banking, where officials take on too much lending risk. Such risks require standard setting and quite in-depth regulation. Contract enforcement and court action can also be used. In the case of banking, executive pay can be related to short-term appearance of profit rather than the long-term actual profit. Restricting these types of payments is one solution. Limiting the facility of limited liability is another.

## 6.5 Difficulties with Regulation

### *What Effect Does The Regulatory Intervention Have On Welfare?*

The purpose of a rule or regulation is to change behaviour. They determine what can and cannot be done with particular resources and, consequently, they affect how resources are allocated and who benefits. Regulation is fundamentally economic in nature. As we saw in earlier lessons, transactions are central to economics, and the market, when it works, provides efficient outcomes. Markets often fail, however, and it may be possible for government to intervene, change property rights and improve the situation. This does not always mean that a regulatory intervention will improve welfare. We discuss this last fact below by addressing three problem areas

for regulation: (a) assessing the level of market failure, (b) having the requisite information and knowledge to implement efficient outcomes and (c) how regulation introduces rent seeking behaviour that distorts decision away from the public good in favour of the private interest, thereby leading to wasteful resource use.

#### *Assessing the Level of Government Intervention*

To repeat, a regulatory intervention into a case of market failure may not result in better welfare. Markets and transactors can be adaptive and a self-correcting mechanism may sometimes emerge. Where there is an informational failure, for example, the market will indicate this to a supplier who in turn will make efforts to overcome these shortcomings. Restaurants develop reputations for good food and service; second-hand car dealers offer warranties to protect the consumer against lemons; while providers of legal, accountancy and investment advice, to name just a few, come together to agree standards of proper behaviour (self-regulation). This, as we discussed, is not a complete answer to market failure. There are situations where the market response does not work very well or where the costs of failure are extremely high. While the cost of buying a poor quality pair of socks is not very high, the price of choosing a poor doctor could be death.

As we saw in Lesson 3, regulations affect the distribution of welfare. A change in regulations can make some people better off and some people worse off. Regulation is complex; it can involve layers of private and public regulation. Further, regulation may have an obvious immediate impact, but it may also have long-term and subtle effect. A policy maker should be aware of these facts and proceed with caution

#### *Regulators Lack the Information and Knowledge to Implement Efficient Outcomes*

In order for a regulator to implement a socially optimal outcome, it is necessary for him or her to collect and collate information rapidly and to repeat this process every time new information emerges. In comparison, a market rapidly conveys new information through the price mechanism. For example, if a new opportunity evolves for the use of, say, gold, the market communicates this increase in demand for gold through a higher price. Very few people need to know what this new use of gold is. Most will just see that the price has risen and that some of the gold they used before can now be more profitably used elsewhere. They will now search for substitutes to use instead of gold or produce less of what they had produced before. All of this information is conveyed through the price mechanism. A regulator has a very difficult (some would say impossible) task in attempting to replicate this mechanism.

#### *Regulation Encourages Rent-Seeking Behaviour*

People or firms in society naturally fall into groupings of association or common interest. Some groupings may be compact, whereby the interest that holds them together is very important to their overall welfare. Other groupings are looser in

nature, whereby the common interest is of only minor importance to members' welfare.

Irish political history regularly sees well-organised lobby groups of taxi drivers, vintners, dentists, doctors, pharmacists, and shop owners, to name but a few, putting across their positions and beliefs forcefully. It is interesting to note that these lobby groups nearly always claim to have the public's welfare in mind when lobbying for reduced access and higher prices. In reality, poor regulation can enable vested interests to appropriate large profits. This problem is exacerbated by the fact that a lobby group, already wealthy from its "rent-seeking" activity, can gain further advantage by practices such as commissioning "independent" reports that support its activity, paying public relations executives to speak to the media, and lobbying/funding political parties.

Regulation invariably makes some groupings better off while it makes others worse off. As you saw in Lesson 4, a change in rules is effectively a change in property right and, consequently, has a distributive effect. Some actors in society realise that they can use their political power to lobby government to have regulations changed in their favour. This is generally known as **rent seeking**. The term was first used in a paper by Anne Krueger in 1974 (although Gordon Tullock had first identified the concept in a paper in 1967), where she investigated the welfare effects of import restrictions in Turkey. She noticed when she was working for the IMF in Turkey that a considerable amount of time and resources were spent by capable and talented individuals lobbying Turkish government officials who had the power to grant import permits. She realised that these talented people could be spending their time actually producing goods and services but instead they were spending their time wining, dining and lobbying government officials.

Why would such talented individuals spend their time in such an activity? The reason is because the regulation of international trade through import permits granted these individuals the monopoly rights to import particular goods into Turkey. If you own the sole firm that can import, say, televisions, then because you do not face competition from any other importers you can charge a monopoly price. However, the key point to realise is that while it may be advantageous for the individuals to seek the import licences, from a societal perspective the restrictions only serve to increase the prices charged for goods paid for by ordinary citizens. The import licences only distribute money from most citizens to a chosen few who have managed to gain favour with their friends in power.

Rent seeking is damaging to the economy in a number ways. Firstly, the opportunity cost of businesses lobbying government officials is that both the business people and the government officials could have been spending their time and resources in doing something that actually increased the welfare of the people. Further, rent seeking leads to a vicious circle. As more people appear to be successful in rent seeking, more and more people are drawn into it as an activity. As more people spend time rent seeking, the opportunity cost becomes greater; less and less goods are produced. This skews the incentive structure of the society. Why would you work hard

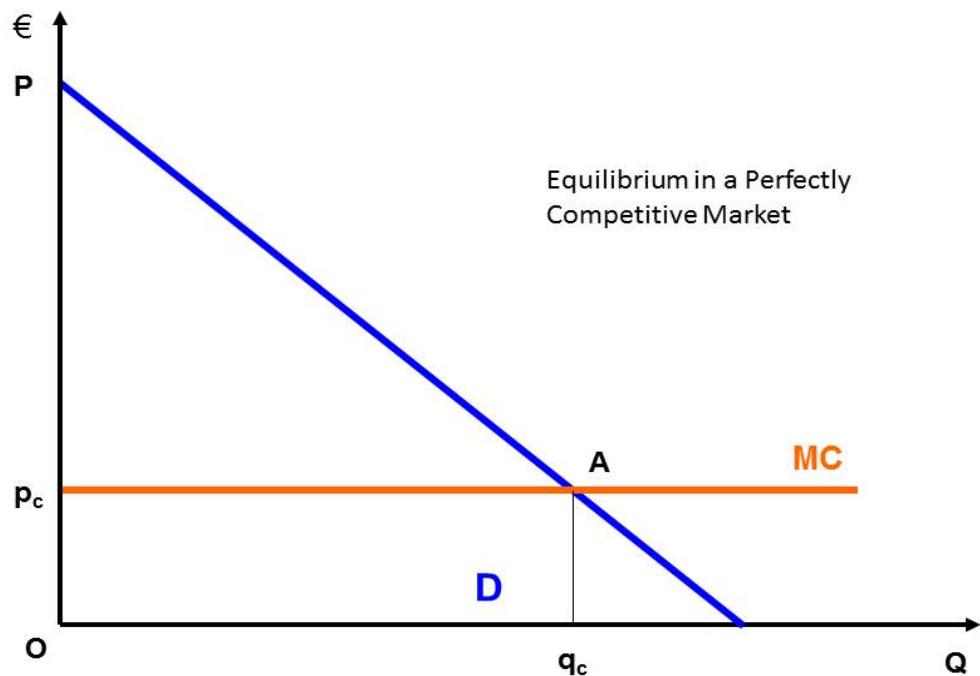
building up a business and spending time creating new innovative products when all your profits are eaten up paying high prices for goods subject to import restrictions or in high taxes to pay for government programmes that produce very little but are kept going solely to reward the politically connected?

### Rent Seeking Example

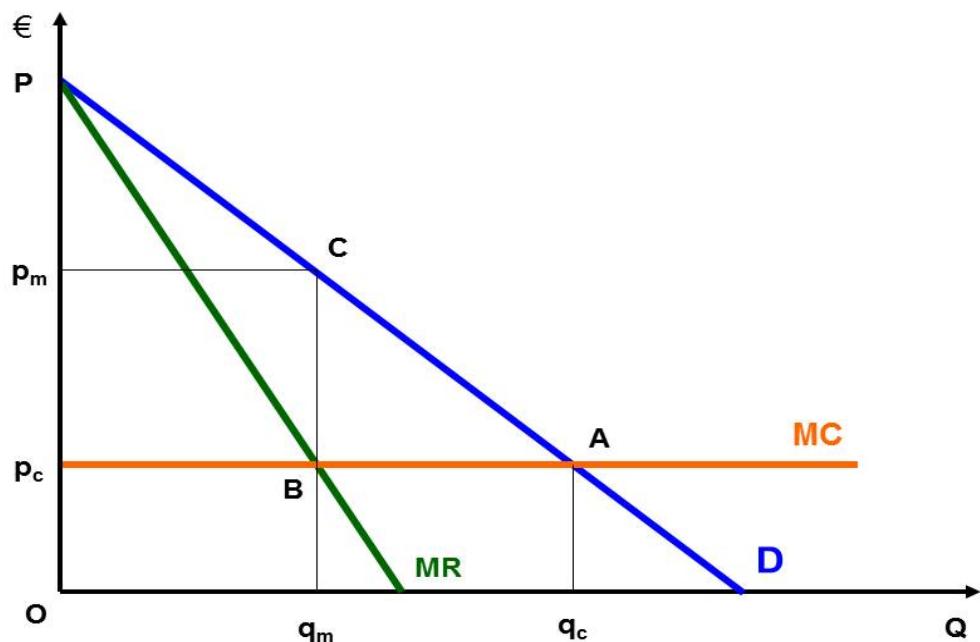
A simple example will help clarify the effects of rent seeking. In economics, the term rent refers to the income that accrues to a factor of production above its opportunity cost. As you will have learnt in microeconomics, in perfect competition each factor of production is paid its marginal product and the price paid for a good is the sum of the costs of all the factors of production (including normal profit) used to produce it. In other words, the market is efficient. The marginal cost of production is equal to the marginal benefit (utility) that the good provides. There is no economic rent or supernormal profit earned.

However, when producers engage in lobbying government for policy and rule changes that will give the producers “supernormal profits” or monopoly rents, we see that they are engaged in rent seeking. For example, taxi drivers, doctors, pharmacists, dentists, importing businesses etc. could lobby government to create barriers to entry to their particular industry. If they are successful, we see that the industry no longer meets the criteria of “freedom of entry” required for a perfectly competitive market. Taxi drivers, for example, could lobby for regulation changes to stop new taxi licences being issued, or doctors, pharmacists, and dentists could lobby to stop foreign trained professionals from practising in the country. The effect of these rule changes is to create a monopolistic type market structure.

We can show this through a simple example. Figure 6.1 shows the market for beef. We assume that the cost of producing a kilo of beef is the same for all farmers, which implies that the marginal cost (MC) curve for beef is a horizontal line. The demand curve for beef is downward sloping, indicating that as each extra unit of beef consumed adds less to welfare than the previous unit consumed. In this competitive market, the price and quantity of beef demanded and supplied occurs where the demand and supply curves intersect. This occurs at equilibrium point “X,” where the price is  $P_c$  and quantity  $Q_c$ . We see at price  $P_c$ , the farmers just earn enough to cover their costs of production (including normal profit). This type of market arrangement maximises welfare. We see from the diagram that under this market arrangement consumer welfare equals the triangle  $PP_cA$



If, for example, the home-based farmers formed an organisation that lobbies the government successfully to prohibit the importation of foreign beef, they could now agree amongst themselves to charge a monopoly price.



Looking at second figure above we see that due to their monopoly power they would price beef where  $MC=MR$  at price  $P_m$ . We see from this that the monopolist farmers now share out supernormal profit equal to the rectangle  $P_mP_{cbd}$ . The consumer only enjoys consumer welfare of the smaller triangle  $cP_mP$  and the loss to welfare equals the triangle  $ABD$ . We see from the diagram above that the rent seekers are better off because they have effectively used their political power to gain a transfer of  $P_mP_{cbd}$  from the consumer, but society in general is worse off because due to the welfare loss  $ABC$ . Ordinary people are paying a higher price and consuming less due to the political power of a group of rent seekers.

### Who Succeeds in Rent-Seeking?

Most people would agree that all citizens should be treated equally by government. However, rent-seeking indicates that this may not occur. Can we figure out who is likely to be successful at rent-seeking? Obviously, a wealthy individual or firm can engage in rent-seeking through making donations to political parties, supporting certain politicians in the press and in public etc. They can also make a politician's life difficult through engaging them in vexatious court cases, lobbying their workforce to vote in a particular way, etc.

Other entities that can affect policy are interest groups. Citizens can form organisations to lobby politicians to change policy; freedom of association of citizens is often protected in constitutions and is seen as a basic human right. Early "interest group" theory saw the joining of citizens together to lobby government as a manifestation of democracy and held that the competition between interest groups in society would ensure a fair and reasonable outcome. However, Mancur Olson (1965) showed that interest groups did not broadly or fairly represent the views of a society. Olson showed that the aims of different interest groups differ due to the fact that some of their aims have essentially the characteristics of a "public good" and some of their aims have the characteristics of a "private good".

Interest groups that lobby for "common cause" aims like a better environment or lower costs for consumers are essentially lobbying for the provision of a public good. The benefits of the policy change gained are effectively non-excludable. If policy is changed the way they want, all of society benefits. We know from studying public goods that people will tend to "free ride" on their provision. Who isn't against less pollution? Will you give up your time and money to protest and lobby for it. Maybe. Maybe not. You may be tempted to let others do the hard work and then free ride on the benefits. However, if you are a taxi driver and you believe that there are too many taxis and hackneys on the streets and want them limited, you can immediately see that less licences will mean a bigger income for you. You will be more inclined to lobby for this policy change. The benefits of this kind of policy change are excludable to you and your fellow taxi drivers. Interest groups cannot be seen as a fair reflection of the will of society and some can effectively damage welfare through rent seeking and obtaining a greater share of the distribution of society's resources for themselves.

Interest groups are a powerful but necessary force in democracies. Their existence is important. They allow weak individuals to come together in order to petition government. They also provide government with information that is needed for politicians and civil servants to design and implement policy. An interest group is more likely to be successful if it seeks a “private type good” aim. This is more likely if membership of the group is small so that the costs of organisation are minimised; that the group is homogenous so that policy conflicts are minimised; and that the benefit to cost ratio of organisation is high so that the individuals in the group earn a high return from their cost of membership.

## **6.6 Conclusion**

You should now have a strong sense that the problem of asymmetrical information is widespread through-out the economy. You should also appreciate that regulatory intervention is often complex and frequently has effects that are difficult to foresee. This is not to say that regulatory intervention is not justified, but it is a warning of the difficulty that policymakers face. As we saw, the private market can go some way towards resolving problems, but where the problems are severe and permanent a regulatory response is required. A further issue that a regulator may face is that regulations, being economic in nature, alter incomes and incentives. As a result, policymakers must resist calls for regulations that favour a minority at the expense of society as a whole.

### **Student Activities**

1. Define asymmetric information.
2. Outline and discuss the issues of moral hazard and adverse selection.
3. Discuss the private market responses to the above issues.
4. Discuss the regulatory responses to the above issues.
5. Explain what rent-seeking is. Is it prevalent in Ireland? Give examples.
6. What problems can regulation create?
7. Discuss the connection between informational failure and monopoly power.

## **7. Economy, Efficiency, and Effectiveness in the Public Sector**

### **Learning Objectives**

When you have studied this lesson and any associated reading, you should be able to:

- precisely define economy, efficiency and effectiveness
- understand the different elements of efficiency
- appreciate the importance of value for money in the public sector
- recognise the difficulties in assessing effectiveness
- describe the problems in measuring outcomes
- discuss the place of equity in economics
- understand the role of efficiency in society.

### **7.1 Introduction**

Considerations of economy, efficiency and effectiveness can appear cold and calculating, but they are at the heart of increasing the welfare of the people. They are also central to debates over such matters as the relative merits of market versus state resource allocation, the results of public policies, and the performance of national economies. In addition, considerations of economy, efficiency and effectiveness are central to decisions about major capital projects, the reform of regulations, allowing a new “wonder drug” to be prescribed, the reform of the tax system, and the level and pricing of government services. This is a formidable list, and it is not an exhaustive one.

This lesson aims to expand on our earlier introductory discussion of efficiency to explore, in-depth, economy, efficiency and effectiveness. Broadly, we will consider issues of definition, of measurement and the pursuit of value for money. What emerges will provide both an overview of a complex area and a foundation for the course material on appraisal and evaluation.

### **7.2 Clarifying Concepts—Efficiency**

Different words and phrases can mean different things to different people. Different branches of the social science often use different terms are used to describe the same concept. To add to a student’s confusion, a word with a precise meaning in one branch of academia is sometimes used differently or more loosely in everyday life. The words economy, efficiency and effectiveness are often used imprecisely. We will proceed by clarifying, for our purposes, the meaning of efficiency. We will then identify the interrelationship between efficiency, effectiveness and economy.

A central concern for any society is the efficiency with which it uses its resources to produce and distribute goods and services. Our definition of an efficient economy is one that delivers the maximum amount of goods, given the resources available to the people who value them the most. This definition can be usefully divided into constituent parts, and we shall examine these below.

### *Efficiency in Production*

In order for production to occur, the limited resources available in an economy have to be converted into finished goods. Efficiency in production is labelled variously throughout the literature as productive efficiency, technical efficiency, x-efficiency, managerial efficiency or internal efficiency. We will use the term productive efficiency. If the resources are used efficiently, more goods are produced, there are more to distribute and everyone is better off.

When examining productive efficiency, we are focusing on the "supply-side" of the economy. Production is efficient if there is no waste: in other words, if it is impossible to increase the production of one good without reducing the production of another. Production is inefficient if by simply reallocating the "input" resources used in production it would be possible to increase the output of one commodity without reducing the output of another. The resource "input-mix" is therefore important in productive efficiency. Productive efficiency is achieved when the firm, industry or economy produce at the lowest possible cost. In essence, the idea of productive efficiency is relatively straightforward. It focuses on the internal processes of firms and industries and exists when a given output uses the minimum amount of inputs. Productive efficiency leads to the maximum output that could possibly be produced from a given amount of inputs.

What causes an enterprise to produce inefficiently, *i.e.* above minimum cost? The reason is waste in any of its forms – too many staff, poor management, carrying excess stocks, overgenerous expense accounts, low productivity and so forth. Such waste can be common in large firms where there is often the separation of ownership and control. The shareholders generally seek to maximize profits and minimize costs, but management may pursue other goals, such as an "easy life" or projects that involve production at higher than minimum costs. In an attempt to improve the performance of the firm, the owners need to monitor the behaviour of the managers through performance reviews, audits, etc. These monitoring activities obviously come at a cost and are often imperfect. Consequently, owners may have to offer incentives, such as stock options, in order to change managerial behaviour. This is a variation on the "principal-agent" problem, other aspects of which we will encounter in due course.

Waste also exists in the public sector of course. What mechanisms are available to help improve productive efficiency in the public sector? Where the public sector can behave somewhat like a firm in a competitive market, it is often worthwhile introducing policies used in such firms, e.g. periodically contracting out government services can help improve efficiency in certain areas. A further method to improve

productive efficiency in the public sector is the process of programme efficiency audits designed to uncover wasteful practices. The movement towards increased accountability based on decentralised authority, combined with clear objectives and priorities, can be expected to lead to improvements in productive efficiency. More immediate and cruder methods also exist, often introduced in times of budgetary crisis. For example, "budgetary stress" and consequent pressure for efficiency could be induced by setting reduced expenditure targets or by restricting the income of a government agency or local government unit. However, these can be very ineffective; the money saved results in a substantial drop in outcomes and, consequently, allocative efficiency.

### *Efficiency in Distribution*

Even if goods and services are produced at lowest cost, resources can still be used inefficiently if the range of goods contains too much of one product and too little of another. This is known as output mix efficiency. This is closely related to efficiency in distribution, or allocative efficiency, which takes account of consumer preferences. The emphasis accordingly shifts from the supply-side to considerations of demand. At the extreme, if goods and services are being produced that no one wants to buy then clearly there is an inefficient use of resources. Such was the case in centrally planned economies where, for example, the orders sent down from the central government required a factory to produce, say, 10 tons of glass or 4 tons of nails. The factory responded by producing extremely thick glass or very large nails. These goods were produced at the minimum cost possible – so the factory exhibited productive efficiency. However, the goods were ultimately unusable. A move to produce different goods could increase the utility of the society and increase allocative efficiency.

Allocative efficiency exists where it is impossible, by redistributing products among individuals, to make one person better off without making someone else worse off. The condition that guarantees such efficiency, in a market, is that the cost of an extra unit of output should be equal to the consumer's willingness to pay. If, for example, consumers are willing to pay more for an extra unit of a good than it costs to produce then it is under-produced and allocative inefficiency exists. By taking account of consumer preferences, allocative efficiency is concerned with the utility of the final consumer. In contrast, productive efficiency is concerned with the internal processes of enterprises. In the public sector allocative efficiency prompts questions such as: Do the services financed by public expenditure actually meet the public's needs? A different type of question is asked about productive efficiency in the public sector: Are the public services that are produced done so at the least cost? It is, unfortunately, much more difficult to answer questions about allocative efficiency than about productive efficiency in the public sector. How do citizens specify, for example, what level and quality of defence they require or the amount and quality of graduates they expect from universities? Quantification and specification are generally easier in the case of productive efficiency, where questions about the least cost combination of inputs arise and in general can be more easily assessed.

The difficulty in quantification associated with questions of allocative efficiency helps to explain why management reforms in the public sector, such as efficiency scrutinies, are more often confined to matters of productive efficiency. This is not to deny that attention is being paid to consumers of public services; we have already alluded to the possibilities of greater consumer choice in the areas of education and health care. Efficiency gains from improved consumer choice complement the productive efficiency gains as suppliers compete for consumers who are free to exercise a measure of choice. In addition, greater account can be taken of the consumer of public services by such methods as consumer satisfaction surveys and the analysis of complaints by the public. However, given the difficulties in quantifying consumer preferences in the public sector, it is wise not to be over optimistic.

Governments (representing the public) attempt to meet the demand for public services. However, the analysis of the demand process is complex, difficult and underdeveloped. Among the unanswered questions, on the demand-side, are whether local governments could respond better than central government to some of the public's needs or whether voter pressure on politicians to tackle inefficiencies is a significant countervailing force on the supply-side.

### **7.3 Digging Deeper: The Relationship Between Economy, Efficiency, and Effectiveness (the 3 'Es')**

Thus far we have predominantly concentrated on efficiency. We now broaden the discussion to include effectiveness and economy and to consider their relationship with efficiency. In order to distinguish between the three concepts, it is useful to think in terms of the familiar economic model of a firm based on resource inputs (labour, capital, etc.), throughputs (sometimes called intermediate outputs), outputs and effects (or outcomes). Economy is exclusively concerned with inputs; efficiency relates inputs and throughputs to outputs, while effectiveness relates outputs to effects, or desired outcomes. Each concept is more fully described below.

Economy is achieved when a manager purchases inputs at the lowest possible cost. Prices are always changing, with new firms entering the market offering cheaper prices. Managers should always keep an eye out for a better deal. An improvement in economy occurs if the *actual* input cost is less than the *planned* input cost. A shift to cheaper inputs—such as lower-cost staff or lower-cost energy will promote economy. It is important to note that the quality of the input should be held constant when making comparisons of economy.

Efficiency, as we described above, can be viewed either as obtaining the maximum output from given inputs or as achieving the minimum level of inputs for a given level of output. This is a fuller concept than economy inasmuch as it relates inputs to outputs. Efficiency may, for example, be measured by utilisation rates, such as the utilisation of hospital beds, lecture theatres, office space, or of recreational facilities.

Effectiveness is the extent to which outputs achieve objectives or policy aims. The *actual* output may differ from the *planned* output or outcome. For example, the number of students sitting and examination may be the output of a school, but the number of students passing examinations is a better measure of outcomes. If a lot of students fail the examination the school's output may be ineffective at achieving outcomes.

This formulation of economy, efficiency and effectiveness covers familiar ground. Economy and efficiency are broadly equivalent to productive efficiency; effectiveness, and its corollary of the appropriate output mix, is broadly equivalent to allocative efficiency. There is a change of terminology rather than of substance. In what follows it may help to think of economy and efficiency as indicators of productive efficiency and of effectiveness as an indicator of allocative efficiency. All three concepts—economy, efficiency and effectiveness—are commonly collectively termed **value for money**.

#### **7.4 Problems in Assessing Effectiveness**

Achieving value for money is difficult. It is relatively straightforward to acquire information on economy and efficiency but measurement of effectiveness has proved elusive. The reason for this is that data on inputs and on the relation between inputs and outputs are internal to an organisation and readily available. By contrast, data on effectiveness related to the consumer is external to the organisation and difficult and expensive to acquire. Moreover, difficulties may arise if, in order to establish the effectiveness of a service, consumers are consulted about their preferences. Many people may not easily be able to formulate preferences about the level and quality of defence they would like provided or the level and quality of public art that the state should pay for. Consumer preferences are, by contrast, much easier to establish in a market system.

Fundamental problems in assessing the effectiveness of a policy or output centre on the specification of objectives: It is notoriously difficult to specify the objectives of public sector organisations; objectives such as promoting the public interest or civic awareness are difficult to pin down. By contrast, the private-sector objective of improving profitability is unambiguously clear. Even when, at first sight, the objectives of public sector organisations seem obvious there may be problems in store. We may think it obvious that the objective of hospitals is to improve health. However, there is no simple definition of health: health may be defined negatively as "absence of disease" or positively as "optimal physical, mental and social well-being". Similarly, we might ask if the objective of education is to prepare students for the jobs-market or to improve their cultural and social sense of being. If the objective is both, how do we know to what level each objective has been met? If there are multiple or combined objectives a question arises about the relative importance of each aim. Failure to establish that importance will confound attempts to gauge effectiveness. To some extent the problem of multiple objectives may be

shared with private sector organisations, but the underlying pursuit of profit provides a benchmark of effectiveness for those organisations.

One can easily imagine other potential hazards posed by the specification of objectives in public sector organisations. It may be that some objectives conflict, as in the case where a state-owned enterprise combines economic objectives with social objectives by providing services to remote areas. Difficulties may also arise if the objectives of the organisation change over the period of time in which effectiveness is being assessed. Alternatively, it may be the case, if objectives are not clearly stated for a particular service, that the parent government department may have a different conception of objectives than the state agency that delivers it. Indeed, an underlying problem in the assessment of effectiveness is that there are often several "stakeholders", such as managers, consumers and service professionals, with an interest in the service and who all have different views on what the outcomes of the policy or organisation should be.

Looking beyond the specification of objectives, other important questions arise in dealing with effectiveness. Concentration on whether outputs meet objectives can distract from strategic questions about the very appropriateness of the objectives. Moreover, the problems don't just apply to the objectives side of the effectiveness ratio: there are also problems with outputs. It is not always easy to specify the output of public service organisations. For example, part of the output of the police service is crime prevention. It is obviously difficult to quantify and assign a relative importance to this facet of police work compared to crime detection.

Effectiveness relates actual output to planned output or effects. However, there can be unplanned effects. The measurement of performance can change behaviour, and that can yield unintended effects. For example, a police force whose success is judged by the number of arrests may have a high incidence of wrongful arrest. Similarly, a school whose success is judged by the number of students who progress to third-level may emphasise cramming rather than personal happiness and development. It could consequently have a higher rate of mental distress or anti-social behaviour. If hospitals are required to be cost effective in bed use, the result might be that they either release patients prematurely or over-perform certain types of surgery that do not require a long recovery period. High rates of readmission could be the unintended consequences of the pursuit of efficiency. This example also serves to illustrate possible conflicts between efficiency and effectiveness. Short-term efficiency gains, in terms of improved rates of bed use, which lead to long-term consequences of a high readmission rate, is most probably not the effect intended by policy-makers.

## **7.5 Measurement and Measurement Problems**

Output and performance measurement are essential for monitoring value for money in the public sector. As discussed above, measurement of economy and efficiency are more advanced than measurements of effectiveness. There has been some progress

in analysing effectiveness, with the development of measures of some outcomes or proxies for outcomes. In education, for instance, measures of the income differentials enjoyed by graduates and/or their employment record provide a certain measure of the effectiveness of third level education. In health, measures such as immunisation rates give us an indication of the effectiveness of a policy designed to rid the population of a certain disease. In policing, the final objective might be to reduce burglaries, but a measurable intermediate objective might be to sensitise the public to the risk and to persuade them to install alarm systems and upgrade the quality of their locks.

Looking now to the measurement of efficiency, a similar use of proxies may be appropriate if there are difficulties in measuring outputs. In such cases intermediate outputs, such as the grades achieved by students or the number of patients seen by doctors, might be used. However, using intermediate outputs or objectives is generally less than fully satisfactory substitutes for final outputs and objectives.

#### *Double Counting*

Double counting is a common problem encountered in economic measurement. In education, for example, research income might be seen as an indicator of performance because such income implicitly attests to a good research record. If research income is also seen as an indicator of input then there will be double counting, with the same income registering twice as a positive indicator

#### *Displacement*

A further pitfall to be aware of in economic measurement is the assumption that in the absence of a policy intervention there would be no improvement. To avoid this pitfall analysts ask what would most likely have happened *without* the policy intervention. In the case of an industrial grant, for example, the analyst would attempt to anticipate what development would otherwise have occurred. A 'with-without' test of this nature will give an estimate of the net benefit of the grant. Similarly, in assessing the benefits of industrial training we might ask what level of skills might be acquired by other means.

#### *Changes in Quality*

A recurring difficulty in output and performance measurement is that of allowing for changes in quality. If the interval at which refuse is collected were to be extended, with the consequence that the same volume of refuse was collected but less regularly, then the output measurement for the service might not change but the quality of the service would deteriorate. An obvious outcome from a refuse service concerns the extent to which it reduces incidents of disease. The fact that the refuse is collected less often may lead to an increase in disease and a consequent fall in outcome, even though, nominally, the same amount of "output" is refuse collected is the same.

Sometimes output and performance measures are adjusted by a quality factor (e.g. class-size in the case of education), but such adjustments are inevitably imprecise. Apart from quality there may be other aspects that are challenging to measure. It is difficult to measure an intangible output such as disease prevention. How could one measure the output or performance of a public art gallery or museum? A proxy such as the number of visits or charge per visit is obviously not a complete indicator.

### *"Gaming"*

The existence of output and performance measures may, in fact, change the behaviour of those being assessed. This is known as "Gaming" in the literature. There may be an understandable inclination to skew effort toward those activities being measured or change or manipulate the definition of the measure. If, for example, a university department is judged by the amount of published research produced or the number of citations of published work by staff, then a probable reaction by staff would be to concentrate on research work at the expense of preparation for lectures. Further, staff may be tempted to publish incomplete or trivial work or may engage in excessive self-citation of their previous work. Moreover, a large volume of published work or a high rate of citation is not "ipso facto" an infallible indicator of the value of the research. With regard to changing and manipulating definitions, there is the real-life example of the measurement of "trolleys" in hospital A&E departments. The definition of a "trolley" for the purpose of the measure was a "bed with wheels". The solution that the hospital management came up with was to remove the wheels from the trolleys and consequently, the measure "improved". Another example occurred where the waiting time of a patient in the Emergency Department only began once the patient was booked into the hospital system. The response of the hospital was to delay booking the patient into the system for as long as possible.

Other forms of "gaming" may include the performance of the more easily achieved tasks by staff at first, in the hope of moving elsewhere before the harder tasks become inevitable. A further form of gaming occurs where, in the absence of proper scrutiny, measured results such as reductions in maintenance costs per square metre may be achieved by deferring spending into the future. This may lead to the unintended consequence of more pronounced, and ultimately more costly, deterioration in the capital stock.

Among the other unintended consequences of measuring output and performance may be to encourage short-term thinking in an effort to satisfy measures taken on an annual basis. This in turn may lead to a reduction in initiative or innovation. Yet a further unintended consequence would be if the existence of measures led both assessors and assessed to assign lower priority to the less easily measured activities. Alternatively, the existence of measures might lead to a defensive attitude among those assessed, resulting in wasteful efforts to sabotage the measures. The reactions of employees and service professionals, therefore, have significant implications for the process of management.

### *Disaggregation*

Another set of problems arises out of the need to disaggregate. If there are a number of people working together on a project it may be difficult to disaggregate the efforts and productivity of individuals. In a joint research team, for example, it may be that one person had a disproportionately large input. Other problems of the same nature arise if there is a joint output that is the responsibility of more than one organisation such as crime prevention and crime detection, or where there are joint objectives such as, in education, to promote personal development, to provide cultural enrichment and to prepare students for the job market.

### *Problems of Comparison*

A final set of difficulties centres on the need to compare like with like. If output and performance measures are to be used to compare organisations at a given point in time then it is necessary to compare organisations of the same scale, producing similar outputs in similar areas. It is also important to allow for the possible influence of other factors. In assessing health care, for example, life expectancy may increase for a particular age-group over a period of time, but the improvement may be due in part to factors external to health care such as improvements in public sanitation and public housing, or improvements in food and in attitudes towards exercise.

## **7.6      Equity**

The scope of this lesson does not extend to a detailed coverage of equity. As discussed in Lesson 1, economists generally adopt Pareto efficiency as their standard of measuring policy changes. (Remember, a Pareto improvement occurs when a policy change makes at least one person better off without making anyone else worse off). Economists use this type of standard because they are attempting to exclude from analysis any subjective comparison that would arise if one person's gain was contrasted to another's loss. Economists do this because they see subjectivity as outside the subject matter of economics. Economists must, however, enter the area of interpersonal comparison when dealing with many economic policies. In so doing they must, to some degree, relinquish the comfort of objectivity.

Efficiency is not an exclusive criterion to be applied in policy formation; considerations of income distribution are also important. Policies that improve efficiency may increase inequalities in income distribution. Conversely, attempts to increase equity by, for example, progressive taxes and redistribution by social welfare transfers may detract from efficiency if those who pay taxes reduce work effort or investment or if the level of social welfare transfers deters some from seeking work.

There is often a trade-off between efficiency and considerations of equity and equality. At the level of the enterprise this may be manifested in multiple objectives.

Consider a state agency expected to pursue commercial objectives, including efficient operation, as well as non-commercial objectives such as widespread or low-price provision of services. Political decision-making on the role of public enterprises in economic and social development may have significant implications for efficiency. Also in the political domain, account must be taken of yet another "E" — electability. Considerations of efficiency may have to pass the "electability indicators" test.

The concern for equity is one of the factors that differentiate the public from the private sector. It is also one of the reasons why private sector management techniques may not automatically transfer to all areas of the public sector.

### **7.7 Conclusion**

In the light of the difficulties outlined above, and the problems with assessing effectiveness dealt with in the previous section, it is not surprising to learn that continual efforts are being made to improve measurement of value for money. It is important to ensure that whatever indicator chosen is quantifiable and measurable. Measurement of inefficiency based on economic theory, which clearly specifies the type of efficiency being analysed, would appear to have decided advantages over the more scattergun approach associated with simple "performance indicators".

The most developed and soundly based economic evaluation of efficiency is to be found in investment appraisal. Techniques such as cost benefit analysis are employed in investment appraisal to assess the efficiency of alternative projects and policies. The rational weighing up of costs against expected benefits is an important aspect of the process of public and private management. A detailed treatment of public investment appraisal is provided in Lesson 8. Even allowing for the sophistication of investment appraisal techniques, however, there is still a need for careful design of evaluations in order to avoid common pitfalls and to make effective choices. In the case of industrial grants, for example, it is proper to ask questions such as whether a project would proceed in the absence of grant aid, whether a project is likely to fail prematurely, and whether a grant-aided project contributes to national output and national efficiency: Addressing such questions raises evaluation above the mechanical application of techniques.

### **Student Activities**

1. Explain the importance of efficiency in the economy
2. Explain the difference between productive and allocative efficiency
3. Define economy, efficiency and effectiveness
4. Explain why measuring effectiveness in particular is difficult
5. Discuss the measurement problems associated with assessing efficiency

## **8. Project Appraisal and Programme Evaluation**

### **Learning Objectives**

When you have studied this lesson and any associated reading, you should be able to:

- understand the rationale for project appraisal and programme evaluation
- describe the historical development of project appraisal
- list the steps involved in conducting a Cost Benefit Analysis
- describe, in detail, each step of a Cost Benefit Analysis
- understand the nature of costs and benefits, the concept of the discount rate, and the various decision rules.
- describe the various methods for valuing a human life
- understand the various estimation techniques
- recognise the problems encountered in conducting a Cost Benefit Analysis.

### **8.1 Introduction**

As we noted in Lesson 1, an essential element of economic activity is the creation of value. In a simple market exchange, like buying an apple, it is easy to evaluate if you are getting value for money. You have a price in mind for the apple above which you will not pay. If you get it for less than that price, then you have created consumer surplus and added value. Similarly, the shopkeeper has a price below which he feels it is not worth his while selling the apple. If he gets more than that price, then he also feels he is getting value for his efforts in supplying the apple. He has created producer surplus and has also added value. This is the essence of economic activity—moving and transforming resources from where they are less valued to where they are more valued.

In the above transaction, the exchange takes place simultaneously. However, what happens when the costs and benefits of an exchange is spread out over a number of years? In a modern, complex economy the timeframe of many activities and projects extends over a long timeframe. How can we assess if value is created?

### **8.2 Project Appraisal Assuming No Market Failure**

In the private sector, the firm is generally concerned with creating the maximum amount of value for its shareholders. Many private sector projects last many years. How can a firm figure out if a project like investing in a new machine that will last ten years is worth the initial cost? Should the firm use its capital in a different project that might earn more money?

Central to answering these questions is the concept of the time value of money. People generally value money “in their pocket” that they can use now greater than the promise of the same amount of money in some future period. Simply, €100 now is worth more than €100 in a year’s time. How do we calculate how much the €100 in one year’s time is worth today? We do this by applying a discount factor to the amount to be received in the future.

In conducting a project appraisal in the private sector, the firm generally estimates the net cash flow it expects to receive in each period. This is normally calculated by subtracting the costs incurred from the revenues received. Normally you would expect a large cash outflow in the early periods as the firm pays for machinery, premises, etc., and then a steady stream of revenue from sales over the lifetime of the project. The firm applies the discount factor to the net cash flow from each period. If the discounted cash flow is positive, then the project is anticipated to create value. The discounted cash flow is known as the net present value (NPV) of the project. The discount rate that the firm uses reflects the firm’s opportunity cost of capital. If the firm is comparing two different projects then the one with the higher NPV is the one that should be chosen.

### **8.3 Project Appraisal & Programme Evaluation in the Public Sector**

In the standard microeconomic theory that we examined in the earlier lessons, the competitive market system leads to optimal efficiency and maximum economic welfare. Competition drives costs down to their minimum levels and drives improvements in technology. In short, society maximizes welfare by allocating goods through the market. Over the course of the earlier lessons, we examined the various market failures and how they impinged on efficiency. Generally, when a private firms conducts a project appraisal, they either implicitly assume no market failure or ignore the fact that they may operate in a situation where there is market failure. In recent years, private sector firms have become more aware of market failures due to an increase in environmental awareness and regulatory requirements.

Whereas private firms tend to examine their projects from a profit-maximization point of view, government tends to take the wider perspective of the welfare of society into consideration. Since the market often cannot be relied upon to deliver an optimal outcome, the political and administrative system (which also forms the basis of all markets) must step in with a “non-invisible hand” and develop centralised decision-making techniques and systems to substitute for the signalling of the market and establish a non-market basis for assessing value and welfare. The rationale for both project appraisal and programme evaluation in the public sector is rooted in the non-market nature of many government services and activities. To clarify some concepts, we see that a project is a finite activity with given boundaries, resources and timescales that can be analysed as a stand-alone entity. A programme is a group of projects with the common aim of achieving some particular goal. Project appraisal is the assessment of an individual project’s value before it starts, while programme evaluation is the process of determining the value of a policy or programme while it

is in train. Appraisal is the assessment of a project's value before it starts, while evaluation is the assessment of value after they have happened.

Various decision-aiding techniques have been developed to help policymakers decide upon choices. Different techniques, such as multi-criteria analysis, decision analysis, and cost effectiveness analysis have been developed to deal with aims, goals and size of the various projects or programmes that are being examined. The most important technique, and focus of this lesson, is cost-benefit project appraisal. It is the most sophisticated and comprehensive decision-making technique available and the other methods tend to be a truncated form of Cost-Benefit Analysis.

In Ireland, most government agencies and departments are involved in some form of evaluation of the activities that they fund, and some (noticeably the industrial development and transport authorities) are engaged in a considerable amount of project appraisal.

#### **8.4      Historical Overview**

Cost Benefit Analysis (CBA) as a formal practical technique was first developed by government engineers in the USA in the 1930s to appraise water resource projects. Its use then spread in the 1950s to other infrastructure projects, notably transport. In the UK, it was used in the early 1960s to assess major transport developments. Economists working for the UN, OECD and the World Bank in the late 1960s and 1970s adapted the approach for developing economies and, in particular, devised sophisticated systems of economic appraisal which would consistently deal with the non-market features of such economies. Meanwhile, in the USA, in the late 1960s and 1970s, the use of CBA was extended to the health arena and wider definitions of benefits incorporating quality of life were developed. Subsequently new developments in CBA were made in environmental economics, as economists attempted to incorporate concepts of sustainability of future generations into their analysis of project proposals.

Programme evaluation has a long history as a practice, but it only became a recognised speciality in the 1960s. It also originated in the USA. Early efforts before World War I were directed towards assessing educational programmes for training and literacy, and public health programmes for reducing infectious diseases. During the 1930s and 1940s, such applied social research continued apace; for example, during World War II, army personnel policies were evaluated using applied research techniques. During the 1950s, Western funding of various aid programmes in developing countries was accompanied by the carrying out of evaluation studies.

In the 1960s, public policies involved a substantial expansion of government spending and with it both an increase in the number of policy and programme reviews. Programme evaluation emerged as a special area of expertise. The 1970s saw a growing awareness that evaluation involved more than the simple application of social research techniques to policy areas. It began to be recognised as part of the

political process of administration. To maintain relevance and integrity required an awareness of the political context.

In the 1980s, there emerged a more general acceptance of diverse methodologies, as the limitations of both quantitative and qualitative techniques came to be more widely recognised. In the 1990s, the methodology was extended to examine the effect of regulations through the development of Regulatory Impact Analysis (RIA). Most evaluation work in the USA continues to be carried out in education, health, regulation and law enforcement.

In Europe, developments more or less followed those of the US after a certain time-lag. The EU has taken a particular interest in the evaluation of its Structural Funds and economic impact of the associated programmes.

### **8.5 Cost-Benefit Analysis and Market Failure**

When considering any future action or undertaking, we generally list the advantages and disadvantages and weigh up the pros and cons. This way of making decisions applies to small items (choosing a hobby), larger items (buying a house), and much larger items (planning a multibillion Euro construction project). Cost-Benefit Analysis is a methodology whereby the advantages and disadvantages of a course of action are quantified and compared, and where simple rules about when to accept a proposal are created. It is a methodology that is used extensively in the public sector.

As discussed in Lesson 1, resources are always limited and there are always competing policy objectives to which the government can allocate its resources. Any decision that allocates resources necessarily involves making a choice between alternative means of achieving specific policy objectives. CBA provides a systematic set of procedures by which the government can choose between alternative approaches for the achievement of specific policy objectives.

As we saw above, it may well be that a company's decision to carry out a particular course of action is one that maximises the welfare of everybody in society. Extra output can be generated through a more productive use of resources. Under conditions of perfect competition it is expected that overall output is maximised at the lowest cost possible.

However, as we saw in Lesson 1, there are many reasons why such maximisation may not happen. We shall briefly mention them here by way of revision:

- The firm has some degree of market power and is consequently a "price-maker" in some way (*i.e.* the market structure is one of monopoly or imperfect competition). Consequently, it can sell its product at a price above its cost of production and earn supernormal profit. This means that consumers who are willing to pay a price above the cost of production, but below the monopolist's price, will consume the good. From their point of

view and from society's point of view, this is a situation where opportunities to create extra welfare have not been exhausted and welfare is not maximised. Further, the firm with monopoly power will, generally, choose not to produce at the lowest average cost, and so not maximise the use of resources.

- Closely related to the previous point, there may be increasing returns to scale, and the firm will not produce at the socially optimum level.
- The factor markets may not be 'perfectly competitive' and so there may be price inflexibility, and an oversupply does not lead to price adjustment. The consequence is unemployment of resources at that level of demand; the most obvious one is the unemployment of people.
- There may be information failures or imbalances, as in the case of experts such as doctors offering professional advice where the non-expert customer is in no real position to assess that advice.
- The goods may be public or semi-public goods, *i.e.* their consumption by others may not stop others using them, e.g. using a bridge or admiring a landscape does not exclude others using or admiring them), and their consumption does use extra resources so that an additional person can enjoy the good (*i.e.* the good is non-rival). The result is that the marginal cost is near to zero and, if the rule for profit maximisation was applied, the price would be near to zero, and the company would have no motivation to start the project
- The project exhibits externalities not reflected in the resource prices that have to be paid for the project. For example, the generation of production negative externalities (e.g. water pollution); of production positive externalities (e.g. training skilled workers); of consumption negative externalities (e.g. passive smoking); and of consumption positive externalities (e.g. a walker enjoying the scenic beauty of a mountain range).

In the above examples, a firm's decision to proceed or not to proceed with a project will not maximise society's output and welfare. In these circumstances it may be appropriate to consider some form of policy intervention with the aim of increasing social welfare.

Such interventions vary enormously. They can be taxes/subsidies, direct production, enforced change of ownership, public information campaigns, regulations, etc. Policy interventions have a cost, however, a fact that should be taken into consideration when determining the best policy intervention. Sometimes "doing nothing" can be the best policy response.

CBA attempts to assess the full social benefits and costs of projects so as to provide guidance on what should be done. The benefits, the costs and decision rules of a

CBA are analogous to those of a limited private sector project appraisal except that the CBA includes all benefits and all costs not just those of the private firm. Indeed, it can be said that CBA is the general case, and private sector project appraisal is a special case of CBA.

## **8.6 The Elements of a CBA**

### *Benefits*

These are the outcomes of a project that advance in some way the objectives of society as a whole or of some group in society. The benefits are often the national output or level of people's incomes, but they can also be many other things.

### *Costs*

These are the resources involved in carrying out the project valued in terms of their alternative use; cost in the sense of "opportunity cost" is the foregone benefits of alternative projects and courses of action.

### *Decision Rules*

The value of the benefits and the costs are discounted by some rate of marginal time preference (social discount rate). The resulting values can be compared to each other in a Benefit/Cost ratio, can be netted out into a net present value of net benefits, or expressed as an internal rate of return etc.

### *Logic and Aims of Cost Benefit Analysis*

The logic of conducting a CBA is to arrive at a **time adjusted** value for both the economic and social costs and benefits of the project or policy. The time adjusted value is arrived at by "deflating" the future costs and benefits by using an appropriate discount rate. The overall aim of a CBA is to assess whether or not the social and economic benefits associated with a policy or project are greater than the social and economic costs.

## **8.7 The Steps of a CBA—Introduction**

Conducting a CBA is a relatively difficult and complex task. The procedure followed in conducting a CBA consists of several steps. Precisely how the steps are delineated varies to some degree in the literature. The approach we adopt captures the essential elements of a CBA, and we divide the procedure of a CBA into 6 steps. These are

- Step 1: Defining objective and boundaries.
- Step 2: Identifying alternatives.
- Step 3: Identifying constraints.

- Step 4: Identifying and estimating the values of cost & benefits.
- Step 5: Calculating decision criteria.
- Step 6: Assessing Risk and Uncertainty.

### **8.8 Step 1: Defining Objective and Boundaries**

It is crucially important that the scope and objectives of the project are clearly defined. The project must be a self-sufficient unit of analysis. It is essential that the project boundaries are specified before any attempt is made to define the projects objectives. The definition of the objectives is impossible to delineate if the boundaries of the project are not specified. For example, an objective to “improve air quality” is, from a project point of view, meaningless unless we define the boundaries of the project as being in a particular geographical area and within a particular timeframe and specify the level of improvement in air quality we wish to achieve. Objectives should be as explicit, precise and as amenable to measurement as possible. This facilitates the assessment of costs and benefits and helps with the identification of alternatives that could achieve the same objectives. It is important to recognise that projects may have more than one objective. If this is the case it is important that they are clearly prioritized.

### **8.9 Step 2: Identifying Alternatives**

Properly specified objectives can assist in the identification of alternatives. It is crucial to identify all the alternatives that are available so that they may be ranked in order of preference. However, it can be difficult to identify all the alternatives. It is good practice to always consider the alternatives of a minimal intervention or of “doing nothing”. Further, one should not presume that a policy or public sector response is needed when a private sector solution may suffice. It is also good practice, where appropriate, that different levels of the same response are included as separate alternatives. Further, if any of the alternatives clash with existing policy, this should be brought to the attention of decision makers, who then may decide to review the broader policy area. Finally, one should always be alert to the fact that those suggesting alternatives to you may be consciously limiting them so that their preferred choice, for whatever reason, is seen in the most favourable light.

Having examined the **steps 1 & 2**, it is a good point to consider the following questions that were set out in New Zealand’s Treasury “Cost Benefit Analysis Primer”. It states that no policy programme or project should be adopted without first having answered the following questions

- What are the specific objectives and outcomes sought?
- Are there better ways to achieve the outcomes?
- Are there better uses for these resources?

## **8.10 Step 3: Identifying Constraints**

When trying to achieve any outcome, there are many different constraints. Constraints take many different forms, and it is crucial to identify which are relevant to the appraisal you are conducting. The most obvious constraints are legal, budgetary, technical, environmental, administrative, input, and policy/political.

Legal constraints on what you can and cannot do are ubiquitous. Like trying to identify alternatives in Step 2, it is difficult to identify all the legal constraints when conducting an appraisal. It is crucial to get good legal advice and to seek advice from people who have been involved in similar projects and have expertise in the policy/project area. Legal constraints can limit the activities of organisations, rights of access, types of land use, etc. They can also impose standards that increase costs in areas like health and safety, employment law, and procurement.

As you already know, resources are always scarce and any project/policy aim should be to achieve efficiency. Budgetary constraints can take different forms. The budget can consist of a set amount to be fully spent, an amount to be spent with discretion up to a maximum, or a requirement that a certain percentage of the funding is self-financed. Regardless of the source or type of funding, it is imperative that the best use of the funds is obtained and consideration of the opportunity cost of the funds should always be to the forefront. It is also critical, particularly if the project is to be self-financing, to properly examine the revenue forecasts and ensure that they are realistic and attainable.

The impact that human existence has on the environment is of increasing concern. Climate change presents an enormous challenge to modern civilisation. It is increasingly important that the impact of any policy or project on the environment is taken into consideration. Environmental constraints may take several forms. They may take the form of natural terrain, the atmosphere, or geological deposits which must not be impacted or minimally impacted upon by the project. In addition, some items may be limited as inputs in the production process. Items such as coal can be non-renewable, in short supply, or their use may cause further environmental impacts. It should also be remembered that changes in technology can reduce environmental constraints. The invention of transport that is fuelled by, say, water would be a game-changer in our battle to protect the environment.

Other constraints include a shortage of a particular input, a technologically difficult challenge, political opposition, or a lack of administrative capacity. The constraints we have briefly examined above are not exhaustive. As mentioned, it is important during the appraisal process to identify as many of the project constraints as soon as is possible. Early detection of constraints can save a lot of later heartache.

## **8.11 Step 4: Identifying and Estimating Costs and Benefits**

An all too common mistake in conducting a CBA is the failure to identify all the relevant costs and benefits. Some of the costs and benefits may be easily identified and quantified while others may be more difficult. A comprehensive approach should be taken to ensure that all costs and benefits are identified. One useful way of doing this is to consider the impacts on the different stakeholders affected by the proposed policy/project. The relevant costs and benefits of projects can be real and pecuniary, direct, indirect, tangible, or intangible or some combination of these.

The key categories of costs and benefits are real and pecuniary, direct and indirect, and tangible and intangible. We shall examine each category briefly.

### *Real and Pecuniary Costs and Benefits*

Real benefits are those derived by the final consumer. They add to the welfare of society and can be offset against the real cost of resources used. Pecuniary costs and benefits derive from changes in relative prices in secondary markets. An example will clarify: The increase in business for restaurants and shops close to a new upgraded road are not a real benefit of the project for society as a whole. They are a pecuniary benefit to the businesses close to the road. The gain in trade for these businesses is likely to be offset by a drop in demand for other businesses that would have previously served the travellers on the old road.

### *Direct and Indirect Costs and Benefits*

Real costs and benefits can be further classified as being direct (primary) or indirect (secondary) with regard to the main objectives of the project. For example, an education programme may be directly aimed at increasing the earning power of a certain geographical cohort of school-leavers. This is the direct benefit. The indirect benefit may be that rates of anti-social behaviour in the geographical area declines.

### *Tangible and Intangible Costs and Benefits*

Tangible costs and benefits are those that have a market value while intangible costs and benefits are those that do not. When building a new road through the countryside, it is easy to identify the costs of labour, materials, etc. They are tangible; they have a market price. However, it is much more difficult to put a value on the loss of scenic beauty due to the road. There is no market for scenic beauty. The cost is intangible. This, of course, gives rise to measurement difficulties which we will examine in greater detail later. A corollary to the measurement difficulties is how much should the analyst spend on estimating intangible cost or benefits?

### *Identifying Costs*

Identifying costs as fixed, variable, and semi variable can be useful in estimating costs and the time periods in which they are likely to be incurred. The explicit identification and categorisation of costs, by type and time, is important because it helps clarify cost behaviour and the drivers of different types of cost. This is helpful in increasing the accuracy of cost estimation. Costs should be calculated on a marginal basis only, e.g. the change in overhead costs resulting from a project. These are the costs that apply specifically to the incremental projects outputs. Average costs should not be used as they will not accurately reflect the true cost of the project.

Typical costs include:

- investment costs, e.g. construction costs
- equipment
- fixed assets
- overheads
- operating costs
- maintenance costs
- negative externalities
- market entry barriers created by regulations – e.g. restrictions on who can operate as a medical doctor increase the quality of service but come at the cost of giving the profession the ability to price monopolistically
- IT costs
- staff costs.

Depreciation should not be included as a cost because it is an accounting concept used to allocate expenditure over the life of an asset. Including both depreciation and the cost of an asset would constitute double counting

### *Identifying Benefits*

The benefits of a project/policy can be harder to identify because often they do not arise as a cash flow. For example, the benefit of a new cancer treatment may be improved quality of life and improved length of life. How does one put a value on the extra time a person is alive? Is there a different value on the extra length of life, for example, if the person is in excruciating pain or if they are relatively pain-free? Techniques have been developed to help answer these questions but, as you can imagine, they remain somewhat controversial. We shall examine this further below.

Typical benefits include:

- reduction in loss of life
- reduction in health care costs
- accident savings
- travel time savings
- reduced environmental emission

- reduced operating and maintenance costs
- job creation
- increased water quality
- scenic benefits.

### *Additionality, Deadweight and Displacement*

Additionality and deadweight are closely related concepts and are related to the net impact of a project/programme. Deadweight occurs when part of a public project confers benefits on persons other than those intended. For example, a programme to encourage up-take of third level education may benefit people who would have gone on to third level regardless of the programme. Viewed from the point of view of effectiveness and additionality, the benefit of the programme should only be counted as net of those students that would have gone to third level *without* the programme. Displacement occurs when a public policy leads to a loss or displacement of output elsewhere. For example, the building of a publicly funded sports facility may displace a private sector facility from being built.

### *Transfer Payments*

Transfer payments should not be included as costs or benefits in a programme/project as they do not represent the creation of value. By definition, they are transfers of spending power from one person or group to another. For example, any tax liability that a project incurs should not be counted as a cost as it only represents a transfer of some of the benefits of the project to the rest of society.

### *Double Counting*

It is very easy to fall into the pitfall of double counting. For example, if a new rail link is built through a residential area, the benefits section of the project's CBA will include an estimation of the value to the residents of the shorter and more frequent journey times. Someone may point out that house prices will increase due to proximity to the rail link, and you may feel that these increases are a benefit of the project. However, these increases are already counted in the CBA as the benefits of the rail link in the shorter travel times and more frequent opportunities to travel. The rise in the price of housing only represents the capitalized value of these shorter and more frequent benefits. If you counted the benefits of the improved journey statistics and the increase in house prices you would be counting the benefits of the rail link twice – double counting.

### *Valuing Costs and Benefits—Market Prices and Social Values*

The resources used in a project should be valued at their opportunity cost. Where market prices exist, it is generally recommended that these are used as they normally best reflect the opportunity cost and are generally reliable and verifiable. However, due to market failures, sometimes market prices do not exist or include distortions that do not make them good indicators of market prices. This is especially relevant

in the public sector, as programme/policy outcomes are often untraded and no market price exists.

Market prices may not reflect social costs and benefits due to market failure. Imperfect competition results in prices that are higher and outputs that are lower than is socially optimal. It entails production where the consumer's willingness to pay does not equal the cost of production of an extra unit of output. This means that consumers that are willing to pay more than the cost of an extra unit of output are not supplied. Consequently, the market price is higher than the cost of production and is therefore not an accurate reflection of the social cost.

Further, taxes, such as VAT, subsidies on expenditure, agricultural subsidies, or import tariffs, place a wedge between the actual cost of production and the market price charged. Again, this means that the market price is not an accurate reflection of the social cost of production. In addition, where the government intervenes in a market to guarantee a price, or where it intervenes via import controls, the market prices will not accurately reflect the social value

It should also be remembered that the market price in a properly functioning market reflects the point where the marginal benefit equals the marginal cost. The marginal consumer's "consumer surplus" at this point is zero. Consequently, the market price reflects the social cost of the items but not the total consumer surplus generated by the consumption of the good. The concept of "willingness to pay" captures the aggregate consumer surplus from consumption of the good. It measures the difference between what the consumer actually paid for the good and the highest price they would have paid for the good. This gives a measure of the value different consumers get from the same good and, in aggregate, reflects the benefit that the market for the good provides to consumers. This is the consumer surplus of market. A measure of gross benefit of a project is obtained by adding the consumer surplus to the market price.

#### *The Absence of Market Prices*

As we saw above, the market price can in certain situations give an inaccurate measure of social opportunity cost. However, in some situations no market price exists whatsoever. Market prices do not exist in many cases where there are public goods, externalities and intangibles. For example, a market for the public good "defence" does not exist. It is supplied collectively, and the willingness of individuals to pay for this good is impossible to ascertain. Similarly, no market exists for the elimination of noise pollution or for intangibles such as scenic beauty, loss of historical heritage, quality of life due to disability, loss of life, or loss of wild life habitat. These can be estimated through methods such as establishing people's "contingent valuation".

When estimating costs or benefits the principle of proportionality should be used. If the resources required to quantify a particular cost or benefit is greater than an obvious and reasonable estimation then common sense should prevail.

### *Valuing Costs*

The costs of a project should be estimated by finding the opportunity cost of the resources required for use in the project. Simply, the cost should be estimated by the best alternative uses to which the resources can be put. Market prices normally reflect the best alternative use of resources. Demand for the use of the project should be carefully estimated and professional advice should be sought. This is an important pitfall to avoid, as the over-estimation of demand, an easy mistake to make, is a key and expensive driver of costs. The specification and extent of the projects should be very carefully estimated in order to avoid the creation of an expensive and embarrassing “white elephant”.

### *Sunk Costs*

Sunk costs are costs incurred before the appraisal period and cannot be recovered. They are sunk. Consequently, they do not have an opportunity cost with regard to the project under appraisal and should not be included in its appraisal.

### *Contingency Costs*

Due to the complex nature of many projects, circumstances can arise that change the estimated cost of the project. While these cannot be known with certainty, areas and situations can be identified that are most likely to result in a change in costs. Allowance should be made for these contingencies and they should be included in the CBA. Large projects should always include contingencies for delay and escalating construction prices. The experience of other completed projects should be used to assess the likelihood of contingencies. Analysts should not take a too optimistic view of the unlikelihood of contingencies. Certain particular events may also trigger contractual obligations. These should be included in the analysis.

### *Shadow Prices for Inputs*

As noted above, market prices should be used where possible and feasible. However, due to market failure, shadow prices may be used. There should be a clear and convincing reason for doing so. The analyst should always demonstrate a sound means of the shadow prices calculation.

The most common shadow prices used in CBA are:

- Shadow Price of Public Funds
- Shadow Price of Labour
- Shadow Price of Profit
- Shadow Price of Carbon.

We shall examine each of the above individually

### Shadow Price of Labour

In periods of high unemployment, the opportunity cost of labour may be zero. In this scenario, the wage rate can overstate the overall social opportunity cost. The argument for this is that those who are unemployed but subsequently gain work would otherwise have not been employed in any productive activity and, consequently, the production lost from them moving to employment is zero. To adjust for this, the shadow price of labour is used. In these situations, the wage rate should be replaced by a lower opportunity cost. The shadow price is often expressed as a percentage of the prevailing wage rate. The percentage depends on labour market conditions, e.g. unemployment rate, regional variations, sectoral differences, labour force participation, skill level, etc.

### Shadow Price of Public Funds

As we saw in lesson 2, taxation creates deadweight in the economy. It gives rise to economic distortions by altering the incentives facing the economic agents. This causes changes in behaviour and reduced economic activity, e.g. a high marginal tax rate on employment reduces the incentive to work. Simply, a €1,000 private benefit resulting from a €1,000 grant raised by extra taxation would cost more than €1,000 due to economic distortions and disincentives. Consequently, the shadow price of public funds is greater than one. A premium should be applied to the nominal costs of the proposal to take account of the excess burden of taxation and thereby equate the private cash flows with the public cash flows.

### Shadow Price of Carbon

As we know from Lesson 4, market prices do not provide an accurate reflection of the social cost of pollution. Consequently, it is necessary to adjust for the impact of environmental emissions. National guidance is given on the monetisation of emissions by the CEEU.

### Shadow Price of Profit

This should generally reflect the opportunity of capital in its best alternative use.

#### *Valuing Benefits*

Benefits include any object, process or concept which enhances value (including extra monetary income, a better environment, better sense of well-being, or greater sense of security). They also include anything which saves resources. Benefits should always be valued on an individual's willingness to pay for the good or service. Market values, due to market failure and intangibles, are not available in many situations, e.g. loss of life, loss of scenic beauty, etc. Consequently, what are known as "non-market" valuation methods must be used to calculate values; where market values are not available then techniques to estimate the consumers' valuation are required. It is assumed that the social value of the project/programme is the

aggregation of the individual values (remember, as per lesson 3, the social value of the public good was the sum of the individual marginal benefits.) These techniques are generally classified as “Revealed Preference” or “Stated Preference”.

Revealed preference techniques are generally preferred as they measure the actual observed behaviour of people engaged in economic activity. Stated preference techniques reflect hypothetical choices in response to questionnaires and surveys. Revealed preference techniques, as stated above, infer a price from observed consumer behaviour. The major revealed preference methods are the “Hedonic pricing” and “Travel Cost” techniques.

### *Hedonic Pricing*

Ideally, this method uses the difference in the price of goods that are similar in every characteristic except the one that is “intangible”. The best way to understand hedonic pricing is through an example. Consider two hotel rooms. One has a fantastic sea view and the other does not. Would you expect the rate per night for each room to be the same? Naturally, you’d expect the room with the sea view to be more expensive. We can then find out how much a sea view is worth by calculating the difference in room rate. This is the essence of hedonic pricing. There isn’t a price for a “sea view” as such, but we can calculate how much people are willing to pay for one by subtracting one room rate from the other. Similarly, we can infer the cost of noise pollution from airplanes near an airport by comparing the difference in prices of similar houses where the one major difference is that one is exposed to aircraft noise while the other isn’t. In reality of course it is difficult to find two different goods that are the same in all characteristics except the one you are attempting to measure. Common sense and proportionality should prevail in coming to estimates.

### *Travel Cost Technique*

This technique is most prevalent in transportation projects. Time savings are generally the largest benefits of transportation projects. Transport projects are generally assessed on their ability to save time for existing travellers, or to increase the number of travellers, or both. For example, the benefit of a traffic route being upgraded from a standard road to a motorway can be calculated by finding the average journey time saved on the route multiplied by the number of users.

At the simplest level, the value of the road users’ time is calculated by estimating the marginal product of labour: their cost of employment, which includes their wage rate, pension and social insurance contributions. The monetized benefit of the time saved can be calculated by multiplying the time saved by the cost of employment.

As you can guess there are several difficulties in arriving at the value of time saved using this method. Different people earn different wage levels. Is the journey time saved primarily used for extra work or leisure? How do you value an unemployed or retired person’s time? Should leisure time be valued differently to work time? As

you can see from these few simple examples, the estimation of the value of time is fraught with difficulty. The key point is that the value of time saved depends critically on the context and use of time, not on the amount of time in the abstract saved.

The tacit assumption made is that travellers dislike travel and that all alternatives are more attractive and valuable. In reality, the conditions of travel and the purpose of a journey will vary from case to case. A train journey that goes along the coast and takes a half-hour longer might be preferable to a shorter but duller train ride. People who are travelling for a golfing holiday may see the time spent in a different light than people speeding to an important business meeting. Employees who seldom get out of the office may have a different attitude to a business journey to those employees who must travel every week. An increase in comfort or reliability may be preferable to a time saving. The extra amount of time may not be substantial enough to bother about from an individual's point of view.

Another way of estimating the value of time saved is to ask prospective passengers through a survey what is the greatest amount of money they would pay for a proposed reduction in travelling time. These contingent valuation stated preference methods have been criticized because the people's imagined behaviour is often different to their actual behaviour.

### *The Value of Life*

It is a sobering fact of human existence that in some situations it is unavoidable that a value must be put on a life. The courts are often asked to come to an assessment of the appropriate amount that should be paid in compensation for wrongful injury or death. For a family of dependents that has lost its breadwinner, it is obvious that no monetary amount can compensate them for the loss. At the same time, however, some amount of compensation is required to enable them to live as reasonable life as possible. How can a judge, an economist or society arrive at such a figure? The value placed on a life depends on the purpose of the evaluation. As we will see, different approaches have advantages and disadvantages and each should be assessed on the purpose of the evaluation.

### Lifetime Earnings

The best-known approach to the valuation of life is the one used by the courts to assess awards for wrongful injury or death. Awards are based on the income the dead or injured person would have made over the course of their remaining life. The value of a life is effectively seen as the person's lifetime contribution to national output expressed in present values. You can immediately see that there are limitations to this method. Firstly, it assumes that a person's earnings are a good indication of what they add to society's production. Secondly, this method does not distinguish between a person's lifetime production and the value of their life. This method would seem to indicate that a well-paid person's life is worth more than a poorly paid person's life. This method has severe limitations. It can, however, be

adjusted to take account of the suffering and death of the victim, and/or the bereavement of his or her family

### Willingness to Pay/Accept

A second method for the valuation of life is to estimate a person's willingness to pay for additional safety or their willingness to accept payment for bearing additional risk to life. For example, the value people place on their life could be estimated from the extra money they are willing to pay for the addition of airbags to their car or the wage premium that workers demand for undertaking risky activities. Again, there are limitations to this method. People may not pay attention to or understand the information on the risks they are taking. Further, people working in certain jobs may have no choice but to accept risks due to labour market conditions or geographical area; the extra risk is not reflected in any wage premium. Wealth also has an impact; a poorer person may in general be more willing than a rich person to accept a wage premium for taking on extra risk.

### Contingent Valuation Approach

This approach uses questionnaire studies to gather information about behaviour under risk. Respondents are asked, for example, how much they would be willing to pay for an added safety feature or how much they would accept as compensation in the case of suffering an adverse event. This method has been criticized due to a lack of information or knowledge on the part of those answering the questionnaire and on account of the fact that people's imagined behaviour in hypothetical scenarios are often very different to their actual behaviour in real life scenarios.

### Life Insurance Premiums as a Proxy for the Valuation of Life

Life insurance valuation method uses life insurance premiums that people are willing to pay to put a value on their lives. This method has been criticized because the insurance premium is more a reflection of a person's concern for their family than it is a valuation of their life.

### *Analysis of Demand*

In estimating the benefits of a project/programme it is crucial that the estimates of demand are rigorous and accurate. The estimates should be based on reliable evidence and should be subject to independent and expert validation. It is crucial that the demand analysis should focus on incremental demand and reflect actual demand as opposed to potential demand. It is also essential to recognise that demand can increase or decrease over the course of the project depending on a variety of circumstances, e.g. pace of economic growth, employment levels, demographic factors, etc.

### *Residual Values*

If the project has capital assets that have a useful economic life in excess of its time period then the residual value of these assets should be estimated and included as a benefit. The analyst should also calculate and include decommissioning costs, environmental clean-up costs, etc.

## **8.12 Step 5: Calculating Decision Criteria**

### *Present Values*

The benefits and costs of a project are usually estimated and listed in a common “unit” (sometimes called numeraire in the literature). This is usually money but can also be, for example, time (saved). Following on from the convention that a Euro received today is worth more than a Euro received in a future date, CBA assumes that a benefit received earlier is worth more than the equivalent benefit received at a later date. This concept of “time preference” is fundamental to CBA. When all the cost and benefits of the different alternatives have been estimated in monetary terms and the timing of the flow of their individual costs and benefits have been arrived at, they must be converted into present values. In order to do this the net benefit/cost from each year of the lifetime of the project is discounted using the formula  $[1/(1+i)^n]$ , where  $i$  is the discount rate and  $n$  is the year in which the benefit/cost occurs in.

### *Social Discount Rate*

The selection of the discount rate is critical to the outcome of a CBA because it has a major impact on the net present value. Great care is required in selecting the discount rate for a CBA, as the market rate of interest rates is generally unsuitable. Firstly, people in general tend to be short sighted and lack information about future costs and benefits, tending to prefer current consumption. This market failure tends to affect the market rate of interest. Secondly, market interest rates tend to reflect the private rather than social rates of time preference taking inadequate account of the preferences of future generations. A further problem is the fact that market interest rates also include a private risk premium that tends to be greater than investment in the public sector.

The social discount rate used for public projects is generally set centrally by the government. This ensures that all public projects are comparable, ensures uniformity and reduces confusion or political gaming on the choice of projects. In Ireland, a method called the social rate of time preference is used to calculate the common social discount rate. This is known as the “Test Discount Rate” (TDR)

### *Decision Criteria*

Having identified and quantified the costs and benefits of a project/programme there are a number of decision criteria that can be used to differentiate between the

alternatives identified in Step 2. There are some criteria that do not take account of the time value of money. These are generally only used as a rule of thumb and are not considered adequate for serious appraisals. The three most common decision criteria are:

- Net Present Value Method
- Internal Rate of return.
- Benefit Cost Ratio

#### Net Present Value Method

The NPV is the sum of the discounted cash flows over the length of the project. The criterion for acceptance of a single option is simply whether the sum of discounted benefits exceeds the sum of the discounted costs. In economic parlance, the project creates value. When there are several different alternatives to compare, each can be ranked according to their net present value. It is important though to compare proposals with equal lives. The project chosen is usually the one with the highest NPV although there may be qualitative or political factors that influence the final choice.

#### Internal Rate of Return

The internal rate of return is the maximum rate that the net benefits can be discounted that results in a zero NPV. An IRR of 10% means that at that discount rate the decision-makers should be indifferent between choosing and not choosing the project. This decision criterion is based on a target rate of return that the project should deliver above a certain cut-off rate. For example, if all projects must provide a greater social return than, say, 5% and a projects IRR is 6%, this means that it has “jumped the hurdle” rate and therefore should be accepted.

#### Benefit Cost Ratio

This is essentially a different way of looking at the Net Present Value Method. It consists of the ratio of discounted benefits to discounted costs. Using this criterion the project should be accepted if the ratio is greater than one. If there are several alternatives, the one with the highest ratio should be adopted.

### **8.13 Step 6: Assessing Risk and Uncertainty**

#### *Assessing Risk and Uncertainty*

The future is uncertain. Project appraisal involves forecasting the estimates of future costs and benefits using the best information available. The key difficulty is predicting these values. The estimated costs and benefits may not materialize as forecast due to uncertainty and risk. Bias is also very difficult to control for.

The assessment of risk and uncertainty is one of the most important aspects of a CBA. Every effort should be made to ensure that the data, methodology and assumptions underlying the estimation of the costs and benefits are realistic and reliable. Each variable should be assessed to ascertain the uncertainty involved in its estimation. Further, such techniques as sensitivity analysis, switching values, scenario analysis, and Monte Carlo analysis should be used to assess the level of risk and the effect of such risks on the performance of the project. Finally, a risk management strategy should be formulated in order to avoid, contain and mitigate risks as appropriate. This strategy should be communicated to all stakeholders.

### *Sensitivity Analysis*

Sensitivity analysis involves the examination of the key elements, variables and assumptions of the projected benefits and costs of the proposal to assess how changes in any of them could affect its feasibility. The analysis establishes the extent to which the outcome of the project is sensitive to changes to the value of variables. It generally involves recalculating the NPV of the project based on changes in variables and assumptions. A properly conducted sensitivity analysis allows the analyst to establish which variables and assumptions the project is most sensitive to. By adjusting the variables individually and in conjunction the analyst gets a sense of potential risks and pitfalls. The sensitivity analysis should be used during the implementation of the project. This enables the project manager to establish critical points of the project, and identify and manage areas of risk. Risk avoidance, containment and mitigation measures for the key identified risky variables should be part of the project management plan.

### *Switching Values*

The “switching value” of a particular variable in the analysis is the value at which a project’s NPV becomes zero or the IRR equals the discount rate. As you can see, the switching value method is just a limited form of sensitivity analysis. However, it is useful as a presentational aid as easy to understand. It is generally presented as percentage changes, e.g. “a 5% increase the cost of variable X would reduce the NPV to zero on the project”. The “switching values” of key variables can be presented in a table to give decision makers a clear understanding of the sensitivity of the project to changes.

### *Scenario Analysis*

Scenario analysis is a variant of sensitivity analysis. The method takes account of the fact that variables may not be independent of one another. It imagines scenarios where particular things happen. They can be constructed as “best case” scenario, “worst case” or down to an examination of various “what if” questions and their impact on a series of variables. They can take account of different political, economic, climate, technological, regulatory, and other uncertainties that most large scale projects face.

### *Monte Carlo Analysis*

The partial and extreme case scenarios that are examined above have some drawbacks. Firstly, they may not take account of all the information available about variables. This is particularly so with regard to the probability of the different scenarios happening. Secondly, they do not provide information regarding the statistical variance of the different variables. For example, if two projects have similar NPVs but one has a smaller variance on outcomes then we are better off choosing that one. We won't go into the details of Monte Carlo analysis but it is sufficient for our purposes to know that it is a risk modelling technique that uses statistical sampling and estimates of probability distributions in order to simulate the effect and likelihood of uncertain variables on project outcomes. The approach estimates a probability distribution for the NPV of a project. This is a complex method and specialist expertise is required.

### *Optimism Bias*

Having discussed the standard methods of conducting sensitivity analysis above, it is crucial to recognise that people tend to overestimate the benefits and underestimate the cost and timings of a project. There is a broad literature of ex post reviews that show these very facts. There are a number of techniques that can be used to overcome such bias.

## **8.14 Conclusion**

This lesson has explored the fundamental elements of project appraisal and programme evaluation. Studying it with regard to your earlier review of market failure, you will have come to appreciate that in order for government to deliver those goods and services that will not be provided for by the market, in an efficient and cost-effective fashion as possible, that it must engage in systematic appraisal and evaluation. It is obvious from the lesson that appraisal and evaluation are complex activities. However, the rational application of the concepts and methods discussed above can help direct resources to more efficient uses, lessen waste and increase the welfare of society.

## **9. Sources of Funds, Risk and Expected Return**

### **Learning Objectives**

On completing this lesson and the associated reading, you should be able to:

- identify the main sources of funds and how they are obtained
- state the return expected from each type of security and what form the return takes
- understand the relationship between risk and return
- measure risk and return.

### **9.1 Introduction**

This lesson identifies the sources of funding available to organisations and the return and risk associated with each type of funding. The relationship between risk and return is stated and the method of measurement of each is given.

### **9.2 Investment, Financing and Dividend Decisions**

- *The investment decision:* In earlier lessons we saw how decisions are reached about whether projects should be undertaken or not. Organisations faced with a choice of projects decide which to accept and which to reject. This is known as the investment decision.
- *The financing decision:* Up to now we have not considered how projects should be financed or whether the method of financing makes a difference. An organisation which decides to undertake a project must raise the funds to finance it. The decision on how to raise the funds is known as the financing decision.
- To examine the raising of funds by firms, it is necessary to look at the providers of the funds and their decision - making process. A company can raise funds from its owners (i.e. its shareholders) or they can borrow the money. Shareholders decide, which, if any, company or companies to invest in. We will address the issue of how shareholders react to the risks involved in buying shares.
- *The dividend decision:* If a company makes profits it will need to decide what to do with them - whether to retain them or distribute them to shareholders. This is the dividend decision.

The next four lessons deal with the financing decision and the dividend decision. The interaction of all three decision areas is also treated.

Every organisation, whether it be a small business, multinational enterprise, Government or state-sponsored body, needs funds to operate. The sources of funds available will depend on the size and structure of the organisation and its ownership.

### **9.3     Government Bonds**

Government bonds are also known as Government stock, gilt-edged securities or simply gilts. When the Government wishes to raise money to finance a deficit, one of the sources of funds available to it is the sale of bonds to the public through the Central Bank. Buyers of Government stock are effectively lending money to the Government and receiving interest in return. Government stock is usually issued by the Bank for a specific term and at a fixed rate of interest which is known as the coupon.

#### *Coupon*

The coupon is the rate of interest payable and is usually stated in the title of the stock, e.g. 13% Exchequer stock. Interest is usually paid in one of two moieties every six months. The rate of interest is guaranteed and there is no likelihood of default. Most gilts are issued at a fixed interest rate but some variable rate stocks are issued from time to time.

#### *Maturity Date*

The maturity date is the date on which the Central Bank will buy back or redeem the bond and is generally stated on the stock. Stocks are categorised by their redemption date, generally into those maturing in under 5 years, 5 to 10 years and over 10 years. A perpetuity is a stock which has no maturity date and is never redeemed.

#### *Issue of Government Stock*

The Central Bank will issue a new stock at the lowest rate of interest which it estimates will attract enough buyers to take up all of the issue. This rate will generally be slightly lower than the market rate of interest. Government stock can be purchased by the general public but a substantial part of any new issue of gilts will be taken up by financial institutions such as insurance companies, pension funds and banks.

#### *Trading of Government Bonds*

Some investors will buy a gilt when it is issued and keep it until it matures at which stage they will receive their money back. However, an investor may find that he requires his money before the stock matures. It is possible for him to sell his stock to another investor. The price he receives for it may be greater or less than the original €100 a unit paid by him and will depend on the level of interest rates in the market at the time of the sale relative to rates at the time of the issue. If interest rates have increased since the issue the price of the bond will be less than €100, whereas if they have fallen, the price will be over €100. The price of the bond will fluctuate in such a

way that its yield will broadly equate to the level of interest rates prevailing at the time. Let us take an example.

The Central Bank issues a new stock (a perpetuity) "10% Exchequer stock" and an investor purchases one unit at €100 when the general level of interest rates is 10%. He will receive €10 a year in perpetuity. A year later the investor decides to sell the stock. In the meantime the general level of interest rates has increased to 16% and, therefore, prospective purchasers will be able to obtain 16% elsewhere. The seller will only be able to sell at a price which will yield 16% to a purchaser. The purchaser pays €62.50 ( $\frac{10}{16} \times 100$ ) for the stock and the €10 coupon is equivalent to 16% of that price. €62.50 is the market price of the stock. The market value of Government stocks fluctuates as the prevailing level of interest rates changes.

#### 9.4 Yield

The yield is the return on an investment, taking into account the annual income (or coupon) and its present market value. To calculate the yield of a stock, divide the coupon by the market price and multiply by 100. So the yield in the above example is  $10/62.50 \times 100 = 16\%$ . Calculate the yield in the above example if the market price of the stock was €120.

##### *Yield to Maturity*

In the above example, the stock was a perpetuity, *i.e.* it will never be redeemed. Governments rarely issue perpetuities nowadays but there are many in existence that were issued formerly, in particular British gilts (war loans). In most cases the stock will have a maturity date. The yield to maturity or gross redemption yield takes account of the face value of the stock and the maturity date as well as the coupon. If the redemption date is 10 years hence it will have less of an impact on the gross redemption yield than if the stock were to be redeemed in 3 months time. The yield to maturity of a stock with  $n$  years to maturity, a coupon of 9% and a market value of 4112 is found by solving for  $r$  in the following formula:

$$112 = 9 + \frac{9}{(1+r)} + \frac{9}{(1+r)^2} + \dots + \frac{9}{(1+r)^n}$$

The yield to maturity is in fact the internal rate of return.

#### 9.5 Ordinary Shares

Ordinary shares or equity capital is the permanent capital put up by the owners (shareholders) of a company. Ordinary shares are denominated in specified units known as the nominal value of the share. When a company issues shares it receives

only the issue price of the share, which may be greater than or equal to the nominal value. Once the company has issued shares they become the property of the purchasers, who are free to sell them. The share price is negotiated between buyer and seller and the deal may be effected through the Stock Exchange if the shares are quoted shares. While the majority of limited companies in Ireland are not traded on the Stock Exchange, we will deal mainly with those companies that are.

The shareholders as the owners of a company are entitled to the fraction of the capital represented by the share and have a right to receive the appropriate portion of any profits which are distributed in the form of dividends. Ownership of a share does not automatically entitle the owner to a dividend. The company may decide to reinvest all profits in the company. Retained earnings are an important source of funding to companies.

## **9.6 Rights Issues**

A company which wishes to raise a particular amount of money can do so by creating and selling new shares. The new shares will be issued to the company's shareholders in proportion to their existing holding of shares. For example, a company may invite shareholders to purchase one new share for every four existing shares held (a one-for-four rights issue). The new shares are usually offered at a discount, i.e. the price will be lower than the market value of the shares. A discount of 10-20% is common. Let us take an example.

A quoted company whose shares are trading at 180 cents wishes to raise €9m from a rights issue and offers one share at 150 cents for every four shares held. An investor who takes up his rights will buy one new share for every four shares which he holds. The average value of his shares after the issue is calculated as follows:-

$$\begin{array}{rcl} 4 \text{ existing shares at } 180c & = & 720c \\ 1 \text{ new share purchased for} & & 150c \\ \hline & & 870c \\ \\ \text{Value of each share (870/5)} & = & 174c \end{array}$$

After the rights issue the shares should trade in the market at 174c all other things being equal.

## **9.7 Return to Ordinary Shareholders**

Investors who invest in a company expect to receive a return. Dividends, which are the portion of the profits the company decides to distribute to its shareholders, are the payment to investors in ordinary shares. A profit-making company will have a dividend policy, *i.e.* its policy in relation to its profits.

It may distribute all its profits, reinvest all of its profits or may distribute a portion of the profits while reinvesting the remainder. The dividend policy of a company will affect a prospective investor's decision.

However, in the case of an investor in ordinary shares, the expected return on investment must include any capital gains (or losses) resulting from the increase (or decrease) in the market value of the shares.

For example, if a share is trading at 150c and investors expect a dividend of 5c per share and also expect the share to increase to 160c over the next year, then the expected return ( $r$ ) is calculated as follows :

$$r = \frac{P_1 - P_0 + \text{Div}}{P_0} = \frac{160 - 150 + 5}{150} = 10\%$$

$P_0$  = price at beginning of the year

$P_1$  = price at the end of the year

Div= dividend paid for the year

## **9.8 Borrowing**

Organisations can also raise funds by borrowing by means of overdraft facilities, short-term loans and long term loans from financial institutions. A company can also borrow by the issue of debentures that will form part of the loan capital of the company. Therefore, debenture holders are the creditors of a company. Debentures generally have a fixed rate of interest and are usually redeemable at par at a future date. They are usually secured on specified assets of the company and, consequently, are a reasonably safe form of investment.

Debentures are very similar to gilt edged securities and the yield on a debenture is calculated in the same way.

On the other hand convertible loan stock is unsecured and, therefore, will carry a higher rate of interest. However, the loan is convertible into ordinary shares at a specified future date.

The general term used to describe Government bonds, ordinary shares, debentures, preference shares, etc. is *financial securities*.

## **9.9 Stock Exchange**

The Dublin Stock Exchange is part of the "International Stock Exchange of the UK and the Republic of Ireland" as set up in 1986. The stock exchange is the main market in

which ordinary shares, Government bonds, debentures, convertible loan stocks and other financial securities are bought and sold. It is both a primary market, where new securities are issued for cash, and a secondary market, where existing securities are sold by one investor to another.

## **9.10 Risk to Investors**

When an investor invests money there is a risk that the return on the investment may not materialise or may be lower than expected and the money invested may be lost. If the risk of losing some or all of the money invested is high, then the expected return will have to be high in order to encourage investors to invest. Conversely, a low or negligible risk will carry a lower return on investment. Investment in Government stock is generally considered to be risk free. As a result, the return to an investor in gilts is low relative to all other investments and is often used as a proxy for the "risk-free rate". The risk-free rate is a rate of return in which there is no compensation to the investor for risk and the only element in the payment is for deferred consumption. The implication of this is that Governments can raise funds at a lower rate of interest than anyone else.

Government stock may not be risk free in some cases in unstable political systems, when the level of inflation rises, and for non-residents holding Government stock when there is a likelihood of devaluation.

### *Risk to Investors in Debentures*

Debenture stock is generally secured, thus reducing the risk to the investor. However, there is a risk of default and the interest rate payable on debentures will be higher than that payable on Government stock.

### *Risk to Investors in Ordinary Shares*

In the event of a company's liquidation, the ordinary shareholder in a company will be repaid his investment only after all other creditors and claim holders are paid. As a result, the expected return is higher for ordinary shareholders, otherwise there would be no funds forthcoming from this source. With higher risk ventures such as oil exploration, the return will have to be higher than with blue-chip companies. A blue-chip company is a well known company with a proven track record.

## **9.11 The Investor, Risk, and Expected Return**

There are three important elements in undertaking investment in financial securities: the decision to invest, the risk involved in an investment, and the expected return from the investment.

Investors are generally considered to be risk averse, *i.e.* they dislike risk. Because of this a higher risk investment will have to offer a higher expected return—if the return or expected cash flow was the same for investments with different levels of risk, investors would buy only the investments with the lowest level of risk.

Therefore we can assert that an investor makes a decision to invest based on the risk and the expected return of the investment. This is a very important concept for the financial decision-maker of a company that wishes to undertake a particular project. The company's ability to raise capital will depend on the investor's perception of whether the risk of purchasing the shares of the company is adequately compensated by the expected return (in dividends and increased value of the shares). Any investment project undertaken by the company should have an expected return which compensates for the level of risk of the project.

### **9.12 Measurement of Risk and Return**

Thus far we have looked only at the return of an investment in a single period - usually a year. However, to get a good picture of how stocks and shares perform, it is necessary to look at their performance over time. For example, a company could pay out a very large dividend in one year and then pay no dividends for the following three years. A person looking only at the year in which the large dividend occurred would incorrectly assume that the shares had a very high return. Likewise the value of a share could rise substantially on the stock market in one year and drop consistently after that.

#### *Arithmetic Mean and Return*

The return on a share is measured using the arithmetic mean (average). This simply means that the return on the share for each year is added together and divided by the number of years. Let us consider an example.

The return on the shares of company A for the five years was 3%, 8%, 5% 11% and 10% respectively. The average return on the share is  $(3+8+5+11+10)/5 = 7.5\%$

### **9.13 Standard Deviation and Risk**

The risk of a financial security is measured using the standard deviation. Consider the return on the three shares of companies A,B and C:

<b>Year</b>	<b>A</b>	<b>B</b>	<b>C</b>
2016	5%	15%	7%
2017	5%	8%	3%
2018	5%	-8%	6%
2019	5%	1%	3%
2020	5%	9%	6%
Average Return	5%	5%	5%
Standard deviation	0%	9%	2%

The average return in each case over the 5 years is the same. However, the identical results tell us nothing about the volatility of the shares. Share A gives a consistent 5% per annum while share B has very mixed fortunes and even gives its investor a loss in 2018. Clearly the mean used on its own does not tell us enough about the shares. We need a measure of the spread of the return on the shares over time. This is given by the standard deviation which shows the degree to which the individual annual returns are scattered around the average - the greater the difference between the individual figures and the mean, the higher will be the standard deviation.

This is a very important result. The highest standard deviation occurs in the returns on the shares of company B. If we examine the individual annual returns, it is obvious that they are very widely scattered between -8% and 15% and there is a high chance that the investor will actually lose money. The cash flow could not be considered dependable unlike the return from the shares in company A which exhibit a steady reliable income. Someone looking for a safe investment would certainly prefer company A. Company B would be a far riskier bet. We can now assert that the standard deviation on the return of a share is an indicator of the riskiness of the share.

Note: The figures given above for company A would be an unusual result for the return from ordinary shares. It is, however, the return which would be exhibited by a gilt with a 5% coupon, in which case the risk would be nil. Also in the above example all investors would invest in company A since the return on all the three shares is the same, but the risk involved in B and C is higher. (If you have difficulty understanding mean and standard deviation you will find the adequately explained in any introductory book on statistics).

## 10. Financial Policy

### Learning Objectives

On completing this lesson and the associated reading, you should be able to:

- understand the Dividend Valuation Model (DVM)
- use the DVM to obtain the market value of a company and/or the cost of equity capital
- explain the Weighted Average Cost of Capital and its importance
- understand Business Risk and Financial Risk
- explain the Capital Structure debate
- identify the traditional view and the Modigliani-Miller view and contrast them
- consider the implications of taxation on capital structure.

### 10.1 Introduction

This lesson examines the cost of the two main sources of financing available to a company (debt and equity) and the cost of a weighted average of the two. The relevance of the cost of capital is explained. The lesson finishes with the debate about the best mix of debt and equity in a company.

Companies who wish to expand their operations or to undertake new investment projects have to decide how to finance them. Capital projects are usually financed from three main sources of long-term finance: ordinary share capital, retained earnings and loans from banks and other financial institutions. Other sources of finance are leasing and Government grants, but the emphasis in this lesson will be on the first three.

In order to decide which method of financing to use, it is necessary to first calculate the cost of each source of finance.

### 10.2 Cost of Equity Capital

Equity capital includes ordinary shares and retained earnings.

#### *Ordinary Shares*

The important characteristic about funds raised from the sale of ordinary shares is that they are not repayable. While the purchaser may transfer the shares by selling them, a company does not (normally) redeem ordinary shares. A company will issue new shares at the approximate market value of the current shares. If a company hopes to raise finance from new share issues, it is important that the market value of the shares is maximised.

### *Dividend Valuation Model*

It is the flow of dividends to the shareholders which give a share its market value. The 'Dividend Valuation Model' (DVM) states that the market price of a company's shares equals the sum of its expected future dividend flow, to infinity, discounted to present values. The discount rate used in the DVM is the return which an investor can expect to obtain on the shares.

The three variables involved in the DVM are the dividend payable (d), the market value of the share (MV) and the return on the share (r). You need to understand the relationship between them and how to manipulate them. The DVM states that the return from a share is its dividend divided by the share price,  $r=d/MV$ . This can also be stated as  $MV = d/r$ .

#### EXAMPLE

$$d = 10\text{p p.a. in perpetuity.} \quad \text{Share price (MV)} = 80\text{p}$$

$$80\text{c} = 10\text{p}/r \text{ therefore} \quad r = 10\text{c}/80\text{c} = 12.5\%$$

The expected return on the shares is the "cost of equity capital" to the firm. Stated simply, if an investor bought a share in a company for 80c and received a dividend of 10c pa, then the return on his investment would be 12.5% pa and the cost to the firm for its funds would also be 12.5%. We can make the following statements about the equity of the company.

$$\text{Market Value of Share} = \frac{\text{Dividend}}{\text{Cost of Equity Capital}}$$

$$\text{Total Value of Equity} = \frac{\text{Total Dividend}}{\text{Cost of Equity Capital}}$$

We can now make the following statements about this company. Shareholders require an expected return of 12.5% for investing in this company. 12.5% must be the going rate of return elsewhere on the stock market for investments with the same level of risk. This implies that if the company cannot achieve at least a 12.5% return on investment, its investors will simply move their funds elsewhere on the stock market. Therefore, if the company cannot find projects which give 12.5% return they should not invest.

There is an inverse relationship between the expected return and market price of the shares.

Expected Return	Dividend	Share Price
12.5%	10c	80c
15%	10c	67c

As expected return increases share price falls (unless dividend also increases). An increase in the dividend should be reflected in an increase in the MV of the share.

Note: A share can be quoted as "cum div" meaning that it is being sold just before its dividend is paid, or "ex div" which is just after its dividend is paid.

#### *Dividend Growth Model*

The assumption above is that the dividend remains unchanged in perpetuity. This is not totally unrealistic as many firms have paid the same dividend over many years. However, most firms will be expected to increase dividends from time to time. The dividend growth model adjusts for expected growth in dividends.

$$\text{Adjusting for growth - MV of share} = d_0 (1 + g) / (r - g)$$

$d_0$  = dividend paid in year one

$g$  = growth rate

Growth can be estimated using an average of historical data.

#### *Taxation and the Cost of Equity Capital*

The effects of the taxation of dividends have been ignored up to now. Corporation tax is payable on dividends and may reduce the amount of cash dividend received by the shareholder. This means that the amount of cash paid out by the company is not equal to the amount of cash received by the investor. In other words, the return on investment received by the shareholder is different to the cost of equity to the company. Taxation represents a distortion. The company may be able to operate in a way which will reduce the amount of tax paid by its shareholders.

#### *The Cost of Retained Earnings*

The cost of retained earnings equals the cost of equity capital, as retained earnings are owned by the shareholders of the company and form part of the equity of the firm. Retained earnings are a slightly cheaper source of investment funds than a rights issue because of the issue costs of the latter.

### **10.3 Debt Cost of Capital**

There is a great variety of debt available to a company in the form of interest bearing medium- to long- term loans. Some debt capital is quoted on the stock market in the form of debentures, but most is unquoted. Debt capital is a loan made to a company

and is usually secured against the assets of the company. Holders of debt capital receive a contractually fixed annual percentage return on their loan, known as the coupon rate. Debt capital is ranked ahead of equity capital for payment, which means that interest on debt capital must be paid in full before any dividend may be paid to ordinary shareholders.

Debt capital, therefore, is less risky than equity capital and it follows that the expected return on the company's debt should be lower than the expected return on its equity.

The market value of debt capital is the summation of the future cash flows it will produce plus the redemption value (if any), discounted to present value. Debentures with fixed coupons, which are traded, will have their yield equated with the market rate of interest by fluctuations (from their nominal value) in the price at which they change hands.

Note, however, that, the opportunity cost is the market rate of interest and not the coupon rate. A company which has managed to raise debt at say 5% less than the market rate of interest should discount the project at the market rate and not the coupon rate. It could invest the capital in the market at the market rate, which may be more than the expected return of the project.

#### *Convertible Debt*

The holder of convertible debt is paid a fixed rate of interest with an option at a later date to convert the debt into ordinary shares at a predetermined price per share, or to have the debt redeemed. The owners of convertible debt can usually choose their time of conversion within limits set down by the issuing company.

#### *Taxation and the Debt Cost of Capital*

Taxation causes a distortion in the market as companies can offset their interest payments against their tax liability, whereas the individual investor cannot. This means that the company can effectively borrow at a lower rate of interest than the individual investor. This can be quoted as one of the reasons why companies raise debt. It must be noted that to obtain tax relief a company must have sufficient tax liability, *i.e.* be making sufficient profits.

### **10.4 Use of the Cost of Capital**

Why is the cost of capital important to a company? Let us look first at a simple example.

Mr. Murphy is offered a block of 20 apartments for €1m. He firmly believes that he will be able to sell the apartments in one year for €55,000 each, giving him a profit of €100,000 ( $55,000 \times 20 - 1m$ ) - a return of 10%. As he does not have any funds he approaches a financial institution for a loan and is offered terms at 12%. He does not

take up the offer as the interest on the loan would amount to €120,000, which is more than his expected profit. He would make a loss on the deal and would not be able to repay €20,000 of the loan.

His expected profit from the deal should equal at least €120,000 or 12% before he should purchase the apartment block. In other words, the discount rate which he should apply to his investment projects (the buying and selling of property) is 12%.

Different investment projects have different discount rates depending on the level of risk. The financial institution might be prepared to loan Mr. Murphy funds at a lower rate of interest, if the outcome of the deal were more certain. On the other hand, if Murphy decided to get involved in oil exploration, the interest rate on the loan would probably be much higher.

A limited company faces the same problems as Murphy. Its shareholders require a particular rate of return by way of dividends. If a company pays lower than expected dividends over a number of years, shareholders will sell their shares and the share price will fall and will continue to fall until the expected return is achieved. (Remember as share price falls while the cash amount of the dividend remains constant, the return increases). A lower share price will make it more difficult for the company to raise capital in future as it will have to sell more shares to obtain a target level of funds.

The only way that a company can hope to pay the shareholders their required rate of return is to invest only in projects that have an expected return greater than or equal to the shareholders' required rate.

## **10.5 Weighted Average Cost of Capital (WAAC)**

From a capital structure point of view, there are two types of companies. One type is where the capital structure is (i) made up entirely of equity capital. The other is where the capital structure consists of both equity capital and debt capital, which vary in proportion from company to company. The second type of company is more common. Short term loans (less than 5 years) and overdraft facilities do not form part of the capital structure of a company.

### *All-Equity Company*

In an all-equity company the cost of capital is the cost of equity. This cost is the return required by the company's shareholders and represents the opportunity cost of the shareholders capital. In other words, if the shareholders can obtain a higher expected return for a similar level of risk elsewhere, they will transfer their funds from the company. The implications of this for the company's management is that they must ensure that any investment project undertaken by the company has an expected return greater than or equal to the opportunity cost of its shareholders' capital.

The discount rate to be applied by a company to its investment projects in an all equity company is the return required by its shareholders.

### *Debt and Equity Company*

In a company which is financed by both equity and debt the WACC is a weighted average of the cost of debt and the cost of equity. For example, if a company is 50% financed by equity costing 20% and 50% financed debt costing 10%, then its WACC is 15% ( $0.5 \times 0.2 + 0.5 \times 0.1$ ). The WACC at 15% is the discount rate which should be applied to investment projects by this company.

#### Scenario 1

The firm decides to raise an additional €2m of debt at a cost of 10% to undertake a project. The expected return from the project is 12%. Should the firm undertake the project?

#### Scenario 2

The firm decides to raise €3m from a rights issue (expected return is 20%). A project with an expected return of 16% is mooted - should the project be undertaken?

If the company wishes to retain the 50:50 capital structure, then it should use the 15% WACC discount rate and the project in Scenario 1 should be rejected and the second project accepted. There are costs attached to raising capital and if the firm wishes to find funds for a project there are economies of scale to be derived from using one source of funds only. This may lead to temporary fluctuations in the firm's capital structure but these will be corrected over time. The company uses the discount rate which reflects its overall cost of capital.

If the firm wishes to change its capital structure then the weights in WACC will change leading to a change in the WACC.

### *Problems with WACC*

The firm's projects must be completely homogeneous because the WACC is an average. A firm with two sections, one high risk and one low risk, using its WACC as a single hurdle rate is liable to make incorrect decisions. Further, in the real world firms encounter difficulties in calculating their WACC.

Note: If the firm invests in projects of greater risk, then there is an increase in the required cost of capital. Theoretically it is the firm's investment decisions which determine its cost of capital not vice versa.

## **10.6 Business Risk and Financial Risk**

There are several types of risk which may be present in a company.

### *Business Risk*

Business risk is the risk which is caused by the nature of the company's operations. For example, the business risk of an oil exploration company would be much higher than the business risk of a supermarket chain or a company which manufactures furniture. Business risk is borne by both debt holders and equity shareholders of a company.

### *Financial Risk*

The term "gearing" is used to indicate the level of debt in a company. It is defined as the ratio of the market value of debt capital to total market value (i.e. debt + equity). In American textbooks, the word leverage is used to denote gearing.

Financial risk relates to the amount of debt held by a company. Financial risk is borne only by the equity shareholders of a company financed by debt and equity. It is caused through debt capital having priority over equity in:

- i) the distribution of annual interest and dividends
- ii) the distribution of funds in the event of a liquidation of the company.

Financial risk arises from the fact that shareholders are always at the back of the annual pay-out queue. Financial risk increases as gearing increases. The more highly geared the company the greater the amount of interest that has to be paid before dividends can be paid. Financial risk is part of the overall risk of a company. In an all-equity-financed company, the shareholders hold only business risk and no financial risk.

## **10.7 The Capital Structure Debate**

From the above analysis it is clear that the cost of capital is important for decision making in a company. The cost of capital dictates whether a project is undertaken or not. However, there is another question which a firm must address.

Shareholders who are the owners of the company will expect the management of their company to maximise wealth. Is there a particular capital structure which will maximise shareholders' wealth? The choice of capital structure, i.e. the debt equity ratio, is known as the Financing Decision.

We saw above that equity capital is more costly to a firm as the risk to shareholders is greater than the risk to debtholders. This might imply that since debt capital is cheaper, a company should be almost completely financed by debt.

### *The Traditional View*

The traditional view is that as gearing in a company increases, the WACC falls initially and then increases. The optimal level of gearing is the point at which the WACC is lowest. WACC falls as gearing increases because the lower cost of debt is not offset by increased cost of equity. Also there is tax relief on interest paid. WACC increases because as gearing increases the cost of debt increases. Traditionalists believe that there is an optimal capital structure for each company which minimises its WACC and so maximises its total market value.

### *Modigliani-Miller*

The capital structure or financing decision was analyzed by Modigliani and Miller (M and M) in 1958.

M and M's three propositions are as follows:

- The total market value of any company is independent of its capital structure and can be found by capitalising its expected returns at a discount rate appropriate to its risk class.
- The expected yield on the equity of a geared company is equal to the appropriate overall capitalization rate plus a risk premium for financial risk.
- The cut-off rate of return for new investment should be equal to the WACC.

The assumptions used by M and M are as follows:

- At any given level of risk, individuals and companies can borrow at the same level of interest which remains constant for all levels of gearing.
- There are no transactions' costs and no bankruptcy costs.
- There is no limited liability advantage for companies.
- There is no taxation (initially).

The total market value of a company is derived from its future expected cash flow, which consists of its future dividend flow and its future interest and redemption flow. According to M and M, changing the gearing ratio cannot have any effect on the company's annual cash flow. The only effect it has is that it changes the proportions of the cash flow which are paid out as dividends and interest. The higher the gearing, the greater the amount of the firm's cash flow paid out as interest, leaving a smaller amount for dividends. Neither will changing the gearing ratio affect the company's WACC, which is determined by the amount of business risk in the company's annual cash-flow.

The return to debt is smaller than the return to equity. If the WACC remains constant as the gearing level increases, (and the interest payments to debt are constant) the return to equity must be increasing with the gearing level. This increased return is for holding the extra financial risk represented by the increasing gearing level.

Shareholders do not actually gain—the increased return simply reflects the higher risks involved in holding the equity capital of a highly geared company.

It is business risk which determines a firm's overall return. As business risk is unaffected by gearing, it follows that companies with the same degree of business risk will all have the same WACC even though they have differing gearing ratios.

Changing a company's gearing cannot have any effect on its annual cash flow as that is determined by the assets in which the company has invested and not how those assets are financed. If the above conditions did not hold - companies with the same business risk and different WACCS - there would be a short-run disequilibrium situation. In such circumstances, arbitrageurs would move into the market, selling shares in the company with the lower valued WACC and buying shares in the company with the higher WACC, in order to profit from such circumstances. This would eventually equalise the two WACCs.

The arbitrage transaction would proceed as follows. The investor would sell shares in the company with the lower WACC and would then buy shares in the company with the higher WACC, having borrowed funds (if necessary) to maintain the same level of financial risk as was held in the company with the lower WACC. (This is substituting home-made gearing for the corporate gearing already held).

#### *Problems with M and M*

- For the arbitrage process to act as proof of the M and M proposition, shares in a geared company must be seen as perfect substitutes for shares in an all equity company.
- Assumption of perfect capital markets and no limited liability for companies. M and M countered this by claiming that limited liability companies sometimes have substantial holdings of shares in other companies. This can get over the assumption of perfect capital markets, as it is not necessary for all shareholders to use arbitrage—all that is needed is enough to bring the share price into equilibrium. However, there is some evidence to suggest that many institutional investors do not readily indulge in arbitrage transactions.
- In reality, transactions costs may be expensive and any gain from arbitrage may be offset by those transactions costs.
- As the percentage debt in a company rises, the cost of debt increases. If this occurs and the WACC is to remain constant, then the return to equity will at first not correctly reflect the increasing financial risk and will ultimately start to fall. M & M's answer to this is that at very high gearing levels the small amount of equity remaining is acquired by "risk-seekers" who are prepared to take a very high risk in return for a small chance of a very high return.

## **10.8 Capital Structure and Taxation**

A company in a taxation regime which allows debt capital interest to be set off against tax liability will be able to increase its expected annual net after-tax cash flow, by gearing up. Therefore, a geared company's total after-tax cash flow can be split into (a) the after-tax cash flow which would arise if it were all equity financed and (b) the tax relief it receives on the debt interest payments. This is equal to the product of interest paid and the tax rate. The more highly geared the company becomes, the larger is (b) and, therefore, the greater is the addition to cash flow. The value of the company is also increased by gearing.

Value of a geared company =

- a) value of the company if it were all equity financed
- +b) the present value of the tax relief on debt interest

This term (b) constitutes what is known as the tax-shield.

In a taxed world, although the cost of equity capital would still be expected to increase with gearing because of the presence of financial risk, it would do so at a slower rate than in a tax-free world.

Summarising, in a taxed world, the more highly geared the company, the lower will be the WACC, the higher will be the value of the company and the greater will be shareholder wealth. This increased wealth comes about through the tax-shield, as it is the shareholder who benefits from subsidised interest payments.

### *Agency Costs*

These arise from the principal-agent problem, which is concerned with how the instructions and objectives of the owners of capital (principals) can be reconciled with the interests of agents (management) acting in their own interest. The principal-agent problem is the problem of external financial control of management by the suppliers of company finance.

Owners of debt may impose restrictions as a condition of the loan:

- the level of dividends paid out may be restricted
- the level of additional debt finance may be restricted by covenant
- debt holders may insist that prior agreement be obtained before a firm can dispose of fixed assets.

As debt increases, so also do the constraints on management, who then try to minimise such constraints. They may do this by maintaining low gearing.

### *Bankruptcy Costs*

The probability of bankruptcy is likely to be an increasing function of the company's gearing ratio. Also the costs of bankruptcy include legal costs, administrative costs, the cost of specialised company assets failing to realise their correct market value on disposal and the loss of going concern, goodwill and synergy values.

Debt interest payments are fixed, whereas cashflow may vary with the business cycle. Thus, as gearing increases, so too does the expected cost of bankruptcy. Also, the cost to management of bankruptcy may be higher than the cost to shareholders as the cost to managers may be the loss of their jobs. Management, therefore, may be reluctant to increase gearing. Shareholders may hold diversified portfolios and, as a result, the cost to them of bankruptcy in a firm may be low.

### *Debt Capacity*

Most debt capital lent to companies is secured against the fixed assets of the company. The most important characteristics of an asset in determining its suitability as security are its second-hand value and its rate of depreciation. Specialised machinery is not a good bet for securing a loan.

Debt capacity means the percentage of the asset's value that can be, for example, used to secure a loan. A mortgage on a building may be given for 90%, whereas only 20% of the value of a lorry may be forthcoming as a loan.

### *Tax Exhaustion*

If a company does not pay enough tax it cannot claim the tax relief. Therefore, the cost of debt capital rises again to the full rate of interest payable on the debt.

# **11. Portfolio Theory and the Capital Asset Pricing Model**

## **Learning Objectives**

On completing this lesson and the associated reading, you should be able to:

- understand the risk reduction effect of diversification
- describe the market portfolio
- construct the Capital Market line
- distinguish between systematic and unsystematic risk
- understand how Beta measures a share's performance
- reproduce the formula for CAPM and use it to value a security.

### **11.1 Introduction**

This lesson introduces portfolio theory and the risk reduction effect of spreading an investment over several securities. The market portfolio is explained and the student is introduced to the "Beta" of a share and to the Capital Asset Pricing Model.

### **11.2 Portfolio Theory**

An investment portfolio is a collection of different financial securities held by either a private individual or a financial institution. Portfolio Theory examines the effect on risk and return of splitting an investment over two or more securities. It is necessary that you know the assumptions underlying portfolio theory. In assignments and examinations, assumptions should always be stated.

Some of the assumptions underlying portfolio theory are as follows:

- Investor's objective is to maximise the utility of his wealth.
- Investors make choices on the basis of risk and return measured by the arithmetic mean return from a portfolio of assets and the standard deviation of those returns respectively.
- All investors can lend and borrow unlimited amounts at the risk-free rate of interest.
- There are no market imperfections - i.e. no taxation and no transactions' costs.
- All investors have access to the same knowledge and expectations about the future and have access to the complete range of investment opportunities. Investors are all price takers.
- All investors have the same decision-making horizons.

The expected return on a portfolio will be the mean or average of the expected return on the securities contained in the portfolio, weighted by the relative amounts invested in each security.

However, the risk of the portfolio will be lower than the average of the risks of the securities in the portfolio. This is because diversification reduces risk. Diversification works because the prices of the securities do not move exactly together, i.e. they are not perfectly correlated. For example, a fall in the price of one share may be cancelled out by a rise in the price of other shares.

The correlation coefficient measures the closeness of the relationship between two variables - in this case the variables are the returns on the two securities. (An introductory book on statistics will explain the correlation coefficient.)

The correlation coefficient gives results on a scale from +1 to -1. If the correlation coefficient is:

- +1 perfectly correlated - the returns on the two securities are identical over the period and there is no risk reduction effect.
- 0- +1 the prices of the shares will tend to rise and fall together but not by the same amount.
- 1 perfect negative correlation - the shares move in opposite directions by the same amount; for example a rise of 10% in the value of one share will be exactly offset by a fall of 10% in the value of the other share.
- 0- -1 the shares will move in opposite directions but not in proportion.

The risk reduction effect of a two asset portfolio increases as the correlation coefficient of the securities approaches -1. This simply means that a decline in the value of one security would be cancelled out by an increase in the value of the other.

### 11.3 The Market Portfolio

We have seen that spreading your investment over two risky securities reduces the average risk of the investment. The risk reduction effect continues as more and more risky securities are added to the portfolio, but the expected return of the portfolio is the weighted average of the expected return of the securities. Diversification reduces risk but not expected return. The maximum risk reduction effect is achieved by spreading the investment over all possible securities, *i.e.* over every share available on the stock market. This is known as the market portfolio. Investors (who are assumed to be rational) will require the highest possible return for any given level of risk, or for any given expected return, will choose the lowest level of risk. The only portfolio of risky assets which satisfies this condition is the market portfolio (M). The market portfolio is the ultimate diversified portfolio and all the risk which it is possible to eliminate has been diversified away. However, studies have shown that a portfolio constructed from a random selection of fifteen to twenty different shares results in the elimination of 90% of diversifiable risk.

## **11.4 The Capital Market Line**

An investor can choose to invest: (i) all his money in Government bonds, (ii) all his money in the market portfolio, or some combination of (i) and (ii). If he chooses to invest everything in Government bonds, then there is no risk and expected return will equal actual return, *i.e.* the risk-free rate. If, on the other hand, an investor requires the maximum return available, he or she will invest in the market portfolio. A fourth option open to an investor is to borrow at the risk-free rate (remember assumptions here) and invest in the market portfolio.

These four options represent the entire capital market to an investor and are represented by the Capital Market Line (CML - return is measured on the vertical axis and risk on the horizontal axis). The only decision which a (rational) investor has to make is where to locate on the CML. To locate at any point which is not on the CML would mean that an investor is obtaining a return lower than that available for the level of risk chosen.

Investors require a higher return from risky assets than from government bonds which are risk free. The difference between the return on the market and the risk free rate is called the market risk premium and is given by the slope of the CML. This is the market price of risk. This means that if the slope of the CML is 1.5 then for every additional 1% risk taken on in a portfolio which contains risk free and risky assets, there will be an additional return of 1.5% on the portfolio.

## **11.5 Systematic and Unsystematic Risk**

Not all the risk can be eliminated by diversification. The risk attached to financial securities is made up of two types of risk: systematic risk (also known as market risk or undiversifiable risk) and unsystematic risk (also known as unique risk, specific risk or diversifiable risk).

Unsystematic risk is the risk specific to a particular company and maybe to its immediate competitors. This risk may stem from the management of a company, labour relations within the company, advertising policy whether the company has kept abreast of new developments. Unsystematic risk can be diversified away.

Systematic risk is the risk to all firms which stems from changes in economic activity. For example, during a recession (downturn) the value of most shares will fall on the stock market.

Bad management in one firm can be offset by good management in another firm, but an increase in interest rates will affect all firms adversely and cannot be offset. Some firms have greater exposure to systematic risk than others. For example, in a recession there will be a fall in the sales of luxury goods, while sales of necessities such as food may be unaffected. The shares of a company producing luxury goods would have higher systematic risk than shares of a company producing dairy

products. Systematic risk is caused by general macroeconomic conditions and cannot be diversified away.

In a well diversified portfolio, all unsystematic risk will have been diversified away and the only risk remaining will be systematic risk caused by general economic conditions. If the stockmarket rises or falls, the portfolio will be carried with it.

**Table 11.1**

Systematic Risk	Unsystematic Risk
Market risk	Unique risk Specific risk
Undiversifiable	Diversifiable away
Caused by general macroeconomic conditions	Caused by factors specific to each firm

### *Measurement of Systematic Risk*

As stated above, the shares of different companies will have different levels of systematic risk. For example, a recession will affect all firms, but it will have a greater impact on some. It is possible to measure the sensitivity of a security's return to movements in the market. This is done by comparing the historical returns on an individual security to the average return on the market portfolio. A stock market index can act as a proxy for the average return on the market portfolio; examples are the ISEQ index on the Dublin stock Exchange and the FTSE (Footsie) 100 index on the London Stock Exchange.

### **11.6 Beta**

Beta is a measurement of systematic risk. The beta of a company's share is the amount of that company's systematic risk relative to the systematic risk of the market portfolio. Share A with a beta of 0.7 has systematic risk equal to 70% of the systematic risk inherent in the market portfolio, while Share B with a beta of 2 has twice the systematic risk of the market portfolio. The market portfolio has a beta of one.

The returns from the market portfolio and an individual share are compared and it is this comparison which gives the beta value. Since higher returns are the compensation for higher risk, we can state that beta is a measure of systematic risk. Remember, the market will not provide a return for risk which can be diversified away (unsystematic risk).

In a rising stock market the return on Share B with a Beta of 2 will rise twice as fast as the market, while Share A with a Beta of 0.7 will increase by only 70% of the increase

in the market. The interesting point is that if the market were falling, the returns on share B would fall twice as fast as the market, while share A would only fall 70% as fast as the market. In effect, the Beta of a share measures the sensitivity of an individual share to the rises and falls of the stock-market.

Securities with negative Betas would provide the perfect hedge. A negative Beta means that, as the market falls, the return on the security increases. Gold tends to have a negative Beta. When the market is falling, players will look for a safe investment which will hold its value, such as gold. The increased demand for gold pushes up the price. Government stock has a Beta of zero as has any risk free security. Evidence tends to show that Beta values for individual firms are relatively stable over time. There is a tendency for Beta values to approach one in the long run.

### 11.7 Capital Asset Pricing Model (CAPM)

The market portfolio has a Beta of 1 and an expected risk premium of the difference between the return on the market portfolio and the risk-free rate ( $R_m - R_f$ ). Risk free investments have a Beta of 0. This information can be plotted on a graph - the expected return is given on the vertical axis as before, but Beta is now measured on the horizontal axis. We will assume that the risk free rate is 6% and the return on the market is 9% (as shown in the figure below). The line joining these two points is known as the security market line (SML).

But what about the expected return on the different risky assets within the market portfolio? These can also be plotted on the diagram. A share with a Beta of 1.5 is plotted and its expected return is noted to be 10.5%. A share with a Beta of 0.5 has an expected return 7.5%.

As stated above, Beta is a measure of systematic risk. In a competitive market, there is a direct relationship between a share's Beta and the expected risk premium of the share. For every level of systematic risk as measured by Beta, there is a specific expected return. This means that all shares can be plotted on the SML. If a security lay above the SML, then it would give a higher return than all other securities with that level of systematic risk; in other words, it would represent a bargain (be underpriced). Heavy buying of such a share would quickly drive up the price and by so doing would reduce the return until it equalled other shares with similar Betas.

This relationship is known as the Capital Asset Pricing Model (CAPM) which is a share price valuation model that can be represented as follows:

$$R_s = R_f + B(R_m - R_f)$$

$R_s$  = return on security

$R_f$  = risk free rate

$R_m$  = return on market portfolio

B = Beta of individual security

In the diagram  $R_f = 6\%$  and  $R_m = 9\%$

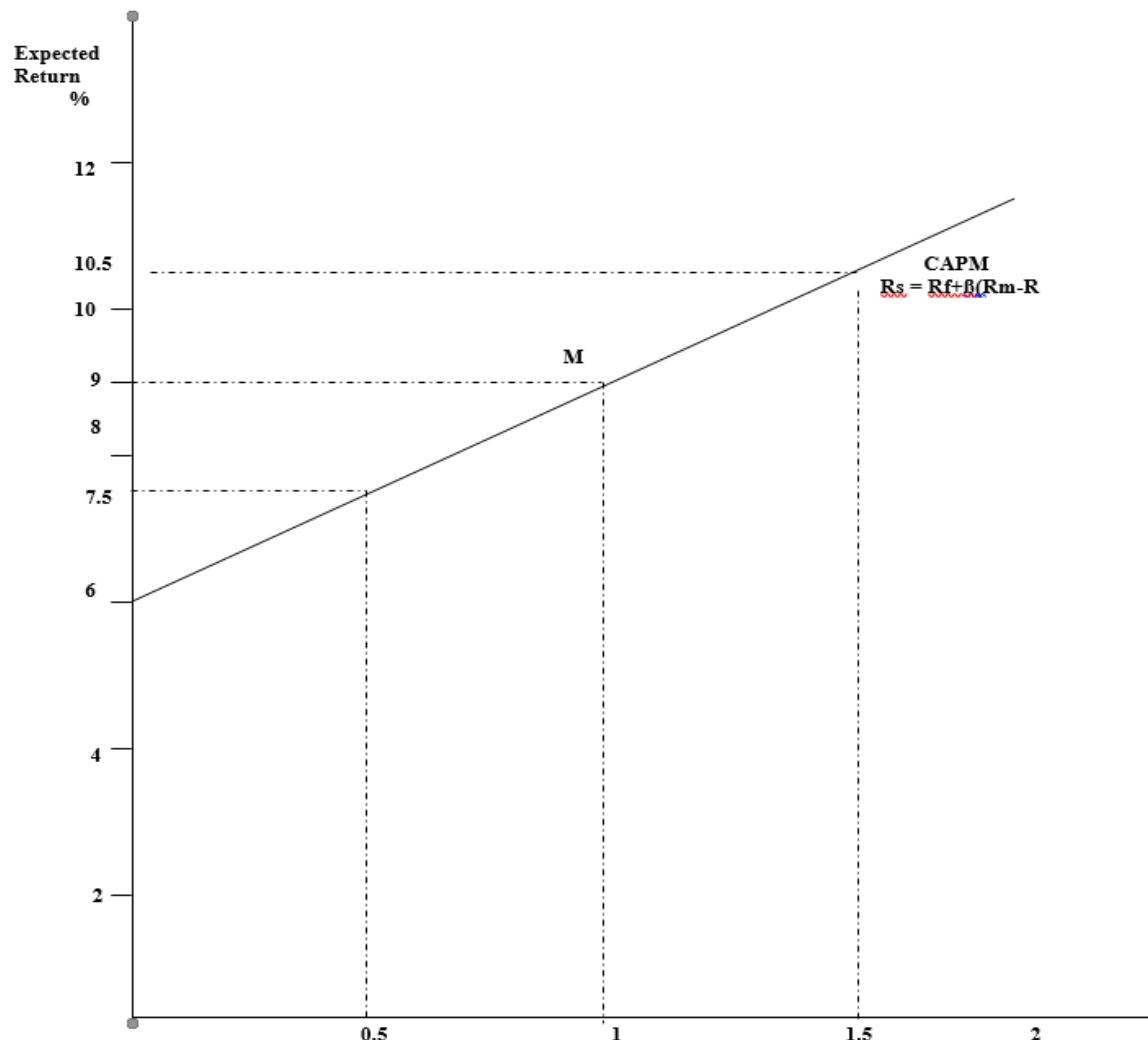
A share with a Beta of 0.7 would have a return of just over 8% while a share with a Beta of 2 would have a return of 12%.

The CAPM provides a relationship between an investment's systematic risk and its expected return.

CAPM states that the return on a share is equal to the risk-free return plus a risk premium. The risk premium is determined by the market price of systematic risk and the systematic risk of the security. CAPM provides the relationship between an investment's systematic risk and its expected return. Investments with a high level of systematic risk should expect a high return given that the market is assumed to be risk averse.

CAPM is a single-period model and there may be doubts about using it to generate a number to be used in a multi-period NPV analysis. Further, the Beta measure of systematic risk may not cover all the factors which determine expected return.

**Figure 11.1**



Evaluating the risk-free rate may be difficult. While the return on government stock may be risk-free in money terms, it may not be so in purchasing-power terms.

The risk-free return should be specified after personal tax, using the marginal tax rate of the marginal investor. This is difficult to identify.

The market return tends to be rather volatile in practice. It is also difficult to identify the correct adjustment for taxation.

Betas in practice are usually estimated using historical data, therefore the Beta value is only useful if Betas are stable over time.

### **11.8 Systematic Risk: Further Comment**

As stated above, systematic risk is caused by general macroeconomic conditions. It is increased by:

- A high level of sensitivity to general economic conditions, e.g. as evidenced by the luxury goods producer.
- The proportion of fixed to variable costs. With a downturn in the economy a firm's revenues will fall, but if they have high fixed costs the firm may go out of business.

Systematic risk can be further subdivided into business risk and financial risk.

#### *Business Risk*

This is borne by both the shareholders and the debtholders. The business risk is:

- the inherent risk of the industry itself (e.g. the risk attached to oil exploration, exporting to the third world)
- the stage in the product life-cycle
- % of fixed costs in total cost.

Business risk relates to the systematic risk of the net cash flow that results from the operation of the company's assets. (Assets = debt capital + equity capital).

#### *Financial Risk*

This arises out of the gearing process and is borne by the equity holders of a geared company. In an all-equity company the shareholders hold only business risk and no financial risk.

Financial risk is caused by debt capital having priority over equity capital. As interest payments to debt capital must legally be paid before dividends can be paid,

the higher the gearing the more likely it will be that the company will have no cash left to pay dividends.

Financial risk is systematic risk and cannot be diversified away. Therefore, shareholders will require a higher expected return on their capital for bearing increased amounts of financial risk. As a company increases its gearing, the amount of financial risk borne by its shareholders increases and, as a consequence, the cost of equity capital rises.

#### *Business Risk, Financial risk and Beta*

Since the assets of a geared company contain only business risk and the equity contains both business and financial risk, it is possible to distinguish between:

- the Beta value of a geared company's equity
- the Beta value of a geared company's assets.

The Beta value of a company's assets is a weighted average of its equity Beta and its debt Beta. The Beta of debt is virtually zero.

## **12. Dividend Policy and the Efficient Markets Hypothesis**

### **Learning Objectives**

On completing this short lesson and the associated reading, you should be able to:

- describe the different approaches to dividend policy
- understand the dividend irrelevancy hypothesis
- explain why different dividend policies attract different investors
- describe the efficient markets hypothesis
- explain why efficient markets are important.

### **12.1 Introduction**

This lesson looks at the decision which faces the firm on how to distribute its profits - the relative amounts of retained earnings and dividends. The second part of the lesson looks at the measurement of the efficiency of the financial securities markets.

### **12.2 Dividend Policy**

At the end of each accounting period the management of a company must decide how to allocate funds between:

- interest payments to debt holders (including preference share capital)
- dividends
- retained earnings.

Since interest payments are largely determined by the capital structure decision, there remains the allocation between dividends and retained earnings. Companies often have well defined dividend policies and the decision on the dividend payable will be determined by these. There are several theories on the "correct" dividend policies which should be applied by firms and they can be divided broadly into three groups:

- firms should pay the highest dividend possible
- firms should pay a low dividend
- the amount of dividend payable is irrelevant.

#### *Dividend Irrelevancy Hypothesis - M and M*

This model was first put forward by Modigliani and Miller (M and M). Their conclusion was that the company would only undertake investment if the market value of the equity after investment was greater than the market value of the equity before investment. To ensure this the return from the project must be greater than or equal to the WACC. Therefore, what has enhanced shareholder wealth was the

investment decision alone. The decision on dividend was merely a residual. M & M's argument is set in the perfect no-tax world of their initial capital structure hypothesis.

The company refers to the physical investment opportunities available to it, which are discounted at the perfect capital market rate of interest.

The amount of profit left over after the investment decision, which maximises shareholder wealth, is what is paid out in dividends. That is distributable cash earnings should be retained within the company for reinvestment as long as there are investment opportunities available which satisfy the expected return. Once the supply of investment opportunities has been exhausted any remaining earnings should be paid out as dividends. The pattern of dividends is irrelevant— they should be treated purely as a residual which arises once the investment decision is made.

In the M and M world, if the capital structure hypothesis (KSH) holds, then the dividend irrelevancy hypothesis (DIH) also holds. They depend on each other: the KSH holds only if the DIH holds and vice versa.

#### *Theory Advocating a Low Dividend*

This theory is based around tax policies. The rule is that when dividends are taxed more heavily than capital gains, companies should pay the lowest cash dividend they can get away with. Dividends, which are paid to the company's shareholders, are taxed as income to the shareholder at the shareholder's marginal income tax rate. Capital gains tax applies to any increases in share values. Income tax and capital gains tax rates may differ.

A company may follow a widely recognised dividend policy, to attract a certain type of shareholder. In a tax regime where marginal income tax rates are substantially higher than capital gains tax rates, some shareholders may prefer a low dividend in return for higher investment by the company which would result in substantial increases in share price values.

It must be remembered that not all shareholders have the same marginal income tax rates. However, investors may choose shares in companies which have a dividend policy which maximises their after-tax return on their investment.

A company which adopts a dividend policy which attracts such investors faces a dilemma if tax rates change. Should the firm:

- a) try to adjust its dividend policy so as to bring about the most favourable outcome to its existing shareholders,  
or
- b) continue with its existing policy and hope to attract new shareholders whose terms of taxation comply with company policy.

The objective of financial management is to benefit existing shareholders. If the firm chooses a) then the firm (and ultimately the shareholders) incurs the cost. If it chooses b) then the shareholders incur the cost.

### **12.3 Traditional View of the Dividend Decision**

This is the view held by most stock market investors and analysts. It is the 'bird in the hand' argument - €1 of dividends now is worth more than €1 of retained earnings.

The company is replacing a certain cash flow to shareholders now with a promise of a cash-flow in the future. This increased uncertainty will effectively raise the discount rate used against these flows and so cause the cost of equity to rise also. Thus increasing the value of retained earnings to be reinvested is likely to increase the cost of equity. This means that dividend policies effectively affect equity values. Dividend policy can alter the riskiness of the expected dividend flow.

The optimal dividend-retention policy must be that which trades off the beneficial effects of retention and profitable re-investment against the detrimental effects of increased risk. If this is done it will maximise the market value of equity. The investor's perception of risk is imperfect and this may lead him or her to undervalue the future dividend stream that the retained earnings will generate.

As with the two M and M hypotheses, the traditional views of capital structure and dividend decision are interdependent. A company's dividend policy affects the amount of earnings retained and can affect the company's market value through changing the gearing ratio.

### **12.4 Dividend Policy in Practice**

In a world of imperfect capital markets and high transaction costs, several arguments have been put forward to explain the dividend decision. By following a consistent dividend policy, the company attracts to it a clientele of shareholders whose consumption pattern accords with the dividend decision. This is known as the "clientele effect".

In practice, companies often follow a stable and easily identifiable dividend policy - not necessarily constant dividends but a constant dividend policy. Many companies follow a policy where a reduction in dividends is avoided and will only occur in very extreme cases and an increased dividend is only declared if management are convinced it can be sustained in the long term. In this way investors whose consumption pattern closely follows that of a firm will be attracted.

The opportunity cost of a constant dividend policy may be profitable investment opportunities which cannot be undertaken due to lack of funds or the issue costs of a

rights issue to raise the funds. This has a detrimental effect on company profits and, ultimately, on shareholder wealth.

## 12.5 Dividends as a Signal

In a world of imperfect capital markets, information is not costless or universally available to the stock market investor. The dividend declaration is free and universally available and, therefore, may be given more weight by investors than is justified - it is seen as a signal of future profitability. Studies have shown that an increase or decrease in expected future dividend levels does precipitate a rise or fall in share price. Hence the dividend declaration effect on the share price may be a major, if not the major, consideration in the decision.

Empirical evidence shows that the dividend decision is important and cannot be treated as a by-product of investment and financing decisions. While firms try to pay out a constant dividend, dividend growth tends to lag 2/3 years behind earnings growth (supporting the signalling hypothesis). Share prices also react to unexpected changes in dividend policy, further supporting the signalling hypothesis.

The bulk of evidence suggests that either dividend policy is important or is seen to be important.

## 12.6 Efficient Markets

In the last three lessons and in this lesson we have examined how firms finance their operations and how individuals invest their funds. Companies face three types of decisions:

1. The investment decision - what projects should be undertaken.
2. The financing decision - how to finance the project, either by debt or equity.
3. The dividend decision - the ratio of dividends to retained earnings.

Investors decide what securities to purchase. The decision here is the level of risk to be taken on.

The decisions of an investor and a company are taken independently of each other, yet each hope to maximise utility. A market in financial securities (stock markets, etc) is the link between the firm and the investor and, like all markets, supply and demand for individual securities decide the price. The prices of financial securities traded on the stock market are generally much more volatile than prices of goods and services.

But how do we know that the price of each investment will give an expected return which will adequately compensate for the level of risk involved? Are identical returns obtainable for identical levels of risk? Are firms making the correct physical investment decisions to ensure continuing support from their shareholders? In other

words, can we say how efficient is the market in financial securities? An efficient market will ensure that returns reflect the risk involved and that firms making consistently poor investment decisions will go out of business.

### **12.7 Efficient Markets Hypothesis**

The market for shares and other financial securities is efficient if the share price rapidly reflects the effects of all information relevant to its value.

#### *Reasons Why Markets Should be Efficient*

- It is important that the market correctly values a company's shares otherwise, cost of capital calculations will be of little use.
- The objective of financial decision making is to maximise shareholder wealth by maximising the value of company shares. It is important, therefore, that the effects of financial decisions once they are communicated to the stock market, are rapidly reflected in the share price.
- If markets are efficient there is no such thing as shares being undervalued or expensive as all shares are correctly valued. Companies will often look for the right time to issue new shares, i.e. when share price is high. (If a new issue was made when the share price is low, it would be considered that the shares were issued too cheaply and consequently the cost of capital would be too high.)
- If markets are efficient there is no right or wrong time to issue shares.
- If the stock market is efficient a takeover decision should not give a positive NPV as the share price reflects a company's true worth. This does not apply to unquoted companies.
- Financial managers should ensure that they communicate all relevant information to the market.

### **12.8 Stock Market Analysis**

Analysts have traditionally examined share movements in order to attempt to predict the future value of those shares. There are different levels of information which can be obtained and which dealers hope will give them an edge on the market.

#### *Technical Analysis*

Technical analysts, known traditionally as Chartists, study charts of share price movements in order to discover patterns of movement. When they find a recurring pattern starting to develop they may be able to predict the share's future course.

#### *Fundamental Analysis*

Fundamental analysts specialise in particular sectors of the stock market, which they study in depth and on which they become very knowledgeable. They derive a value

for a share, based on other share values in that sector and compare it to the market price of the share. If they differ there may be a profit to be made.

### *Insider Information*

This may be illegal in some forms. Any information, insights or connections which are not yet fully reflected in the market price may be "inside" information.

## **12.9 Levels of Stock Market Efficiency**

There are three levels of stock market efficiency:

1. *Weak-form Efficient*: Share prices reflect all information which can be obtained from studying and analysing past movements in the share price. If a market is weak-form efficient, technical analysis will not give any advantage to the chartist.
2. *Semi-strong-form Efficient*: Share prices reflect all the relevant, publicly available information that is known about the company and its circumstances. (A semi-strong form efficient market is also weak-form efficient.) If a market is semi-strong form efficient both technical and fundamental analysis is useless.
3. *Strong-form Efficient*: Share prices reflect all relevant information about their value, even though some of that information may not be available to investors in general. Technical analysis, fundamental analysis and the use of inside information give no advantage to any investors if a market is strong form efficient

## **Appendix**

### **The Public Spending Code**

**Expenditure Planning, Appraisal, & Evaluation in the Irish  
Public Service: Standard Rules & Procedures**



# Public Spending Code

All Irish public bodies are obliged to treat public funds with care, and to ensure that the best possible value-for-money is obtained whenever public money is being spent or invested.

The Public Spending Code is the set of rules and procedures that apply to ensure that these standards are upheld across the Irish public service. The Code brings together in one place all of the elements of the value-for-money framework that has been in force up to now, updated and reformed in some respects. The Code is maintained on this website under the management of the [Central Expenditure Evaluation Unit \(CEEU\)](#) of the Department of Public Expenditure & Reform as a resource for the entire Irish public service. In September 2013, Departments and Offices were formally notified by [circular](#) that the Public Spending is in effect.

The Public Spending Code is structured as follows:-

The [Introduction](#) sets out the core principles of the Public Spending Code, including the new principle of consultation and participation. As a general working principle, amendments to the Public Spending Code will be subject to peer review by stakeholders. In keeping with this approach, some elements of the Public Spending Code are flagged as “consultative drafts”, and will not be formally in effect until the peer review process has been completed.

[Part A](#) of the Code sets out general provisions, which apply in principle to all types of spending at different stages of the project life-cycle. Part A includes a [map or overview](#) of the entire Public Spending Code, and is a useful starting point for public service users wishing to know what elements of the Code apply to their work.

[Part B](#) of the Code relates to the appraisal and planning of public projects, before expenditure is incurred.

[Part C](#) concerns the ongoing management, control and ongoing review / evaluation of expenditure projects and programmes that are underway.

[Part D](#) brings together user-friendly guidance material on the analytical techniques that are applied in appraisal of both capital and current expenditure. These elements of the Code deal with basic introductory material, through to more technical and advanced guidance on how the analytical techniques are applied.

Part E is a technical reference section, showing the up-to-date standard parameter values for use in technical analytical techniques. This section also includes a useful glossary of technical terms used throughout the Public Spending Code.

# Introduction A-00

## Document Update Log

Most people have an intuitive feel for what constitutes **value for money**, whether dealing with their own spending or with expenditure from the public purse. In very simple terms **value for money** is achieved when you are:

- *doing the right thing* – that is, spending money to achieve the right objectives, and
- *doing it right* – that is, spending money as efficiently as possible, avoiding waste.

*This means that:*

Good choices are made on the areas where money is spent. Resources (including all of the costs that arise over the lifetime of a project) are allocated to meet priority needs identified and the most cost-effective interventions are chosen to meet those needs. This involves good appraisal of proposals for new expenditure. Having made good choices on how resources are allocated, projects and programmes are then implemented efficiently i.e. minimum input is used to generate the outputs required and projects and programmes are only continued if they are effective in achieving the outcomes intended.

Ensuring that the State achieves **value for money** demands more than an intuitive feel. A disciplined approach needs to be applied to all aspects of the expenditure life-cycle, from the moment a proposal is put together, through its implementation and beyond when *ex-post* reviews are undertaken. The **Public Spending Code** brings together in one place details of the obligations that those responsible for spending public money are obliged to adhere to as well as guidance material on how to comply with the obligations outlined.

Elements of the Public Spending Code apply to any project or programme that:

- may incur expenditure in the near future (Appraisal, Planning)
- is currently incurring expenditure (Management, Monitoring, Evaluation)
- has incurred expenditure in the recent past (Review, Evaluation)

The Public Spending Code applies to both Capital and Current expenditure. The Code sets out to explain what is required of public service managers at different points of the expenditure lifecycle and offers advice on how to fulfil those requirements.

All Government Departments and public bodies and all bodies in receipt of public funding must comply, as appropriate, with the relevant requirements of the Public Spending Code. In the case of State Companies, the Board of each must satisfy itself annually that the Company is in full compliance with the Code.

Nothing in the Public Spending Code should be taken as precluding Government or Ministers, under the delegated sanction arrangements set down by the Minister for Public Expenditure & Reform, from deciding to approve projects independent of the detailed application of the Public Spending Code. Such decisions still require Departments to ensure that best practice is adhered to as regards public financial procedures generally, in terms of ensuring that necessary terms and conditions are applied to secure full accountability and transparency for the funds concerned.

### **General Points on the Public Spending Code:**

- *Building on Good Practice*

The Public Spending Code builds upon some long-established elements of the VFM arrangements that have been in place in Ireland over many years. In particular, public service managers who are familiar with the *Capital Appraisal Guidelines* from 2005, as they have been expanded in subsequent Circulars and advice notes, and with the previously issued *Working Rules on Cost-Benefit Analysis*, will already have a good grounding in the main elements of the Public Spending Code. Equally however, there is a need to consolidate all of the previous advisory material, to bring procedures up to speed with best national and international practice, and to strengthen procedures so that citizens can be assured they are getting the best value for scarce public funds.

- *Aids to good decision making*

Programme evaluation and project appraisal are aids to inform decision making. They do not constitute final decisions in themselves. The basic purpose of systematic appraisal is to achieve better investment decisions. Proposals for public sector investment invariably exceed the resources available. Choice and priority setting are inescapable. It is not enough to be satisfied that investment is justified; it is also necessary to ensure that it produces its planned benefits at minimum cost. This cost includes the ongoing current costs generated by the use of capital assets, as well as the initial

capital cost. The systematic appraisal and professional management of all capital projects and current expenditure programmes helps to ensure that the best choices are made and that the best value for money is obtained. It should also be noted that in arriving at policy decisions on investment programmes or individual projects, Ministers have to take all relevant factors into account – the economic costs and benefits are not the only relevant factors, and a judgement on social or public-good expenditure (which may not be directly amenable to costing as regards economic impact) will also be brought to bear. Accordingly, the Public Spending Code does not preclude Government or Ministers from deciding to approve projects independent of the detailed application of the Code.

- *Proportionality*

The complexity of the appraisal or evaluation of a project or programme and the methods used will depend on the size and nature of the project or programme and should be proportionate to its scale. The resources to be spent on appraisal or evaluation should be commensurate with the likely range of cost, the nature of the project or programme and with the degree of complexity of the issues involved.

- *Appraisal never to be “case-making”*

The Sponsoring Agency is responsible for ensuring that the appraisal is done on an objective basis and not as a ‘case-making’ exercise. Good quality appraisal at this stage will make it easier to complete the planning and implementation stages and minimize the potential for difficulties and risks to arise in the later stages.

- *Avoiding Premature Commitments*

All involved in the appraisal and management of expenditure proposals should guard against the danger that when a project is mooted, it is given a premature commitment. This must be avoided. A sequence of considered decisions will lead to progressively greater commitment of resources, but an irrevocable commitment to a proposal should only be made after all appraisal stages have been satisfactorily passed, and final approval obtained. **Where necessary, Departments and public bodies should be prepared at any stage, despite costs having been incurred in appraising, planning and developing a project, to abandon it if, on balance, continuation would not represent value for money.**

- *EU Funding*

Aid from the EU is a national resource and must be used as effectively, and economically, as any other national resource. The EU expects us to ensure this. The availability of EU aid for a project is not a justification for investment in that project. The consideration that the EU may aid a project must not lead to less rigorous appraisal and decision making than if that aid was not forthcoming. If the project does not go ahead the EU aid can be applied to better effect elsewhere. In addition to the national project appraisal procedures outlined in the Public Spending Code, projects aided by the EU Funds must meet specific Community appraisal requirements. As a general principle, the provisions of the Public Spending Code should be at least as rigorous – and applied at least as rigorously – as Community appraisal. Irish citizens are entitled to know that they are getting the maximum value-for-money for their funds.

- *Adapting Guidelines to suit the decisions you have to make*

Obligations and good practice are generally described at a high level and these should be taken and adapted to suit your organisation's own circumstances. It is the responsibility of each Sanctioning Authority to ensure that Departments and agencies draw up their own procedures for management and appraisal of programmes and projects consistent with the principles set out in these guidelines.

- *A responsive and evolving Code*

The Public Spending Code will change as needs be to incorporate new requirements, better practices and other revisions to keep the code relevant and as user-friendly as possible. Since the Code represents an evolution of established VFM procedures, in which all Government Departments and agencies are stakeholders, a new model of consultation and quality-proofing is being introduced. Several elements of the Code are flagged as “Consultation Drafts” and should be regarded as provisional for the present: these will not be formally instituted as binding elements until they have been subject to peer review by all relevant stakeholders. In particular, the Central Expenditure Evaluation Unit (CEEU) of the Department of Public Expenditure & Reform will engage actively with the broader evaluation community, in the public and private sectors and in academic life, to ensure that Ireland’s Public Spending Code evolves to keep pace with best practice both nationally and internationally.

**A-01**

## **Public Spending Code: Arrangement and Programme Life Cycle**

**A-01**

### **Update log document A01**

**Document Summary:** This document acts as a map to the Public Spending Code, and is intended to serve as a starting-point for public service users in planning and managing public expenditure in line with the Code requirements. Part I lists the contents of the Public Spending Code. Part II describes the various stages of the Project/Programme Life-cycle (also referred in parts of the Public Spending Code as the “Expenditure Life-cycle”) and points to the key Public Spending Code documents that are relevant to each stage.

**I – Public Spending Code Layout:** The Public Spending Code is made up of four sections: Section A – General Provisions: (These documents apply to all stages of the life-cycle.)

- A-00 [Introduction](#)
- A-01 [Public Spending Code Layout & Project/Programme Life-Cycle](#)
- A-02 [Clarify your Role](#)
- A-03 [General Conditions of Sanction for Capital](#)
- A-04 [Quality Assurance – Compliance with the Public Spending Code](#)

Section B – Appraisal & Planning (Expenditure being Considered):

- B-01 [Standard Appraisal Steps](#)
- B-02 [The Planning Phase](#)
- B-03 [Approvals Required and Scale of Appraisal](#)
- B-04 [Procurement Guidelines](#)
- B-05 [PPPs](#)
- B-06 [Appraising Current Expenditure](#)
- B-07 [Conducting a Regulatory Impact Analysis](#)

Section C – Implementation (Expenditure being Incurred) & Post-Implementation (Expenditure has recently been completed)

- C-01 [Management](#)
- C-02 [Periodic Evaluation/Post-Project Review](#)
- C-03 [Reviewing and Assessing Expenditure Programmes](#)

#### Section D – Standard Analytical Procedures

- D-01 [Overview of Appraisal methods and techniques](#)
- D-02 [Carrying out a financial appraisal for capital expenditure](#)
- D-03 [Carrying out an economic appraisal - guidelines on how to conduct a CBA](#)

#### Section E – Reference/Parameter Values

- Discount Rates
- Shadow Costs (Labour, Profits, Public Funds, Carbon)
- Calculating Staff Costs
- Other Parameters

#### **ICT projects:**

The principles and guidelines in the Public Spending Code apply to all expenditure including expenditure on ICT. ICT projects are subject to some specific additional requirements. The document [ICT Expenditure Approval Process](#) briefly describes the additional requirements.

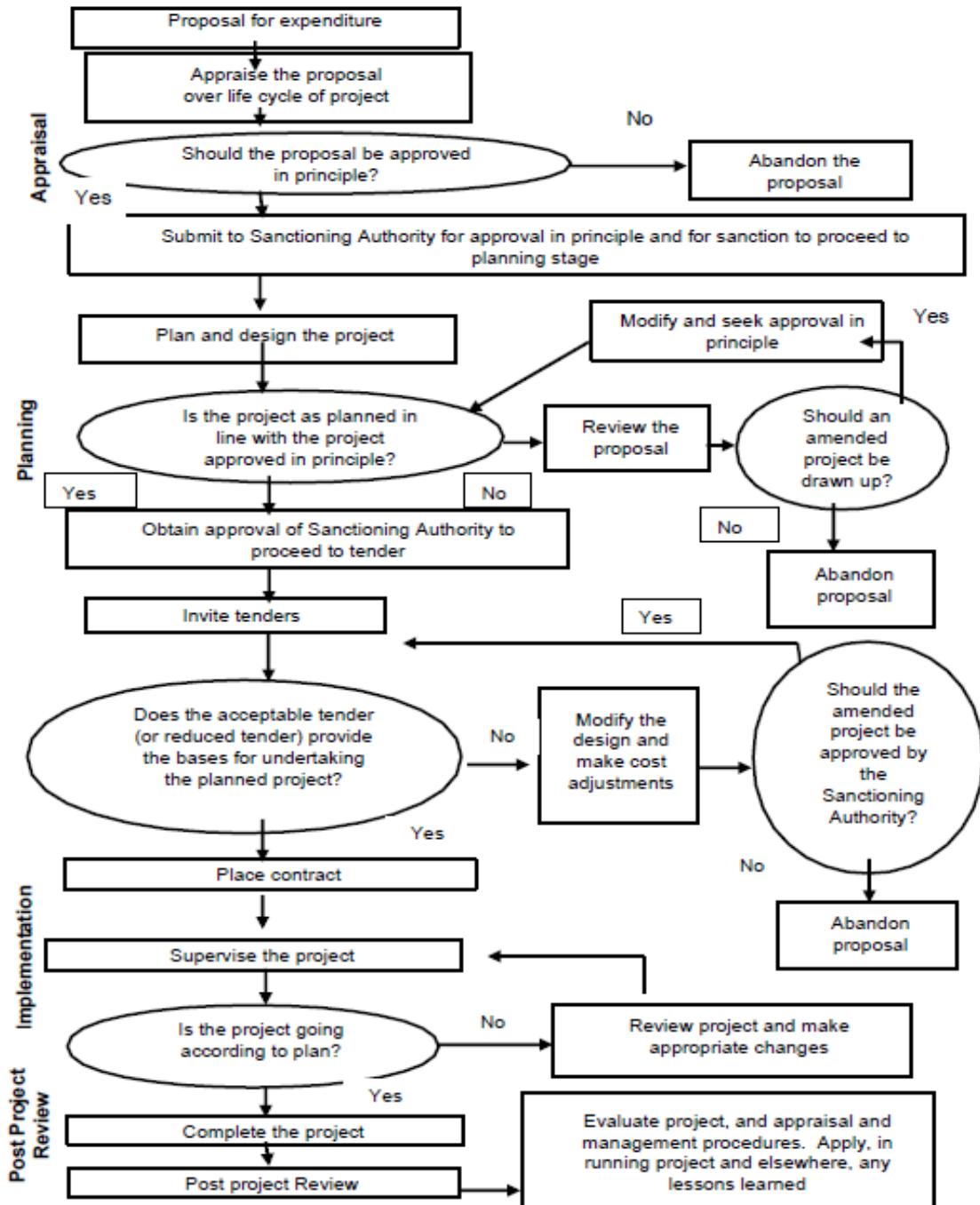
**II – Project or Programme Life-Cycle** The four stages in the life-cycle of a project or programme are:

1. Appraisal: assessing the case for a policy intervention
2. Planning/Design: a positive appraisal should lead on to a considered approach to designing how the project/programme will be implemented
3. Implementation: careful management and oversight is required for both capital and current expenditure. Ongoing evaluation should also be a feature of current programmes
4. Post-Project or Post-Implementation Review: checking for delivery of project objectives, and gaining experience for future projects.

The successive stages should follow a realistic time schedule and have clear starting and finishing points. The appraisal and planning stages may overlap. Good detailed appraisal will require some

design and planning work. Decision-making takes time and allowance should be made for this in time schedules. Figure 1 overleaf gives an overview of how the various stages are inter-related.

**Figure 1: OVERVIEW OF THE PROJECT APPRAISAL AND MANAGEMENT PROCESS<sup>1</sup>**



\* This is an Overview of the process when outsourcing is used for the development or implementation of the project/scheme. Where outsourcing is not being used the latter part of the Planning and Design Phase and the beginning of the Implementation Phase will be different as there will neither be a tender or a contract.

## **1. Appraisal – Before Expenditure is Incurred**

### *(i) Preliminary Appraisal*

The preliminary appraisal aims to establish whether, at face value, a sufficient case exists for considering a proposal in more depth. It leads to a recommendation on whether or not to proceed to the detailed appraisal stage which can often be a costly exercise.

For proposals costing **more than €5m**, a preliminary appraisal should be undertaken by the Sponsoring Agency. It involves an initial specification of the nature and objectives of the proposal and of relevant background circumstances (economic, social, legal, etc.). The reasons why it is thought that public resources should be committed should be set out, having regard to what the private sector is doing or might be willing to do, independently or with State participation or encouragement.

A preliminary appraisal should include a clear statement of the needs which a proposal is designed to meet and the degree to which it would aim to meet them. It should identify all realistic options, including the option of doing nothing and, where possible, quantify the key elements of all options. It should contain a preliminary assessment of the costs (particularly financial costs) and benefits of all options.

On the basis of the preliminary appraisal, the Sponsoring Agency should **decide whether formulating and assessing a detailed appraisal would be worthwhile** or whether to drop the proposal. A recommendation to undertake a detailed appraisal should state the terms of reference of that appraisal. If significant staff resources or other costs would be involved in a detailed appraisal, the prior approval of the relevant Sanctioning Authority should be sought.

### *(ii) Detailed Appraisal*

The detailed appraisal stage aims to provide a basis for a decision on whether to drop a proposal or to approve it in principle. It involves the clarification of objectives, exploration of options, quantification of costs and a method of selecting the best solution from competing options. See:

- Document B-01 Standard Appraisal Steps for further information on a Detailed Appraisal
- Document B-03 Approvals Required and Scale of Appraisal
- Section D of the Public Spending Code for guidance on particular appraisal methods and
- Section E of the Public Spending Code for technical parameter values.

## **2. Planning/Design**

Planning/Design starts with the Approval in Principle from the Appraisal stage (although some elements of planning/design may need to be completed to fully inform the appraisal). No commitment to finance a project should be made until this stage is completed and a decision taken on whether to proceed is taken. This stage involves detailed planning and costing of the project. The latter end of this stage may involve procurement and lead to the evaluation of tenders and an assessment of whether the best proposal received meets the requirements and is within the approvals required. For more information on the Planning/Design stage see documents:

- B-02 [The Planning Phase](#)
- B-03 [Approvals Required and Scale of Appraisal](#)
- B-04 [Procurement Guidelines](#)

### **3. Implementation**

This stage may, if an external provider is involved, begin with contract placement. Management, Monitoring, Supervision and Control are key terms that apply to this stage. For capital projects the implementation stage will be of limited duration but the implementation of current expenditure programmes could extend over many years or even decades. In the case of current expenditure, evaluation will also play an important role. Both continuous evaluation using pre-determined performance indicators and more formal evaluations will be required to ensure that programmes are operating efficiently, are achieving the outcomes as planned and are serving needs that remain a priority. Documents in the Public Spending Code that are specifically relevant to the stage include:

- C-01 [Management](#)
- C-02 [Periodic Evaluation/Post-Project Review](#)
- C-03 [Reviewing and Assessing Expenditure Programmes](#)

### **4. Post-Project or Post Implementation Review**

Post-Project Reviews aim to confirm whether project objectives have been met, the project has been delivered to required standard, on time and within budget and to ensure that experience gained can be used on other projects. It may also help to inform managers on the continued best use of a new asset. Documentation on the appraisal undertaken is the key starting point or reference for any post-project review.

The Post-Project Review stage is more relevant to capital expenditure. Current expenditure is likely to be reviewed during what is typically a more extended implementation period but reviews post-

implementation may also be relevant. Documents in the Public Spending Code that are relevant to this stage include:

- C-02 [Periodic Evaluation/Post-Project Review](#)

## Document Update Log

**Document Summary:** An organisation's responsibilities under the Public Spending Code depend on whether it is responsible for proposing and subsequently implementing a project or programme or whether it grants approval for a project or programme to proceed under the management and oversight of another body. This document describes the roles of the Sponsoring Agency and the Sanctioning Authority. These roles are referred to throughout the Public Spending Code.

Most parts of the Public Spending Code but in particular *Public Spending Code B.03 – [Approvals Required and Scale of Appraisal](#)* make references to the *Sponsoring Agency* and the *Sanctioning Authority*. This document outlines the different roles that organisations play in the life-cycle of a project.

### Sponsoring Agency

The **Sponsoring Agency** has the overall responsibility for the proper appraisal, planning and management of projects/schemes (incl. current expenditure). Sponsoring Agencies are also responsible for post-project review. (The Sponsoring Agency may be a Government Department, local authority, health agency, University or other State body.)

The Sponsoring Agency must obtain the necessary [approvals](#) from the Sanctioning Authority and ensure that the project/scheme proceeds along the lines approved by the Sanctioning Authority. All capital projects being sponsored by a State company must be specifically approved by the Board of the company or, by management in accordance with any delegated authority from the Board, before its submission to the Sanctioning Authority. If a subsidiary company or agency is set up specially to undertake a project, it is important that the responsibilities of the parent body are not diluted.

Where the Office of Public Works (OPW) is undertaking a project in response to a request from a Government Department/Office it is the responsibility of the relevant Government Department/Office to complete the project appraisal and to secure the approval of the Sanctioning Authority before involving the OPW in the planning and implementation stages. In the case of a PPP project, the

Sponsoring Agency is the public body or agency sponsoring the project, subject to subsequent assignment of responsibilities under PPP contractual arrangements.

### Sanctioning Authority

The **Sanctioning Authority** is responsible for granting the approvals required as projects/schemes, funded with public assistance, proceed through the project/expenditure life cycle. The approvals required include the approval in principle following detailed appraisal and pre-tender approval. If there is no procurement there should still be an approval checkpoint at the equivalent stage i.e. when the quantity of internal resources required is known.

The Sanctioning Authority may also set conditions under which a project may proceed. It is also responsible for paying the public assistance to the Sponsoring Agency and for ensuring the project's delivery as approved. While implementation is the responsibility of the Sponsoring Agency the Sanctioning Authority must be satisfied that the Sponsoring Agency delivers the project/scheme as approved.

The Sanctioning Authority is normally the Government Minister or Department or public body with sectoral responsibility for implementing Government policy and for providing public financial assistance in that sector. In the case of major projects the sanctioning authority may be the Government. As a rule the Government will be the Sanctioning Authority for very large projects, costing more than €100m, but the Government could also be the Sanctioning Authority for projects below this value. Where the Government is the Sanctioning Authority, the day to day oversight functions of a Sanctioning Authority revert to the line Department. The Government is involved at the major decision points. The Sanctioning Authority should take the necessary steps to ensure that it has the requisite expertise to assess project appraisal proposals from Sponsoring Agencies.

Each Sanctioning Authority is responsible for drawing up its own procedures applicable to its area of control. These procedures should comply with the principles set out in the Public Spending Code. Each Sanctioning Authority should also ensure that bodies under its aegis follow the procedures laid down by it. If there is an intermediary body (e.g. the Higher Education Authority) between the Sanctioning Authority and the Sponsoring Agency it is the responsibility of the Sanctioning Authority to define clearly the roles and responsibilities of any such intermediary bodies in regard to programme/project appraisal and management consistent with these guidelines.

In some instances the Sponsoring Agency and the Sanctioning authority, in relation to individual projects, may be the same body e.g. the National Roads Authority, non-Exchequer funded commercial State Companies. All such projects will, however, be part of a multi-annual programme or business plan which will have been appraised by a parent Department and/or Board of the company. Individual projects will still have to be appraised and approved in accordance with these guidelines with internal approval processes substituting for an external sanctioning authority.

#### Finance/Budget

The source of finance for a project is a good guide to the role played. The provider of the finance is usually the sanctioning authority and the organisation making the payments or incurring the expense is usually the sponsoring agency. If the finance has been received with delegated sanction that allows the funded organisation to make decisions up to a certain limit under certain conditions then the sanctioning authority and sponsoring agency may be the one body. Any organisation whether a sponsoring agency or sanctioning authority has to ensure that the necessary arrangements have been made for the financing of a project before any commitment is entered into.

Proposals made by bodies other than those responsible for their implementation. Proposals may be initiated by bodies other than those which will be responsible for them. Submissions and research documentation coming from such sources may provide some of the information required for a preliminary appraisal. However, the Sponsoring Agency must satisfy itself that such information is accurate and objective.

**A-03**

## **General Conditions of Sanction for Capital**

**A-03**

### **Document Update Log**

#### **General Conditions of Sanction for Multi Annual Capital Envelopes**

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Capital investment allocations are typically made on a multi-annual basis by the Government, so that Government Departments can undertake proper medium-term planning for the cost-effective delivery of investment projects. Sanction from the Department of Public Expenditure & Reform to each other Department for the multi-annual investment framework is subject to the following conditions:

##### **(a) Contractual commitments**

The level of contractual commitments (meaning formal legal contract or grant approval) made in the current year in respect of 2014 will not exceed 75% of that year's allocation for the department. The corresponding limits in subsequent years are 60% and 50% of each year's allocation. These limits will be rolled over each year. **No contractual capital commitments beyond these ceilings can be entered into without the explicit sanction of the Minister for Public Expenditure and Reform.**

##### **(b) Virement**

The Multi-Annual Investment Framework does not affect the normal rules for operation of virement between Vote subheads. Virement between capital and current sub-heads should only occur in exceptional circumstances and with the prior approval of the Department of Public Expenditure & Reform. Virement from capital to current should not be used as a tool of expenditure management. Where Public Private Partnership (PPP) contracts were signed before July 2010, a separate subhead has been established in your Vote to meet unitary payments arising under those contracts. Unitary payments from this subhead under contracts in respect of projects delivered by PPP will be "ring fenced" and regarded as non-discretionary current expenditure. Unitary payments for PPP projects signed in or after July 2010 will be met from your Vote's capital envelope. Virement will not apply to the carryover sums at (g) below.

### **(c) Programme contingency provision**

The Department will make a contingency provision within its overall envelope to meet any unforeseen demands or additional costs which might emerge for the programme as a whole.

### **(d) Project contingency**

In making provision for each project, account should be taken not just of the contract price but limited provision should also be made for likely price increases for inflation for projects with a construction duration of more than 3 years, and unforeseeable variations that might arise during project construction. In this respect, the project contingency shall have regard to the extent of risk that is retained by the contracting authority having undertaken adequate risk analysis prior to tender.

### **(e) Project costings**

Departments must in their evaluation of a project satisfy themselves that any staffing and other current costs arising are consistent with Government policy on staffing and should be fully consistent with the figures in the Employment Control Framework (ECF). Given current and foreseeable budgetary circumstances, resources are and will be very limited and Departments must take account of this.

### **(f) Grants to private companies, individuals and community groups**

An appropriate contractual arrangement must be put in place by the Department or its agencies, as appropriate, for all significant grants of public funding to private companies and individuals or community groups relating to the State's interest in the asset. In such cases they should, in particular, have in place a written contract to safeguard the Exchequer interest in the event of change of ownership. The contractual provisions should also provide for the repayment of such grants where the terms are not adhered to and in the event of sale of the asset. Departments should also take account of the requirements set out in Circular 17/10- Requirements for Grants and Grants-in-Aid issued by this Department on 22 December 2010.

### **(g) Carryover of unspent annual allocations**

Any proposal by a Department to carryover unspent capital will be subject to a ceiling of 10% of the current year's Voted capital allocation (excluding Dormant Accounts capital funding) as adjusted by

any pertinent Government decision. Any such sums approved for carryover will be lodged to the credit of the Department's PMG Account and may, in accordance with the provisions of Section 91 of the 2004 Finance Act, be spent in the following year upon approval by the Dáil of the Ministerial Order specifying the amounts by subhead. Any sum which is carried over and not spent in the following year will be surrendered to the Central Fund.

#### **(h) Reporting requirements**

The Department should make arrangements:

- (i) to report regularly (at least every six months) to its MAC on the appraisal of capital projects prior to approval, the management of capital projects and on progress on its capital programmes;
- (ii) to highlight variances against the agreed budget; and,
- (iii) to undertake an annual Quality Assurance exercise to ensure compliance with the Public Spending Code and to report the findings of such Quality Assurance exercises annually to the Department of Public Expenditure & Reform. This new Quality Assurance procedure replaces and updates the "spot check" requirements previously laid down in Circular letter dated 15<sup>th</sup> May 2007 and should take the form of a short summary report which will be generated as a matter of course through compliance with steps 1-4 of the quality assurance procedures of the Public Spending Code (see section A04 of the Code). This report should be submitted by the end of February each year in respect of the previous calendar year. The report should be certified by the Accounting Officer and published on the Department's website. The Central Expenditure Evaluation Unit will carry out reviews of these Quality Assurance reports. These periodic assessments may also be published on the Department of Public Expenditure and Reform website.

#### **(i) Adherence to National and EU requirements in relation to capital appraisal, public procurement etc.**

The Department will comply fully with:

- The Department of Public Expenditure & Reform's Public Spending Code including the requirement that projects over €20 million are subject to a Cost Benefit Analysis (CBA) or Cost Effectiveness Analysis (CEA). Prior to Approval in Principle the CBA (or CEA) should be submitted to the relevant vote section in the Department of Public Expenditure and Reform

who may seek the views of the CEEU. The CEEU will give its views on the appraisal to the Sponsoring Agency and may publish their review of the CBA (or CEA) on their website, with any necessary redaction to protect the State's interest in the tender process and commercial sensitivity.;

- Where appropriate, requirements for undertaking Public Private Partnerships as set down by the Department of Public Expenditure & Reform, including the requirement to consult with the National Development Finance Agency on financing options for all projects in excess of €20 million;
- Public Procurement Procedures – both National and EU; and
- Tax clearance requirements as laid down by the Revenue Commissioners.

**(j) North-South commitments** Departments will fulfil all commitments entered into in respect of the North-South Bodies established under the Good Friday Agreement.

**A-04**

## **Quality Assurance – Compliance with the Public Spending Code**

**A-04**

### **Document Update Log**

**Document Summary:** The Public Spending Code will only be of use if it is complied with by those that are responsible for expenditure at the appraisal, planning, implementation or post implementation stages. This document describes what is expected of the internal independent team that will carry out quality assurance checks and produce the annual quality assurance report.

The Public Spending Code imposes obligations, at all stages of the project/programme life-cycle on organisations that spend public money. These obligations apply to those that have responsibility at the different stages i.e. those within the Sponsoring Agency or Sanctioning Authority responsible for appraising, planning, approving, implementing or reviewing.

An additional obligation of the Public Spending Code is that each Department should put in place an internal, independent, quality assurance procedure involving annual reporting on how organisations are meeting their Public Spending Code obligations. This new Quality Assurance procedure replaces and updates the “spot check” requirements previously laid down in Circular letter dated 15th May 2007. The old procedure required a report with five sections – (i) Steps taken to disseminate the Guidelines (ii) Description of current systems for appraisal and management (iii) Coverage of the spot-checks and the findings (iv) measures in place to ensure compliance and (v) the views and responses of Departments and Agencies regarding the spot-check findings.

*This new Quality Assurance Process aims to be easier to understand, more of an aid to compliance and easier to complete. The QA process should not place an undue burden on organisations. QA does not involve doing or redoing any of the appraisal, evaluation or review work that is required elsewhere in the Code. QA reviews pieces of ex-ante appraisal, management, evaluation or review work done by others.*

The Quality Assurance procedure is made up of five steps:

1. Draw up inventories of projects/programmes at the different stages of the Project Life Cycle. It is expected that the Organisation’s Finance Unit is best placed to draw up this inventory. They

- may have to consult with others to ensure that they have the full picture on projects that are at the appraisal/planning stage i.e. have yet to incur expenditure. The person responsible for the Quality Assurance process should be satisfied that they have a full and complete inventory.
2. The Organisation's Finance Unit should publish summary information on its website of all procurements in excess of €2m, related to projects in progress or completed in the year under review. A new project may become a "project in progress" during the year under review if the procurement process is completed and a contract is signed. Department's should also publish details of the website references where its agencies have placed information on procurements over €2m.
  3. Complete the checklists contained in this guidance document. Only one of each checklist per Department/Agency is required. Checklists are not required for each project/programme. The QA process is based on a sample.
  4. Carry out a more in-depth check on a small number of selected projects/programmes
  5. Complete a short summary report for the Department of Public Expenditure & Reform. The report, which will be generated as a matter of course through compliance with steps 1-4, involves minimum administrative burden and should be submitted by the end of February in respect of the previous calendar year.

Step 1 was not formally a part of the old process but it would have had to be completed in order to select the projects that were to be checked. The second step is new but should not be a significant burden as the inventory compiled as part of Step 1 will provide the master list. The set of checklists to be completed for Step 3 serve as prompts that allow organisations to self-assess how compliant they are at a general level and will allow them to identify areas that need attention. They can also measure progress from one year to another. Step 4 is the most detailed step. Organisations are required to look in detail at a small number of projects/areas of expenditure. The detailed checks will verify whether the assessments made when completing the checklists are accurate or not. Organisations may think that they are very compliant based on the initial surface checks but find that when the detailed checks are undertaken that the practice does not live up to the theory or vice-versa. This may prompt a revisit to the checklist assessments.

### **Responsibility for Quality Assurance**

The Quality Assurance requirement rests mainly with the Sponsoring Agency. The questions in the self-assessment questionnaires have to be answered by the organisation that is responsible for the appraisal or management of an area of expenditure i.e. the Sponsoring Agency.

Departments are usually Sanctioning Authorities in respect of one part of their budget and Sponsoring Agencies for the remainder. Where the Department is the Sponsoring Agency it carries out Steps 1-5 of the QA process in respect of that part of its expenditure.

Departments in their role as Sanctioning Authorities must choose how they will implement the QA process for agencies that they fund. The Sanctioning Department could require those that they fund to complete the QA process and report it into them or the Sanctioning Authority could decide to take a hands-on role in part of the QA process particularly Step 4 where the Sanctioning Authority chooses to undertake one or more of the in-depth reviews.

Only Departments are required to send an annual QA report to the Department of Public Expenditure & Reform

### **Who Quality Assures compliance with the Public Spending Code?**

The Quality Assurance process should be undertaken by internal staff that are as independent as possible of the areas responsible for appraisal, planning and implementation e.g. staff from the economic /evaluation units, financial management units, internal audit, staff from an evaluation unit in another Department or academics on a *pro bono* basis. The process should be led by a small group chaired at senior level (*minimum PO*).

### **Supplementary Quality Assurance by the CEEU**

In addition to the quality assurance checks undertaken by Departments themselves, the Central Expenditure Evaluation Unit (CEEU) in the Department of Public Expenditure & Reform may undertake its own quality assurance checks from time to time. This exercise, which aims to promote a consistent approach to Quality Assurance and VFM enforcement across the public service, will not replicate the internal quality assurance process but may instead involve in-depth reviews of the processes followed for specific projects or programmes.

The five steps in the Quality Assurance procedure are described in more detail below.

#### **1. Drawing up Inventories of projects/programmes**

For Departments to know that they are compliant with the Public Spending Code they first need to be aware of the areas of expenditure to which the Code applies in their Department. The first step in the process is to draw up or update your inventories of:

(i) Expenditure being considered:

- Capital projects that are or were under consideration during the year. These should be broken down by their anticipated cost (between €0.5 – €5m, between €5m – €20m, greater than €20m). Grant schemes for capital purposes should also be included here. - New Current expenditure programmes or significant extensions to existing programmes that will involve annual expenditure of €0.5m or more.

(ii) Expenditure being incurred

- Capital Projects (> €0.5m) that are at the implementation stage
- Capital Grant Schemes (> €0.5m) that are incurring expenditure
- Current expenditure schemes or programmes (> €0.5m) that are incurring expenditure

(iii) Expenditure that has recently ended

- Capital Projects (> €0.5m) that were completed in the year being reviewed
- Capital Grant Schemes (> €0.5m) that were completed or were discontinued
- Current expenditure schemes or programmes (> €0.5m) that were completed or were discontinued

It is expected that the Organisation's Finance Unit is best placed to draw up this inventory. They may have to consult with others to ensure that they have the full picture on projects that are at the appraisal/planning stage i.e. have yet to incur expenditure. The person responsible, for the Quality Assurance process, should be satisfied that they have a full and complete inventory.

**2. Publish summary information on your website of all procurements in excess of €2m, whether new, in progress or completed**

Drawing from the inventory compiled or updated in Step 1 the organisation should publish, annually on its website, summary details of all procurements (capital and current) where the value exceeds €2m. This information should appear under the standard heading **PROCUREMENTS/PROJECT PROGRESS** on all Departmental websites. This information should be published concurrently with the quality assurance report i.e. by the end of February each year. The table below should be published for each project/procurement >€2m:

Project Details:	
Year	
Parent Department	
Name of Contracting Body	
Name of Project/Description	
Procurement Details:	
Advertisement Date:	
Tender advertised in:	
Awarded to:	
EU contract award notice date	
Contract Price:	
Progress:	
Start Date:	
Expected Date of Completion per Contract:	
Spend in Year under Review:	
Cum Spend to end Year:	
Projected final Cost:	
Value of Contract variations:	
Date of Completion:	
Outputs:	
Expected Output on completion (e.g. X km of road, No. units)	
Output achieved to date (e.g. Y km of road, no. units)	

There should be an entry for all new projects and projects still in progress. Completed projects feature for the last time in respect of the year that they were completed.

The presentation of this information can be in tabular or spreadsheet if that is more convenient.

### **3. Checklists to be completed in respect of the different stages**

Step 3 involves completing a set of basic checklists covering all expenditure. These are high level checks that should be readily completed within each organisation. The objective of the exercise is to provide local and senior management, and the public more generally, with a self-assessment summary overview of how compliant the organisation is with the Public Spending Code. More in-depth checks are carried out as part of Step 4.

The first checklist captures obligations/good practice that apply to the organisation as a whole. Each of the remaining checklists listed below (checklists in the Appendices) might apply to a number of projects/areas of expenditure. Only one of these checklists is required for each organisation.

Organisations are asked to estimate their compliance on each item on a 5 point scale (0. Not Done, 1. < 50% compliant, 2. 50-75% compliant, 3. > 75% compliant or 4. 100% Compliant). This self-assessed estimate of compliance can be based on an appropriate sample of the projects/areas of expenditure that are relevant to the checklist. The sample could be 5-10% of projects/programmes. The sample should rotate from year to year. Using a sample, to form a view on what should be included for the organisation in the Checklist answers, is in keeping with the intention that the QA process does not become over burdensome.

Checklist 1: General Obligations not specific to individual projects/programmes Checklist  
2: Capital Projects or Capital Grant Schemes being considered Checklist  
3: Current expenditure being considered

Checklist 4: Capital Expenditure being incurred

Checklist 5: Current Expenditure being incurred

Checklist 6: Capital Expenditure completed

Checklist 7: Current expenditure completed

#### **4. Carry out a more in-depth check on a small number of selected projects/programmes**

Parts 1 & 3 of the Public Spending Code Quality Assurance process will give an organisation a good overview of how compliant its processes are with the Public Spending Code. Quality Assurance Step 4 is about examining in more detail a small subset of its practices to see if the practices used are of a high standard. This step requires a higher level of analysis and judgement than previous steps in the

QA process. It may for example involve drawing conclusions on whether the CBA used to appraise a proposal for a large project was satisfactory or not.

### **Selection of subset for closer examination:**

Over a 3-5 year period every organisation should ensure that every stage of the project life-cycle and every scale of project is subject to a closer examination. In any given year this may involve looking at a couple of large projects at appraisal/planning, implementation or review stages or looking at a larger selection of smaller projects. Not every organisation has a large project every year so where large projects, in the year under review, are at the appraisal stage, implementation stage or have recently been completed it is opportune to select them for closer examination. In other years when large projects may not be a feature there is an opportunity to select a number of smaller scale projects. The value of the projects selected per annum, should be at least 5% of the total value of all projects in the inventory. This includes projects at the appraisal stage that have yet to incur expenditure. A subset of more than 5% may be needed for large organisations or because of the way that expenditure is divided a 5% sample would not give good coverage. To allow flexibility the minimum of 5% can be achieved as an average over a three year period e.g. 8%, 4%, 3%. The same projects should not be selected more than once in a three year period unless it is as a follow-up to serious deficiencies discovered previously.

Where there is a scheme that involves a large number of grants then it is the scheme itself that is the unit that is examined, not all of the individual grants i.e. it will not be necessary as part of this QA process to check 5% of all grants paid. The appraisal work on the scheme itself might be reviewed i.e. was there sufficient analysis to reach a conclusion that introducing the scheme was the best option to meet the objectives pursued? A small number of individual grants might be checked to confirm (i) that the conditions attaching to a grant matched the scheme design e.g. is this the subset of the population that we intended to target?, and (ii) that there was reasonable evidence that the scheme conditions were complied with.

This approach leaves organisations the greatest flexibility to cover the whole spectrum of projects and life-cycle phases over a number of years but also allows them to focus on large items at the most appropriate time.

### **What is expected of a more in-depth check?**

Step 4 will look at a small subset and probe the quality of the work carried out. Step 3 above looks for basic indicators of compliance with the Public Spending Code i.e. if the project is over €20m, a CBA is required. Step 3 does not involve an assessment of whether or not the CBA is up to standard. Step 4, in contrast, looks in more detail at the quality of the appraisal, planning or implementation work done. This may mean:

- examining a CBA for a large project,
- an appraisal of a project under the €20m threshold,
- looking at how the outputs and outcomes for a current expenditure programme are defined and whether the data exists for on-going monitoring and evaluation
- examining how a large project was managed or
- looking at a post-project review

and **making a judgement** on whether the CBA, post-project review etc. was of an acceptable standard. Adverse findings might be that the estimated number of users of the proposed project was too optimistic, that the value of the benefit was overstated or unfounded, that other realistic options were not considered, that all costs including lifetime costs were not included, that the outputs were not defined prior to implementation or that data was not gathered during implementation to allow ongoing monitoring etc.

Step 4 may highlight, that while processes are in place and the organisation looks very compliant as per the checklists, there are deficiencies when more detailed checks are made.

Step 4 is a in depth look at how the organisation complies with the Public Spending Code. It is different from a Value for Money Policy Review (VFMPR). Step 4 looks at how the decision was made initially, was it soundly based, was it well managed and reviewed in more depth when necessary.

The VFMPR looks at whether the intervention chosen worked or not or whether it was efficiently implemented. An organisation can do everything right as per the Code and come through this Quality Assurance check with a clean bill of health but an intervention it has chosen to fund may be shown in a VFMPR to have failed in spite of the best appraisal, planning and management. They are two

separate exercises. If a VFM PR found that an intervention failed then continued compliance with the Public Spending Code should mean that the intervention is either abandoned or redesigned to address the deficiencies.

## **5. Complete a short report for Department of Public Expenditure & Reform.**

The final step in the Quality Assurance process is the completion of a report to be submitted to the Department of Public Expenditure & Reform by the end of February in respect of the previous calendar year. The report should contain:

- the inventory of project/programmes, current & capital as compiled by the organisation's Finance unit;
- the website reference where details of procurements over €2m are published;
- completed checklists as per Step 3;
- the Department's judgement on the adequacy of the appraisal/planning, implementation or Review work that it examined as part of Step 4 and the reasons why the Department formed these judgements; and - the Department's proposals to remedy any inadequacies found during the Quality Assurance process.

**This report should be certified by the Accounting Officer and published on the Department's website.**

The Quality Assurance Process should serve as an aid to each Department in its ongoing task of achieving the best value for money. The Quality Assurance process takes stock of how well an organisation does its job as steward of a significant block of public expenditure. Compiling and submitting a report will allow the Department of Public Expenditure & Reform to be of greater assistance in how it supports the achievement of this objective. It will also allow the D/PER and Departments generally to assess how appropriate this Quality Assurance Process is in practice and to make whatever adjustments may be required, in the context of the broader Consultation and Review procedures that are now integrated into the Public Spending Code itself.

The CEEU may make an annual assessment of each Department's compliance with the Public Spending Code and may publish this assessment on its website. The assessment will be based on Departments' Quality Assurance Reports, their record in completion of VFM and any reviews that the CEEU itself conducts in Departments. Rather than focus only on deficiencies and shortcomings, it is important that instances of good practice be acknowledged, and that due credit should be given to Departments when they themselves identify and address deficiencies as part of the internal Quality Assurance process. **Checklist 1:** – to be completed by all Departments

General Obligations not specific to individual projects/programmes	Self-Assessed Compliance Rating: 0 – 4	Comment/Action Required
Does the Department ensure, on an ongoing basis that appropriate people within the Department and in its agencies are aware of the requirements of the Public Spending Code?		
Has training on the Public Spending Code been provided to relevant staff?		
Has the Public Spending Code been adapted for the type of project/programme that your Department is responsible for? i.e. have adapted guidelines been developed?		
Has the Department in its role as Sanctioning Authority satisfied itself that agencies that it funds comply with the Public Spending Code?		
Have recommendations from previous Quality Assurance exercises (incl. old Spot-Checks) been disseminated, where appropriate, within the Department and to your agencies?		
Have recommendations from previous Quality Assurance exercises been acted upon?		
Has an annual Public Spending Code Quality Assurance Report been submitted to the Department of Public Expenditure & Reform?		
Was the required sample subjected to a more in-depth Review i.e. as per Step 4 of the QA process		
Has the Accounting Officer signed off on the information to be published to the website?		

Self-Assessed Ratings: **0** – Not Done, **1** - < 50% compliant, **2** – 50-75% Compliant, **3** – > 75%

Compliant, **4** – 100% Compliant

**Checklist 2:** – to be completed in respect of **capital projects or capital programme/grant scheme** that is or was **under consideration** in the past year.

Capital Expenditure being considered – Appraisal and Approval	Self-Assessed Compliance Rating: 0 – 4	Comment/Action Required
Was a Preliminary Appraisal undertaken for all projects > €5m		
Was an appropriate appraisal method used in respect of each capital project or capital programme/grant scheme?		
Was a CBA completed for all projects exceeding €20m?		
Were all Programmes with an annual value in excess of €30m and of 5 years or more duration subjected to an ex-ante evaluation?		
Was an Approval in Principle granted by the Sanctioning Authority for all projects before they entered the Planning and Design Phase?		
If a CBA was required was it submitted to the CEEU for their view?		
Were the NDFA Consulted for projects costing more than €20m?		
Were all projects that went forward for tender in line with the Approval in Principle and if not was the detailed appraisal revisited and a fresh Approval in Principle granted?		
Was approval granted to proceed to tender?		
Were Procurement Rules complied with?		
Were State Aid rules checked for all supports?		
Were the tenders received in line with the Approval in Principle in terms of cost and what is expected to be delivered?		

Were Performance Indicators specified for each project/programme which will allow for the evaluation of its efficiency and effectiveness?		
Have steps been put in place to gather the Performance Indicator data?		

Self-Assessed Ratings: **0** – Not Done, **1** - < 50% compliant, **2** – 50-75% Compliant, **3** – > 75%

Compliant, **4** – 100% Compliant

**Checklist 3:** – New Current expenditure or expansion of existing current expenditure under consideration

Current Expenditure being considered – Appraisal and Approval	Self-Assessed Compliance Rating: 0 – 4	Comment/Action Required
Were objectives clearly set?		
Are objectives measurable in quantitative terms?		
Was an appropriate appraisal method used?		
Was a business case prepared for new current expenditure?		
Has an assessment of likely demand for the new scheme/scheme extension been estimated based on empirical evidence?		
Was the required approval granted?		
Has a sunset clause been set?		
Has a date been set for the pilot evaluation?		
Has the methodology and data collection requirements for the pilot evaluation been agreed at the outset of the scheme?		
If outsourcing was involved were Procurement Rules complied with?		
Were Performance Indicators specified for each new current expenditure proposal or expansion of existing current expenditure which will allow for the evaluation of its efficiency and effectiveness?		

Have steps been put in place to gather the Performance Indicator data?		
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**Self-Assessed Ratings:** **0 – Not Done,** **1 - < 50% compliant,** **2 – 50-75% Compliant,** **3 – > 75%**

Compliant, **4 – 100% Compliant**

**Checklist 4:** – Complete if your organisation had capital projects/programmes that were incurring expenditure during the year under review.

Incurring Capital Expenditure	Self-Assessed Compliance Rating: 0 – 4	Comment/Action Required
Was a contract signed and was it in line with the approval in principle?		
If a construction or ICT project was the contract for a fixed price?		
Are suitable management structures in place, commensurate with the scale of projects?		
Did management boards/steering committees meet regularly as agreed?		
Were Programme Co-ordinators appointed to co-ordinate implementation?		
Were Project Managers, responsible for delivery, appointed and were the Project Managers at a suitable level for the scale of the project?		
Were monitoring reports prepared regularly, showing implementation against plan, budget, timescales and quality?		
Did the project keep within its financial budget and its time schedule?		
Did budgets have to be adjusted?		
Were decisions on changes to budgets or time schedules made promptly?		
Did circumstances ever warrant questioning the viability of the project? (exceeding budget, lack of progress, changes in the external environment)	Y/N	
If circumstances did warrant questioning the viability of a project was the project subjected to adequate examination?		
If costs increased was approval received from the Sanctioning Authority?		

Were any projects terminated because of deviations from the plan, the budget or because circumstances in the environment changed the need for the investment?	Y/N	
For projects > €20m were quarterly reports on progress submitted to the MAC or Management Board and to the Minister?		
Were prescribed annual tables on projects, completed or in progress and > €20m submitted to the Department of Public Expenditure & Reform?		

Self-Assessed Ratings: **0** – Not Done, **1** - < 50% compliant, **2** – 50-75% Compliant, **3** – > 75%

Compliant, **4** – 100% Compliant **Checklist 5:** – For Current Expenditure

Incurring Current Expenditure	Self-Assessed Compliance Rating: 0 – 4	Comment/Action Required
Are there clear objectives for all areas of current expenditure?		
Are outputs well defined?		
Are outputs quantified on a regular basis?		
Is there a method for monitoring efficiency on an ongoing basis?		
Are outcomes well defined?		
Are outcomes quantified on a regular basis?		
Is there a method for monitoring effectiveness on an ongoing basis?		
Have formal VFM evaluations or other evaluation been completed in the year under review?	Y/N	
Are plans for new evaluations made in good time to ensure that they are completed in time to feed into the annual budget cycle?		
Are unit costings compiled for performance monitoring?		

Self-Assessed Ratings: **0** – Not Done, **1** - < 50% compliant, **2** – 50-75% Compliant, **3** – > 75%

Compliant, **4** – 100% Compliant **Checklist 6:** – to be completed if capital projects were completed during the year or if capital programmes/grant schemes matured or were discontinued.

Capital Expenditure Completed	Self-Assessed Compliance Rating: 0 – 4	Comment/Action Required
Were the required post-project reviews carried out?		
Was a post project review completed for all projects/programmes exceeding €20m?		
If sufficient time has not elapsed to allow a proper assessment of benefits has a post project review been scheduled for a future date?		
Were lessons learned from post-project reviews disseminated within the Sponsoring Agency and to the Sanctioning Authority?		
Were changes made to the Sponsoring Agencies practices in light of lessons learned from post-project reviews?		
Was project review carried out by staffing resources independent of project implementation?		

Self-Assessed Ratings: **0** – Not Done, **1** - < 50% compliant, **2** – 50-75% Compliant, **3** – > 75% Compliant, **4** – 100% Compliant

**Checklist 7:** – to be completed if current expenditure programmes that reached the end of their planned timeframe during the year or were discontinued.

Current Expenditure that (i) reached the end of its planned timeframe or (ii) Was discontinued	Self-Assessed Compliance Rating: 0 – 4	Comment/Action Required
Were reviews carried out of, current expenditure programmes that matured during the year or were discontinued?		
Did those reviews reach conclusions on whether the programmes were effective?		
Did those reviews reach conclusions on whether the programmes were efficient?		

Have the conclusions reached been taken into account in related areas of expenditure?		
Were any programmes discontinued following a review of a current expenditure programme?		
Was the review commenced and completed within a period of 6 months?		

**B-01**

## **The Public Spending Code: B. Expenditure under Consideration**

### **Standard Appraisal Process**

**B-01**

#### **Document Update Log**

**Document Summary:** The techniques used in appraising proposals or new areas of expenditure vary depending on the scale of expenditure involved. The more complex techniques are explored in the Standard Analytical Guidance Section of the Public Spending Code. Regardless of the scale or the technique used all appraisal involves a series of steps from objective definition and options exploration through to selection of the preferred option. This document sets out those standard appraisal steps. For expenditure involving less than €5m, following the standard appraisal steps should ensure a good appraisal.

Appraisal involves both the Sponsoring Agency and the Sanctioning Authority being clear about the objectives of a proposal/intervention and consideration of all the options open to the Sponsoring Agency in meeting these objectives. All publicly funded projects or initiatives should be appraised carefully for:

- consistency with programme/policy objectives;
- value for money (taking account of deadweight<sup>[1]</sup> and displacement<sup>[2]</sup>)

Appraisal by the Sponsoring Agency should follow the general approach in the checklist below. Appraisal of **all** new expenditure (whether capital or current), large or small should be subjected to the general appraisal process described below.

The *appraisal and planning stage will often overlap*. In reality, it is very difficult to carry out a detailed appraisal unless some planning and/or initial design work has been done.

There are seven standard steps and these are expanded upon below.

- (i) Define the objective

- (ii) Explore options taking account of constraints
- (iii) Quantify the costs of viable options and specify sources of funding
- (iv) Analyse the main options
- (v) Identify the risks associated with each viable option
- (vi) Decide on a preferred option
- (vii) Make a recommendation to the Sanctioning Authority

Further guidance on particular techniques and methods are contained in Section D of the Public Spending Code and parameter values are to be found in Section E.

### **(i) Define the Objective**

Define clearly the objective of the proposals i.e. what needs are to be met and what is the planned scale on which those needs will be met, measured as precisely as possible. This is a key step that does not always get the required attention. If the objective changes during the appraisal or planning process then all parts of the appraisal need to be reviewed.

#### Needs and Objectives

An objective is the explicit intended result of a particular programme or project, measured as precisely as possible. For example, there may be a need to improve traffic flow on a road. To state the objective of works on that road as being “to reduce average journey times” would be unsatisfactory since it would not provide a basis for judging whether investment proposed to improve the roads would produce sufficient benefit. Something more explicit is needed. “To reduce average journey times between Town A and Town B by X percent by the year 2020” is a precise objective. It assists in addressing such questions as what are the various ways in which this objective can be reached; what costs and what results can be expected from each alternative course of action; and are the benefits sufficient to justify the costs.

Project and programme objectives should be expressed in terms of the benefits they are expected to provide and those whom they are intended to benefit. For example, road building programmes are

not ends in themselves, as they must be seen in the light of the needs of the economy as a whole, and of the target groups for which the programmes cater (for example, freight traffic, tourist traffic, commuters. etc.). There is a need for realism in stating objectives.

Where programmes have multiple objectives it is necessary to be clear about the relative importance of each and how this should be reflected in resource allocation and in the appraisal process.

Objectives should be expressed in a way which will facilitate consideration and analysis of alternative ways of achieving them. They should not be so expressed as to point to only one solution. For example, population growth may put pressure on the schools in a particular area and an objective might be expressed as being “to build new schools in the area” to meet this pressure. The objective “to provide school places to meet population growth within the area” would provide a better basis for considering alternative ways of achieving this objective, such as the provision of new schools, the expansion of existing schools, on a permanent or temporary basis, or making better use of the existing stock of schools by provision of special transport (school bussing) arrangements.

New projects should only be undertaken where there is a clearly established public need for the projects or service provided; existing services should be reviewed to ensure that the kind of service provided is the kind of service required, and is on the appropriate scale. Costly and wasteful over-supply, and/or under-utilisation of resources should be avoided.

Identifying the most appropriate policy response to a “need” can be difficult. Every effort should be made to identify available research that will assist in identifying a problem properly and which may have looked at how different types of solutions work.

## **(ii) Explore Options – taking account of constraints**

- list the **options** i.e. realistic alternative ways in which the objective can be achieved; include the option of doing nothing, or consider whether an objective could be met by ways other than expenditure by the State;
- list the constraints;
- The output from this step should be a list of realistic options that meet the objective(s). If the objective cannot be met from the available options then the objective should be revisited.

### Options & Constraints

All realistic ways of achieving stated objectives should be identified and examined critically when considering project options for the first time. This should be done with a completely open mind, and

should always include the option of 'doing nothing' or 'doing the minimum'. Different scales of the same response should be included as separate options, where appropriate. There should be no presumption that public sector responses are the only ones available; options which involve, or rely totally on, the private sector should also be considered. The alternatives should be described in such a way that the essentials of each alternative, and the differences between them, are clear. Options on the appropriate procurement method will also be considered i.e. traditional design build (DB), Design Build Finance (DBF), Design Build Finance Operate (DBFO) and Design Build Finance Operate and maintain (DBFOM) etc.

### *Constraints*

There will invariably be constraints in reaching objectives. There will normally be resource constraints. There may be technical constraints; for instance, there may be only a limited number of ways in which a product can be made, or a service delivered. Constraints may also arise as a result of previous policy or investment decisions, but these may be amenable to change. Constraints must also be explored and fully taken account of, because they will limit the range of solutions which are feasible or acceptable. The following is a checklist of the kinds of constraint which typically should be considered in appraising a proposal:

- Financial
- Technological
- Legal/regulatory
- State Aids rules
- Environmental
- Physical inputs/raw material
- Availability of manpower and skills
- Time
- Administrative /managerial ability

- Distributional (e.g. between regions, income groups, etc.)
- Social
- Spatial policy
- Land use planning
- Co-operation required from other interests
- General policy considerations.

Considering the possible alternatives in the light of the constraints will usually lead to the conclusion that some of the alternatives are not feasible. Others may conflict with existing policies. Objectivity is important in considering options. There is a danger that the selection of options may be manipulated in order to make a case for a course of action which is already favoured. For example, options for which there is a very weak case may be put forward in order to make a poor option look good. If the poor option is the best available it should be considered alone on its own merits.

### **(iii) Quantify the costs of viable options and specify sources of funding**

For capital projects, cost quantification should cover ongoing capital and life cycle costs relating to the operation and maintenance of the project, and receipts generated by the use of capital assets, as well as the costs involved in their creation. The cost of the project should be the expected outturn cost, including construction costs, property acquisition, risk and contingency. The cost of possible future price increases and variations in project outputs should be factored into the calculation of project costs.

Costs of current programmes or capital grant schemes will largely depend on the amount per eligible individual and the expected take-up. Reliable estimation of take-up is key. The costs of current programmes or capital grant schemes can be more difficult to predict. Cash limits on schemes should be used to protect the exchequer from unexpected exposure. Projected administration costs should also be included and external sourcing must be one of the methods of delivery considered for any new service that is to be introduced.

### **(iv) Analyse the main options**

This step and the next step on the consideration of risk will lead to a recommendation on the preferred option. Different forms of analysis provide different kinds of information about investment proposals, and it is important to identify clearly, and to agree with the Sanctioning Authority, which forms of analysis are appropriate. The chief criterion used in deciding on the appropriate forms of analysis is whether or not the project is to be operated on a commercial basis.

The costs of the possible options will have been determined in the previous step. Depending on the scale of the project the analysis of options may involve placing a monetary value on the benefits.

Types of analysis that may be used include:

- Multi-criteria analysis (MCA)
- Financial analysis
- Cost benefit analysis
- Cost effectiveness analysis
- Exchequer cash flow analysis

Further information on when a particular method is required is contained in document B-03 Approvals Required and Scale of Appraisal and further guidance on each type of analysis is available in the Standard Analytical Techniques Section of the Public Spending Code.

*Sensitivity Analysis:*

Sensitivity analysis involves evaluating proposals over a range of assumptions about key factors (e.g. prices, costs, interest rates on any borrowed funds, growth rates, demographic changes) and should always be undertaken. If an option yields acceptable results only with particular combinations of circumstances, and the results are very sensitive to variations in these circumstances, then it should probably not be undertaken. If the relative merits of options change with variations in the assumed values of variables, those values should be examined to see whether they can be made more reliable. It may be possible to attach probabilities to ranges of values, to help pick the best option.

**(v) Identify the risks associated with each viable option**

Identify the potential impact of adverse circumstances on each option, and draw up, if possible, a strategy for dealing with risks. Important aspects of an appraisal will necessarily be based on assumed future outcomes and events. **Realistic** assumptions must be made about future prices, costs, market growth, and other relevant factors. Appraisal reports should always clearly state their assumptions. Over optimism should be avoided. Assumptions should be based on analysis of past performance, bad years as well as good and careful study of possible future developments. Realistic assumptions reduce, but cannot eliminate, the element of uncertainty in the decision-making process, and the risk that decisions made on the basis of the analyses may turn out to be wrong. Good project appraisal highlights the elements which are uncertain, so that the Sponsoring Agency and the Sanctioning Authority are aware of the risks involved in proceeding, or not proceeding, with any proposal. Suitable strategies to minimise risk, and its consequences, should be put in place e.g. in project management organisation, review procedures, information flows, etc. An appropriate level of contingency should be built into the costings.

#### **(vi) Decide on a preferred option**

Decide on the preferred option, specify it and a clear and detailed **time profile** for actions, (including time for planning and decision making) and for expenditure. Excessively high quality and cost specifications should be avoided. A balance must be struck between specifications which are excessive relative to needs and low quality specifications which may generate short-term economies but which lead to greater costs in the long-run.

#### **(vii) Make a recommendation to the Sanctioning Authority**

The Sponsoring Agency should recommend the preferred option – with reasons for its choice and an indication of its sensitivity to changes in key assumptions – for consideration and approval by the Sanctioning Authority.

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<sup>[1]</sup> Deadweight : would have happened anyway in the absence of public funding <sup>[2]</sup> Displacement: to what extent have existing facilities or activities been displaced by those that are now grant-aided

**B-02**

## **The Public Spending Code: B. Expenditure under Consideration**

### **The Planning Stage**

**B-02**

#### **Document Update Log**

**Document Summary:** This stage moves the preferred option that was been approved in principle after appraisal to the point where contractors put a price on delivering a fully specified solution and the Sponsoring Agency selects the one that it would place a contract with. This stage has a number of checkpoints and if expected costs or environmental conditions change a reappraisal and re-approval may be required

The planning stage involves seven steps. These are

- establishment of project management structure;
- preparation of a project brief;
- detailed planning and design;
- review of proposal, using information provided by the planning process;
- obtaining approval of the Sanctioning Authority to go to tender;
- obtaining tenders for projects; – review of proposal, using tender prices.

#### **1. Management of Projects**

The scale and complexity of the project should be reflected in its management structure and information system. Unless it already exists (e.g. for ongoing capital programmes) the management structure should always be identified and established once approval in principle has been obtained. In some cases, it may be possible to outline the proposed structure, filling some of the roles immediately and leaving others to be filled later on, as appropriate. However, the senior decision-

makers for the project, and the senior managers should all be identified clearly at the outset, and their involvement and relative role clearly agreed. Three issues should be carefully considered. These are:

- what kind of management structure would be suitable for the project?
- who is to be accountable for what aspects of the project?
- what kind of reporting systems should be installed?

The management of the project should usually be organised along the following lines:

#### *Sanctioning Authority*

The Sanctioning Authority (Government, Department, Local Authority, etc.) is responsible for conveying approval to a project, within specified cost, to specified standards and time limits, etc.

#### *Sponsoring Agency*

The Sponsoring agency has overall responsibility for the proper management of the project, including its detailed planning; for obtaining necessary approvals from the Sanctioning Authority and for ensuring that the project proceeds along the lines approved by the Sanctioning Authority. Usually, the Sponsoring Agency is the body with whom the contractor(s)/supplier(s) will have a legal commitment.

#### *Steering Group*

A Steering Group has the responsibility for overseeing the execution of the project. A Steering Group will usually be required on a complex and large scale project and particularly where a number of bodies are interested or involved in the project. It should usually be chaired by a representative of the Sponsoring Agency. The group should include appropriate professional staff e.g. architect/engineer/quantity surveyor. The Group may include a representative from the Sanctioning Authority and/or the Department of Public Expenditure and Reform.

#### *Project Co-ordinator*

The Project Co-ordinator is the person who is responsible for the execution, on time to the requisite quality and within budget, of the decisions taken by the Steering Group, or by the Sponsoring Agency

in the absence of a Steering Group (where the project is small). For very large projects it may be necessary to appoint a professional firm to take on the task of actually managing the project. It would report to the Project Co-ordinator (who in turn would report to the Steering Group, and/or Sponsoring Agency, as appropriate) and it would be responsible for ensuring that the project came in on time and within cost.

#### *Design Team Leader*

A Design Team Leader should normally be appointed for every project with more than one technical consultant. The Design Team Leader would report to the Project Co-ordinator or, where a project management firm had been appointed, to that firm.

Information Flows The following should be established as early as possible:

- The information needs at various levels of the management structure.
- The format that should be used for presenting this information. In this connection the standard forms in *National Standard Building Elements and Design Cost Control Procedures* should be used wherever these are appropriate. However, particular projects may require special forms which vary from those standard forms
- The frequency of the submission of reports.
- Who is responsible for supplying and for compiling information? The information system should reflect the nature of the project but should deal with all of these points.

## **2. Project Brief**

The project brief is essentially a description of the project option which has been approved in principle, detailing the objectives and parameters to be taken into account by the planning professionals. All the client's requirements should be set out in appropriate detail (e.g. for buildings, specify schedule of accommodation and room sizes etc.).

The project brief should not call for over-elaborate designs and/or the specification of standards which exceed the minimum necessary to achieve a satisfactory **and cost-effective** end product. The

programme for the completion of the work specified in the detailed appraisal should also be given. The services to be provided by consultants, architects, engineers, etc., should be clearly identified.

Cost limits/targets for the project should be included in the project brief. Estimated costs for the project itself and for project planning will have been included in the detailed appraisal. These should be used as the permitted expenditure limits.

### **3. Detailed Planning and Design**

Once design has commenced on the basis of the project brief, **changes in the scope or objectives of the project should not be made unless absolutely necessary**, or unless the proposed changes could reduce the overall cost of the project. If changes are to be made, the cost implications (including the effects on design costs) and the effects on the timing of the project should be fully appraised, and the express approval of the Sanctioning Authority sought, before an amended design brief is given to consultants.

#### *Employing Consultants*

Depending on the type of project and the availability of skills within the Sponsoring Agency, it may be necessary to engage the services of consulting architects, engineers, quantity surveyors, etc. Outline guidance on selecting consultants is contained in Appendix 1.

#### *Costs*

In managing the design process, it is important to consider regularly how the information being produced is likely to affect the estimated cost of the proposed project.

Departments and public bodies will be in a position to develop and update standard costs of providing typical projects or elements of projects. These will be used as a benchmark for appraising project costs. Regard should be had to national and international benchmarks for larger and more complex projects.

If the designs furnished by consultants to the Sponsoring Agency exceed the cost limit(s) set in the project brief, they should be referred back to the consultants by the Sponsoring agency to ensure that costs are reduced to stay within the said overall cost limit(s). Significant changes in specification to

achieve cost reduction should be notified to the Sanctioning Authority for approval, with information on any change in the quality of the works being undertaken.

#### *Data Gathering for Evaluation*

It is during the detailed Planning & Design stage that the data, required for the subsequent monitoring and evaluation, should be specified. Failure to specify data gathering requirements from the start of implementation should be the subject of critical comment in any subsequent VFM or similar evaluation. Many evaluations fail to reach conclusions on the value of an investment/expenditure programme due to lack of data. This can lead to years of further wasteful expenditure while data is gathered.

#### Changes in Circumstances/Time Scale

Changes which are relevant to a project, and which may make it more or less beneficial for the economy, may occur at any time (e.g. developments in technology, fluctuations in the availability or cost of raw materials or other inputs, changes in the domestic and international economies, legal changes). Such changes may alter radically the needs to be met, the priority which they are to be given, the scale on which they should be met, and the feasibility of possible alternative solutions. Under or over-estimation of relevant factors, notably cost, may be discovered during detailed planning following approval in principle, or when tenders are received.

Changes in the time scale of a project can also have very significant effects. Unscheduled delays (due, for example, to time overruns on particular stages or to delays in reaching decisions) may result in circumstances changing so as to alter radically the case for a proposal. Similarly, decisions to delay a project (i.e. to change the time profile) may result in significant changes in factors affecting decisions made. When significant alteration of the planned time scale occurs, it is particularly important to reassess fully the basis on which earlier decisions were made.

The detailed appraisal is the framework against which the impact of changes can be assessed. In setting it up, it is important to identify clearly factors which are so significant to the appraisal that unexpected changes in them would warrant speedy reappraisal, and corrective action, if necessary.

#### Indefinite Postponement of Project

If a decision is taken to defer a project indefinitely, then it should be fully reappraised before being started again. For instance, a project deferred indefinitely after architectural or engineering plans have been drawn up should not subsequently be proceeded with, without returning to the detailed appraisal stage.

#### **4. Pre-Tender Review**

When plans and designs have been finalised, the project proposal should be reviewed, taking into account any major changes in relevant circumstances and the more precise information generated by the design process. In particular, if the expected total cost of the project has increased, then the project should be re-examined and reductions achieved without lowering the quality standard of the project below acceptable levels, in order to bring the project within the approved limit. Works should not be omitted so as to achieve reductions if they will have to be reintroduced later as being essential for the completion of the project, or for the generation of its full benefits, or if they significantly change the nature of the project. The Sanctioning Authority should be notified of any significant changes.

The pre-tender review is necessary to provide the information required by the Sponsoring Agency and the Sanctioning Authority to decide whether or not to approve the project and to allow it to proceed to Request for Tender.

##### *Planning Permission Requirements*

If a project requires planning permission, a final decision to proceed with it should not be taken until permission is obtained from the appropriate Planning Authority or An Bord Pleanála. The implications of any conditions attaching to the planning permission should be fully assessed, going so far, if warranted, as to consider whether the project should be abandoned. Before these steps are carried out financial exposure in respect of the project arising, for example, out of contracts, should be minimised. Similar considerations should apply to the requirements of various statutory codes operated by local authorities and other bodies, e.g. Building Control (Fire Safety Certificate), Air or Water Pollution Licence, Waste Permit, or Integrated Licence (Environmental Protection Agency).

**Under Design and Build Contracts responsibility for obtaining planning permission may be assigned to the successful contractor.**

#### **5. Obtaining Approval of Sanctioning Authority**

Approval of the Sanctioning Authority is required before tenders are invited.

## **6. Tendering**

Tendering should, as appropriate, be invited in accordance with national procurement guidelines or where the costs exceed EU thresholds on the basis of the procedures set out in EU Directives.

## **7. Review using Tender Price**

When a tender price and other relevant information become available, the case for proceeding with the proposal should again be reviewed. The analysis contained in the detailed appraisal once again provides the framework for undertaking this review. The award criteria in the tender document will be used to select the best proposal received. The best proposal is then compared with what was expected at the Approval in Principle point. If the costs and output from the best proposal do not match the costs and benefits that led to the Approval in Principle then the Appraisal decision may have to be reviewed.

If tenders exceed the approved budget, the project should be re-examined and reductions achieved without lowering the quality standard of the project below acceptable levels, in order to bring the project within the approved limit. Works should not be omitted so as to achieve reductions if they will have to be reintroduced later as being essential for the completion of the project, or for the generation of its full benefits, or if they significantly change the nature of the project. The Sanctioning Authority must be informed of all significant works omissions.

If serious additional costs have arisen, the sanctioning authority should require the Sponsoring Agency to undertake, as appropriate, a revised cost-effectiveness analysis or cost benefit analysis having regard to the increased costs. Where a revised cost-effectiveness analysis or cost benefit analysis has been carried out and the project is either no longer affordable or the best value option, the procurement should be terminated and the resources diverted to more worthwhile projects.

If tenders are over the approved limit re-appraisal may be required to determine whether the project should be abandoned or proceeded with. If this re-appraisal suggests proceeding at higher cost the approval of the Sanctioning Authority to a raised financial limit must be sought before contracts are placed. If it is decided that the project should be abandoned at this post-tender stage, and if substantial amounts have already been spent on planning etc. at this stage, the position should be reviewed to determine why the project came to proceed to this stage and was then abandoned.

## **Proceed to Implementation**

It is at this point that the bulk of the spending on the project itself (spending will have been incurred at the appraisal and planning stages in relation to design fees, planning fees environmental assessments, site investigations etc.) can be sanctioned. (Once this point has been passed, it is often very difficult to withdraw from the project without incurring very large costs.) An explicit amount should be sanctioned.

[Figure 4](#) summarises the various steps that are required during the Planning Stage.

## **Appendix 1 Employing consultants for construction contracts**

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If the necessary resources are not available within the public sector to fully appraise a project the employment of outside consultants may be considered.

- Management consultants may be required to undertake detailed studies/appraisals.
- Technical consultants may be needed to give technical advice at various stages.

The first priority in engaging consultants is to ensure that the best quality of professional service is provided. It is essential that every authority which engages consultants should establish formal systems for monitoring and assessing the effectiveness and efficiency of consultants in the discharge of their contracts.

A comprehensive brief for consultants is of fundamental importance. All the clients requirements should be set out in proper detail, together with a tentative programme for the completion of the work. The service to be provided by each of the consultants must be clearly identified.

Separate agreements are required for consultancy tasks at the appraisal stage and at the planning and implementation stages of a project and that the contract under which consultants are engaged for particular tasks must make it clear that, if the project proceeds, they may not necessarily be engaged on later tasks. Fees should be sought on a competitive tendering basis.

The importance of complying with these requirements in employing consultants can be illustrated in a situation where, for instance, a project has proceeded to the planning stage. If, at this stage, circumstances warrant revising or abandoning the project, it is important that provision has been made in consultants' contracts for termination without incurring undue costs/liabilities.

Departments should try to anticipate their likely needs for consultancy services for project appraisal and planning purposes. Allowances for such services should be included in annual Departmental Budgets.

**B-03**

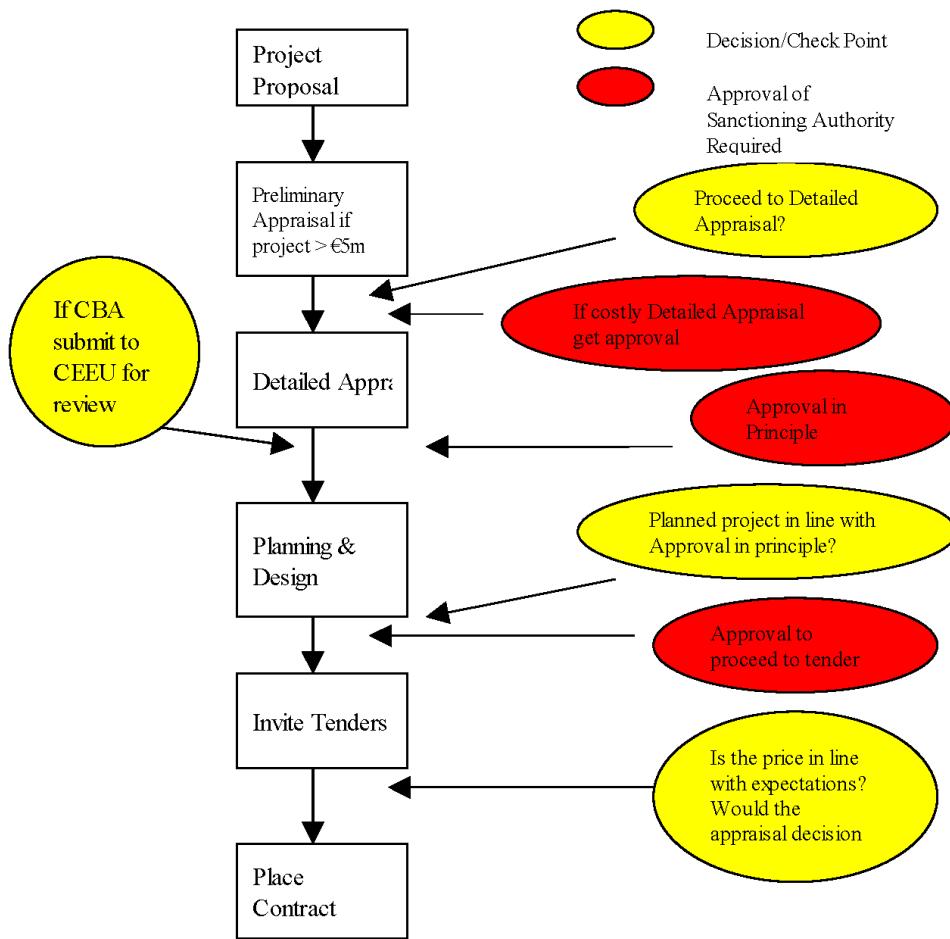
## **The Public Spending Code: B. Expenditure under Consideration**

### **Approvals Required and Scale of Appraisal**

**B-03**

#### **Document Update Log**

**Document Summary:** There are several checkpoints and approvals required before a proposal can proceed to implementation. The type of Appraisal required will depend on the type or scale of project. This document summarises the checkpoints and approvals required before a proposal can proceed to full implementation.



### Approval in Principle

'Approval in principle' is a decision given by a Sanctioning Authority to a Sponsoring Agency at the end of the appraisal stage. It permits the successive steps in planning a project or scheme to proceed, stopping short of the placement of major contracts or the making of any irrevocable commitments to undertake the project/scheme. It commits relatively limited resources to planning the project. Those resources are expended progressively. If circumstances warrant, it should be possible to revise or drop the proposal during the planning process without incurring all of the planning costs or any of the more substantial liabilities associated with the project itself. **If the value of the capital project exceeds €20m then the CBA (or CEA) should be submitted to the CEEU in the Department of Public Expenditure and Reform for their views, prior to the Sanctioning Authority granting the Approval in Principle.** The CEEU will give their views to the Sponsoring Agency and may publish their review of the CBA (or CEA) on their website, with any necessary redaction to protect the State's interest in the tender process and commercial sensitivity. Redactions,

if necessary at all, should be kept to a minimum and a justification for the redactions should be published with the document.

**For current expenditure proposals expected to incur over €20m (with an annual spend of at least €5m) an economic appraisal should be submitted to the Vote Section who may seek the views of the CEEU.** If the CEEU is asked to give their observations on the appraisal of a current expenditure proposal they may decide to publish their review of the appraisal on their website. For more information on appraisal of Current Expenditure proposals see document B-06 Appraising Current Expenditure.

### Pre-Tender Approval

When plans and designs have been finalised, the project proposal should be reviewed. Account should be taken of any major changes in relevant circumstances and the more precise information generated by the design process. In particular, if the expected total cost of the project has increased, then the project should be re-examined and reductions achieved without lowering the quality standard of the project below acceptable levels, in order to bring the project within the approved limit. Works should not be omitted so as to achieve reductions if they will have to be reintroduced later as being essential for the completion of the project, or for the generation of its full benefits, or if they significantly change the nature of the project. The Sanctioning Authority should be notified of any significant changes.

The pre-tender review is necessary to provide the information required by the Sponsoring Agency and the Sanctioning Authority to decide whether or not to approve proceeding to seek tenders.

### Review using Tender Prices

When a tender price and other relevant information become available, the case for proceeding with the proposal should again be reviewed. The analysis contained in the detailed appraisal once again provides the framework for undertaking this review. The award criteria in the tender document will be used to select the best proposal received. The best proposal is then compared with what was expected at the Approval in Principle point. If the costs and output from the best proposal do not match the costs and benefits that led to the Approval in Principle then the Appraisal decision may have to be reviewed.

If tenders exceed the approved budget, the project should be re-examined and reductions achieved without lowering the quality standard of the project below acceptable levels, in order to bring the project within the approved limit. As stated above in relation to the pre-tender stage, works should not be omitted so as to achieve reductions if they will have to be reintroduced later as being essential for the completion of the project, or for the generation of its full benefits, or if they significantly change the nature of the project. The Sanctioning Authority must be informed of all significant works omissions.

If serious additional costs have arisen, the sanctioning authority should require the Sponsoring Agency to undertake, as appropriate, a revised cost-effectiveness analysis or cost benefit analysis having regard to the increased costs. Where a revised cost-effectiveness analysis or cost benefit analysis has been carried out and the project is either no longer affordable or the best value option, the procurement should be terminated and the resources diverted to more worthwhile projects.

If tenders are over the approved limit re-appraisal may be required to determine whether the project should be abandoned or proceeded with. If this re-appraisal suggests proceeding at higher cost the approval of the Sanctioning Authority to a raised financial limit must be sought before contracts are placed. If it is decided that the project should be abandoned at this post-tender stage, and if substantial amounts have already been spent on planning etc. at this stage, the position should be reviewed to determine why the project came to proceed to this stage and was then abandoned.

### **3. Scale of Appraisal**

Every spending proposal should be appraised carefully. However, the resources spent on appraisal should be commensurate with the cost of projects (or proposals for current expenditure), and with the degree of complexity of the issues involved. Small and routine projects should be appraised with a readily applicable methodology which is used consistently and which reflects the principles set out in this document.

Simple appraisals involving expenditure of less than €500k may be completed within a matter of days. The appraisal of complex projects involving expenditure of more than €20m, which will involve a Cost Benefit Analysis, may take a number of months.

- (i) A simple assessment will be carried out for minor projects with an estimated cost below €0.5 million, such as projects involving minor refurbishment works, fit outs etc.

- (ii) Projects costing between €0.5 million and €5 million should be subject to a single appraisal incorporating elements of a preliminary and detailed appraisal.
- (iii) A Multi Criteria Analysis (MCA) should be carried out at minimum for projects between €5 million and €20 million.
- (iv) Projects over €20 million should be subjected to a Cost Benefit Analysis (CBA) or Cost Effectiveness Analysis (CEA). **Prior to Approval in Principle the CBA (or CEA) should be submitted to the Central Expenditure Evaluation Unit in the Department of Public Expenditure & Reform for their views.** The CEEU will give its views on the appraisal to the Sponsoring Agency and may publish their review of the CBA (or CEA) on their website, with any necessary redaction to protect the State's interest in the tender process and commercial sensitivity. Redactions, if necessary at all, should be kept to a minimum and a justification for the redactions should be published with the document.

For **current expenditure proposals expected to incur over €20m (with an annual spend of at least €5m)** an economic appraisal should be submitted to the Vote Section who may seek the views of the CEEU. If the CEEU is asked to give their observations on the appraisal of a current expenditure proposal they may decide to publish their review of the appraisal on their website.
- (v) Programmes with an annual value in excess of €30 million and of 5 years or more duration to be subject to prior and mid-term evaluation at the beginning and mid point of each 5 year cycle or as may be agreed with the Department of Public Expenditure & Reform. Programme Evaluation should consider five key questions:
  1. **Rationale** -What is the justification or rationale for the policies underpinning the programme? What is the underlying market failure justification for Government intervention?
  2. **Relevance** – What are the implications for the programme of changes in the wider socio-economic environment and in the context of overall Government policy?
  3. **Effectiveness** – Is the programme meeting its financial and physical objectives?
  4. **Efficiency** – Could more be achieved for the resources invested?

**5. Impact** – What socio-economic changes can be attributed to the programme. Most projects will be considered in the context of a sponsoring agency's business plan or a multi-annual investment programme. The Sanctioning Authority should ensure that there is adequate consultation between sponsoring agencies, relevant Departments and public bodies having functional responsibilities in the sector or cross-sectoral responsibilities.

### **Cost-Benefit or Cost-Effectiveness Analysis?**

There are two basic forms of economic analysis, one of which should be applied in the appraisal of each non-commercial investment proposal valued over €20m (see figure 6 below):

#### *Cost-Benefit Analysis*

The general principle of cost-benefit analysis (CBA) is to assess whether or not the social and economic benefits associated with a project are greater than its social and economic costs.

#### *Cost-Effectiveness Analysis*

Cost-effectiveness analysis (CEA) compares the costs of different ways of achieving a particular objective. A choice can then be made as to which of these options (which all achieve the same or similar ends) is preferable. Cost-benefit and Cost-effectiveness analysis are very similar. Ideally, cost-benefit analysis would always be undertaken. However, there are situations where significant costs or benefits associated with a project cannot be quantified or valued, and where this occurs cost effectiveness analysis may have to be relied on. CEA is employed to determine the least cost way of determining the project objective. Whether undertaking cost-benefit or cost-effectiveness analysis, a number of important considerations arise:

- There may be significant costs or benefits which do not affect the Sponsoring Agency but which are important to other persons or agencies or to society in general. These are usually called 'externalities' (i.e. they are external to the sponsor's direct concerns).
- There may be no market prices available for evaluating some costs or benefits associated with project options as they may not be traded items.
- In some cases, though resources consumed and outputs produced may be traded, the prices may not reflect the real value to society of those resources or outputs.

For further information on Appraisal Techniques see Document D.01.

### Project Finance including PPPs:

The Sponsoring Agency is required to seek the advice of the NDFA on all projects above €20 million and should do so at preliminary appraisal stage and in any event no later than before tender documents are finalised. The Agency's statutory functions include advising public bodies on the optimum means of financing the cost of public investment projects to achieve value for money and providing advice in relation to all aspects of financing, refinancing and insurance including risk analysis of public investment projects.

The option of procuring a project by PPP for projects costing over €20m should be considered by the sponsoring agency as part of the project appraisal. The separate Guidelines on Public Private Partnerships should be followed when considering the PPP option – see [www.ppp.gov.ie](http://www.ppp.gov.ie).

Figure 6: Identifying the Appropriate Type of Analysis

## **The Public Spending Code: B. Expenditure under Consideration Procurement Guidelines**

### **The Public Spending Code: B. Expenditure under Consideration**

#### **Procurement Guidelines**

**B-04**

##### **Document Update Log**

Capital projects as a rule and in some cases current expenditure programmes will involve third party provision on a contractual basis. Having attained an Approval in Principle on completion of the Appraisal phase and an Approval to Proceed to Tender during the planning phase the project moves on to Procurement which is a phase of planning that is governed by extensive regulations and guidance.

Procurement Regulations aim to give potential suppliers a fair opportunity to compete. From a Value for Money perspective lower prices are secured when competitive processes are used. To be compliant with the Public Spending Code, Departments and Agencies have to comply with Procurement Regulations and Guidelines.

For regulations and guidance on procurement see: <http://per.gov.ie/public-procurement-2/>

##### **Contract Placement**

**The Sponsoring Agency should procure the services of a contractor in accordance with EU and national procurement requirements.** Depending on the kind of project being undertaken, the Sponsoring Agency may have a choice of engaging in a single contract with one contractor, or of co-ordinating a number of minor or sub-contracts. The task of managing a large number of contracts should not be underestimated; any potential cost savings associated with such an approach should be weighed against the inevitable additional management costs. **The use of nominated subcontractors is not permissible in any public works contract. The contract should make clear the specific responsibilities of the parties.**

The NPPPU was established in June 2002 and is charged with the formulation of policy and guidance in public procurement and the delivery of the government's e-procurement strategy. It is also responsible for producing national procurement guidelines, transposition of EU directives and for the Government Contracts Committee. The unit can be contacted at 01 6318034 or 01 6318101 or email: [procure@per.gov.ie](mailto:procure@per.gov.ie).

### National Procurement Service (NPS)

The NPS was established in April 2009 on foot of a Government Decision assigning responsibility for procurement to the Minister of State at the Department of Finance with special responsibility for the Office of Public Works.

The establishment of the NPS is part of an overall vision for Public Procurement, which sees policy and operational structures working together. The NPS has been tasked with centralising public sector procurement arrangements for common goods and services (excluding the construction sector). By identifying key markets and analysing procurement trends, the NPS develops a more integrated approach to procurement across the public sector utilising procurement tools such as aggregation and framework agreements.

The NPS establishes central framework agreements and contracts for use by the wider public service. These central contracts are publicised through [www.procurement.ie](http://www.procurement.ie). This website also contains guidance material and standard procurement documents for use by public service buyers and suppliers.

The NPS administers the [www.etenders.gov.ie](http://www.etenders.gov.ie) website which is the portal through which all public service contracts over the value of €25,000 must be advertised. This website also allows full access to the Official Journal of the European Union. **The NPS can be contacted on 046-9426000 or email [nps@ope.ie](mailto:nps@ope.ie) and is based in OPW Headquarters, Jonathan Swift Street, Trim, Co. Meath.**

## **The Public Spending Code: B. Expenditure under Consideration Public Private Partnerships**

### **The Public Spending Code: B. Expenditure under Consideration Public Private Partnerships**

**B.05**

#### **Document Update Log**

Public Private Partnerships are an alternative way of financing a project. As stated in Public Spending Code Document [B-03 Approvals Required and Scale of Appraisal](#) procurement using PPP should always be considered when the value of the project exceeds €20m.

A Public Private Partnership (PPP) is an arrangement between the public and private sectors (consistent with a broad range of possible partnership structures) with clear agreement on shared objectives for the delivery of public infrastructure and/or public services by the private sector that would otherwise have been provided through traditional public sector procurement.

The PPP approach has the potential to offer value for money and timely delivery of infrastructure when applied to projects of the right scale, risk and operational profile.

One key aspect of the PPP approach is that risk is transferred to the party that can manage it best.

Further information on PPPs can be found on the Central PPP Unit's website at [www.ppp.gov.ie](http://www.ppp.gov.ie)

### **Document Summary:**

The Public Spending Code extends the requirement for expenditure appraisal to current as well as capital expenditure. While section B.01 sets out the standard appraisal steps which apply to public expenditure both current and capital, this section of the Code provides more detail on specific *ex ante* requirements before new current expenditure projects/programmes are undertaken or sanctioned. The new obligations are:

- (a) Preparation of a detailed Business Case incorporating a financial and economic appraisal for consideration by the relevant vote section of D/PER, assisted by the CEEU as appropriate.
- (b) Resubmission of Business Cases in order to address any issues identified by D/PER
- (c) Provision for a ‘sunset clause’, after which the expenditure scheme will be reviewed and discontinued unless it can be demonstrated to meet VFM criteria.
- (d) Fixed cash limits for demand-led schemes.
- (e) Pilot implementation of new proposals required before final approval, where feasible
- (f) “Evaluation-proofing” of all Business Cases and related Memoranda for Government.

These obligations apply to new current spending proposals involving total expenditure of at least €20m over the proposed duration of the programme and a minimum annual expenditure of €5m. In particular, the current appraisal provisions apply to:

- (i) New grant/subsidy schemes
- (ii) Extension, renewal or re-orientation of existing programmes/schemes
- (iii) New delivery mechanisms for existing services
- (iv) New public services
- (v) New State bodies or amalgamations of State Bodies
- (vi) Measures deriving from broad cross sectoral or framework policy initiatives

This section also sets out some items of good practice to ensure appraisal of current expenditure is robust and an overview of required content for a Business Case. Additional guidance will be developed in line with the evolving nature of the Public Spending Code.

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## **1 Introduction**

Prior to the formulation of the Public Spending Code, project/programme appraisal requirements only formally applied to capital expenditure. There were no specific published rules and guidelines regarding new *current* spending proposals, and the procedures for assessing such proposals were devised on a case-by-case basis. Although Regulatory Impact Assessment (RIA) Guidelines (2009) impose certain appraisal requirements when a new regulation is proposed, these generally only cover instances of new current expenditure involving a regulation and are not designed to cover all types of current spending. This section of the Public Spending Code puts the procedures for assessing and appraising current expenditure on a standardised basis.

The appraisal rules have been designed to address, in particular, a number of shortcomings that can commonly arise in the case of new current spending proposals. These include:

- Poor objective setting
- Poor appraisal and planning
- Inadequate estimation of demand and take-up by clients
- Underestimation of the full costs of implementation
- Lack of sufficient piloting and testing
- Inadequate risk assessment
- Little effort made to design appropriate management information arrangements e.g. data collection streams to support ongoing monitoring and review.

The Public Accounts Committee (PAC) of Dáil Éireann has also recommended that new initiatives should be underpinned by Business Cases and cost benefit analysis<sup>1</sup>.

This section explains the scope of the new requirements and outlines the specific obligations for Departments and Agencies that are developing current expenditure proposals. It also outlines critical success factors for best practice in appraising current expenditure. It includes an appendix which highlights the main high level components required for a Business Case submission.

1

Dáil Éireann Committee of Public Accounts Final Report on: Appropriation Accounts 2008 & 2009; Annual Reports of the Comptroller and Auditor General 2008 & 2009; and Special Reports of the C&AG (Hearings of the Committee in the period July 2009 to January 2011), July 2011

## **2 Distinction between current and capital expenditure**

A differentiation is made between capital and current spending in accounting for public expenditure. Capital spending generally involves the creation of an asset where benefits accrue to the public over time e.g. a road, a rail line, a school or a hospital. Public funds are allocated to time-bound projects where substantial once-off costs are incurred in earlier time periods with investment on land acquisition, construction materials and human capital. The targeted benefits usually arise in future time periods once initial investment is completed. However, current expenditure involves day to day expenditure and typically includes spending on:

- Salaries of public servants involved in delivering public services
- Non-pay costs such as materials (drugs, teaching materials etc) and administrative overheads as well as other commercially procured products and services
- Income supports for targeted groups
- Grant payments to achieve specific economic and/or social objectives
- Payments for services carried out by professionals (e.g. training etc) or other business sectors.

The cost profile for current spending proposals also tends to be more evenly distributed over time. In some cases, the benefits of current expenditure materialise directly as expenditure is incurred (e.g. income supports such as social protection schemes) but in other cases, positive outcomes arise over longer time horizons (e.g. early childhood intervention schemes).

It should be noted that programmes and projects often have both current and capital characteristics. In addition, capital expenditure projects generally include current costs such as operating and maintenance costs which are subject to the same appraisal requirements as the upfront investment costs. The majority of the general provisions in the Public Spending Code as set out at sections A and B are equally applicable to current and capital expenditure.

Analysts carrying out current expenditure appraisals will generally be required to devote more attention to the following issues:

- Costing staff time including pay overheads such as employers PRSI and pensions (usually existing internal Departmental/agency staff or new staff)
- Difficult to measure personal and programme outcomes and wider effectiveness indicators
- Administrative costs of services e.g. management costs, non pay costs such as IT
- Costing different methods of delivery including external sourcing.

It is beyond the scope of this section to set out all the detailed current expenditure appraisal issues for different project types across different sectors. The appraisal requirements can vary significantly from area to area, and the precise approach often needs to be customised to suit the type of spending under consideration. Each Department should draw up its own guidelines for the conduct of appraisal of new current expenditure programmes/schemes. Proposed guidance may be submitted to the CEEU for consultation purposes. The advice of the CEEU can be sought at the outset of the current appraisal process to discuss best practice. In particular, it may be difficult to quantify and monetise outcomes. Targeted outcomes may be influenced by many causal factors and isolating the specific impacts of one causal factor can be a technical and complex task, particularly if the quantum of programme expenditure is small relative to the overall scale of other expenditure interventions in the policy area.

### **3 Scope**

This section describes the scenarios where the new current expenditure guidelines apply. The appraisal guidelines apply to the main activities involved in the appraisal stage of the project/programme lifecycle as summarised below:

- 1) Identify proposal
- 2) Preliminary appraisal
- 3) Detailed appraisal
- 4) Finalisation of business case
- 5) Planning and design
- 6) Pilot Implementation

As with capital projects, some of the elements of the appraisal activities necessarily overlap with the planning and design stage (e.g. piloting). Further detail on the stages is set out on page 13.

Departments and agencies will be required to appraise the options for new current expenditure proposals before a determination is made that the proposal is approved in principle and should move on to the planning stage.

The obligations and guidance for current expenditure appraisal apply to proposals which involve a total

budget of at least €20m or more for the duration of the programme and an annual expenditure of at least €5m. Some indicative examples of the scope of current spending proposals covered by the new obligations are set out below in sections 3.1 to 3.6.

### *3.1 New grant/subsidy schemes*

It may be proposed to introduce a new grant scheme<sup>2</sup> or subsidy to achieve specific objectives for particular sectors of the economy or to promote social development. Grant schemes may be provided by Government Departments or Agencies and typically include grants to the agricultural, arts, energy, sports and enterprise sectors. Grants are also paid to third sector or voluntary bodies to achieve a range of social objectives

Some examples of new grant schemes launched in recent years include:

- Suckler Welfare Scheme (Department of Agriculture, Food and the Marine)
- Employment Subsidy Scheme (Enterprise Ireland)
- Language Support Schemes (Arts, Culture and the Gaeltacht)

The new current appraisal obligations apply to new grant schemes introduced across all Government Departments and Agencies.

### *3.2 Extension, renewal or re-orientation of existing schemes*

In some cases, existing spending schemes may terminate because schemes are time-bound or because scheduled payments to beneficiaries have finished. It is common for Departments and Agencies to develop proposals to either extend schemes or develop successor schemes with similar objectives. In both these instances, the new appraisal obligations are deemed to apply. The appraisal obligations apply even if the change to the scheme does not involve any significant additional spending relative to the pre-existing scheme i.e. a rigorous appraisal of the entire scheme must be carried out as if it were being implemented for the first time. An evaluation of an existing scheme (whether by way of VFM & Policy Review or FPA) may also act as valuable inputs to this appraisal as well as any other evidence based policy outputs.

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<sup>2</sup> This should not be confused with grant-in-aid payments which are payments to State agencies, public and voluntary bodies to cover running costs or payments to a specific public or private agency to cover the cost of a particular activity carried out by that body (Requirements for Grants and Grants-in-Aid, Circular 17/2010, Department of Public Expenditure and Reform)

### *3.3 New delivery mechanisms for existing services*

New spending proposals may also involve a major change in delivery mechanisms to achieve more cost-effective delivery of the same objectives for a programme or project. For example, a buy vs. lease decision to address housing objectives could involve the design of new mechanisms to meet housing needs for eligible claimants but the long term objectives for the intervention may not change. Another example could involve a change in the administration of services such as individualised budgeting instead of block grant allocation for social care programmes. There are also instances where public services or administrative functions could be delivered using a shared service model or external sourcing. In these cases, there should also be a strong focus on a financial analysis and an Exchequer cashflow analysis including, in particular, an assessment of administrative savings.

### *3.4 New public services*

Merit goods such as healthcare, social and educational services may be introduced to achieve Programme for Government objectives. These are often delivered by professional frontline staff. These services are also subject to the new appraisal requirements. Quantifying the targeted outputs to be delivered and designing appropriate measures of outcomes are important tasks to be addressed in the appraisal of these services.

When considering the delivery mechanism for all new services the option of external sourcing must be considered.

### *3.5 New State bodies*

The creation of a new agency or public body also requires adherence to the new appraisal obligations. This also applies to proposed amalgamations of existing public bodies. In this case, an important element of the appraisal efforts should be the Exchequer cash flow analysis or financial analysis which illustrates the potential savings from amalgamations.

### *3.6 National/cross sectoral policy programmes and frameworks*

Broad policy frameworks or cross sectoral policy initiatives may be formulated by lead Departments e.g. the Framework for Sustainable Development. These strategic documents generally set out broad principles and aims for a given policy area (s). However, inclusion of measures at a strategic level in these

frameworks does not obviate the requirement for proper appraisal of specific current and capital spending proposals arising from high level policy aims. The Department proposing specific measures should apply the Public Spending Code appraisal requirements as approval of broad policy frameworks does not confer automatic approval of the specific actions, schemes or programmes which result from these frameworks.

In general, the obligations for appraising new current expenditure proposals do not apply automatically to the broad range of existing current expenditure schemes i.e. it is not intended that all existing programmes must be appraised each year as this would be highly resource-intensive and the VFMPR/FPA arrangements set out at section C apply instead to ongoing expenditure. Similarly, it is not intended that these arrangements for appraisal of new current expenditure apply to routine administrative budgets already in place as the focus is on new programme expenditure. However, as pointed out at section 3.2 above, any proposed extension, renewal or re-orientation of existing schemes should be informed by expenditure appraisals.

If it is uncertain as to whether or not the new arrangements apply to a spending proposal, line Departments should consult the relevant vote section in D/PER and the CEEU. In general, the approach should be taken that even if there is some doubt as to whether expenditure is new or not, it is more than likely that the area of spend would benefit from appraisal and evaluation.

## **4 Obligations/Rules**

The specific obligations for current spending appraisals are set out below.

### ***4.1 Business Case***

Line Departments are required to submit a Business Case (see Appendix A of this section for overview guidance on the contents of a Business Case ) for current expenditure proposals with total expenditure over the duration of the programme/scheme of at least €20m and a minimum annual expenditure of €5m to the relevant Vote section in DF/PER. The vote section may send the Business Case to the CEEU for formal technical review to determine compliance with the Public Spending Code. The CEEU may publish this assessment. The economic and financial appraisals are key components of the Business Case document.

Re-submission will generally be required by the Vote section in any case where an appraisal requires further work and the Business Case document will required to be developed through as many iterations as are necessary to address the relevant appraisal issues.

It is important that preparation of Business Cases begin at early stage to be consistent with budgetary timetables. Ideally, work on a new spending proposal should commence 9 to 10 months prior to the core period of the estimates cycle i.e. a business case for a spending proposal intended to begin in 2013 should be initiated in quarter 4 2011.

A multi criteria analysis should be carried out at minimum for new current expenditure proposals between €5m and €20m. Projects costing between €0.5m and €5m should be subject to a single appraisal incorporating elements of a preliminary and detailed appraisal. The scale of appraisal should be commensurate with the level of expenditure proposed (see also document B03).

#### *4.2 Sunset clauses*

All new proposals should contain specific dates for the application of “sunset clauses”. The sunset clause is the specification of a fixed date by which spending the programme or project will terminate, unless the value for money of the programme can be demonstrated on foot of a rigorous review. Even for schemes where spending is expected to continue for a significant period of time (e.g. merit goods involving human services), a sunset clause should still be applied to facilitate a review of the merits of the scheme taking into account effectiveness to date and changes in the external environment. Sunset clauses are of particular importance for new grant schemes and new agencies.

#### *4.3 Cash limits for demand led spending proposals*

In keeping with the multi annual expenditure framework reforms, any new demand-led spending proposals should incorporate strict cash limits<sup>3</sup>. This is so that unexpected or unanticipated rises in demand do not automatically pre-empt other uses for scarce resources, whether in that Department/Agency or elsewhere. Cash limits are also a necessary feature of modern expenditure management in the context of fixed multi-annual expenditure ceilings in each departmental area.

If eligibility or qualifying criteria is the mechanism used for selection then the scheme should have a cash or other volume limit. A queuing system may be appropriate to determine the distribution of the fixed

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<sup>3</sup> See also part 10 of section C3 in the Public Financial Procedures, 2008

allocation among competing applicants. In general, commitments should be managed to avoid the risk of incurring expenditure that is significantly in excess of what is intended or budgeted.

The cash limits for demand led spending proposals do not apply to some social protection schemes where expenditure is driven by demographics or macro-economic issues and where competing applicants is not appropriate e.g. unemployment related payments.

#### *4.4 Evaluation proofing*

New spending proposals proposed in Business Cases should include a detailed plan for evaluation and monitoring. The plan should specify the data to be collected and the methods for gathering the data. It should also include the following:

- Articulation of the programme logic model which outlines the contribution of all relevant factors to the objective of the intervention and sets out the linkages between objectives, inputs, activities, outputs and outcomes
- Specific measures to set up systematic data collection and data collection streams to support reporting of performance indicators for monitoring , performance budgeting purposes<sup>4</sup> and evaluation (VFM's and FPA's)
- Specific evaluation techniques proposed to track outcomes including plans regarding the design of control/comparison groups where feasible (i.e. experimental evaluations) e.g. surveys, focus groups, statistical analyses, longitudinal studies, phased introduction, before and after studies
- Schedule of pilot studies and evaluations as well as an identification of who will carry these out

The feasibility of assessing outcomes can vary from programme to programme and monetising outcomes can be difficult. However, at minimum, it should be possible to quantify the types of outcomes targeted.

#### *4.5 Pilot exercises*

In principle and as general rule, no new programme / scheme can be introduced without a pilot. Final approval for full implementation of a scheme should not be granted until the pilot has been completed, formally evaluated and submitted for approval to the vote section in the Department of Public Expenditure and Reform. The piloting exercise will enable testing of different variants of the policy

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<sup>4</sup> Performance budgeting information is set out in the Revised Estimates for Public Services volume published annually by the Department of Public Expenditure and Reform

proposal, will highlight potential drawbacks and generate data about outcomes. However, pilot schemes may not be feasible for each new spending proposal and exceptions to this rule may be considered where issues of equity, feasibility or proportionality of expenditure arise. The Business Case should include a section on piloting. In this section, the proposing Department/Agency would set out the planned arrangements for piloting or provide a justification as to why piloting is not feasible.

#### *4.6 Approvals*

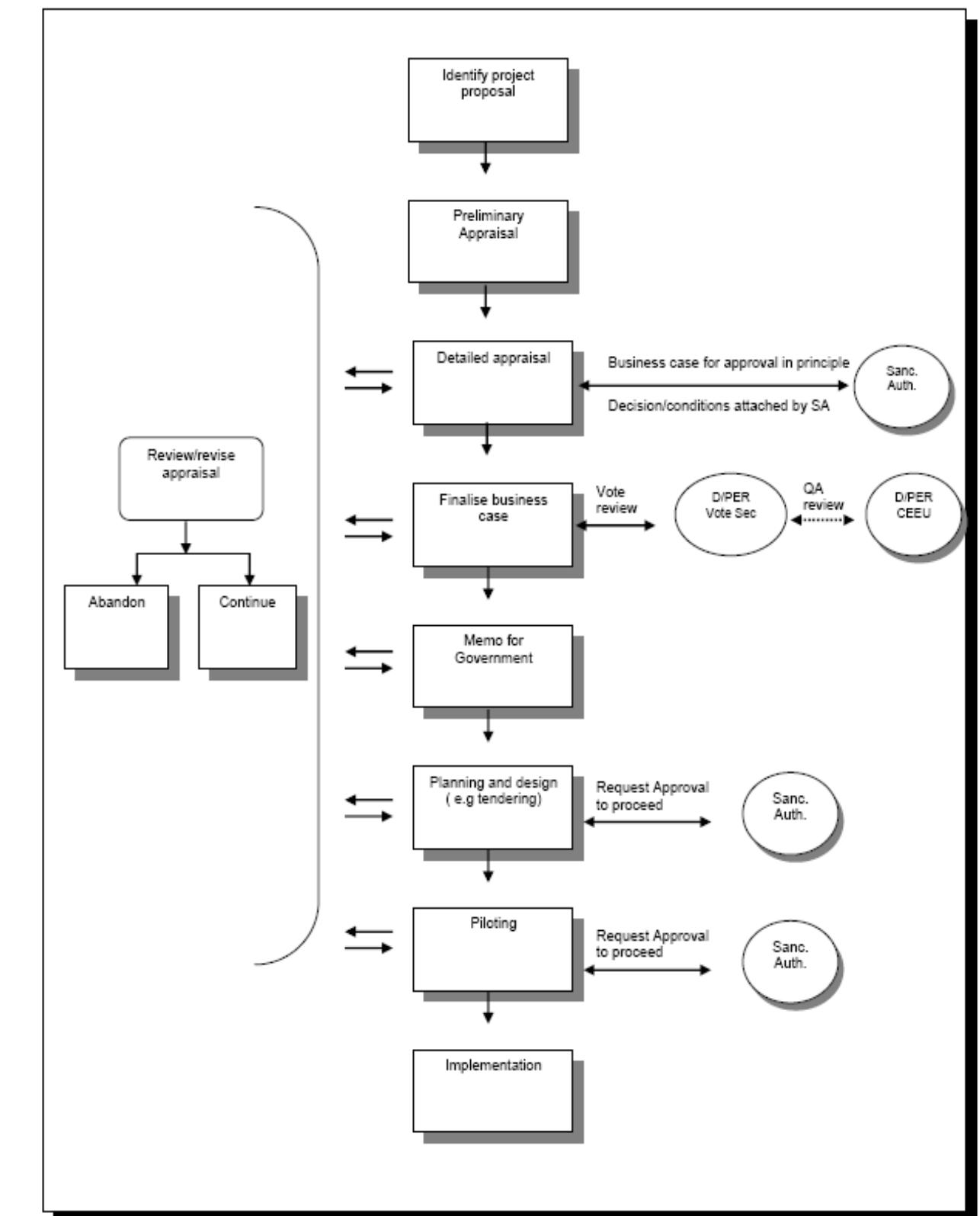
A similar sequencing of approvals by the sanctioning authority is required for current expenditure as is required for capital expenditure. Figure 1 (page 12) shows the main stages in the appraisal process for current expenditure proposals, illustrates when approval by the sanctioning authority is typically required and also when the appraisal should be revised in light of new information or conditions attached to approvals and assessments. The main triggers for a review/revision of the appraisal are when:

- The sanctioning authority approves the proposal in principle and includes conditions or changes in scope
- The Department of Public Expenditure and Reform provides feedback on technical aspects of the appraisal
- Changes arise as a result of a Government decision
- Additional and more detailed information is gathered during planning and design
- More detailed appraisal information emerges from the piloting process

In practice, appraisal is an iterative process with the analysis undergoing continuous updating as new information emerges.

There are a number of differences in the stages for capital expenditure projects and current spending. For example, a capital project will generally involve tendering for goods and services provided by the private sector. This is generally considered to be part of the planning and design stage because a decision for approval is required after tender prices become available and the project may still be abandoned. However, for a current spending proposal, there may not always be tendering as a scheme or programme may be delivered using internal resources only. This does not obviate the need for a revision of the appraisal and seeking approval based on up to date planning and design information at key stages of the decision cycle.

**Figure 1 Illustrative Stages and approvals required for current expenditure appraisal**



## **5 Key success factors for high quality appraisal**

A review of the core principles which apply equally to current and capital spending proposals is an important starting point in appraising current expenditure below: (see also overview of [VFM framework](#) for more detail). It can be resource intensive to carry out a rigorous appraisal. However, a properly conducted appraisal will ensure better decision making and greater allocative efficiency. This section outlines some high level success factors for carrying out a robust appraisal. The resources and practical guidance in relation to appraisal on the Public Spending Code website will be subject to ongoing development in line with the requirements of users.

### *5.1 Key components of the appraisal*

As with the appraisal of capital projects, there will be significant overlap between the appraisal and planning/design stages. However, a certain amount of planning/design information will be required to carry out a proper appraisal in the first instance e.g. eligibility conditions and related demand.

The appraisal should incorporate an appraisal of the merits of the proposal (i.e. an economic appraisal such as a CBA) and also a separate financial analysis.

In general, the Business Case should incorporate both economic and financial appraisal. The economic appraisal (e.g. CBA or CEA) should be presented to demonstrate the merits of the scheme. As part of the overall appraisal, a separate financial appraisal should also be carried out. In most cases, the financial flows will be included in the economic appraisal. The financial appraisal will generally also incorporate an Exchequer cashflow analysis, a note on budgetary impact (i.e. consistency with multi annual expenditure ceilings) and a note on the sources of funds. In certain narrow circumstances, economic appraisal may be less relevant for certain types of spending proposals where the costs and benefits relate solely to elements of the Exchequer. This is the case where the proposal involves a redesign of a scheme/programme to achieve the same objective but at a lower cost to the Exchequer, an agency amalgamation which aims to generate efficiencies, a shared services decision or an external sourcing decision. Where an economic appraisal has not been carried out, the justification for this decision must be clearly set out in the Business Case.

### *5.2 Good practice checklist*

Box 1 overleaf highlights some high level issues to consider to ensure a robust appraisal of new current expenditure proposals.

**Box 1 Critical success factors for current expenditure appraisal***Objectives*

- Proposals should pay particular attention to the specific articulation of quantifiable objectives.
- Due account should be taken of other Government programmes with similar objectives to avoid duplication and to ensure a whole of Government approach
- The team involved in compiling the appraisal should complete the programme logic model to illustrate the links between objectives, inputs, activities, outputs and outcomes
- Appraisals should pay particular attention to the intended clients of schemes, relevant demographic characteristics (location, income, household composition etc) and the predicted level of take up. Likely demand should be linked to anticipated funding levels and eligibility considerations.
- Demand estimation should be based on empirical research.
- Appraisals should clearly consider the impacts (costs etc) on other Departments arising from spending proposals. Any potential overlaps or duplication with other schemes/tax expenditures should be identified.
- Distributional/equity concerns i.e. is the programme/scheme targeted at those with most need

*Options appraisal*

- Appraisal of spending proposals should incorporate a detailed options appraisal to ensure decisions are fully informed. Realistic options can include operational implementation options, private sector alternatives, varying scale solutions or alternative types of economic intervention (subsidies, taxes, regulations etc). The do-nothing or do-minimum options should always be considered.
- For new services external sourcing must be considered as one of the possible delivery mechanisms.
- The costs and benefits of each option should be appraised and not just the favoured option.

*Quantification of costs and benefits*

- Detailed research should be carried out in order to quantify the costs and benefits of the spending proposal under consideration using primary sources where possible. This is subject to the principle of proportionality.
- Appraisals should incorporate address deadweight (e.g. eligibility conditions, rates of subsidy/grant and duration of programmes/schemes), displacement and additionality issues Evaluation methods should be designed to ensure these can be measured in future evaluations.
- Include opportunity cost of internal staff re-assigned to administer and manage new schemes
- Cost recovery issues and/or financial contributions from programme participants (these should feature in the financial analysis)
- The pattern and timing of programme/scheme take up is critical for planning/design purposes, particularly given the importance of adhering to multi annual spending ceilings
- In the event that private, community or third sector organisations are involved in programme delivery, the forthcoming supplementary guidance for this sector should be taken into account

*Reporting*

- The final iteration of the business case, including the appraisal, should be completed before piloting and implementation.

### 5.3 Analytical Techniques

The Business Case for new current spending proposals should include a financial and economic appraisal.

The key appraisal techniques which should be applied include:

- CBA
- Exchequer cashflow analysis
- Multi criteria analysis (MCA)

More detail on the specific application of these techniques are set out in section D of the Public Spending Code. This section of the website is subject to ongoing development. In particular, CBA is the main economic appraisal technique required by the Public Spending Code. In circumstances, where CBA is not appropriate due to the difficulty in monetising outcomes, CEA may be considered.

Given that the outcomes of some current spending proposals may be difficult to monetise, MCA can also be an additional, useful tool to rank competing options according to different criteria. This does not mean that no attempt should be made to monetise outcomes but targeted outcomes can also be expressed in performance indicator terms and the expected effectiveness of options can be ranked accordingly. Examples of such outcome measures include:

- Unit cost per job created (enterprise sector)
- State subsidy per subscriber (national broadband scheme)
- Annual energy savings over baseline levels (energy schemes)

If all outcomes cannot be fully monetised, the qualitative assessment should always be carried out in a structured way.

### 5.4 Revising the appraisal

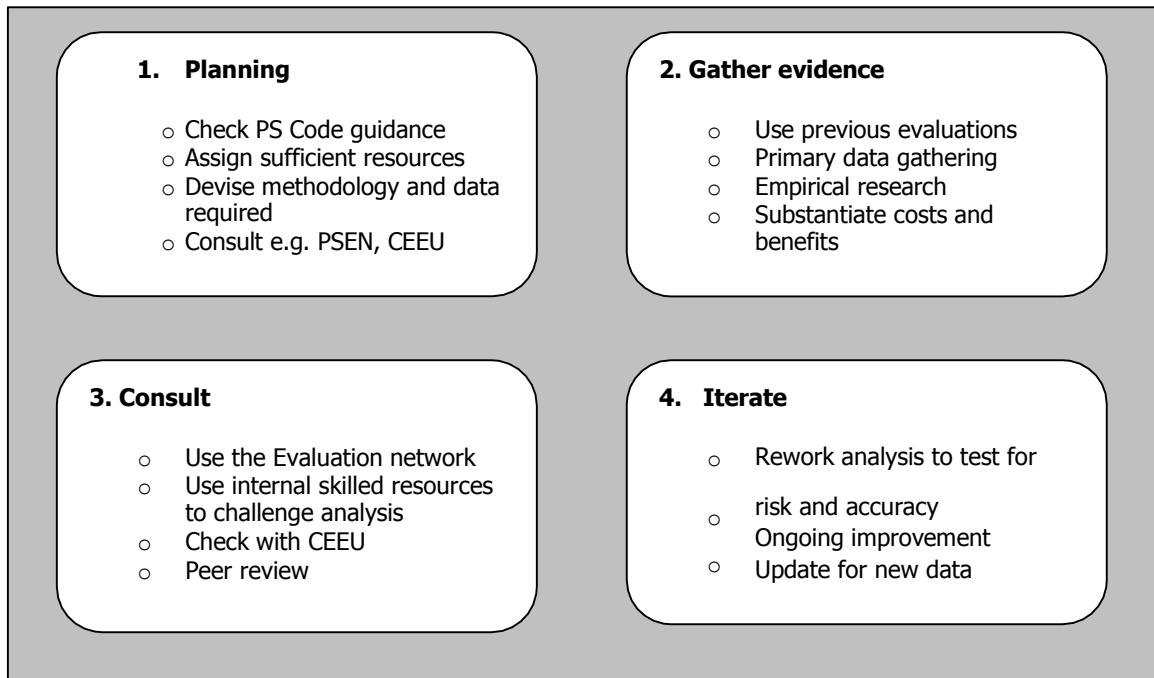
Unlike a capital project, tendering may not always play a significant role in the delivery of many current expenditure programmes/schemes. This does not detract from the requirement to revise the CBA at key decision points. The appraisal for a current expenditure programme/scheme should be reviewed and potentially revised at key decision points (see Figure 1, p.13).

Appraisals should always be revised if the scope of the proposal changes or there is a significant lapse in time between the initial appraisal and the approval decision.

## *5.5 Practical steps to ensure a high quality appraisal*

In order to carry out a successful appraisal, there should be a systematic approach to generate the analytical outputs required. Box 2 below summarises the steps which should be taken to ensure a high quality appraisal.

### **Box 2 Best practice in carrying out an appraisal**



## **Appendix A    High Level Guidance on Business Cases**

The Business Case is the formal submission presenting the spending proposal that Departments make internally to senior management as well as to the Department of Public Expenditure and Reform. It becomes the key document of record and integrates all the various elements required to support a decision on the merits of a proposal. The Business Case should incorporate the following key elements:

- Objectives
- Scope
- Feasibility
- Options Appraisal
  - Economic
  - Financial
  - Risk analysis
- Planning and design issues
- Evaluation plan
- Recommendation

The Business Case should be prepared by the sponsoring agency. It is important that there is input from staff resources with experience of economic analysis and evaluation to underpin the quality of analysis carried out.

While the Business Case will contain some planning and design information, it will not be possible to include all planning and design related details until the proposal has proceeded to this stage. Nonetheless, a certain amount of planning and design information is required to carry out the appraisal. For example, the eligibility conditions and rate of subvention are important design considerations for a new grant scheme.

### **Box A1 High level Outline of Business Case requirements**

Nr	Item	Detail
1	Objectives	<ul style="list-style-type: none"> <li>➢ Definition of the policy proposal and its objectives</li> <li>➢ Economic rationale for the proposal</li> <li>➢ Programme logic model showing linkages between inputs, outputs and outcomes</li> </ul>
2	Scope	<ul style="list-style-type: none"> <li>➢ Duration of spending proposal (including identification of sunset clause)</li> <li>➢ Departments affected</li> <li>➢ Number of clients</li> </ul>
3	Feasibility	<ul style="list-style-type: none"> <li>➢ Constraints</li> <li>➢ Administrative feasibility</li> <li>➢ Previous experience</li> </ul>
4	Options Appraisal	<ul style="list-style-type: none"> <li>➢ Options appraisal (including justification of options)</li> <li>➢ Core assumptions</li> <li>➢ Decision criteria</li> <li>➢ Limitations</li> </ul>
4a	<i>Economic appraisal</i>	<ul style="list-style-type: none"> <li>➢ Exchequer cashflow analysis</li> <li>➢ Affordability analysis (MTEF)</li> <li>➢ Analysis of sources of funding</li> </ul>
4b	<i>Financial</i>	<ul style="list-style-type: none"> <li>➢ Identification of risks</li> <li>➢ Sensitivity and scenario analysis</li> <li>➢ Risk mitigation strategy</li> </ul>
4c	<i>Risk analysis</i>	<ul style="list-style-type: none"> <li>➢ Scheme design i.e. eligibility, payment rates</li> <li>➢ Administrative issues e.g. IT, staffing,</li> <li>➢ Roles, responsibilities and reporting</li> <li>➢ Project implementation plan</li> <li>➢ Procurement issues e.g. outsourcing</li> <li>➢ Cross cutting issues</li> </ul>
5	Planning and design issues	<ul style="list-style-type: none"> <li>➢ Pilot arrangements</li> <li>➢ Performance measurement framework <ul style="list-style-type: none"> <li>○ Data collection streams</li> <li>○ Indicators</li> <li>○ Techniques to measure outcomes</li> </ul> </li> <li>➢ Proposed monitoring/evaluation arrangements</li> <li>➢ Schedule of evaluations</li> </ul>
6	Evaluation plan and proofing	<ul style="list-style-type: none"> <li>➢ Key results from appraisals</li> <li>➢ Qualitative issues</li> </ul>
7	Recommendation	<ul style="list-style-type: none"> <li>➢ Assumptions, parameters, input values</li> <li>➢ Detailed methodology</li> </ul>
8	Appendices	<ul style="list-style-type: none"> <li>➢ Assumptions, parameters, input values</li> <li>➢ Detailed methodology</li> </ul>

## **B07 – Conducting a Regulatory Impact Assessment**

### **Discussion Draft**

# **B07 – Conducting a Regulatory Impact Assessment**

## **Discussion Draft**

### [Document Update Log](#)

Regulations and their implementation often result in considerable costs to the public service, to citizens and to businesses. It is important that these costs are taken into account. Regulatory Impact Assessment (RIA) is a tool to assess the likely effects of a proposed new regulation and involves a detailed analysis to:

- (i) ascertain whether or not the new regulation would have the desired impact and
- (ii) to identify the costs and benefits associated with the regulation.

Regulatory Impact Analysis (RIA) is used by all Government Departments and Offices and applies to:

- (i) proposals for primary legislation involving changes to the regulatory framework
- (ii) significant Statutory Instruments
- (iii) proposals for EU Directives and significant EU Regulations when they are published by the European Commission
- (iv) Policy Review Groups bringing forward proposals for legislation are also expected to carry out RIAs. Departments have responsibility for conducting and preparing RIAs, which is comprehensively addressed in the RIA Guidance Manual, which can be found at:  
[Revised RIA Guidelines June 2009](#)

In addition, the CEEU in the Department of Public Expenditure and Reform is available to advise on some of the more analytical components of RIA, for example in the identification and measurement of costs, benefits and impacts. Requests for advice should be circulated via the relevant Vote Section in the Department of Public Expenditure and Reform.

**C-01**

## **The Public Spending Code:**

### **C. Implementation and Post-Implementation**

#### **Management**

**C-01**

#### **Document Update Log**

**Document Summary:** From a Value for Money perspective the Management or Implementation stage can be key. Good appraisal leading to a well chosen solution can go to waste if implementation is not properly managed. Current Expenditure Programmes or Capital Grant schemes can be allowed to drift on with no evidence that objectives are being achieved. This document outlines at a high level what Sponsoring Agencies and Sanctioning Authorities should be conscious of. This includes proper structures, performance indicators and reporting requirements. Being aware that termination is an option if the circumstances justify it is also highlighted. .

#### **Implementation**

The implementation stage of a project begins once final approval for the award of a contract has been secured. Capital Grant Schemes or Current Expenditure programmes enter this stage once final approval is secured. The critical tasks at this stage are management and monitoring to ensure that what is planned is executed satisfactorily, within budget, to standard and on time.

Implementation is the responsibility of the Sponsoring Agency while the Sanctioning Authority must be satisfied that the Sponsoring Agency delivers what has been approved. Where the Government is the sanctioning authority, the responsibility for ensuring delivery – for the management and monitoring functions in the implementation stage will rest with the relevant line Department (the Department which presented the proposal to Government).

The Sanctioning Authority should satisfy itself that the Sponsoring Agency has systems in place and system checks in place to ensure that the project is delivered as per the contract, approved project specification and within the approved budget and in compliance with these guidelines.

Actions or responsibilities at the Implementation Stage can vary depending on whether you are responsible for:

- a large capital project i.e. > €20m
- a capital project of a smaller scale
- a programme of capital expenditure
- a capital grant scheme
- an area of current expenditure

All require:

- a) assigned responsibility for delivery
- b) an appropriate structure to monitor and manage the implementation phase
- c) regular reporting
- d) a means of measuring if the project, programme, capital grant scheme or current expenditure intervention is delivering on its expectations

This document sets out a combination of specific requirements and some high-level pointers for the Implementation Phase. It does not aim to be prescriptive about every situation as the nature of what is being implemented; the scale of expenditure and the period of implementation all have a bearing on what is appropriate. Sponsoring Agencies responsible for implementation together with the Sanctioning Authority must decide on the best approach for each individual situation taking account of the guidance in this document.

**Note:** The monitoring, management, evaluation or review of discrete areas of expenditure should incorporate the relevant administrative expenditure associated.

#### (a) Assigned Responsibility for Delivery

For capital projects a Project Manager should be appointed within the sponsoring Department or Agency at the planning/procurement stage of the project. The person appointed to the role should be a senior official including an official at MAC level or equivalent where appropriate. The project manager should be assigned personal responsibility for monitoring progress on the project against the contract requirements and for reporting progress and issues arising to the Project Board.

Similarly responsibility for capital programmes, capital grant schemes and current expenditure programmes should be assigned within Departments and Agencies.

(b) Appropriate Structure for monitoring and management

All expenditure, whether capital or current, has to be actively managed. This will involve monitoring against plans and expectations, monitoring and assessing changes in the broader environment that may impact on the underlying need and making decisions on adjustments or even termination.

Capital projects will have a Project Board with appropriate expertise and authority. It will include the Project Manager and a representative of the sanctioning authority.

Capital Programmes, capital grant schemes and current expenditure programmes also need formal structured arrangements to ensure that there is systematic co-ordinated monitoring and management of programmes. Responsibility for putting these structures in place may primarily rest with the sanctioning authority or the sponsoring agency depending on the nature and scale of the expenditure. These structures may include a programme co-coordinator to coordinate implementation of the programme and a monitoring committee to monitor and review progress. Where the programme is a cross-cutting programme the monitoring committee will be representative of relevant Government Departments, implementing public bodies and sectoral interests.

(c) Regular Reporting

Monitoring of all types of expenditure is required to ensure that milestones are being met and expenditure is within budget. Regular reports should be submitted to the Project Board or other structure as discussed above. If adverse developments occur such as potential cost overruns or delays the progress report should include recommendations to address the situation, including where warranted the option of project/scheme termination.

For projects costing over €20m a separate progress report for each project must be submitted to the Department's MAC for Departmental projects and to Management and/or the Board for Agency projects and then to the relevant Minister on a quarterly basis. These reports may be subject to audit by the Department of Public Expenditure & Reform.

(d) A means of measuring if on target with expectations

For capital projects, milestones in the contract and in the project plan can be used by the Project Manager and Project Board to ensure that the project is on schedule and within budget. Other performance indicators may have to be developed for changes in the external environment that could influence the project.

For non-project expenditure performance indicators should be developed at the outset as well as a means of gathering the data to support performance indicator measurement. These performance indicators will then be used as part of the monitoring and management of the Implementation Stage for capital programmes, capital grant schemes and current expenditure programmes. There may be schemes or programmes underway that do not have suitable performance indicators. If this is so then suitable performance indicators should be developed as soon as possible.

### **Adverse Developments or Changes in Circumstances**

Regular management reports should be prepared by the Sponsoring Agency covering all significant developments relating to the project and its costs. If adverse developments occur, including unforeseen cost increases, which call into question the desirability or viability of the project, the Sponsoring Agency should submit a report at the earliest possible moment to the Sanctioning Authority, detailing the necessary measures proposed to rectify the situation.

Where, despite these measures, increased costs above those already approved are likely to arise, the approval of the Sanctioning Authority for the extra expenditure should be obtained before any commitment is made to accept cost increases. Any application for such approval should outline the reasons for the excess, along with a detailed explanation of why it was not possible to take appropriate measures to offset the increased cost. The viability of the project, given the changed circumstances, should also be reported on.

If a project is going badly wrong, there should be a willingness to terminate it before completion. Action of this kind can be justified if the cost of the project escalates above earlier estimates or if the benefits expected from it are not likely to be realised. An attitude that, once work on a project commences, it must be completed regardless of changed circumstances, is to be avoided. Before making a final decision to terminate a project that is not going according to plan, the costs of termination (for example, payments that might have to be paid by way of compensation to contractors etc.) should be ascertained and made known to the appropriate authorities.

### **Post-Implementation**

The main requirement post-implementation is one of review. This is discussed in Document C-03 Periodic Evaluation/Post Project Review.

[Figure 5](#) reviews the Implementation Stage.

**C-02**

## The Public Spending Code:

### **C. Implementation and Post-Implementation Periodic Evaluation/Post-Project Review**

**C-02**

#### Document Update Log

**Document Summary:** All expenditure is subject to ongoing monitoring using appropriate performance indicators. Ongoing analysis of performance indicators should give management a good idea of whether an investment or intervention is yielding the expected outputs and outcomes. A subset of expenditure in any one year will be subject to further in-depth evaluation. Evaluation/post-project review of some expenditure is mandatory i.e. capital projects > €20m whereas there is discretion on the selection of other projects/programmes/schemes that will be selected for evaluation. This document outlines why there is a need for more in-depth evaluations and what must be evaluated and also the importance of aligning evaluation timetables with the new 'Whole of Year' Budgetary process.

The importance of active management, regular reporting and monitoring and the use of performance indicators was outlined in Public Spending Code Document [C-01](#)

**Management.** Active management allows a sponsoring agency to assess whether a capital project is on schedule and within budget. For capital grant schemes and current programmes a regular analysis of performance indicators should give the sponsoring agency and sanctioning authority a good idea of whether an intervention is achieving its objectives or not.

In addition to the active management and regular analysis of performance indicators there is a need for periodic evaluations of areas of expenditure. This requirement is there because:

- regular monitoring of performance indicators needs to be supplemented with a more in-depth study to assess efficiency and/or effectiveness
- an independent review of efficiency, effectiveness and continued relevance is sometimes needed

- the outcomes of the intervention will not occur for some time and a different approach to measuring effectiveness is required
- the scale of the investment/intervention justifies an in-depth evaluation

For capital projects the benefits will not be seen until the project has been completed. The project has by then exited the active management stage. All large capital projects and a proportion of other capital projects have to be subjected to a post-project review to see if the predicted benefits of the project were realised. Post-project reviews should be undertaken once sufficient time has elapsed to allow the project to be properly evaluated with sufficient evidence of the flow of benefits/costs from it. There are two separate focuses of review – (i) project outturn and (ii) appraisal and management procedures. The second element can be done after project completion as it involves reviewing administrative and management procedures. The timing of the first element will depend on the nature of the project i.e. the period required to observe the expected benefits. This period should be no longer than one third of the timeframe used in the Appraisal. The detailed appraisal provides the base against which the outturn review is made. The aim of a review of project outturn is to determine whether:

- the basis on which a project was undertaken proved correct;
- the expected benefits and outcomes materialised;
- the planned outcomes were the appropriate responses to actual public needs;
- the appraisal and management procedures adopted were satisfactory;
- conclusions can be drawn which are applicable to other projects; to the ongoing use of the asset; or to associated policies.

Post-project reviews for capital grant schemes and for current expenditure programmes may also be needed particularly where evaluations were not undertaken when the schemes were active or if the benefits would not be apparent for some time. Post-implementation reviews reveal if the type of intervention chosen is effective and efficient and informs future decision making.

The Value for Money and Policy Review process aims to subject some significant portion of an organization's expenditure to an in-depth review every year. There are also more focused reviews that may not examine all of the evaluation questions posed by a VFMPR.

(See [Public Spending Code Document C-04 Reviewing and Assessing Expenditure Programmes](#)).

**Note:** The monitoring, management, evaluation or review of discrete areas of expenditure should incorporate the relevant administrative expenditure associated.

### Evaluations and the Annual Estimates and Budgetary Timetable

Whether evaluations are undertaken as part of the VFMPR initiative, with a full set of terms of references or focused on a targeted subset of evaluation questions e.g. effectiveness or efficiency they should be completed within a reasonable period (6-9mths for full set of terms of reference and much less for more focused evaluations). They should be scheduled so that their findings are available for the forthcoming budgetary cycle.

From 2012 the budgetary process is moving to a 'Whole of Year' timetable. Oireachtas Committees will feed their views into the process starting in the spring of each year. It is expected that by the Autumn of each year Committees will be informed by the VFM reviews generated on an ongoing basis by Departments.

It is important therefore that Departments target the completion of their evaluations for the Autumn of each year at the latest so that the findings can inform opinions and decisions, in Departments, in the Committees and in the Department of Public Expenditure and Reform at the earliest opportunity. Failure to adhere to this schedule seriously undermines the value of the evaluation work. To give Departments their best chance of meeting this timetable significant new evaluations should begin in the Autumn/early Winter.

### Mandatory Evaluation/Post-Project Review Requirements

- Capital Grant Schemes with an annual value in excess of €30m and of five years or more duration to be subject to prior and mid-term evaluation at the beginning and mid-point of each five year cycle or as may be agreed with the Department of Public Expenditure & Reform.
- All Capital Projects costing > €20m<sup>[1]</sup> are to be subject of a post-project review
- At least 5% of other capital projects should be reviewed
- The VFMPR process obliges Departments to carry out a minimum numbers of VFMs. This varies depending on the size of the Department. See Public Spending Code Document C-04 – Reviewing and Assessing Expenditure Programmes.

## **Additional Evaluation/Post-Project Review Requirements**

Departments and agencies should not restrict themselves to the mandatory evaluation or post-project review requirements. From time to time it may be apparent that while not mandatory, an area of expenditure would benefit from a more in-depth review based on the picture the performance indicators paint or maybe because the performance indicators are not as informative as originally thought.

### **Communicating lessons learned**

As with all parts of the Public Spending Code any significant lessons should be translated into changes in the Sponsoring Agency's practices and communicated within the organization and to the sanctioning authority so that it can apply any general lessons learned to this Code or to supplementary information.

### **Responsibility for Evaluation/Review**

It is the responsibility of the Sponsoring Agency to carry out the evaluations or post project reviews. Those conducting reviews and evaluations should not be the same people as conducted the appraisal or managed the implementation. VFM & Policy Reviews have specific requirements regarding Steering Committees and independent chairpersons.

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[1] As the threshold for post-project review has been reduced from €30m to €20m, DPER will consider on a case by case basis whether projects costing between €20m and €30m and appraised when the previous threshold figure applied, will require a post-project review.

**C. Implementation and Post-Implementation  
Reviewing and Assessing Expenditure  
Programmes****C-03****Document Update Log**

**Document Summary:** Current expenditure programmes are subject to review under the established system of VFM & Policy Reviews (VFMPRs). The procedures for conducting VFMPRs are being updated to ensure that they form an effective input into the ongoing resource allocation process. In particular: each Department / Office should prepare an annual and multi-annual VFMPR schedule, agreed with the Department of Public Expenditure & Reform, providing for review of strategic programmes over a three-year period; each such review should be completed within a 6 to 9 month timescale as a rule; and each Review should have a uniform output – a ‘balanced scorecard’ – assessing each programme against a range of criteria of use to decision-makers. In addition, the VFMPRs will be supplemented with sharper and more narrowly-focused assessments designed to answer specific issues of policy configuration and delivery, whether within a particular Department or on a cross-cutting basis. These Focused Policy Assessments will be conducted by Departmental Evaluation Units and by the CEEU. As a matter of course, Departments/Offices should also engage with relevant Committees of the Oireachtas to ensure that their evaluation work programme is aligned – in terms of content and timetabling – with Oireachtas requirements, and with the new ‘whole-of-year’ budgetary timetable announced by the Minister for Public Expenditure & Reform on 5 December 2011.

**1. Background**

VFM & Policy Reviews (VFMPRs) are now a well-established feature of the evaluation landscape in Irish public policy-making. The Reviews, which are conducted in accordance with detailed guidelines laid down in a 2007 Guidance Manual, are generally carried out thoroughly and are useful in addressing the standard VFM questions that are relevant for any such review, including:

- What is the rationale and the objectives for the scheme?

- Are the objectives still relevant, in light of evolving policy priorities?
- Has the scheme achieved its objectives?
- How efficiently has the scheme been delivered?
- How does the scheme rate against alternative ways of achieving the same objectives?

However, the VFMPR process has not achieved its full initial ambitions, in terms of breadth of coverage and direct relevance for the resource allocation process. Some shortcomings that have been identified by practitioners include the following:-

- The VFMPR process can be quite time-consuming and administratively burdensome. This does not lend itself to timely turnaround of reports, and indeed some VFMPRs have in the past taken several years from start to completion.
- Related to this, it is difficult for the VFMPR process to cover a broad range of spending areas in any one or two year period. This problem, which is exacerbated in some areas by the shortage of staff with relevant analytical expertise, can make the VFMPR process seem removed from the regular Estimates cycle, whereby policy-makers must form an overall judgement about how resources should be prioritised and allocated.
- The VFMPRs do not share a common format or presentation, and there is no uniform standard for reporting the outcomes of a Review. A more standardised approach would enable policymakers to digest the findings of a report more readily, and would help to orient the VFMPR so that it provides clear answers to the key questions.

For these reasons, the Government has decided to update and streamline the VFMPR process in a number of ways, and to supplement it with more focused policy assessments, which can be conducted more quickly by trained evaluators within Departments / Offices and by the Central Expenditure Evaluation Unit (CEEU). These measures draw upon the experiences of conducting the 2011 Comprehensive Review of Expenditure, and are detailed below.

## **2. Updates to VFMPR Process**

### *2.1 Existing VFMPR Procedures*

Up to now, the VFMPR procedure has been governed by a 2007 Guidance Manual which has been updated on an *ad hoc* basis, and the key provisions of which can be outlined as follows:

- (a) **Selection of topics for review:** All VFMPRs should be targeted at areas of significant expenditure where there is the greatest potential for them to add value and influence policy developments. The Minister for Public Expenditure & Reform prepares an annual schedule of reviews for approval by Government, taking account of suggestions prepared by Departments.
- (b) **Steering Committees:** Each VFMPR should be overseen, managed and delivered by a Steering Committee appointed by the relevant Department, with an independent chair, and include representatives of the Department of Public Expenditure & Reform.
- (c) **Terms of Reference:** The Steering Committee prepares the ToR for each review, on the basis of standard template drawn up by the VFMPR Central Steering Committee.
- (d) **Evaluation Framework:** Under the ‘programme logic model,’ evaluators must have a clear sense from the outset of the rationale for a spending programme, expressed in terms of inputs, activities, outputs, results / impacts; their linkage to specific strategic and programme objectives; the performance indicators that can be used for these purposes; and the evaluation criteria to be used (rationale, continued relevance, efficiency, effectiveness etc).
- (e) **Planning:** Decide upon evaluation criteria, methodologies, involvement of stakeholders; and then manage the conduct of the VFMPR – including data collection, analysis and evaluation – within budget, on schedule, and to proper quality standards.
- (f) **Methodologies:** Detailed guidance is provided on methodological approaches for conducting the VFMPR, by reference to the programme logic model of the Evaluation Framework.
- (g) **Content:** Guidance is also provided on the standard elements for inclusion in a VFMPR Report.

These VFMPR procedures and guidelines remain valid, but need to be updated and streamlined in a number of respects to allow for more timely conduct of Reviews, and more direct linkage to the annual and multi-annual processes of expenditure allocation. The intention is that the VFMPR process, and other supporting processes outlined in this document, will be more effective in helping Departments / Offices to remain within the fixed expenditure allocations set out as part of the Medium-Term Expenditure Framework (MTEF).

## *2.2 Changes to VFMPR Procedures*

### *(a) Selection of Topics for Review / Coverage of Reviews*

Under the pre-existing arrangements of the VFMPR process, the areas of Health, Education, Social Protection and Justice & Equality are required to conduct one review per year, while all other line Departments plus the Office of the Revenue Commissioners and the Office of Public Works carry out 2 reviews each in the three-year period. The new approach will satisfy the following objectives:-

- **All Strategic Programmes of expenditure** – which form the basis of the performance budgeting framework – should be subject, in whole or in part, to rigorous evaluation over the three-year period. While it may not be practicable to evaluate the entirety of spending under each Strategic Programme, significant elements of expenditure should be covered and VFMPRs should not be focused on schemes that account for very minor elements of spending (the Focused Policy Assessments outlined in section 3 below may have a role in that respect). Departments should focus in particular on the more discretionary areas of programme expenditure, where issues of both effectiveness and efficiency feature strongly. For Departments / Offices with a relatively high proportion of “non-discretionary” ongoing expenditure, VFMPRs will still have a key role to play in assessing issues of efficiency, scheme design / alternative modes of delivery etc.
- To facilitate this breadth of coverage, all VFMPR analyses should be completed to report stage within a **6 to 9 month timescale**, as a rule, and should be planned and managed accordingly within each Department / Office.
- Following discussion between the line departments and the Department of Public Expenditure & Reform (D/PER) and following consultation with Government, the Minister for Public Expenditure & Reform will decide a **comprehensive VFMPR schedule of topics** to cover the coming year and the following two years (consistent with the new Medium Term Expenditure Framework or MTEF). The schedule will be made public and will be delivered upon by all Departments / Offices. The schedule will allow for limited flexibility to adjust topics on an annual basis, mainly to take account of viewpoints put forward by relevant Oireachtas Committees.

In proposing suitable topics for evaluation, Departments should have regard to the overarching objective of facilitating the prioritisation, and re-allocation, of expenditure in support of Government Programme commitments and consistent with MTEF spending ceilings. Accordingly, it will be necessary to target evaluation resources at areas of

significant expenditure, for which – on the basis of previous reports, the CRE or other analyses – there may be a *prima facie* case for critical examination of the current scale of resource allocation. In this regard, Departments/Offices will be required to clearly indicate the estimated total expenditure that the proposed reviews will cover.

Departure from the list of review topics approved by Government is only allowed in exceptional circumstances, and then only where a suitable topic of at least equal significance is substituted for a review being dropped.

*(b) Steering Committee Membership and Meetings*

Based on the experience of the 2009-11 round of VFMPRs, the Steering Committees of Reviews should be more focussed and limited to key relevant officials. The aim, where possible, should be no more than 5 officials on the Steering Committee, comprising the Chairperson, the lead evaluator, the D/PER representative and two other senior officials – whether from within the Department / Office or from elsewhere – with knowledge and experience that is relevant to the subject matter of the review and/or to the Department's review/audit process more generally. External evaluation expertise on the Steering Committee can also be considered but stakeholders that are beneficiaries or sectional interests should not be members. Their views will be sought as required as part of the evaluation.

With the exception of the lead evaluator and chairperson the work of Steering Committee ordinary members is additional to their normal 'desk jobs'. For this reason, care should be taken to minimise the demands upon their time. The Steering Committees, particularly in the case of smaller reviews, should hold fewer meetings at key stages in the process e.g. one/two to agree on ToR /work programme, two mid-review meetings to discuss progress and a final meeting to finalise the draft.

The work programme and role of the Steering Committee should be linked to key milestones in the lifecycle of a VFM. A timetable for delivery of key milestones should be agreed. The meetings of the Steering Committee will be dictated by the production of the required deliverable. If deliverables are produced in accordance with the agreed timetable then the VFMPR can meet its target delivery date. The role of the Committee is to sign-off deliverables associated with the key milestones and to give direction on work needed to produce the next deliverable.

Milestone/Deliverable	Comment
Sign-off: – Terms of Reference – Objectives of Programme being Reviewed – Programme Logic Model – Methodology incl. data required – Timetable for Deliverables	These are the basic foundation stones of a good evaluation and no further work should be done until these are signed-off. They should be signed-off after a maximum of two meetings of the Steering Committee.
Preliminary analysis of data gathered.	This allows the Steering Committee to form an opinion on whether the data received matches the expectations they had when the methodology was agreed. It also allows the Steering Committee to give advice/direction to the Evaluator on report drafting and further analysis of the data to support the findings that will emerge. One meeting of the Steering Committee
First draft of key chapters of the Report	Steering Committee gives its views on first draft of the key chapters. Gives advice and direction on the findings, on structure and drafting. One meeting of the Steering Committee
Final Report	Finalisation of the Report may take one or two meetings of the Steering Committee.

*(c) Approval of Terms of Reference*

The first key task of a VFM Review Steering Committee is to draw up the Terms of Reference for the review. When a draft of the ToRs has been discussed with the Steering Committee, it should be forwarded for consultation to the relevant Vote Section in the Department of Public Expenditure and Reform. This can be done informally through the Department of Public Expenditure and Reform representative from the relevant Vote section on the Steering Committee. However, it should be noted that Vote Sections should submit all draft ToRs for approval at Assistant Secretary level before advising line Departments/Offices of agreement to proceed.

Following this consultation, any amendments that might be agreed with the Department of Public Expenditure and Reform should be made to the draft ToRs before they are submitted to the Secretary General/Head of Office who is carrying out the review. Where a matter of dispute exists, direct consultation should take place between the Secretary General/Head of Office and the relevant Department of Public Expenditure and Reform Assistant Secretary with the aim of resolving the point at issue. Once the Secretary General/Head of Office is satisfied with the draft ToRs, he or she will give authority to formally commence the review.

*(d) Role of the Evaluator*

The lead evaluator has a pivotal role in the evaluation. S/he is not a secretary to the Steering Committee but is conducting the VFMPR under their direction. The lead evaluator should have sufficient analytical capacity to deliver the review. It is a person's knowledge/experience of evaluation and the VFMPR process that is important and not their prior knowledge of the programme being reviewed. The lead evaluator cannot be working in the area that is being reviewed. It is the lead evaluator's responsibility to produce the deliverables required for the Committee. In advance of the first meeting the evaluator should have prepared a background document/presentation on the area being reviewed as well as draft TORs, PLM and methodology. This will facilitate an efficient running of the review. Meetings of the Steering Committee will be dictated by production of deliverables by the evaluator rather than a set timetable of meetings. The Committee should not need to meet with stakeholders or conduct field visits. They may do so if they wish but it is quicker to give direction to the evaluator on who should be consulted. The lead reviewer should keep the Chairperson of the Steering Committee informed of progress in the review and of any issues that may require resolution, so that timely decisions can be made and reports finalised in time.

*(e) Use of paid consultants*

The engagement of paid consultants to carry out VFMPRs, as a rule, is not permitted. The VFMPR work should be conducted from within the evaluation / policy analysis resources that are developed and maintained within each Department / Office. Exceptions can only be justified on the basis that a particularly complex piece of analysis is required and that the necessary skills are not available internally. Even where this is the case it is not a justification to outsource the whole review.

*(f) Independent Chairpersons*

It is best practice to have a fully independent Chairperson in charge of each Steering Committee. The Independent Chairperson is responsible for driving the review within schedule and within its Terms of Reference and acts as a key channel between the lead reviewer and the Steering Committee. It is the responsibility of the independent Chairperson to see that the review deadline is met. The Chairperson should not be the lead reviewer.

The CEEU will maintain the existing central list of suitably-qualified retired officials at Principal Officer grade (or higher) to act as independent Chairpersons, and will also

compile a list of serving Principal Officers who have evaluation and VFM experience and who would be available to chair Steering Committees.

*(g) Role of CEEU and publication of Assessments*

The Vote Section in the D/PER will continue to be represented on the review Steering Committee. The CEEU of the D/PER will no longer be directly involved in reviews and will instead be involved in carrying out its own quality assessments of Reviews at terms of reference / work plan stage, interim and final draft report stages. These assessments will be made available to the Steering Committee and the final assessment will be made available online.

The evaluator should send the TORs, Objectives, PLM, Methodology, Timetable, first draft key chapters and first final draft, to the CEEU prior to the Steering Committee meeting at which these deliverables will be signed-off, and in reasonable time to allow the CEEU to return their written comments to the Steering Committee. The evaluator is free to avail of advice from the CEEU on a less formal basis prior to formally sending any deliverable. The CEEU may be requested by the Chairperson to attend to exchange views at particular meetings of the Steering Committee or to engage more fully on certain aspects of the review process, where in the Chairperson's view this would be helpful; as a rule, the CEEU will endeavour to accede to such requests.

The CEEU will publish a simple tracking document on all VFMPR deliverables on its website in the format below. It will also publish its final review of the VFMPR here.

**Tracking Table for VFMPRs**

Department	VFMPR	TORs, Obj's PLM, Methodology rec'd	CEEU sign-off	First draft of key chapters	CEEU sign-off	First final draft	CEEU sign- off
Dept of Industry	Employment Grants	•	•	•	x		
Dept of Sport	Sports Facilities	•	•	•	•	•	•

*(h) Timetabling of reviews*

In order to ensure the relevance of evaluations, the annual cycle of VFMPRs will be aligned more closely within the new, ‘whole-of-year’ approach to setting expenditure allocations (see section 4 below). This involves the following elements:-

- The schedule of VFMPRs should be decided, following consultation with Government, by the Minister for Public Expenditure and Reform during the autumn of each year.
- Work on the VFMPRs for the year ahead should get under way immediately with appointment of Steering Committee, agreement of Terms of Reference and commencement of fieldwork. VFMPRs for later years, as specified in the multi-year schedule, can be planned for in advance, but the precise timetabling of these future reviews will be subject to revision in light of views expressed by the relevant Oireachtas Committees.
- The VFMPRs should be concluded within a timeframe (6-9 months from their commencement) that allows for the final Reviews to be submitted to the Oireachtas Committees during the course of the year, to inform discussions and debate of the following year’s Estimates.
- Accordingly, an end-date for each VFMPR should be specified from the outset of each Review, and this deadline will be regarded as fixed and binding.

*(i) Compliance with Timeframes / Sanctions*

In order for the evaluation process to be effective it is essential that, insofar as possible, that timeframes are strictly adhered to. If the Chairperson considers that the agreed timeframes may not be adhered to, he/she should notify the Head of Department/Office immediately, who in turn must request an extension of the deadline from the Head of the CEEU in the Department of Public Expenditure & Reform. In this context, the reason for slippage should be explained and a new deadline will be fixed, which will not exceed 3 months from original deadline.

*(i) Principle of transparency*

A primary rationale for the VFMPR process is to facilitate better resource allocation decisions by bringing to light, and testing, the evidential basis for spending programmes. Complementary to this is the general principle of transparency in relation to how public money is allocated, used and evaluated. The CEEU will maintain a central repository of all reports including terms of reference, timescale, status update and letters (if any) seeking

extensions to deadlines on the <http://publicspendingcode.per.gov.ie> website. As a guiding principle, all of the background material that would be released in response to an FOI request should be made public at the same time as the VFMPR report is published.

*(k) Completing the Report & Memorandum for Government*

The final report should be submitted by the Steering Committee Chairperson to the Secretary General and Minister of the relevant Department for publication. A copy of the report should also be circulated to the Minister for Public Expenditure and Reform at this stage. Before publication of the final report the relevant Minister should bring a Memorandum to Government. This Memorandum should outline the main findings and recommendations of the report and the proposed responses to address any issues arising. The Memorandum should be submitted to Government within one month of the finalisation of the report. The following steps should be taken once the report has been cleared for release:

- lay the report before both Houses of the Oireachtas, ideally, along with the response of the Department/Office to the report's recommendations; the Oireachtas Library requires six copies of the document together with the completed form. For further information, contact Oireachtas Library.
- copies of each review must also be forwarded to the relevant Dáil Select Committee. The Clerk of the Committee will be able to advise how many copies the Committee will need;
- the report (and the Department's/Office's response) should be published on the website of the Department/Office;
- two copies should be forwarded to the Central Expenditure Evaluation Unit;
- a copy of the report should be sent to the Department of Public Expenditure Vote Section;

*(l) Uniform Reporting: 'Balanced Scorecard'*

As highlighted in the 2011 Comprehensive Expenditure Report<sup>[1]</sup>, in order to bring greater uniformity and standardisation to the evaluation process, each VFMPR will include a 'Balanced Scorecard' which will be used to assess the programme against a range of criteria of use to decision makers. This standard approach will represent one key, recognisable output of the Reviews for all programmes, and will to some extent facilitate performance comparisons across programmes and across Departments. A draft approach to the Scorecard is outlined in Box 1 and will be further developed in consultation with the Public Service Evaluation Network.

### **3. Focused Policy Assessments (FPAs)**

Building upon the experience of the 2011 Comprehensive Review of Expenditure (CRE), the full VFM & Policy Reviews will also be complemented with sharper and more narrowly focused assessments designed to answer specific issues of policy configuration and delivery. The experience of the Comprehensive Review of Expenditure – including the major analyses conducted by each Department, and the cross-cutting and thematic evaluations undertaken by the Central Expenditure Evaluation Unit (CEEU) in the Department of Public Expenditure & Reform – showed that it is possible to get a quicker turnaround, to high standards of quality, when specific timelines and specific policy questions are set.

These Focused Policy Assessments (FPAs) can play a useful role in addressing the following types of policy issue:-

- Cross-cutting issues of relevance to one or more department; typically conducted by the CEEU or by evaluation staff from relevant Departments working together;
- Evaluation of a discrete expenditure programme, to answer specific questions of programme design and delivery, by reference to one or more evaluation criteria;
- Preliminary evaluation of a more complex programme or inter-connected set of programmes, to scope issues that may benefit from full VFMPR.

To optimise the effectiveness of the FPAs, it is intended that the overarching process will be flexible and not overly prescriptive, however it is envisaged that the FPAs:

- Operate under a clear mandate from the relevant official with responsibility for Programme area and the Head of CEEU.
- Are conducted by a Department's evaluation unit and / or by an evaluator from CEEU. Ideally there should be no more than one or two evaluators.
- Have tightly framed terms of reference focusing on the key issue at hand.
- Do not require a steering committee; the responsibility of the evaluation should be under the management of the head of the departmental evaluation unit or the head of CEEU, as appropriate.
- Are completed within tight timeframes, 3 months as a rule.

- Are routinely published on <http://publicspendingcode.per.gov.ie> subject to any necessary redactions arising under FOI legislation. Redactions should be kept to the minimum necessary and a justification for redactions should be published with the document.

#### **4. Role of the Oireachtas and its Committees**

The *Comprehensive Expenditure Report 2012-2014* set out range of reforms and an enhanced role for the Oireachtas. As can be seen from the timetable below the Oireachtas and its Committees will now play an ongoing part in the new ‘Whole of Year’ budgetary process.

<b>Input from the Oireachtas: A New Annual Estimates Timetable</b>
Under the new arrangements Estimates allocations will be determined in the following manner.
<i>Start of year: Multi-annual expenditure ceilings are known</i>
Spending allocations are set for each Department not just for the forthcoming year (n), but also for years (n+1) and (n+ 2). Ministers and officials have up to two years to plan their affairs so as to achieve policy objectives within these allocations.
<i>Spring of each year: Engagement with Oireachtas Committees on allocations / Estimates</i>
It is open to the Oireachtas Committees, from the early part of each year, to engage with Ministers and their Departments to exchange views on how the fixed allocations for future years should be allocated to best effect. These perspectives can be taken into account by Government as the Estimates allocations are considered over the remainder of the year.
<i>April: Stability Programme Update</i>
Just as the November 2011 Medium-Term Fiscal Statement set out the Government’s overall fiscal adjustment path for the 2012-2015, the Stability Programme Update (SPU) published in April each year will adjust these targets as necessary to reflect economic developments, input from the assessments of the independent Fiscal Advisory Council and indeed the views of the Oireachtas Committees. In this context, the multi-year fiscal planning horizon will be extended by a further year, including the new overall expenditure figures.
<i>Autumn of each year: Further engagement on expenditure policy</i>
As the Government’s annual Estimates process becomes more advanced, Oireachtas Committees will have further opportunities to engage on specific policy proposals. The Committees will be informed by the range of VFM Reviews and focused policy analyses generated on an ongoing basis as part of the Government’s new Public Spending Code.
<i>End of each year: Estimates are finalised</i>

The Estimates for the coming year will be published as part of the annual Budget process, having been informed by the input of the Oireachtas Committees over the preceding year.

*February of the following year: Revised Estimates and “Performance Budgets”*

More detailed versions of the annual Estimates, which will now include key performance information, will be published and referred to Dáil Select Committees for consideration. In this context, Ministers and public service managers can expect to be held to account for delivery – or non-delivery – of the targets and objectives spelled out previously.

This new approach allows greater opportunities for Oireachtas members, as representatives of the public, to play a more substantive role throughout the entire budgetary process, from initial allocation of funds, through to holding Ministers and public service managers to account for the achievement – or non-achievement – of stated performance targets. The VFM PRs in particular will be used to assist Oireachtas Committees in their assessment of resource allocation priorities. Completion of these reviews will therefore have to be more closely aligned with this timetable. The Oireachtas Select Committees can also play a role in setting the agenda of topics and programmes to be reviewed in the VFM process, and holding Departments to account for timely progress.

Each Department should avail of the opportunity presented by the new process to work in a proactive way – including through submitting lists of topics for the annual and multi-annual review cycle to Committees and soliciting their feedback, and through timely completion and submission of reviews during the course of the year to facilitate Committee consideration.

<sup>(1)</sup> <http://www.budget.gov.ie/Budgets/2012/Documents/CER%20-%20Estimates%20Final.pdf>

### **Box 1**

#### **‘Balanced Scorecard’: A New Standard for Programme Evaluation**

A criticism of the VFM & Policy Reviews is that they are each conducted differently, the various Reports are presented differently from one another, and it is hard for policy-makers to form a common view of how particular programmes rate relative to other programmes. As part of the new process, all Reviews will have to include a standard report – a ‘balanced scorecard’ – based upon a number of important criteria that are common to all evaluations. These criteria include:-

##### *Quality of Programme Design*

- Are the programme objectives clearly specified?
- Are the objectives consistent with stated Govt priorities? Is there a clear rationale for the policy approach being pursued?
- Are performance indicators in place from the outset, to allow for an assessment of programme success or failure in meeting its objectives? If not, can such success/failure indicators be constructed *ex post*?

- Have alternative approaches been considered and costed, through cost-benefit analysis or other appropriate methodology?
- Are resources (financial, staffing) clearly specified?

*Implementation of Programme / Scheme*

- To what extent have programme objectives been met? In particular, what do the success/failure indicators show?
- Is the programme efficient in terms of maximising output for a given input and is it administered efficiently?
- Have the views of stakeholders been taken into account?

*Cross-cutting aspects*

- Is there overlap / duplication with other programmes?
- What scope is there for an integrated cross-departmental approach?
- Are shared services / e-Govt channels being used to the fullest extent?
- Can services be delivered more cost-effectively by external service providers?

This approach allows for an overall, standardised quality score to be put in place, providing a programme rating that is of use to policy-makers and to those – including Oireachtas Committees and the general public – scrutinising the cost-effectiveness of spending. In other countries, more general programme ratings using the ‘traffic light’ system are found to be useful:- HIGH Score (Green light) – the programme is well-specified, achieving its objectives, and cost-effective in general terms. INTERMEDIATE Score (Amber light) – the programme scores highly in some areas, poorly in others: scheme re-design or efficiency improvements must be considered. LOW Score (Red light) – poor evidence of delivery of objectives; scheme funding should be available for reallocation to other priority areas.

# **The Public Spending Code: D. Standard Analytical Procedures Overview of Appraisal Methods and Techniques**

## **The Public Spending Code: D. Standard Analytical Procedures**

### **Overview of Appraisal Methods and Techniques**

**D.01**

#### **Document Update Log**

**Document Summary:** This document outlines the main appraisal methods and techniques which should be used as part of the Public Spending Code. It provides a brief introduction to each technique and contains reference material at the end of the document. This information is intended to provide a general overview of these techniques, helping to orient new Public Spending Code users and point the way to further more detailed material, both in the Public Spending Code and more generally.

#### **1. Overview of appraisal**

The basic purpose of systematic appraisal is to achieve better spending decisions for capital and current expenditure on schemes, projects and programmes. This document provides an overview of the main analytical methods and techniques which should be used in the appraisal process. These techniques can also be used in the evaluation process. More detailed information on individual techniques can be found in financial and economic textbooks, examples of which are listed at the end of this document and in other guidance material on the VFM portal.

An understanding of discounting and Net Present Value (NPV) calculations is fundamental to proper appraisal of projects and programmes. A good understanding of Cost Benefit Analysis (CBA), Internal Rate of Return (IRR), Multi Criteria Analysis (MCA) and Cost Effectiveness Analysis (CEA) is also essential for economic appraisal purposes.

#### **2. Analytical methods**

The recommended analytical methods for appraisal are generally discounted cash flow techniques which take into account the time value of money. People generally prefer to receive benefits as early as possible while paying costs as late as possible. Costs and

benefits occur at different points in the life of the project so the valuation of costs and benefits must take into account the time at which they occur. This concept of time preference is fundamental to proper appraisal and so it is necessary to calculate the present values of all costs and benefits.

### ***Net Present Value Method (NPV)***

In the NPV method, the revenues and costs of a project are estimated and then are discounted and compared with the initial investment. The preferred option is that with the highest positive net present value. Projects with negative NPV values should be rejected because the present value of the stream of benefits is insufficient to recover the cost of the project.

Compared to other investment appraisal techniques such as the IRR and the discounted payback period, the NPV is viewed as the most reliable technique to support investment appraisal decisions. There are some disadvantages with the NPV approach. If there are several independent and mutually exclusive projects, the NPV method will rank projects in order of descending NPV values. However, a smaller project with a lower NPV may be more attractive due to a higher ratio of discounted benefits to costs (see BCR below), particularly if there affordability constraints.

Using different evaluation techniques for the same basic data may yield conflicting conclusions. In choosing between options A and B, the NPV method may suggest that option A is preferable, while the IRR method may suggest that option B is preferable. However in such cases, the results indicated by the NPV method are more reliable. The NPV method should be always be used where money values over time need to be appraised. Nevertheless, the other techniques also yield useful additional information and may be worth using.

The key determinants of the NPV calculation are the appraisal horizon, the discount rate and the accuracy of estimates for costs and benefits.

### ***Discount rate***

The discount rate is a concept related to the NPV method. The discount rate is used to convert costs and benefits to present values to reflect the principle of time preference. The calculation of the discount rate can be based on a number of approaches including, among others:

- The social rate of time preference
- The opportunity cost of capital
- Weighted average method

The same basic discount rate (usually called the test discount rate or TDR) should be used in all cost-benefit and cost-effectiveness analyses of public sector projects.

The current recommended TDR is 5%. However, if a commercial State Sponsored Body is discounting projected cash flows for commercial projects, the cost of capital should be used or even a project-specific rate.

### ***Internal Rate of Return (IRR)***

The IRR is the discount rate which, when applied to net revenues of a project sets them equal to the initial investment. The preferred option is that with the IRR greatest in excess of a specified rate of return. An IRR of 10% means that with a discount rate of 10%, the project breaks even. The IRR approach is usually associated with a hurdle cost of capital/discount rate, against which the IRR is compared. The hurdle rate corresponds to the opportunity cost of capital. In the case of public projects, the hurdle rate is the TDR. If the IRR exceeds the hurdle rate, the project is accepted.

There are disadvantages associated with the IRR as a performance indicator. It is not suitable for the ranking of competing projects. It is possible for two projects to have the same IRR but have different NPV values due to differences in the timing of costs and benefits. In addition, applying different appraisal techniques to the same basic data may yield contradictory conclusions.

### ***Benefit / Cost ratio (BCR)***

The BCR is the discounted net revenues divided by the initial investment. The preferred option is that with the ratio greatest in excess of 1. In any event, a project with a benefit cost ratio of less than one should generally not proceed. The advantage of this method is its simplicity.

Using the BCR to rank projects can lead to suboptimal decisions as a project with a slightly higher BCR ratio will be selected over a project with a lower BCR even though the latter project has the capacity to generate much greater economic benefits because it has a higher NPV value and involves greater scale.

### ***Payback and Discounted payback***

The payback period is commonly used as an investment appraisal technique in the private sector and measures the length of time that it takes to recover the initial investment.

However this method presents obvious drawbacks which prevent the ranking of projects. The method takes no account of the time value of money and neither does it take account of the earnings after the initial investment is recouped. For example, a project requires a €3 million investment and Option 1 returns €2 million in the first year and Option 2 returns €3 million for the same year. On this basis Option 2 is the preferred option as the payback period is shorter but if the cashflows changed in subsequent years and Option 1 returned €2 million annually while Option 2 only earned €1 million annually, the chosen option would have been incorrect. The ordinary payback period should not be used as an appraisal technique for public investment projects.

A variant of the payback method is the discounted payback period. The discounted payback period is the amount of time that it takes to cover the cost of a project, by adding the net positive discounted cashflows arising from the project. It should never be the sole appraisal method used to assess a project but is a useful performance indicator to contextualise the project's anticipated performance.

### ***Sensitivity analysis***

An important feature of a comprehensive CBA is the inclusion of a risk assessment. The use of sensitivity analysis allows users of the CBA methodology to challenge the robustness of the results to changes in the assumptions made (i.e. discount rate, time horizon, estimated value of costs and benefits, etc). In doing so, it is possible to identify those parameters and assumptions to which the outcome of the analysis is most sensitive and therefore, allows the user to determine which assumptions and parameters may need to be re-examined and clarified.

Sensitivity analysis is the process of establishing the outcomes of the cost benefit analysis which is sensitive to the assumed values used in the analysis. This form of analysis should also be part of the appraisal for large projects. If an option is very sensitive to variations in a particular variable (e.g. passenger demand), then it should probably not be undertaken. If the relative merits of options change with the assumed values of variables, those values should be examined to see whether they can be made more reliable. It can be useful to attach probabilities to a range of values to help pick the best option.

Sensitivity analysis requires a degree of exploratory analysis to ascertain the most sensitive variables and should lead to a risk management strategy involving risk mitigation measures to ensure the most pessimistic values for key variables do not materialise or can be managed appropriately if they do materialise. It is important to take into account the level of disaggregation of project inputs and benefits – sensitivity analysis based on a mix of highly aggregated and disaggregated variables may be misleading.

### ***Scenario analysis***

The scenario analysis technique is related to sensitivity analysis. Whereas the sensitivity analysis is based on a variable by variable approach, scenario analysis recognises that the various factors impacting upon the stream of costs and benefits are inter-independent. In other words, this approach assumes that altering individual variables whilst holding the remainder constant is unrealistic (i.e. for a tourism project, it is unlikely that ticket sales and café-souvenir sales are independent). Rather, scenario analysis uses a range of scenarios (or variations on the option under examination) where all of the various factors can be reviewed and adjusted within a consistent framework.

A number of scenarios are formulated – best case, worst case, etc – and for each scenario identified, a range of potential values is assigned for each cost and benefit variable. When formulating these scenarios, it is important that appropriate consideration is given to the sources of uncertainty about the future (i.e. technical, political, etc). Once the values within each scenario have been reviewed, the NPV of each scenario can then be recalculated.

### ***Switching values***

This process of substituting new values on a variable-by-variable basis can be referred to as the calculation of switching values. These can provide interesting insights such as what change(s) would make the NPV equal zero or alternatively, by how much must costs or benefits fall or rise, respectively, in order to make a project worthwhile. The switching value is usually presented as a % i.e. a 20% increase in investment costs reduces project NPV to 0.

This is very useful information and should be afforded a prominent place in any decision-making process. Moreover, given the importance of this information the switching values chosen should be carefully considered and should be realistic and justifiable. For example, for capital projects requiring an Exchequer commitment over the medium to long-term, operating and maintenance costs should always be examined. Similarly, any

project reliant upon user charges should always examine the impact of changes in volumes and the level of charges.

Finally, the European Commission have suggested that when undertaking a sensitivity analysis a useful determinant of the most critical variables is those for which a 1 per cent variation (+/-) produces a corresponding variation of 5 per cent or more in the NPV.

**Distributional Analysis** The calculation of NPV's makes no allowance for the distribution of costs and benefits among members of society. This is an important drawback if the intended objectives of a programme/project aimed at specific income groups. Differential impact may arise because of income, gender, ethnicity, age, geographical location or disability and any distributional effects should be explicit and quantified where appropriate. A common approach to take account of distributional issues is to divide the relevant population into different income groups and analyse the impact of the programme/project on these groups. Weights can be attached to the different groups to reflect Government policy. Carrying out a distributional analysis can be a difficult task because costs and benefits are redistributed in unintended ways.

### **3. Economic appraisal techniques**

Economic analysis aims to assess the desirability of a project from the societal perspective. This form of appraisal differs from financial appraisal because financial appraisal is generally done from the perspective of a particular stakeholder e.g. an investor. Sponsoring Authority or the Exchequer. Economic analysis also considers non-market impacts such as externalities.

#### **CBA**

The general principle of cost benefit analysis is to assess whether or not the social and economic benefits associated with a project are greater than its social and economic costs. To this end, a project is deemed to be desirable where the benefits exceed the costs. However, should the benefits exceed the costs, this does not necessarily imply that a projects will proceed as other projects with a higher net present value (NPV) may be in competition for the same scarce resources. In addition, there are affordability constraints which mean that projects should not proceed even if the NPV is positive.

In cost-benefit analysis all of the relevant costs and benefits, including indirect costs and benefits, are taken into account. Cash values, based on market prices (or shadow prices, where no appropriate market price exists) are placed on all costs and benefits and the

time at which these costs/benefits occur is identified. The analytic techniques outlined above (i.e. NPV method, IRR method, etc.) are applied using the TDR. The general principle of cost-benefit analysis is that a project is desirable if the economic and social benefits are greater than economic and social costs. It is vital that cost-benefit analysis is objective. Its conclusions should not be prejudged. It should not be used as a device to justify a case already favoured for or against a proposal. Factors of questionable or dubious relevance to a project should not be introduced into an analysis in order to affect the result in a preferred direction.

A more detailed guide on how to carry out a CBA is set out in *Public Spending Code D.03 – Guide to Economic Appraisal: Carrying out a CBA*.

### **Cost Effectiveness Analysis (CEA)**

It is difficult to measure the value to society of public investment in social infrastructure because the outputs may be difficult to specify accurately and to quantify, and are not frequently marketed. In cases like these, the cost of the various alternative options should be first determined in monetary terms. A choice can then be made as to which of the options (if they all achieve the same effects) is preferable. CEA is not a basis for deciding whether or not a project should be undertaken. Rather, it is concerned with the relative costs of the various options available for achieving a particular objective. CEA will assist in the determination of the least cost way of determining the capital project objective. A choice can then be made as to which of these options is preferable.

Evaluating options in CEA is best done by applying the principles of the NPV method to the stream of cash outflows or costs. The recurring costs of using facilities as well as the capital costs of creating them should be taken into account, particularly if they differ between alternative options. Usually, the aim will be to select the option which minimises the net present cost.

There is a particular need for consistency in the assumptions and parameters adopted for CBA and CEA appraisals. CEA is most applicable to healthcare, scientific and educational projects where benefits can be difficult to evaluate.

### **Cost Utility Analysis (CUA)**

CUA is a variant of CEA that measures the relative effectiveness of alternative interventions in achieving two or more objectives. It is often used in health appraisals. In a CUA, costs are expressed in monetary terms and outcomes/ benefits are expressed in

utility terms e.g. outcomes are often defined in quality adjusted life years (QALYs). This outcome measure is a combination of duration of life and health related quality of life. Whereas in a CBA, there is a requirement to attempt to place a monetary value on all benefits, CUA allows for a comparison of the benefits of health interventions without having to place a financial value on health states.

### ***Multi Criteria Analysis (MCA)***

Multi-criteria analysis (MCA) establishes preferences between project options by reference to an explicit set of criteria and objectives. These would normally reflect policy/programme objectives and project objectives and other considerations as appropriate, such as value for money, costs, social, environmental, equality, etc. MCA is often used as an alternative to appraisal techniques because it incorporates multiple criteria and does not focus solely on monetary values.

MCAs often include “scoring and weighting” of the relevant criteria reflecting their relative importance to the objectives of the project. Care should be taken to try and minimise the subjectivity of decision making in an MCA as this is a common problem with carrying out MCA’s. The relative importance of objectives and criteria to achievement of the project will vary from sector to sector. The Sponsoring Agency should agree these with the Sanctioning Authority.

In constructing a multi criteria analysis scorecard and determining the weightings to be given to criteria the aim should be to achieve an objective appraisal of project options and consistency in decision making. Judgments regarding the scoring of investment options should be based on objective, factual information. The justification for scoring and weighting decisions must be documented in detail. In this regard, the system should be capable of producing similar results if the selection criteria were applied by different decision makers.

The main steps in the MCA process include:

1. Identify the performance criteria for assessing the project
2. Devise a scoring scheme for marking a project under each criterion heading
3. Devise a weighting mechanism to reflect the relative importance of each criterion
4. Allocate scores to each investment option for each of the criteria
5. Document the rationale for the scoring results for each option
6. Calculate overall results and test for robustness
7. Report and interpret the findings

The importance of explaining the weights and scores fully, and interpreting the results carefully, cannot be over-stressed.

### **Sources for further reading**

Brealey, R. A. and Myers, S. C., *Principles of Corporate Finance*, Ninth Edition.

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# **The Public Spending Code: D. Standard Analytical Procedures Carrying out a financial analysis D.02**

## **The Public Spending Code: D. Standard Analytical Procedures**

### **Carrying out a financial analysis**

#### **D.02**

##### **Document Update Log**

**Document Summary:** This document provides a high level guide to carrying out a financial analysis. Financial analysis is an important element of overall appraisal, and focuses upon the cash implications of particular projects or programmes. Every spending proposal must include a separate financial analysis with the level of detail commensurate with the extent of expenditure involved. A financial analysis is usually undertaken from the perspective of the sponsoring agency. There are different forms of financial analysis depending on the perspective taken. In addition to a financial analysis from the perspective of the sponsoring agency, an Exchequer cashflow analysis is also an important analytical tool. This analysis considers all direct and indirect flows which impact on the Exchequer and not just the sponsoring agency. An Exchequer cashflow analysis must accompany every CBA (mandatory for projects over €20m). Financial analysis is also of relevance for commercial semi-state companies which are appraising investments. This guide also explains the differences between a financial analysis and an economic appraisal and describes the main steps in carrying out a financial analysis. The main application of this guide is for capital projects but the general principles also apply to current projects as an understanding of financial flows is critical to any spending proposal.

##### *Introduction*

Detailed appraisal is a key stage in the project or programme lifecycle. This document provides introductory guidance on how to carry out a financial analysis. A financial analysis or appraisal is an important building block in the overall appraisal process and acts as a first step before carrying out the economic appraisal. A financial analysis only considers financial cash flows whereas an economic analysis in the form of a CBA examines all costs and benefits for society and not just the direct financial flows arising from the project.

It should be noted that financial analysis is a broad term which can cover many different types of assessments carried out for different purposes. Some of the variants of financial analysis used for appraisal purposes include:

1. A general financial analysis identifies and quantifies financial inflows and outflows.
2. Exchequer cash flow analysis is a specific financial analysis which takes into account direct and indirect flows which impact on the Exchequer. This is an important type of analysis because it isolates the cashflow impact of spending proposals for the Exchequer, regardless of which part of the Exchequer is affected by the cashflows.
3. Affordability analysis – an assessment of whether or not a project is affordable with reference to expenditure ceilings, the timing of payments and the opportunity cost of investments.
4. Analysis of sources of funds – a breakdown of the sources of finances for a given project.

A clear distinction must be drawn between the general financial analysis which should be carried for every spending proposal and which is reflective of inflows and outflows for the sponsoring agency and an Exchequer cashflow analysis which takes a whole of Exchequer perspective and which should accompany every CBA carried out.

This document describes the main features of financial analyses, explains the difference between financial appraisal and economic appraisal and outlines the main steps involved.

#### *What is a financial analysis?*

Financial analysis is a method used to evaluate the viability of a proposed project by assessing the value of net cash flows that result from its implementation. Such appraisals are routinely carried out in the private sector by companies to assess whether investment projects are commercially profitable.

Financial analyses are also relevant for the public sector, particularly where there is output to be sold and charges imposed e.g. light urban rail, water charges. A financial analysis allows for an assessment of the budgetary impact of projects by looking at the pattern of project related cash flows. Financial analyses are particularly important for appraising PPP projects, large projects with complex financing structures and for assessing the net return of projects developed by commercial semi-state companies. Nevertheless, any sponsoring agency must be able to quantify the financial cashflows associated with any spending proposals.

Financial analyses are prepared using many of the same principles which apply to economic appraisal techniques such as CBA e.g. incremental flows and the calculation of discounted cash flows. Although some elements are shared, financial analysis differ from economic appraisals in the scope of their investigation, the range of impacts analysed and the methodology used. An economic appraisal such as CBA typically considers all the social and economic impacts on society and not just the cash flows directly affecting the sponsoring body or the Exchequer. In addition, CBA also considers costs and benefits for

which market values are not readily available whereas a financial appraisal focuses only on cash flows. Figure 1 overleaf sets out the main differences between a financial appraisal and an economic appraisal. (More detailed information on economic appraisal and on CBA in particular, is located at document D03 – Guide to Economic Appraisal: Carrying out a CBA)

**Figure 1 Differences between financial analysis and economic appraisal**

Financial Analysis	Economic appraisal
<ul style="list-style-type: none"> <li>▪ Considers only financial cashflows</li> <li>▪ Used by the private sector but can also be used by the public sector</li> <li>▪ Focuses on financial flows directly affecting project sponsor and/or Exchequer</li> </ul>	<ul style="list-style-type: none"> <li>▪ Considers economic costs &amp; benefits</li> <li>▪ Used mainly by the public sector due to the focus on net benefit for society</li> <li>▪ Focuses on economic and financial flows affecting society</li> </ul>

It is important to note that whereas a CBA may illustrate that a proposal would generate a net benefit for society, the distributional analysis of the costs and benefits as between the Exchequer and private citizens can vary. For example, a project may involve significant costs to the Exchequer and a net benefit for society but the extent of the Exchequer costs are such that the project is unaffordable or the project causes significant costs for other components of the Exchequer other than the Sponsoring Agency.

#### *Purpose of a financial appraisal*

A financial appraisal focuses on financial cashflows as opposed to economic flows and in particular considers profitability and sustainability. The objectives of a financial appraisal can include:

- Identifying and estimating the financial cashflows
- Assessing financial sustainability i.e. can a project's revenues cover its costs and will a project run out of cash[1]
- Determining that part of the investment cost which will not be recouped by net revenue
- Calculating performance indicators such as the Net Present Value (NPV) and Internal Rate of Return (IRR)
- Assessing the funding sources (public, private, EU) for the project and examining the return on capital for different sources of funds.

#### *Who should carry out a financial appraisal?*

Sponsoring agencies should carry out financial appraisals. As outlined in *Public Spending Code A.02 – Clarify Your Role*, these are normally Government departments, offices and

agencies or any body in receipt of public funds. Financial appraisals are the main focus of the investment appraisal[2] process for commercial semi-state companies.

As previously stated, there are at least two types of financial analysis which must be carried out for projects over €20m:

- A financial analysis from the perspective of the sponsoring agency
- An Exchequer cashflow analysis

*When to undertake a financial appraisal?*

A financial analysis incorporating an analysis of cash flows, even at a simple level, should be carried out for all spending proposals regardless of scale because an understanding and quantification of financial flows is critical to the approval decision. The level of detail involved should be commensurate with the scale of expenditure.

The financial analysis should be carried out as one of the first steps in the overall appraisal stage because an understanding of the pattern of the cashflows is a critical building block for the overall business case as well as the CBA.

It is useful to distinguish the financial analyses from the economic appraisal because the former acts as a foundation on which the CBA is built, particularly regarding the estimation of project costs. In the case of an Exchequer cashflow analysis, it also allows for a separate consideration of the budgetary impact of the project on cashflows.

*Main steps in carrying out a financial analysis*

The main steps in carrying out an Exchequer cashflow analysis are set out below. The same basic steps also apply to a financial analysis from the perspective of the sponsoring agency with the exception that broader Exchequer cashflows are excluded.

1. Identify the time horizon (usually the same as the CBA time horizon) based on the economic useful life of the asset.
2. The incremental inflows and outflows should be identified for each of the main options. Figure 2 sets out some typical types of inflows and outflows.

**Figure 2      Main types of cashflows in a financial appraisal**

Outflows	Description
Investment costs	The initial capital outlay, usually a once off cost incurred at the outset of a project
Operating costs	Ongoing running costs for a project e.g. utilities, labour, material, accommodation costs, administrative costs

Start up costs	Preparatory studies, consulting, training, R&D, design, planning
Decommissioning cost	Costs associated with removing an asset from use
<b>Inflows</b>	
Operating revenues	Revenue from charges or tolls / dividends
Residual value	The value of an asset at the end of its useful life or at a point in time, usually a once off value. The residual value of an asset should usually be the discounted value of net future revenue after the time horizon. It can also be considered as the value of the asset in its best alternative use e.g. scrap.
Dividends	
Savings on unemployment payments (indirect)	These can be relevant but are not amenable to reliable costing. They should always be directly attributable to the project i.e. savings on welfare payments are not included if these savings occur regardless of the project going ahead
Additional tax revenue (indirect)	These can include income tax, VAT and corporation tax but should be included only to the extent that these are net of deadweight i.e. the revenue is additional revenue which would not be received in the absence of the project.

The analysis should take into account flows both directly and indirectly associated with proposals. Additional expenditure for which the sponsoring agency is not responsible but which are project related should be included. The costing of indirect flows should be strictly net of deadweight and displacement. Often, only a low proportion of social protection savings or additional tax revenue can be directly attributed to the project.

All sources of finance, including EU finance, should be included. The financial appraisal should also include all attributable overheads.

There are different ways of categorising costs. In addition to the direct/indirect categorisation, it may also be useful to categorise costs into variable, fixed and semi fixed groupings. Exchequer cashflows should be separately identified.

It is important to note that the following flows should not be included as part of a financial appraisal.

- Depreciation is an accounting transaction and not a cashflow and should be excluded from the financial analysis
- Reserves are also not cashflows.
- Other accounting items should be ignored such as :

- Sunk costs – costs which have already been spent or committed and cannot be changed by the decision under consideration. They should be ignored. However, the quantum of sunk costs to date is a noteworthy point of information in terms of progress under the project to date and should be noted separately
- VAT[\[3\]](#)

For a commercial semi-state organisation carrying out a financial analysis, the profit and loss projections should also be included. This would show the impact of a project on the main revenues and costs of the organisation. Similarly, the balance sheet projections should also be shown by illustrating the impact of the project on the finances of the organisation with particular emphasis on its working capital, debt and resources. Commentary should be included where necessary.

### 3. Quantify the costs

Cost estimation is difficult and often requires the input of accountants, economists and other specialists. Costs should be based on the most accurate data available and should be as realistic as possible because underestimation of costs can be a common problem with appraisals.

Costs should be set out in constant prices to be consistent with the application of the real discount rate.

4. Identify the pattern of these flows i.e. in what years do these flows arise.
5. Discount the value of these flows to take account of the time value of money using the official Department of Public Expenditure & Reform discount rate (see section E of the Public Spending Code).
6. Carry out a sensitivity analysis of the most critical cost and revenue variables
7. Report the results

There should be a clear link between the financial analysis and the CBA so allow private and social costs and benefits to be separately identified.

An indicative sample Exchequer cashflow analysis is set out at Appendix A.

#### *Common errors*

It is a common problem to conflate financial flows with economic flows and include them in the same analysis. Other issues to avoid include:

- Not including residual values

- Incorrect valuation of residual values e.g. overly optimistic assessment of residual values given that residual values are difficult to predict
- Underestimation of costs
- Increases in costs from initial project conception to final delivery are common. Cost increases must be reconciled back to show or explain the reasons for the cost increases. Cost estimates must include all initial capital costs and lifecycle costs (in detail)
- Errors in the timing of cash inflows and outflows
- Not including cashflows which may affect other Exchequer components
- Overestimating the income tax receipts/benefits and social protection payments savings of projects<sup>[4]</sup>
- Mismatching real/nominal values with real/nominal discount rates

## **Appendix A      Sample Exchequer cashflow analysis for a capital project**

### **Financial analysis template**

	2012	2013	2014	2015*
Revenue from charges				
Residual value				
Dividends				
<b>Total inflows</b>				
Equity participation				
Subsidies/grants				
Operating costs				
<i>Materials</i>				
<i>Labour</i>				
<i>Other maintenance</i>				

<i>Administrative</i>				
Investment costs				
<i>Plant</i>				
<i>Machinery</i>				
<i>Planning and design</i>				
Decommissioning costs				
PPP payments				
<b>Total outflows</b>				
<i>Indirect taxes</i>				
VRT				
Carbon levy				
Customs and excise				
<i>Direct taxes</i>				
Income tax				
Corporation tax				
<b>Total tax impact</b>				
PPP Payments				
EU Finance passing through the Exchequer				
Fines				
<b>Other flows</b>				
<b>Net cashflow</b>				
<b>Discounted net cashflow</b>				

\* The first four years are shown for indicative purposes, appraisal timeframes are generally longer

### Analysis of sources of funds

	2012	2013	2014	2015
EU finance passing through the exchequer				
Exchequer contribution				
National Private capital				
EIB financing				
Other loans				
<b>Total sources of finance</b>				

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[1] Sustainability occurs if the net flow of cumulated generated cashflow is positive for all the years considered

[2] Commercial semi-states should also assess the impact of a project on the profit and loss account and the impacts on the organisation's finances including working capital, debt and reserves.

[3] To the event that additional VAT revenue is generated as a result of the scheme, this revenue can be included but only if it is strictly additional and net of deadweight. In general however, VAT on inputs can be excluded as it is a transfer payment unless there are differences in tax treatment between options.

[4] These indirect flows must always be calculated net of deadweight and care is required.