ON GOODS AND SERVICES

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The paper is concerned with the concept, definition and measurement of a service. Although services are often dismissed as immaterial goods, they are not special kinds of goods and belong in a quite different logical category from goods. The search for appropriate units of quantity in which to measure services is not an idle metaphysical pursuit. Without quantity units there can be no prices, and most economic theory becomes irrelevant. Indeed, large parts of economic theory may be irrelevant to the analysis of services anyway, precisely because they are not goods which can be exchanged among economic units. Services are as important as goods in modern developed economies and they need to be identified and quantified properly if the measurement of economic growth and inflation is to have any meaning for the economy as a whole. The concept of a service is explained in some detail in the paper, and various ways in which services can be classified for purposes of economic analysis are elaborated. The distinction between private and public goods, or rather between private and collective services, is re-examined in the light of the general concept of a service proposed in the paper. Externalities are shown to be simply special kinds of services.

INTRODUCTION

The steady growth of services is a characteristic feature of most economies, with up to a half or more of the labour force engaged in their production. Yet the measurement of price and volume changes for most services remains primitive and rudimentary. There is little understanding about the nature of the physical units in which most services should be quantified, and consequently their prices are also vague and ill defined. Indeed, a price, perhaps the most fundamental concept in economics, is meaningless unless the physical unit to which it refers can be identified and specified. It is a sad reflection on the state of economics that there is so little perception of the physical characteristics of most services, that the outputs of major industries such as health and education are usually measured by their inputs, thereby making the measures useless for most analytic purposes.

The distinction between goods and services was emphasized by Adam Smith and regarded as a matter of great importance by classical economists. It gave rise to the somewhat emotive distinction between productive and unproductive labour according to whether the labourer was engaged on the production of goods or services, a distinction which through Marx's influence has survived in the Material Product System of accounting used today in socialist countries. The distinction between goods and services assumed less importance, however, among neo-classical economists until today it is usually regarded as trivial. Marshall, for example, dismissed services as "immaterial products" while present day economists tend to describe them as "immaterial goods" or simply as "goods". In fact, services are not goods and their characteristics differ fundamentally from goods. Moreover, the distinction is very persistent in ordinary speech, which shows that it is both useful and important. The layman has no

difficulty in distinguishing services from goods, and knows what he expects to receive when he pays to have a service performed.

The main purpose of this paper is to elucidate the concept of a service and to provide a proper definition of a service. The characteristics of services are examined in some detail, and various ways of classifying them are proposed. A close generic similarity between services and externalities is noted, and the distinction between private and public goods or between private and collective services is reconsidered in the light of the preceding discussion. On a matter of terminology, the concept of a "good" as used in this paper has to be narrower than is customary in economics today because it has to exclude services. Indeed, one of the main purposes of the paper is to compare and contrast goods and services, which necessitates reverting to an older definition of a "good" which is essentially the same as that used by classical economists.

A Preamble on Transactions

An important common characteristic of both goods and services is that they must be transactable. Transactions play an important part in the argument of this paper and it is worth examining them briefly as a preamble. A transaction consists of an inter-change, or inter-action, between two economic units which may take a variety of different forms. A transaction may, or may not, involve the exchange of a good or the provision of a service. It may, or may not, involve the exchange of money. It may, or may not, involve financial assets or liabilities. In the present context, attention is focussed on transactions involving goods and services, including not merely those in which payments are made but also those in which goods and services are provided free or for a purely nominal payment. These transactions are often called commodity flows, the term "commodity" being used to embrace both goods and services.

A necessary condition for some item to be a good or a service is that it must be capable of being the subject of a transaction between two or more different economic units. The reason for this can be seen by considering something which cannot be transacted. It follows at once that the item cannot be purchased and no price can be attached to it. Moreover, the production of such an item cannot be carried out by a different unit from that which consumes or uses it if, by assumption, the latter cannot acquire it from the former. Specialized production is impossible and there can be no division of labour. Thus, not merely markets but industries cannot exist for something which is not transactable.

In seeking to identify the characteristic of goods and services, it is necessary to focus on transactions between producers and consumers. The objective is always to identify exactly what one economic unit hands over to, or provides for, the other. This must be something which is observable and quantifiable in physical terms. It must, moreover, be clearly distinguished from the benefits or utility that the consumer expects to derive from the good or service. Although these benefits are important in explaining the behaviour of consumers, it is a matter of simple logic that the good or service itself is not the same as the benefits derived from that good or service. Unfortunately, the two are often confused in the case of many services.

In insisting that goods and services must be transactable or marketable, it is not suggested, of course, that they always have to be marketed. In particular, goods and services are often produced and consumed by the same economic unit, and such production on own account is very important in every country. Thus, if an individual grows his own vegetables or repairs his own car, he is engaged in the production of goods or services. On the other hand, if he runs a mile to keep fit, he is not so engaged because he can neither buy nor sell the fitness he acquires, nor pay someone else to keep fit for him.

Goods

Although in this paper interest is centred on services, it is necessary to begin with goods in order to see how services differ from them. A good may be defined as a physical object which is appropriable and, therefore, transferable between economic units. Ownership need not imply formal or legal property rights of a kind found in a capitalistic economy. Ownership can be interpreted more generally to mean the right to make use or dispose of the object in question within the constraints imposed by the social and political system. Economics is principally concerned with scarce goods, but scarcity does not seem to be inherent in the concept of good as a free good is not a contradiction in terms.

Most objects within ordinary human experience are capable of being goods as it is not easy to think of tangible objects which are not capable of being appropriated. Objects which cannot be goods are mostly ones which are outside human experience or control; for example, extra-terrestial objects or at the other extreme micro-organisms or particles. There are also certain conditions or qualities which may be greatly desired but which cannot be treated as goods because they are not transferable objects—for example, good health, beauty or youth. Moreover, accumulated knowledge and acquired skills cannot legitimately be treated as goods either. Thus, the musician and surgeon who decide they would like to pursue each other's profession cannot simply exchange this knowledge and skills in some kind of barter-transaction in the way that they could exchange cars or houses if they happen to prefer each other's. Just as there are goods which are not scarce, there are also conditions or attributes which are both very scarce and highly desired, but which are certainly not marketable goods. Of course, highly skilled individuals can provide specialist services, but they cannot dispose of the actual skills themselves because they are not transferable.

It is not necessary to elaborate on the concept of a good as a transferable object as this notion was extensively explored and debated in the first half of the nineteenth century by classical economists.[1]

Services

Consider a series of examples of different kinds of services—the shipment of goods by a transport firm; the repair of a vehicle or redecoration of a house; the

[1]For example, there is a penetrating discussion of the characteristics of both goods and services in Nassau Senior's *Political Economy*, 5th edition (Charles Griffin & Co., London 1863) pp. 8, 9 and 50 to 53.

cleaning of a house by a servant; the shampooing of hair by a hairdresser; the extraction of a tooth by a dentist; and so on. What is the common factor shared by all these examples that enables them to be readily identified and classified as services?

In every case, some change is brought about in the condition of some person or good, with the agreement of the person concerned or economic unit owning the good. Secondly, the change is the result of the activity of some other economic unit. These two points provide the key to the concept of a service. A service may be defined as a change in the condition of a person, or of a good belonging to some economic unit, which is brought about as the result of the activity of some other economic unit, with the prior agreement of the former person or economic unit. This definition accords with the meaning of the word "service" as used in ordinary speech and by economists. It is consistent with the underlying idea which is inherent in the concept of a service, namely that one economic unit performs some activity for the benefit of another. In this way, one unit "serves" the other. Whatever the producer of the service does must impinge directly on the consumer in such a way as to change the condition of the latter. Otherwise, no service is actually provided. The mere performance of some activity is not enough if the consumer unit is not affected in some way. In the great majority of cases the change in the consumer unit can actually be observed by comparing the condition of the person or goods belonging to the consumer unit before and after the provision of the service. The amounts of services produced must be measured by recording the extent of these changes in the consumers, and not by observing the activity of the producers. The distinction between the process of production and the output of that process is quite clear for goods. In the case of services, however, the process of production is often mistaken for the output. The process of producing a service is the activity which affects the person or goods belonging to some economic unit, whereas the output itself is the change in the condition of person or good affected. Just because the consumer of a service is often in a position to observe the production or performance of the service taking place should not cause the process of production to be confused with the end product of that process.

When a service is provided by one economic unit for another, nothing is actually exchanged between them in the way that the ownership of goods is transferred from one unit to another. It is, therefore, quite inappropriate to think of services as "immaterial goods" which can be traded on markets. Goods and services belong to quite different logical categories. For example, the transport of goods from one location to another is a clear example of a service, but the change of location is not to be regarded as an "immaterial good" as if it were some kind of ghostly vehicle. A surgical operation is not some kind of immaterial drug; the cleaning of clothes is not some kind of immaterial detergent. Such statements are nonsense. The conceptual status of services is totally different from that of goods as their juxtaposition in these statements reveals. Because services cannot be transferred from one economic unit to another, models of pure exchange economics of a Walrasian type in which existing goods are traded between economic units are quite inapplicable and irrelevant to services.

Moreover, this is not because services are highly perishable commodities which cannot be put into stock. The fact that services cannot be put into stock has nothing to do with their physical durability; as explained below, many services are not merely permanent but irreversible. Services cannot be put into stock because a stock of changes is a contradiction in terms. Thus, the fact that services cannot be held in stock is not a physical impossibility, but a logical impossibility.

Before elaborating these ideas further, it is advisable to draw a basic distinction between services affecting persons and services affecting goods. A service affecting a person is some change in the physical or mental condition of a person resulting from the activity of the producer unit, whereas a service affecting a good is a change in the state of some good. It is convenient to examine services affecting goods first.

Services Affecting Goods

Examples of services affecting goods are the transportation of goods, postal deliveries, repairs, cleaning and maintenance. In each case goods which already belong to some economic unit are transformed in some way as a result of the activity of the producer unit. Normally, the two economic units are different from each other, but the production of services on own account is always a real possibility; for convenience of exposition, however, it will be assumed that the producer and consumer are different economic units, as this is the typical case. Transformations of goods must be physical in nature, so that the production of services affecting goods consists of processes of physical transformation which are *not* intrinsically different from those used to produce goods. Thus, the difference between goods and services does not stem from the technology of their production. The repair of a vehicle, for example, will tend to use exactly the same kind of materials and processes as its original manufacture. Moreover, the repair will often consist of a permanent change in the vehicle concerned, or at least a change which is as permanent as the vehicle itself. Similarly, when a building is cleaned and redecorated, the change is presumably expected to last for some time. Thus, certain services consist of changes whose permanence must be measured on the same time scale as the durable goods on which they are effected. Even transportation often involves changes in location which may be presumed to be permanent, such as shipping the Statute of Liberty from Paris to New York. On the other hand, changes in location are normally reversible, whereas most of the processes of transformation used in the production of services are no more reversible than those used to produce goods.

The production of a service cannot generally be distinguished from that of a good by means of the technology used but by the fact that the producer unit operates directly on goods which already belong to the consumer of the service. In contrast to the producer of goods, the producer of services does not purchase or acquire all the inputs into his production process. The principal "input", namely the good being serviced, continues to be owned by the consumer of the service. The good which is being repaired, transported or otherwise serviced must not, therefore, be transformed out of recognition in the process. It must not

lose its identity in the way that many material inputs do in the course of production. The consumer of the service must be able to recognize and claim his good at any point in the process. Thus, one characteristic of service production is that the degree of physical transformation of the good being serviced must be fairly small. While this appears to be true, it is also true of some goods production so that it cannot be elevated into the distinguishing feature between goods and services production.

Services affecting goods are often maintenance type services to goods such as machinery, equipment and buildings which were originally produced in previous periods. On the other hand, they may contribute towards the production of new goods in the form of specialist painting or transportation services, for example. In the latter case, the technology of production is important in so far as it must be feasible to break down the complete process of production into stages, some of which can be contracted out to specialist service producers. This shows once again that the degree of transformation must be small to ensure that the identity and ownership of the goods being serviced do not get lost. Thus, one and the same activity, such as painting, may be classified as goods or service production depending purely on the organization of the overall process of production among different economic units. If the painting is done by employees within the producer unit which makes the good, it will be treated as goods production, whereas if it is done by an outside specialized painting agency, it will be classified as an intermediate input of services. However, in terms of a classification of end products, the result is the same in both cases as the good which is painted is still a good, even if some service inputs are consumed in the course of its production. This example underlines the importance of the way in which production is organised in determining the extent of the production of intermediate as distinct from final services. Thus, some changes in the share of service industries in total output or employment may be determined purely by changes in the way in which production is distributed among different producer units, and may have no influence whatsoever on the share of services in final expenditures.

The producer of a service works directly on the good or goods belonging to the consumer of the service. This means that the consumption of the service must take place simultaneously with its production. The consumption of the service is the change which the producer effects in the condition of the consumer's good so that the production and consumption of the service obviously cannot be separated from each other. On the other hand, such a separation necessarily occurs in the case of goods where the process of production must precede that of consumption. A good is produced within the producer unit and initially is added to the producer's stock of completed goods. Subsequently, the good is acquired by the consumer in an exchange transaction which is totally separate from the process of production itself. Indeed, there may be a considerable time lag between the production of a good and its ultimate acquisition by the consumer. However, the very process of production of a service entails a transaction between the producer and consumer as the consumer's goods must be changed in some way for the service to be produced. In the ordinary market situation this requires the prior agreement of the consumer in the form of a statement of willingness to pay before the service takes place. Because services

must be consumed as they are produced, they cannot be put into stock, a fact already noted.

These characteristics of services have been a source of great confusion because of the tendency to regard services as special kinds of goods. The only goods which cannot be put into stock and must be consumed as they are produced are highly perishable goods. Ergo, services must be highly perishable commodities, a fallacious sentiment which can be traced back to Adam Smith who referred to services which "generally perish in the very instant of their performance, and seldom leave any trace or value behind them"[2]. In fairness to Smith, most of the services he had in mind were fairly transitory. As already explained, however, services cannot be put into stock because they consist of changes, not because they are ephemeral. Moreover, the fact that they are consumed as they are produced does not mean that they are physically consumed in the sense of being extinguished or annihilated. The consumption of a service is the counterpart of the acquisition of a good by a consumer in an exchange transaction. Just as the good, especially a durable good, may continue in existence long after it is acquired by the consumer, so the service consumed may consist of a permanent change in some good. The danger in thinking of services as if they were highly perishable commodities is that it creates the illusion that the benefits derived from the services must be confined to the period in which they are produced. This is as false for many services affecting goods as it patently is for many services affecting persons, such as education. Just as a distinction is needed between durable and non-durable goods, a distinction is also needed between permanent and transitory services, to emphasize the long duration of time over which the benefits from certain services can be derived.

Services Affecting Persons

These consist of changes in the physical or mental condition of the consumer which are the direct consequence of the activity of the producer, such changes being at the request of the consumer. For example, services, such as passenger transportation, hairdressing, and various forms of medical treatment involve changes in the physical condition of the consumer, while services such as education and communication involve changes in mental condition. Domestic services, incidentally, such as house cleaning, cooking and gardening are mostly services affecting goods, and only the services of valets or personal maids include some services affecting persons. There is very little correspondence between services affecting persons as defined here and personal services as conventionally understood in economics.

Most of the points made in the previous section about services affecting goods are equally applicable to services affecting persons, and need not be elaborated here. Thus, the services may result from processes of physical transformation of varying degrees of permanence: passenger transportation is a temporary physical transformation which is easily reversible, whereas surgery is permanent and usual irreversible. Production and consumption must always take

[2]Adam Smith, *The Wealth of Nations*, Vol. I, Ed. by E. Cannan, (Methuen & Co, Ltd., London, fifth edition, 1930), p. 314.

place simultaneously and the services cannot be put into stock: medical treatments cannot be stock piled in advance of the illness to which they relate. Because these services affect people directly, however, there is a tendency to confuse the services themselves with the benefits the consumer expects to derive from them, and great care is needed to keep them distinct from each other. The distinction is clear enough for goods where, for example, the clothing itself is easily distinguished from the warmth it provides.

It is convenient to examine several major types of service separately, and the first to be considered consists of health services, produced by doctors, dentists and medical establishments generally. People seek medical treatments with the broad objective of improving their health, but it is essential to draw a sharp distinction between the treatments themselves and any improvements in health which may subsequently result from them. The services provided by doctors, dentists, etc. are the changes in the conditions of their patients which are directly attributable to their own actions. The nature of such changes is fairly obvious in the case of surgery, injections and other bodily changes. The services provided by physicians often consist of no more than the provision of advice. During the course of a consultation the physician passes on a bit of specialized information, and the change in the condition of the patient, the actual service rendered, is the acquisition of this information. After examining the patient, the doctor forms a diagnosis and then prescribes a course of action for the patient to follow. Drawing on his own special training and experience, the doctor is able to pass on to his patient that bit of his knowledge which is relevant to the particular patient in question. He cannot transmit the whole of his accumulated knowledge, but he can select a bit of it and communicate that bit. This is essentially the kind of service provided by many professional persons. Acting on the information acquired the patient then pursues a certain course of action such as retiring to bed or resting, or taking exercise, or swallowing pills, or consuming or not consuming certain food or drink, and so on. However, the treatment itself—what the doctor actually does for his patient in a consultation—is no more than to pass on the relevant bit of specialized knowledge. There are patients who choose to ignore the advice provided, but that in no way reduces the service provided by the doctor.

It is important not to over-step the boundary of production by seeking to attribute to doctors what is beyond their powers to provide. Doctors do not provide cures, still less good health. The general health of the community depends upon a variety of other factors such as standards of nutrition, housing, sanitation, working conditions and environmental pollution, together with the personal habits of the population such as the amounts of tobacco and alcohol consumed, the taking of exercise, and so on. Medical treatments constitute only one of many factors contributing to the health of the community and they cannot be measured in terms of changes in the community's health. Various treatments are prescribed, and desired by patients, because of the probability that certain changes in the condition of the patient will result, but the treatment itself is quite separate from the outcome. Certain patients may be too old or ill to respond to a given type of treatment, but that does not in itself affect the amount of treatment provided. The treatment may even be harmful to the patient (and there have

been periods when doctors collectively may have done their patients more harm than good, at least in treating certain illnesses) but that does not mean no service is provided when the patient actually wants the treatment.

It is not being suggested that the probable outcome of a particular type of treatment is irrelevant. Obviously, consumer preferences are strongly influenced (on the advice of their doctors) by probable outcomes so that certain treatments are in great demand whereas others are not. However, it is being insisted that the service provided consists of no more than the treatment itself and does not extend to the actual outcome, whether favourable or not. And the treatment itself consists only of the changes in the condition of the patient actually brought about by the activity of the doctor himself, and does not cover the patient's subsequent response to that treatment. Finally, it may be noted that "medical treatment" is only a general term covering a wide range of specific services. Many of these are very complex, but they can still be used as units of quantity provided they are reproduced time and again. Many manufactured goods, such as aircraft or computers, are also extremely complicated and difficult to specify, but that does not prevent them from being counted and used as units of quantity.

Another important category of service affecting persons is passenger transportation. The nature of the service is fairly obvious, consisting of the transporting of a person from one location to another, which is a form of physical transformation. Different kinds or qualities or service may be distinguished to take account of factors such as comfort, speed, punctuality, safety, and so on. An important feature of passenger transportation is that a single producer may transport a group of consumers at the same time, and the problems created by a group or collective service are examined in more detail in a later section. While the amount of services produced must be based primarily on the number of passengers transported and the distance over which they are transported, the quality of the service provided may deteriorate if the vehicle carrying the passengers becomes over crowded. This "congestion factor" is also important for various other services affecting persons.

In order to ascertain the nature of educational services it is necessary to examine carefully exactly what is the change produced in the condition of the consumer, namely the pupil. Broadly speaking, educational services are produced by a process of instruction, where instruction is not merely a matter of verbal explanation, but may require demonstration by the teacher as well as the supervision of pupils when they practise on equipment; it also covers the correction of pupils' mistakes. Instruction is a process of production whereby knowledge and skills are communicated, bit by bit, from teacher to pupil. It has already been pointed out that the entire accumulated knowledge or skills, possessed by an individual is not a commodity which can be exchanged en bloc on the market, but small bits of those skills or knowledge can be transmitted and this is one of the main functions of professional people such as doctors or lawyers. The role of teachers is to continue this process of communication, bit by bit, but over long periods of time in an attempt to transmit large amounts of knowledge and skills.

An educational service is, therefore, the additional skill or knowledge imparted in a pupil directly as a result of the instruction provided by a teacher.

Such changes in the condition of pupils may well be permanent, and it is certainly the intention of most educational establishments that the changes produced should be as permanent as possible. The additional skills or knowledge acquired by a pupil, however, depend not only on the amount of instruction, but also on the pupil's capacity to absorb that instruction, a factor over which the teacher has no control. The pupil's capacity depends upon his previous training and qualifications, his natural ability and aptitude, and the amount of attention and concentration he applies. If the pupil's qualifications and ability are such that he is incapable of understanding and absorbing the teacher's instruction, there can be no change in his condition as a result of the teacher's activity and no service is produced in these circumstances. The activity of the teacher is wasted and cannot count as productive. Teaching poor pupils can be compared to cultivating poor soil: however efficiently the process of production is carried out the output will be low if it is necessary to work with poor materials.

The amount of knowledge or information transmitted from teacher to pupil is not directly quantifiable, just as the advice provided by a doctor to his patient is not readily quantifiable. In practice, therefore, it is necessary to use proxies such as numbers of pupil-hours of instruction received (distinguishing, of course, different kinds or qualities of instruction) or numbers of consultations or patient-hours of consultation in lieu of true measures. The movement of such proxies over time is likely to be highly correlated with those of the actual services provided. It is sometimes suggested that the output of educational services should be measured by the numbers of diplomas, certificates and other qualifications attained by pupils, but this goes too far. The qualifications obtained depend very greatly on the work done by pupils outside the classroom. Formal instruction is only part of the process of learning and the knowledge and skills acquired are strongly influenced by the pupils' own efforts in the form of private study and practice. The results of those efforts cannot be attributed to the teachers and counted as services produced by them. However important they may be for other purposes, numbers of diplomas and other qualifications are not an appropriate measure of the amounts of services produced by educational establishments.

Finally, in this section some reference should be made to entertainment services—theatres, cinemas, football games, and so on. Such services are relatively unimportant, but they are also rather different from other services so far considered. The service rendered is undoubtedly some change in the mental condition of the audience or spectators, but it is perhaps for the psychologist to describe the nature of the change. In practice, the measurement of such services has to be approximated by the numbers of spectators or people in the audience and, of course, in the market situation payment is levied in the form of admission charges. Presumably, these kinds of services consist of changes which are only transitory, but it is debatable whether even they vanish in the instant of their performance.

Several of the services considered in this section can be provided collectively as well as individually—transportation, education, entertainment, etc.—and further consideration is given to group services in the final section of this paper on "public goods".

Labour and Capital Services

The services considered up to this point are services which are capable of being produced as the output of service industries. It is appropriate to examine to what extent the concept of a service as developed in the previous sections is applicable to the inputs to production contributed by the primary factors of production, labour and capital.

Labour Services

Labour services as generally understood, are perfectly consistent with the definition of a service proposed in this paper. As the employee provides a service for the benefit of the employer, the former has to be regarded in this context as the producer of the service and the latter as the consumer. There is nothing strange in casting the employer in the role of consumer: he consumes all kinds of intermediate inputs of goods and services as well as primary inputs of labour services.

In general, the service performed by an employee is to achieve some change in the condition of the goods belonging to the employer. The latter are mostly goods purchased for use as intermediate inputs. The activity of producing the labour service by the employee is simply work, while the service itself is the change in the employer's goods which is actually realised by the employee. The employer does not pay the employee for the exertion of physical or mental effort as such, but for the achievement of something of benefit to the employer. It is perfectly possible for time and effort to be wasted, in which case it does not count as a labour service. Where payment is made by results it is clear that the service rendered by the employee to the employer is to be measured in terms of the results achieved, but even where payment is by the hour, week or month it is not made literally for the time spent (except in a few special cases) but on the assumption that a certain flow of results are achieved, on average, per period of time.

Thus, to measure labour inputs properly it is necessary to measure the results achieved by the operations carried out by the workers. This is not easy because of the immense variation in the jobs done by different workers, but it is doubtful whether it is any more difficult in principle than compiling aggregate price or volume measures covering the immense variety of goods and services produced for final consumption. Statistics of employment or hours worked are needed for a variety of other purposes, but they are very inadequate proxies for labour inputs. Such statistics take no account whatsoever of the labour services actually contributed to processes of production so that it is not surprising that their use in empirical studies of production functions leads to the result that there is usually a considerable discrepancy between the movement over time of output and of combined factor inputs, a discrepancy which either remains unexplained as a residual or is passed off as technical progress. In principle, in so far as technical progress actually leads to a change in the nature of the work done by employees this ought to be reflected in the measures of labour services, but the theoretical and practical problems involved here have passed unnoticed.

Non-labour Activities

Not all human activities are capable of constituting labour services, and it is useful to consider where the boundary should be drawn between service and non-service type activities. Any service must be capable of being provided by one individual or economic unit for another: otherwise, the possibility of a service as such does not exist. Any activity, which is such that it cannot by its very nature be delegated, or contracted out, to another individual or economic unit, must, therefore, be treated as intrinsically a non-service type activity. Examples of such activities are everyday activities such as eating, drinking, sleeping, taking exercise and other bodily functions which cannot be performed by one person on behalf of another. There can be no specialized producer units in respect of these activities, no industries and no markets. The individual does not have a choice as to whether to perform these activities himself and to pay someone else to do them for him. These activities are, therefore, fundamentally different from other familiar activities such as washing, shaving, cleaning, cooking, gardening, etc., which can be performed by others. Specialized producer units not merely can, but do, exist for all the activities just listed.

The benefits derived from the non-service or non-labour type activities such as eating, drinking and sleeping, are very real. The activities are literally vital to the individual and certainly affect his efficiency as a worker. However, it is misleading to describe these benefits as "output", just as the activities themselves are not productive in an economic sense. There is an increasing tendency to describe the outcome of any kind of process as "output", but this merely degrades and dilutes the concept of "output" to the point that it does not even have to refer to a good or a service and can refer to anything. Such usage robs fundamental economic concepts such as "production" and "output" of any precision and renders them useless for scientific analysis.

The activities so far considered have all been physical, but the same criteria must apply to mental ones. Mental processes such as thinking, learning and studying cannot be performed by others and cannot be treated as productive in an economic sense. Otherwise, the rich of this world would possess not merely large mansions, but encyclopaedic knowledge and batteries of skills. Thus, the acquisition of knowledge and skills through a process of learning is intrinsically different from processes which produce goods and services. Pupils and students should not be treated as if they were workers in an industry engaged on the production of goods and services. Of course, acquired knowledge and skills affect an individual's productivity and efficiency as a worker, but so do other non-economic activities such as eating and sleeping. Malnutrition may be as harmful as ignorance in its effects on a worker's capacity. It is customary in economic accounts to treat students as consumers and not producers of educational services, and the present argument reinforces this view. The time and efforts spent by students should not be treated as equivalent to the labour of workers; their efforts are not inputs which are consumed by enterprises producing educational services (for others). The boundary of production is correctly drawn in education between the teacher who produces and the pupil who consumes the services produced. The argument has nothing to do with the fact

that pupils and students are not normally paid for the time spent on study or practise. Housewives are also not paid, but in contrast to students, housewives are clearly engaged on production in an economic sense; their work can be performed by others and, of course, domestic service does exist and has been a major industry at certain times in certain countries.

Capital Services

There are at least two possible interpretations of capital services: one is that the capital goods themselves contribute services to the process of production, while the other is that their owners provide the services. The first interpretation is similar to the way in which Irving Fisher conceived capital goods as providing a flow of services over time. Thus, Fisher argued: "The services of an instrument of wealth are the desirable changes effected (or the undesirable changes prevented) by means of that instrument. For instance, the services of a loom consist in changing yarn into cloth, or what is called weaving. Similarly, a plow performs the service of changing the soil in a particular manner; a bricklayer, of changing the position of bricks. A dam or dike performs the service of preventing the water from overflowing the land; . . .[3] Despite the superficial similarity between Fisher's concept of a service and that proposed here, there are also important differences. Fisher does not always distinguish properly between the change itself and the act of producing that change; more importantly, however, the idea of a capital good, an inert object, providing a service is alien to the basic notion that services are only provided by economic units for each other. Economic units, whether individuals, enterprises or the government, may make extensive use of capital goods in the process of producing a service but the service itself is a form of output which must be attributed to the economic unit and not to some individual good taken in isolation which is used in the production of the service. The service of an instrument of wealth as envisaged by Fisher is an extension of the ordinary meaning of a service which is potentially confusing if the usage is not recognized to be different. The concept of a capital service is not parallel to that of a labour service because in contrast to a capital good, each worker is a separate economic unit, an autonomous economic agent, who is capable, by means of engaging in economic activity, of providing services for the benefit of other individuals or economic units when asked to do so.

The fact that a capital good continues to be used over a very long period of time does not mean that it has to be described as providing a flow of "services." A capital good no more produces a service than any other type of good used as an input in the course of production. If it is suggested that all inputs, including materials, and fuel, contribute services to the process of production, then the statement "contributing services" ceases to have any special significance or connotation. Describing some good, whether durable or not, as contributing a service to production does not mean any more than it is used up, in whole or in part, in the producing of other goods and services. Unfortunately, there is a

[3]Irving Fisher, *The Nature of Capital and Income*, (August M. Kelley, New York, 1965), Chapter II, p. 19.

recent tendency in economics to describe something as "providing a flow of services" whenever it is used in the course of some activity or other and it is not clear precisely what its function is or what effect it has. The phrase is often used as a kind of smoke screen to conceal inadequate specification of the inter-relationships involved and tends to be symptomatic of lack of precision and analytical rigour.

Even though it is misleading to describe capital goods as providing services, it may be argued that their owners provide a service by making them available for use in the course of production or consumption. As the owners are at least economic units it makes some sense to think of them, as distinct from the goods they own, as providing services for the benefit of other economic units. By putting the goods at the disposal of users, it can be argued that the owners do change the condition of the users, and the hiring out of capital goods is actually treated as a form of production in economic accounts such as the S.N.A. and implicitly this production is categorized as a service activity.

The difficulty with this view is that it is the user of the capital good, and not the owner, who actually employs the good for purposes of production or consumption. The owner of the good does not engage in productive activity. Moreover, the user evidently acquires a good from the owner and not a service. Hiring is actually a kind of temporary sale or exchange of a good in which de facto ownership rights are transferred for a fixed duration of time from one economic unit to another. There is also a service element involved in the transaction between owner and user where the owner makes a regular business of hiring out equipment, and part of the payment made covers this service element in the same way that part of the price charged by a retailer on the permanent sale of a good denotes the margin in respect of his own services. Apart from this element, however, the owner does not produce a service merely by putting the good at the disposal of the user, and the transaction between them is best treated as a temporary exchange of a good.

Thus, there are also difficulties about the concept of a capital service, when it is used to describe the so-called services rendered by the owners of capital goods. It seems, therefore, that the concept of a service developed in this paper, which is intended to refer to services produced as outputs by economic units, is not readily applicable to the concept of a capital service, however it is defined even though it does happen to fit perfectly the concept of a labour service. Although this might be dismissed as a semantic curiosity, it could also be interpreted as indicating that the attempt to treat labour and capital symmetrically as supplying primary inputs of services into processes of production may be based on a category mistake.

The Classification of Services

It has been customary in economics, at least since Adam Smith, to make a simple dichotomy between goods and services. However, if any such dichotomy is to be made, it is questionable whether the boundary should be placed between goods and services or, alternatively, between goods and services affecting goods on the one hand and services affecting persons on the other. As already shown,

the production of services affecting goods has so many points of similarity with the production of goods that the distinction between them often appears confused and paradoxical, whereas there is a clear dividing line between both of these and the production of services affecting persons. This distinction corresponds to that between material and immaterial services in the Material Product System of accounting, or MPS. This is undoubtedly an important distinction, which is not recognised in systems of economic accounting used in Western countries. In the MPS, which is stated to be based on the Marxist–Leninist theory of social production, all forms of production are divided into two spheres, "the spheres of material production and the non-material sphere, or the sphere of services. . . . The non-material sphere embraces all activities directed towards rendering services to the population in order to satisfy certain personal and social needs of people. . . . The features of services are, first, that the time they are rendered is, as a rule, the same as the time they are consumed, and second, that the object of the application of labour is man himself, while the object of the application of labour in the production of material goods are natural things and natural forces"[4]. Thus, the non-material sphere corresponds to services affecting persons as defined here. In principle, transportation is actually divided in the MPS between the transportation of goods and persons respectively, which fall into different spheres of production: in practice, however, transportation is usually included entirely within the material sphere because of data difficulties.

Various other properties can also be used to classify services in addition to that leading to the basic distinction between services affecting goods and services affecting persons. Perhaps the most important of these is the distinction between a *permanent* and a *temporary* service, which turns on the length of time over which the change effected may normally be expected to persist. For example, the washing and cleaning of an automobile could be classified as a temporary service because with ordinary use the vehicle tends to become dirty again fairly soon, whereas the painting of a house could be treated as permanent. This distinction cuts across that between services affecting goods and persons. Thus, hairdressing may be classified as a temporary service whereas surgery is permanent. This distinction is analogous to that between non-durable and durable goods and is important for the same reason, namely that the benefits from a permanent service may continue to be derived over a long period of time after it is produced.

A similar kind of property, but one which is nevertheless not the same, is whether or not a given change is *reversible*. There are some services which although permanent may be reversed by further productive activity. For example, the colour or appearance of some good may be changed again even though it has only recently been decorated: a good which has been transported may be returned to its original location. This distinction can also be applied to services affecting persons. Thus all forms of passenger transportation are reversible services, whereas many forms of medical treatment are not.

[4]United Nations, *Yearbook of National Accounts Statistics*, 1974, *Vol.* 1. p. xxix. See also *Basic Principles of the System of Balance of the National Economy*, United Nations (Studies in Methods, Series F, No. 17)

Finally, services affecting persons may be sub-divided into changes in *mental* and *physical* conditions. The nature of this distinction is fairly obvious: services such as entertainment and education consist of mental changes, while services such as transportation and many kinds of medical treatment consist of physical changes.

By combining the four properties listed above it is possible to envisage a cross-classification of services into at least nine sub-groups as shown in the table. It is assumed in the table that no transitory changes are irreversible and that no services affecting goods consist of changes in mental condition, although exceptions to these generalizations can be imagined, such as the services produced by the training of animals (while the classification of computer programming raises interesting problems). Furthermore, yet another sub-division may be superimposed on those shown in the table, namely the distinction between *individual* and *collective* services. This distinction is examined in more detail in the final section of this paper. It appears, therefore, that there are rich possibilities of classifying services in analytically useful ways which have been completely ignored up to the present.

		Services affecting goods		Services affecting persons	
		Permanent	Transitory	Permanent	Transitory
Physical Changes	Reversible	X	X	X	X
	Irreversible	X		X	
Mental Changes	Reversible			X	X
	Irreversible			X	

Productive and Unproductive Labour

The antecedents of the classificatory schemes discussed in the previous paragraphs are to be found in the debates among classical economists on the distinction between productive and unproductive labour. Adam Smith, like later classical economists, was preoccupied with material goods: in the chapter on capital accumulation Smith was at pains to distinguish a labour service which "fixes and realizes itself in a particular subject or vendible commodity" from labour services which "generally perish in the very instant of their performance".[5] The first kind of labour service was described as "productive" and the second as "unproductive". Classical economists recognized, however, that certain services affecting persons could increase labour productivity, a point emphasized by J. S. Mill who drew attention to "utilities fixed and embodied in human beings: the labour being in this case employed on confering on human beings qualities which render themselves serviceable to themselves and to others. To this class belongs the labour of all concerned in education; . . . the

[5]Adam Smith, *op cit.*, p. 314.

labour of physicians, . . . of the teachers of bodily exercises and of the various trades, sciences and arts; . . ."[6] Mill goes on to argue that he would prefer the distinction between productive and unproductive labour to "turn upon the permanence rather than upon the materiality of the product",[7] and for this reason he classes workers in service industries such as health and education as "productive". While continuing to restrict the concept of wealth to material goods and adhering to the classical view that labour is only productive when it materializes in goods, Mill was prepared to treat as productive labour which contributes only indirectly to the production of goods. This opens the gates wide and, in contrast to Smith, he was even prepared to classify government services as productive. "The labour of officers of government in affording protection which . . . is indispensable to the prosperity of industry, must be classed as productive even of material wealth, because without it, material wealth . . . could not exist. Such labour may be said to be productive indirectly or mediately, in opposition to the labour of the ploughman and the cotton spinner, which are productive immediately."[8] Using Mill's criteria, therefore, the class of unproductive workers seems to be reduced to Adam Smith's "players, buffoons, musicians, opera singers,"[9] and the like.

The attempt to brand certain types of labour as unproductive seems rather contentious today, although there has recently been some popular revival of sympathy for Smith's point of view, at least in respect of "servants of the public". As already noted, moreover, the distinction between productive and unproductive labour has been perpetuated through Marx's influence in the distinction drawn in the MPS between the material and non-material spheres of production. While it may indeed be more useful to separate out services affecting persons from all other forms of output than to draw a dividing line between goods and services, there seems little gain in labelling the workers, or resources, involved in different kinds of activity with such emotively charged descriptions as "productive" and "unproductive".

Public Goods

Externalities

Before considering public goods, or collective services, the close generic similarity between externalities and services should be noted. As defined earlier in this paper, a service is a change in the condition of a person or good belonging to some economic unit, which results from the activity of another economic unit, with the agreement of the former. If the word "with" in this definition is replaced by "without", then the definition becomes that of an externality. Not much emphasis has been placed so far on the proviso that the consumer of a service must agree in advance, but the qualification is obviously important. In a

[6]J. S. Mill, *Principles of Political Economy*, Vol. 1, third edition (J. W. Parker & Son, London 1852), p. 57.

[7]J. S. Mill, *op. cit.*, p. 60.

[8]J. S. Mill, *op. cit.*, p. 60.

[9]Adam Smith, *op. cit.*, p. 314.

market situation, a consumer incurs a liability to pay for the service when he agrees to its being performed on his person or property.

Externalities are, therefore, simply unsolicited services. The changes in the conditions of the economic units affected may be desirable or undesirable, but so long as they were not requested they must be treated as externalities. In practice, the changes must also be accidental or at least unintentional on the part of the producer. If one economic unit deliberately sets out to change the condition of another without the latter's approval, then some kind of criminal offence is likely to be involved. Theft and assault are scarcely externalities.

Treating externalities as unsolicited services suggests that they ought to be included, with imputed positive or negative prices, together with ordinary goods and services in measures of output. There may be severe practical difficulties in the recording and pricing of externalities, but in principle the case for including them alongside other goods and services seems very strong.

Collective Services

It is perfectly possible for a single service activity to affect several different economic units at the same time. Examples abound. Thus, the same vehicle may transport several people, or goods belonging to several economic units, in a single journey. Many people may attend the same concert, theatre performance or sporting event. Many people may attend the same class or demonstration. In general, a collective service is provided whenever changes occur in the conditions of several persons, or of goods belonging to several economic units, as a result of the activity of a single economic unit, with the agreement of all concerned. Collective services may affect persons or goods; they may be permanent or transitory; and they may be physical or mental.

The kinds of collective services to be considered first are those for which there is an upper limit to the number of consumers of the services imposed by the size or capacity of some capital good. For example, there is an upper limit to the number of passengers, or volume of goods, which may be carried by a given vehicle; there is a limit to the size of the audience in a theatre or to the size of a class in a class room or lecture theatre. One important characteristic of these services is that there is no more difficulty in distinguishing economic units which consume the services from those who do not than in the case of services supplied individually. The consumption of these services requires deliberate acts on the part of the consumer, such as seeking admission or entering a vehicle. Consumers are not obliged to consume the services if they do not wish to do so, while producers can similarly exclude other economic units from consuming them. All these services can, and are, provided commercially and charges may be levied on consumers according to their use of the services.

The amounts or qualities of collective services produced must be a function of the number of economic units consuming the services given that a service itself is a change in the condition of an economic unit. The more units affected, the greater the output, irrespective of the activity of the producer. This is precisely the way in which the value of the output of these services is measured at current prices in a market situation. Output is valued according to the total

receipts from sales of ticket or other forms of charges. This value fluctuates from one journey to the next, or from one performance to the next, according to the number of passengers or size of audience, even though the activity of the producer and his costs may be unchanged. In the limit, if a vehicle travels empty or no one attends a performance or lecture, there is no output produced. The measurement of the volume of these kinds of services has, therefore, to be based on their utilization by consumers, a fact which is recognized by the widespread use of statistics such as passenger-miles or ton-miles to measure the volume of transport services. The activity of the producer is not the service. It is the process by which the service is produced and as such it must not be confused with the output from that process. Although the distinction is quite clear for goods, it is not always recognized for services. As just noted, the output associated with a regularly repeated service activity may fluctuate from period to period, but this does not mean that the production function is not single valued. Whenever the number of economic units consuming a collective service is below capacity the producer is operating inefficiently or inside his production possibility frontier. At the other extreme, congestion or over-crowding may occur as the number of consumers reaches or possibly exceeds the planned capacity and this, of course, affects the nature of the service provided and tends to reduce its quality. Changes in quality due to the "congestion factor" are often quite important for this type of collective service. For this reason, it was stated above that the amounts of collective services produced must be a function of the number of units consuming the service without stipulating that the function must necessarily be a simple linear one.

Because many types of educational services are non-market services for which output values have to be imputed at current prices, there is some uncertainty about what is the appropriate way to measure the volume of such services. Educational services are not, however, intrinsically different from other services which may be provided collectively and the same principles must apply. The amounts of any given type of educational service produced must be measured by the amounts of that kind of instruction received by pupils. The amounts of instruction are a function of the numbers of pupils receiving the instruction or, more precisely, of the number of pupil-hours of instruction. As a first approximation, changes in amounts of instruction may be assumed to be proportional to changes in pupil-hours, or even numbers of pupils, but some allowances may also need to be made for the "congestion factor" which in this context is indicated by pupil–teacher ratios. Any changes in these ratios may affect the quality of instruction provided, and it is not easy to quantify these quality changes. However, the measurement problems are no greater, and probably much less, than for many kinds of manufactured goods which are subject to continual changes in specifications, often as a result of rapid technological progress.

Objections are sometimes raised to those kinds of output measures for educational services because they are liable to show reductions in output, and in labour productivity, over time when numbers of pupils are declining for demographic or other reasons. However, labour productivity must not be confused with the efficiency of the workers employed in the process of production. When the

number of passengers using a particular air flight declines substantially for some reason, there is inevitably an associated decline in labour productivity, but it is to be trusted that the efficiency of the air crew does not diminish correspondingly. A decline in the productivity of teachers is no more a reflection on their efforts or competence than a similar decline in productivity in other industries where demand happens to be falling.

Pure Public Services

The general government services of public administration and defence remain to be considered. The distinctive feature of these services is that no acts of consumption are required on the part of individual economic units so that their consumption cannot be observed taking place. It is not possible even to distinguish economic units which are consuming these services from those which are not. No transactions take place between producers and consumers when the services are consumed, and it is not possible to charge individuals according to their own individual usage of these services. Neither producers nor consumers can practice exclusion. Market failure occurs for a quite fundamental reason. It is not that the transactions costs involved in trying to levy charges according to individual usage are prohibitively high for technical reasons. It is because there is no distinction to be drawn between consumers and non-consumers: the distinction is irrelevant when in effect, every economic unit is deemed to be consuming these services passively all the time. It is evident, therefore, that these services are basically different from all services considered up to now, including collective services, and they will be called "pure public services".

It is customary in economic literature to describe these services as "public goods", but this terminology is not acceptable in the context of this paper when the items in question are services and not goods. It is possible to have genuine goods which are owned jointly by a group of economic units and used by them communally, or one after another, but such goods are not the typical "public goods" of public finance. These are usually services of one kind or another which are provided collectively either to designatable groups of economic units or to the community as a whole. As the former kinds of services are just as likely to be produced commercially for profit as provided by the state, it is somewhat confusing to describe them as "public" services (or goods) rather than as collective services and the expression "pure public services" is reserved here for those services which are provided for the community as a whole, almost invariably by general government. The characteristic feature of a pure public service as defined here is that every economic unit is deemed to be automatically consuming it more or less continuously, whether he likes it or not, and whether he is aware of it or not. Such "consumption" is clearly quite different from the consumption of ordinary goods and services as this expression is normally understood. Only public administration and defence would appear to fit into the category of a pure public service, and these services should be sharply distinguished from all other services provided by the state either to individuals or groups of individuals.

The question inevitably arises, therefore, of whether or not these really are services of a kind which can be aggregated with other goods and services, a

nagging problem which has worried economists from Adam Smith to the present day. Following the general principles underlying this paper, it must be asked what change occurs in the condition of economic units who are supposedly consuming these services. No change can actually be observed to occur over time, but it can be argued that, without these services, the condition of most economic units might be very different from what it is. In other words, these services prevent certain undesirable changes from occurring, in the same way that Irving Fisher, in the quotation used earlier in this paper, described a dike as preventing land from being flooded. The traditional justification for the services of general government is that without them law and order would collapse and the country exposed to attack from abroad. Moreover, security and stability are conditions which are undoubtedly desired by most members of most societies, and in the sense governments can be described as providing services to the community.

Furthermore, in contrast to various activities which were designated earlier in this paper as being intrinsically non-service activities, the government does undertake activities which are to the benefit of other economic units. They are the kinds of activities which can be, and are, carried out commercially by specialist producers. In earlier periods when police forces were rudimentary the individual might have to devote considerable resources to preserving his own security. Even today, many economic units choose to supplement the basic security provided by the state by engaging additional security services available commercially, and it is common for groups of economic units to combine together for this purpose. As the objective is to prevent some change occurring, the "consumption" of such services can obviously not be recorded by observing changes occurring in individual members of the group. Moreover, preventing the occurrence of certain events—whether thefts, acts of violence, fires, or floods—will tend to benefit neighbouring economic units, so that unsolicited services to others in the form of externalities are typically also provided. Indeed, because of these externalities individual members of the group have an incentive to opt out when it comes to payment. Their own consumption cannot be identified by any overt acts of consumption and the temptation to try to evade payment is strong.[10] For this reason, the provision of general security, particularly national defence against external attack, must be provided by the state in practice and paid for out of taxation.

Market failure as generally understood refers to the impossibility of a decentralized charging system whereby consumers pay according to their own individual consumption. It does not preclude, however, the possibility of charges being levied collectively on groups of consumers who agree in advance; although

[10]The incentive to conceal rather than reveal one's preference in this kind of situation was one of the main points of P. A. Samuelson's classic paper on the "Pure Theory of Public Expenditure", *Review of Economies and Statistics*, Vol. 36, 1954, pp. 387-9. The position more recently adopted by Samuelson, that a public good is simply one which enters two or more persons' utility so that there is no difference in kind between ordinary collective services and pure public services, ignores the fundamental distinction between services which require positive identifiable acts of consumption by individuals and those which do not. Only when consumers are not forced to reveal their preferences through individual acts of consumption (which is not true of collective as distinct from pure public services) do they have the opportunity to conceal them.

charging according to individual use may be impossible, certain activities may still be carried out commercially for profit. These activities can be organised on a market basis precisely because they are activities which individual economic units can devolve into others who specialize in them, and for this reason it seems preferable, on balance, to treat them as service activities.

Notwithstanding their differences from ordinary goods and services, therefore, there are adequate grounds for treating pure public services such as public administration and defence as genuine services. The problem which emerges is not so much whether or not to classify them as services, but how to measure them, given that their production and consumption is not a function of their utilization by individual economic units. It is in this respect that they differ intrinsically from all other services and goods. The output of such services is indicated by the extent to which certain changes do not take place, which evidently poses measurement problems. The incidence of the events which they are intended to prevent depends upon extraneous factors over which there may be no possibility of control, so that the frequency with which these events occur, or rather do not occur, cannot be readily converted into suitable output measures. On the other hand, when output is measured by inputs consumed, which is the normal practice for these kinds of services, decisions to allocate more resources to their production become self-fulfilling in terms of output achieved. When there are such severe difficulties about measuring the amounts of pure public services produced, it is extremely difficult to decide what is the optimal allocation of resources to them, and in this way measurement problems create major policy problems.

Summary and Conclusions

The paper is concerned with services and how they differ from goods. It seeks to identify the units to which the prices of services refer and in which their volume must be measured. Despite the tendency of economists to dismiss the distinction between goods and services as trivial, it is a very real one which is easily recognised by the layman and is very persistent in ordinary speech. Economists, however, are prone either to deny the existence of services by asserting they are goods or, perhaps worse, to treat them as special kinds of "immaterial" goods. Such assertions are highly misleading, if not meaningless. The complete neglect of services in economic theory is almost incredible given the role of services in contemporary economies.

A service is a change in the condition of an economic unit which results from the activity of another economic unit. Being a change over time, its dimensions are quite different from those of a good considered as a material object, so that goods and services belong in different logical categories. The ownership of a good can be transferred from one economic unit to another in an exchange transaction, whereas no such exchange is possible for a service. A service is produced by one economic unit for another, but it is not exchanged between them. Models of pure exchange economies are quite irrelevant to services. The idea that services are ephemeral and insubstantial because they are "immaterial" goods is a persistent and pernicious fallacy. Although they are not

themselves physical objects, services may well consist of changes in the physical condition of goods or persons which are, in effect, permanent. The benefits from such services may continue to be derived long after they are produced. Moreover, the production of services often involves processes of physical transformation which are exactly the same as those used to produce goods. The difference lies not in the technology or materials used, but in the fact that the producer works directly on the person or goods belonging to another economic unit. The extent of the physical transformation is usually small, however, so that the good (or person) does not lose its identity in the process. The underlying idea of a "service" implies two different economic units, one of whom *serves* the other, but the production of services on own account is by no means precluded when the same economic unit acts simultaneously in two different capacities as both producer and consumer. To count as an own-account service, however, the nature of the service rendered must be such that it is *capable* of being provided by a different economic unit.

Services are consumed as they are produced in the sense that the change in the condition of the consumer unit must occur simultaneously with the production of that change by the producer: they are one and the same change. The consumption of a service cannot be detached from its production in the way that the acquisition of a good by a consumer in an exchange transaction may take place some time after the good is produced. The "consumption" of a service is the counterpart of the acquisition of a good by purchase: in both cases, the consumer may continue to benefit from them long after the good or service were originally acquired, and consumption must not be interpreted as if it meant physical extinction. Nevertheless, the fact that services must be acquired by consumers as they are produced means that they cannot be put into stock by producers. Because the only goods which cannot be put into stock are highly perishable goods, the impression has been formed that services must also be highly perishable, but this analogy is totally false. The inability to stock services has nothing whatsoever to do with their physical characteristics: it is a logical impossibility because a stock of changes is a contradiction in terms.

A major distinction may be drawn between services affecting goods and services affecting persons. The former consist of changes in the physical condition of goods brought about by productive activities such as transportation, cleaning, repairs and decoration, while the latter consist of changes in the physical or mental condition of persons, brought about by activities such as transportation, surgery, communication, education or entertainment. Some care is needed to avoid confusing the service itself with the benefits resulting from that service, especially with health and education services. A service must be a change which one economic unit is actually capable of providing for another unit, and it cannot extend to benefits which are beyond the capacity of the producer to supply. Services must be a form of marketable output which can actually be provided by specialized producers. The distinction between services affecting goods and services affecting persons is as fundamental as the basic distinction between goods and persons itself. For this reason if a simple dichotomy is to be made the case for isolating services affecting persons from all other goods and services is at least as strong as that for separating goods from services,

when the latter include many services affecting goods whose production is sometimes indistinguishable from the original production of those goods. In the Material Product System of accounting used in socialist countries, services are actually restricted by definition to services affecting persons, with services affecting goods included in the material sphere of production.

Although the concept of a service which is developed in the paper refers to services produced as the outputs of processes of production, it also embraces without modification labour services contributed as primary inputs to processes of production. On the other hand, it cannot be extended to cover so-called capital services, whether these are interpreted as services provided by the capital goods themselves or by their owners. Because capital goods are used over long periods of time in the course of production, there is a tendency to describe them as contributing a flow of services, but the attempt to treat capital and labour inputs symmetrically in this way seems to be based on a false anology between them.

The performance of a service has to take place with the prior agreement of the consumer unit on whose person or goods the service is performed. In a market situation, this agreement implies an obligation to pay for the service provided. It is possible, however, that some changes may be produced in the condition of other economic units without their agreement, in which case unsolicited services, or externalities, are produced. Generically, externalities are services performed, usually unintentionally, on the persons or goods of other economic units, but without their agreement.

Some services can easily be provided simultaneously for a group of economic units by a single process of production: for example, a number of persons may be transported in the same vehicle or entertained in the same theatre. The amounts of these services produced and consumed depend on the number of persons affected so that their volume is a function of their utilization, taking account of any deterioration in quality which may be caused by congestion. This type of collective service, however, must be sharply distinguished from so-called "pure public services", provided by general government, which require no participation by consumers. These services are concerned with the prevention of certain changes which would result from the occurrence of theft, fire, or attacks on individual members of the community or on the community as a whole. Individuals are deemed to consume these services all the time whether or not they want such services or are even aware of them. In marked contrast to all other services, their consumption cannot be observed to take place and cannot be measured by changes in the condition of consumer units when their main purpose is the prevention of unwanted changes and the maintenance of the status quo. It is very debatable whether they should even be treated as services at all, but at the very least they should be recognized to be intrinsically different from other services. So far no satisfactory way has been devised to measure these services properly, and this is an area in which further theoretical and empirical research is required, given the size of the resources consumed in their production.