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Introduction

Welfare economics

A consumer having a limited income at his/her disposal must make choices. He* can certainly not afford to buy unlimited quantities of all goods and services he finds desirable. Similarly, societies must make choices of how to use their scarce resources of labour, capital, natural resources, and so on. At any point of time the total amount of resources can be considered as fixed, implying that we are automatically faced with the fact that trade-offs must be made. If we ask for more of one thing, it usually means less of something else. In addition, any such change may affect millions of households so that one can safely assume that there are both those who gain and those who lose from the considered change. This raises the question whether we can say anything about the desirability of a change in the many cases where there is no unanimity.

A distinction is usually made between analysing the *consequences* of a change and making *judgements* concerning the desirability of particular changes or policies. The former kind of analysis is called *positive economics*, while the latter is referred to as *normative economics*. We can use tools such as demand and supply curves to describe the effects of a policy change, such as a proposed tax on cigarettes. For example, we may want to examine how the market price and the market demand are affected by the tax, if introduced, and how the tax affects poor and rich people. These are examples of the kind of questions positive economics is concerned with. On the other hand, normative or *welfare economics* is concerned with evaluating the various consequences of the proposed tax and coming to a judgement concerning the desirability of the tax.

* A distinguishing feature of economists is that they begin all statements with: let us assume ... Therefore, let us assume that he is an abbreviation of he/she.

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Thus, the basic aim of welfare economics is to provide us with criteria according to which various policy proposals can be ranked. For example, we may want to know whether or not society is better off if a nuclear power plant is built. Unfortunately, it is not possible to find an objective rule for ranking policy proposals. Ultimately, any rule must be based on some value judgements. For example, there is no 'objectively correct' size for our national defense. One individual may think that society spends too little on its defense while another individual thinks that society devotes too many resources to national defense. However, this does not mean that there is nothing useful we can say about the desirability to society of different policy proposals. In some cases, some very weak value judgements suffice to rank policy proposals. Moreover, it is important to clarify what value judgements are used when somebody, perhaps you or me, claims that policy A is superior to policy B. This helps us in understanding what ethical presumptions our own and others' policy statements are based on. In any case, in this book we will present the major approaches used in evaluating policy changes that benefit one group but make another group worse off, and assess some of the criticisms that have been levelled against each other.

The market economy, market failures, and government failures

It is sometimes argued that competition and the profit motive will lead individuals to serve the public interest while acting in their own interest. There is no need for government intervention since the economy on its own, led by an *invisible hand*, produces not only what is demanded but does so in the cheapest possible way. Competition ensures that firms that fail to do so will go bankrupt. Thus, what is in the best interest of society emerges as an unintended consequence of individual actions. The doctrine of *laissez faire* says that the government should not intervene in markets because an economy left on its own will be 'efficient'.¹ Later analysis has shown that a perfect market economy is efficient in the following sense. Competitive markets result in an equilibrium position from which it is impossible to make a change without making someone worse off. Of course, it is possible to make one person (or several persons) better off, but not without making at least one other person worse off. This is a powerful result and is widely used by those who are opposed to government intervention in markets.

A competitive equilibrium is achieved given a particular initial distribution of factor (labour, capital, and so on) ownership. If the distribution of

¹ The term 'invisible hand' is associated with the eighteenth-century English economist Adam Smith (see, e.g. Smith (1776)). The eighteenth-century French economist Jacques Gournay is supposed to be the first one to use the term 'laissez faire'; see Groenewegen (1977).

ownership is changed, a new competitive equilibrium results. The implication is that there is room for welfare economics even in the perfect market economy; for example, what is the 'optimal' or 'best' distribution of income in a perfect market economy?

Moreover, it is not necessarily true that the market economy, if left on its own, will be efficient. For example, in many industries there are relatively few firms each with a large share of the market, while a large number of firms (an assumption of competition) is required for the invisible hand to work. There may also be goods that either will not be supplied by the market or, if supplied, will be supplied in an insufficient quantity. A commonly used example is national defense. These are just two examples of what are called *market failures*. The existence of market failures provides further rationale for analysis of the desirability of government policies. Many different measures are available to attempt to remedy alleged deficiencies in markets, and they may have very different implications for the distribution of welfare in society. Hence, there is a need for rules that can be used to assess the desirability of government policies.

In the literature on welfare economics, the government is generally assumed to act in some neutral or objective way. It is as if all those employed in the public sector (including politicians and bureaucrats) have two personalities. As private individuals, they are assumed to act in their own self-interest, but in their work they act in the interest of all citizens. This view has been challenged by, among others, advocates of the public choice school. It has been argued that bureaucrats seek to maximize the size of their agency, not to find the size that is, in some sense, the best for the entire society. Such *government failures* have far-reaching consequences for the evaluation of government policies. It seems necessary to incorporate these into the domain of welfare economics.

Outline and summary of the rest of this book

Utility versus welfare

In this book the terms utility, welfare, and satisfaction are used interchangeably. Some authors make a sharp distinction between utility and welfare.² In microeconomics an individual is generally assumed to derive utility from the commodity bundle he consumes. Thus, whenever he prefers a commodity bundle x to a commodity bundle y , we infer that his utility is higher in the former than in the latter case. However, an individual need not

² In this book the terms individual, consumer, and household are used interchangeably as well (i.e. we suppress the fact that a household may consist of several individuals).

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only be concerned about his own consumption of goods and services. He may also be affected by his consideration for the well-being of other individuals. For example, an individual may vote for party x , knowing that he himself will be better off with party y in government. Nevertheless he votes for party x because he believes that the majority of the people will be much better off with x . Similarly, parents may sacrifice their happiness for the well-being of their children.

In any case, the point of departure for this book is a household that derives satisfaction only from its own consumption of commodities. The household is assumed to be able to rank any number of commodity bundles in terms of better than, as good as, or worse than, so that we can use a function, called the utility function, to describe its choices. The reader is assumed to be familiar with microeconomics, but the basic concepts and tools used in the main text are summarized in an appendix at the end of the book. The conditions for utility maximization are derived and interpreted. The appendix also introduces a firm producing a single output using two inputs, and examines the conditions for profit maximization.

The Pareto principle

In order to be able to say anything about social (overall) welfare in a multi-household economy some value judgements must be introduced. Whenever we say that one situation is better than another, our assessment must be based on a certain set of value judgements. The basic value judgement used in welfare economics and introduced in chapter 2 is known as the *Pareto principle*. This principle says that a change is desirable if it makes some individual(s) better off without making any others worse off. Although this is a value judgement, it is a very weak one in the sense that most people probably will accept it. But what about a change that makes the rich much better off but leaves the poor just slightly better off? Some people would probably argue that this change is undesirable because it increases inequality in society. But this just says that people are concerned not only about their own consumption, as we usually assume in microeconomics, but also have preferences on the income (welfare) distribution in society. Therefore, 'better off' and 'worse off' in the Pareto criterion is often assumed to refer to the individual's judgement, so that the considered change is evaluated on the basis of each individual's subjective evaluation of the change.³

³ See, however, the discussion in section 7.6.

Pareto optimality and the market economy

Chapter 2 introduces the Pareto criterion and relates it to the working of the *perfect market economy*. It is shown that such an economy may attain *Pareto optimality*. By this is meant that the perfect market economy attains a general equilibrium, characterized by equality between supply of and demand for each and every provided commodity, such that it is impossible to improve the situation of some individual(s) without making at least one other individual worse off. The importance of this result lies in the fact that it is the point of departure in welfare economics for analysis of (1) the working of real world market economies as opposed to the perfect (model) economy, and (2) the role for the government or the public sector. In particular, it must be noted that the market economy, if left on its own, may produce a very unequal distribution, implying that there *may* be a role for the government even in the perfect market economy. Some economists also argue that individuals do not always act in their own best interest, for example, they do not always complete their elementary education. The government should intervene in such cases, it is claimed.

Compensation criteria

A weakness of the Pareto principle to be discussed in chapter 3 is that it cannot be used to assess changes from which some gain while others lose. This has led economists to search for other hopefully less restrictive criteria (but still based on the Pareto principle). One such criterion is the *compensation test*. In fact, there are several compensation tests, but one, the Kaldor version, says that a change is desirable if gainers *hypothetically* can compensate losers. Actual compensation is not required, so that some individuals may in fact be worse off following a change in, say, prices (i.e. the compensation test involves a particular value judgement). If one accepts the compensation principle, the number of changes or projects that can be ranked increases in comparison to what can be achieved only using the Pareto test.

An attractive feature of the Pareto and compensation tests is that they do not require interpersonal utility comparisons. We don't have to measure individual utility or welfare and compare gains and losses of happiness across individuals. Instead we look at individuals' ranking, in terms of better than or worse than, of different social states (corresponding to, say, different prices and/or incomes). On the other hand, many changes cannot be assessed using only compensation criteria; these criteria sometimes break down in the sense that a certain change may be proposed but the reverse change may also be proposed by the same compensation criterion.

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Also, since compensation criteria indicate only *potential* improvement many economists maintain that distributional effects have to be taken into account for a welfare criterion purporting to indicate actual improvement.

Social welfare functions

The *social welfare function* introduced in chapter 3 represents an attempt to provide a complete ranking of all possible social states. Unfortunately, Arrow (1951) showed that a rule for deriving, from *individual* orderings of social states, a *social* ordering consistent with some reasonable conditions cannot be found in general. This result is known as *Arrow's Impossibility Theorem*. The only way to obtain a consistent ranking of all social states is through a dictatorship, i.e. to have a super-Stalin whose preference function is also the social welfare function. However, if one is prepared to make assumptions of *measurability* and *comparability* of individual utility over and above those implied by *ordinality*, i.e. ability to rank states, the set of possible social welfare functions increases. *Cardinality* per se, i.e. ability to reveal intensities in the same sense as a thermometer reveals changes in temperature, is not sufficient in order to broaden the set of permissible social welfare functions. In addition, one must postulate that utility (levels and/or changes) can be compared across individuals. This is indeed a strong value judgement because it implies that we can meaningfully say that your loss of happiness is smaller than my gain of happiness, or vice versa. Moreover, a social welfare function expresses a view on the distribution of welfare in society. It may impute the same weight to all households regardless of whether they are 'rich' or 'poor'; this is a *utilitarian* social welfare function. Or it may just look at or be concerned about the worst-off group in society; this is a *Rawlsian* social welfare function.

Consumer and producer surplus measures

A fundamental problem in using concepts such as utility functions and social welfare functions is that they are *unobservable*. There is no obvious way in which we can observe, say, the gain to an individual of a fall in a commodity price. Therefore, in order to be able to proceed further, we need observable and reasonable easily obtainable measures of utility change. Chapter 4 presents the most commonly used *money measures* of utility change. These are known as *consumer surplus* measures because they indicate what the consumer is willing to pay over and above what he actually pays for a desired change. The area to the left of the consumer's demand curve for a commodity between the initial and the final price can be shown to contain this information, at least in some cases. It turns out,

however, that, if several prices are changed, the change in consumer surplus as measured to the left of *ordinary* or *Marshallian* demand curves may be positive, although the considered change in prices causes utility to fall, and vice versa. The basic problem, known as the *path-dependency problem*, is that the order in which prices are changed affects the size of the total change in consumer surplus (but not the change in utility since this change is uniquely given by utility attained after prices have been changed less the utility attained before the change). This problem can be avoided by using *income-compensated* or *Hicksian* demand curves. These have the property that any change in utility caused by the change in prices is neutralized by an appropriate change in the consumer's income. The chapter also presents *producer surplus* measures that can be used to assess the change in a firm's profitability caused by changes in input and/or output prices.

Market failures

Equipped with such money measures we are ready to analyse various *market failures* that can be observed in a market economy. Chapter 5 discusses a number of reasons why a market economy may fail to achieve Pareto optimality. One source of failure is *increasing returns to scale* (here the costs per unit of output produced decline with the scale of production). This is one reason why we sometimes observe a few or even a single firm, a *monopolist*, operating in a market. If unregulated, these firms will restrict output to attain a higher price and higher profits than is possible under free competition between many small sellers. There are also some goods that will not be efficiently supplied by the market. The most often used example is national defense. Such goods are called *public goods* since they, in sharp contrast to *private goods* like a piece of cake, can be consumed simultaneously by everyone. Since consumers cannot be excluded from consuming a pure public good it is very difficult to provide such goods via the market. Who is willing to pay not only for their own consumption but also for everyone else's consumption? A similar problem occurs in the case of *externalities*. Perhaps the most discussed example in recent years has been air and water pollution. There is a difference between *private* and *social costs* in such cases; polluters do not have to pay for the losses they inflict on others. This means that the resource allocation provided by the market may not be efficient. Another example of a market failure is the periods of high *unemployment* in western market economies. These high levels of unemployment indicate that something is not working well in the market, although there is no unanimity among economists regarding what is wrong. Are wages too high, aggregate demand too low, or what?

8 *An introduction to modern welfare economics**Social choice*

Market failures indicate a possible role for the government. This is not to say that the government should necessarily intervene in the market. First of all the government must have at its disposal means that are efficient in the sense that everybody can be made better off (Pareto improvement). Second, even if such means are available, there is the question of whether governments really work the way we tend to assume. After all, there are political processes and bureaucratic structures that may cause *government failures*. For example, if bureaucrats try to maximize the size of their agency, as some economists argue they do, then we have an imperfection similar to the one arising when there is a monopolist operating in a market.

In any case, the provision of public goods is a central issue in welfare economics. Chapter 6 discusses the conditions for the optimal or Pareto-efficient provision of such goods. The outcome of majority-voting rules, where the *median voter* plays an important role, as well as the *Lindahl solution*, which attempts to imitate the market solution, are presented and discussed.

The *income distribution* both within and across *generations* may be thought of as a particular public good. The market mechanism is unable, in general, to provide an income distribution that is deemed to be fair (in some imprecise sense). This raises the question of how to design *tax schemes* that are both Pareto efficient and produce the desired distribution of welfare (income) in society. This question is dealt with in chapter 7. This chapter also deals with externalities, among other things. In particular the role of *property rights* is stressed. If there were a perfect market for, say, air pollution rights, then there would not be any air pollution problem. The chapter also examines a particularly well-known inefficiency due to poorly defined property rights, called the *problem of the commons*. Overfishing in international waters is an example of this problem.

Applied welfare economics

The three final chapters of the book are devoted to applied welfare economics. Chapter 8 presents different methods that can be used to reveal people's preferences for public goods or 'bads' (externalities). Such methods include *surveys* whereby people are questioned about their willingness to pay for a particular change, say an improvement in air quality. Sometimes people's visits to, say, a park provide information – via *travel costs* – about their valuation of the park. It may even in some cases be possible to exploit *market prices for homes* (or wage differentials) to get

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information about the valuation of public goods; for example, if air quality differs between areas this may be reflected in house prices.

Chapter 9 goes through many of the steps in a *cost-benefit analysis*. This is the way economists evaluate a (usually small) project to assess its impact on social welfare; cost-benefit analysis is applied welfare economics. The chapter aims at providing simple but nevertheless useful rules that can be used by those who are working in the field.

A particular feature of many projects is that we cannot predict their consequences with absolute certainty. This raises a need for project evaluation criteria that can be used to assess *risky projects*. In particular, such criteria must reflect attitudes towards risk. A society (or an individual) that is inclined to accept large risks, is *risk loving*, and will not use the same decision criterion as a society that is *risk averse*. How to deal with such issues when evaluating public sector projects (or private sector projects like nuclear power plants) is the subject of the book's final chapter.

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Pareto optimality in a market economy

If there is just a single household (individual) in an economy, there is no problem in evaluating policy changes. We can use this household's utility function (or ask it) to rank different social states, for example, corresponding to different prices.¹ If the household prefers state A to state B (corresponding to, say, other prices than state A), 'society' makes the same choice. However, real world economies have millions of households with different preferences (tastes) and incomes. Some households may gain while others may lose from a proposed policy change, such as a move from state A to state B. Therefore, in order to be able to say something about the desirability for society as a whole, one must aggregate preferences so as to arrive at meaningful and operational welfare criteria. This will be the focus of attention for the next few chapters.

2.1 *The Pareto criterion*

The Italian economist Vilfredo Pareto² has specified a condition of optimal or efficient allocation referred to as the *Pareto condition*. By this criterion, a policy change is socially desirable if everyone is made better off (the weak Pareto criterion) or at least some are made better off while no one is made worse off (the strong Pareto criterion). Obviously, when the possibilities of making such policy changes are exhausted, we are left with an allocation of commodities that cannot be altered without someone being made worse off. Such an allocation is called *Pareto-optimal* or efficient.

The Pareto criterion is often considered to be the common core of welfare

¹ Since there is just one household, this household must be the sole owner of any firms. Thus, firms' profits are distributed to the household.

² Pareto (1848–1923) was a contemporary of the great English economists Francis Edgeworth and Alfred Marshall.