The stock of fixed assets in the United Kingdom: how to make best use of the statistics

TOM GRIFFIN, *Statistician*, Central Statistical Office*

Introduction

There can be no doubting the importance of investment in fixed capital in an industrialised economy. The story of the industrial revolution could be written in terms of looms, steam-driven pumps and locomotives. Today, investment and the stock of fixed capital play a very important part in the consideration of the performance of all modern economies.

Fortunately the statistics of expenditure on fixed assets are fairly simply definable and fairly well understood, but the same degree of understanding cannot be claimed for statistics relating to the stock of fixed capital and the rate at which it is used up. These statistics add valuable further dimensions to the basic estimates of the flow of capital expenditure. But there are two distinct standard measures of the stock and two measures of the rate at which it is used up.

We have available to us in the United Kingdom a range of detailed estimates of the stock of fixed capital which are in some respects the most highly developed of their type in the world. Even in the USA, where a vast array of economic statistics are published, there are, for example, no estimates for industry groups within manufacturing. But it is clear from a number of published sources which quote and use capital stock estimates that they are often wrongly applied even by those who are relatively familiar with the subject. There are several reasons for the misunderstanding. Firstly there is the inescapable fact that capital stock is not a single concept capable of unique measurement. But further, the published series have not been as comprehensive as they might and are not accompanied by any explanatory notes, except those given in Sources and Methods [1] which is the definitive account of how the UK National Accounts are compiled.

There is of course no uniquely correct worth or 'value' of fixed assets. The two types of estimate which are the main subject here, 'gross capital stock' and 'net capital stock', are each quite different in definition. Each has advantages over the other for specific purposes but neither can claim to be more intrinsically correct than the other. The estimates shown in the published accounts of business enterprises represent another value. Yet another, not discussed here at all, could be derived from the stock market evaluation of quoted companies.

The purpose of this article is simply to explain how to make best use of the National Accounts estimates of capital stock and derivatives such as capital consumption and, in doing so, to introduce some new series, of capital retirements, which have been published for the first time this year in the Blue Book [2]. It is in the Blue Book that the most detailed tables of all these series are published. Very little is published elsewhere.

An article in *Economic Trends,* October 1975 [3] described in detail, with examples, the methodological principles behind the estimates. The present article includes a description of the methodology in outline, sufficient only to enable anyone not familiar with the subject to follow the later arguments. The use of price deflators is discussed here a little more fully because they have such a crucial bearing on the definition of the series. Earlier comprehensive papers on the compilation of UK capital stock estimates were published in the *Journal of the Royal Statistical Society* in 1955 [4] and 1964 [5].

Gross capital stock and retirements estimates: how they are calculated.

The principles of the estimation of gross capital stock are simple. We begin with two kinds of data. Firstly we know from the direct survey questionnaires on capital expenditure† how much each industry, let us say iron and steel for example, has spent each year on fixed assets. (The list of different industries and different types of asset for which we calculate gross capital stock are shown in copies of the Blue Book tables in Appendix IV.) Secondly we have estimates, less firmly based, of the life expectancy of plant and machinery and other assets in those industries. (Some of these are discussed in Appendix I.) To calculate gross capital stock we simply accumulate capital expenditures year by year and only deduct those capital expenditures from the past on assets which are assumed to have completed their expected lives. In order to calculate capital stock for 1947 therefore, the earliest year for which estimates are derived, it is necessary to establish very long historic series of capital expenditure estimates for prior years. This has been done on the basis of a range of data [4] which was generally less reliable and less detailed than the current capital expenditure estimates. Fortunately, the older the data the less impact it has on the resulting stock estimates.

A simplified example will illustrate the process best. Let us assume that an industry began in the year 1900 with an unknown stock of plant but we know that its plant has a service life of about three years. Let us also assume that from 1901 it spent £12 million each year on more assets which have a life of about 3 years, and that prices did not change over the period. We now have enough information to calculate gross stock from 1904. At the end of 1901, the first year for which capital expenditure is known, the gross capital stock would have been at least £12 million (we must say 'at least' because the stock extant from before 1901 is unknown). In 1902 and 1903 another £12 million was spent and so at the end of the third year the gross capital stock will have amounted to £36 million. Since we

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† The term capital expenditure is used here to refer to gross domestic fixed capital formation as defined in *National Accounts Sources and Methods,* (pages 360–361) (HMSO 1968.)

know that the stock installed before 1901 lasted no more than three years we can now assume that it has been discarded. In the fourth year another £12 million was spent and so could be added to the £36 million already accumulated but, as the plant was expected to last only about three years, we can now assume that the plant bought in the first year will be retired in the fourth and so the gross capital stock at the end of 1904 was £36 million *plus* £12 million *minus* £12 million equals £36 million. Similarly in the fifth year £12 million would have been added to capital expenditure in that year and £12 million would have been deducted for retirements of plant now three years old and so gross capital stock will have remained at £36 million. This method of calculating gross capital stock is called the perpetual inventory method and variants of it are used in most western industrialised countries.

EXAMPLE 1

	Assumed life three years		
	Gross capital formation	Retirement	Gross capital stock (end-year)
1901	12	unknown	12 minimum
1902	12	unknown	24 minimum
1903	12	unknown	36
1904	12	12	36
1905	12	12	36

The process applied in the CSO is in practice more complex than described here even for one kind of asset in one industry. The method was fairly complex from the beginning and is more sophisticated now especially in its treatment of asset lives and scrapping following the revisions to the model in 1975 [3]. Allowance is made, for example, for war damage and for the fact that retirements are probably distributed over a number of years around the average: also, plant and machinery in a given industry is generally sub-divided into several classes each with their own life expectancies, and of course estimates for buildings and vehicles are each calculated separately. The distributions of retirements and the subdivisions of plant and machinery into several classes of life lengths are particularly important. The service lives for plant and machinery in manufacturing industries are given in Appendix I. In the chemical and allied industry group, for example, expenditure on plant is divided into five classes. For each of the five classes it is assumed that retirements are spread around the mean expected service life so that, taking the twenty-five year life class as an example, retirements are assumed to begin in the twenty-first year and end in the thirty-first.

Apart from the explanation below of how we arrive at constant price estimates, the outline descriptions above is sufficient for the present purpose. A more detailed description of the method is given in *Economic Trends*, October 1975 [3].

Net capital stock and consumption estimates: how they are calculated.

The essential difference between gross capital stock described above and net capital stock is that, whereas for gross capital stock the whole of the original value of fixed assets is deemed to remain in stock until the year of retirement, for net capital stock the original value of assets is deemed to decline gradually over their service lives. If machinery is expected to last 20 years then it is assumed to be depreciated or consumed at the rate of one-twentieth per year. To illustrate the principle consider the same imaginary data used above for gross capital stock and retirements. So, an industry began in the year 1900 with an unknown stock of plant but it is known that its assets last about 3 years. It then spent £12 million each year up to 1905 on machines which were expected to last 3 years. Again, for the sake of simplicity, we will assume that prices did not change over the period. At the end of the first year, during which £12 million was spent, the net capital stock will have been at least £12 million *less* £4 million equals at least £8 million (*plus* the unknown stock remaining from before 1901). At the end of the second year, the first year's capital expenditure will be reduced again by £4 million so that the original £12 million will now have been reduced to £12 million−£4 million −£4 million equals £4 million. Meanwhile the second year's expenditure of a further £12 million will have been depreciated by £4 million leaving £12 million −£4 million equals £8 million. So the total net capital stock at the end of the second year is £4 million remaining from 1901 *plus* £8 million remaining from 1902 which equals £12 million in all. The pre-1901 stock will by now have retired. So, net capital stock at the end of each year is calculated by taking net stock at the end of the previous year, adding the year's gross capital expenditure and deducting the year's capital consumption.

The gross capital stock and retirements example can now be put together with the net capital stock and consumption example to show how the four series relate:-

EXAMPLE 2

	Assumed life three years				
	Gross capital formation	Retirements	Gross capital stock (end-year)	Capital consumption	Net capital stock (end-year)
1901	12	unknown	12 min.	4 min.	8 min.
1902	12	unknown	24 min.	8 min.	12
1903	12	unknown	36	12	12
1904	12	12	36	12	12
1905	12	12	36	12	12

Again it must be said that the process of calculating all these series is rather more complex than this simple illustration would suggest, for example, consumption is lagged by half a year, but the principles outlined are accurate enough for the present purpose.

Adding together expenditures made at different price levels

To estimate an aggregate of capital stock it is necessary, especially over periods of high inflation, for the individual components of the stock to be valued consistently between years. To value each item of capital stock at the price at which it was originally bought (its historic cost) and to aggregate all such expenditure over a period of years, without revaluing them to the prices reigning in a single year, is like adding chalk and cheese. The stock of fixed assets in the published accounts of businesses, in particular their plant and machinery is in most cases composed of just such a heterogeneous mixture of prices; although it should be noted that 'historic cost accounting', will probably give way in the next few years to an accounting system in which all assets are valued at current price levels [6].

The accounts of individual enterprises are discussed further in the last section below.

Fixed capital stock in the National Accounts, on the other hand, from the introduction of the estimates in the 1950s, has as a matter of principle been valued as far as possible on a price basis which is consistent over time. For our estimates of capital stock in any year we either revalue to the prices current in that year or to prices of 1970 which happens to be the present reference year for most of our constant price series in national statistics. For capital stock at the end of 1975 at current prices, for example, we revalue all relevant past expenditures to end-1975 prices. The price indices used are discussed in some detail later.

Gross national product (GNP) and net national income (NNI)

It was for the purpose of estimating consumption to arrive at 'net national income' that the 'perpetual inventory' model was first used.[1] By definition net national income is equal to gross national product *less* capital consumption.

The measurement of the output potential of fixed capital.

This is probably the commonest use to which estimates of capital stock are put, whether as explanatory variables in econometric models or as rule of thumb indicators of the relative capital intensity of an industry or of an economy. In practice both gross capital stock and net capital stock are often used for the purpose or, more rarely, the two measures in combination [1] but a closer look at the two different measures shows that, although neither is ideal, gross stock is superior to net stock in most respects as an indicator of potential rates of gross output.

The following arguments hold for the general case. It is not proposed to discuss here the complex and contentious issue of the precise role of aggregates of capital in production functions. As an illustration of the complexity of the relationship it may be noted that despite technical progress additions to the stock of fixed capital are commonly accompanied by less than proportionate extra output, although output per man may also be increased.

To put the comparison between the two measures of capital for this purpose in the simplest terms it may be said that to use net capital stock would mean assuming that productive potential declines in a straight line from the date of the capital expenditure so that for example a machine which is expected to last 20 years would be deemed to have become one-twentieth less productive after only one year of life, half as productive after 10 years, and nineteen-twentieths less productive after 19 years. The gross capital stock concept assumes on the other hand that productive potential is unaltered after one year, 10 years or 19 years‡ The crucial question is which measure is most appropriate to the purpose at hand.

An analogy is often drawn between an asset familiar in our domestic lives, the motor-car, and manufacturers' plant: and it has been misleadingly concluded that both decline rapidly in their utility from the date of purchase. Analogies between domestic assets and industrial plant can of course be helpful but care has been taken to identify the relevant issues. In measuring capital for the purpose of estimating its productive potential in the short and medium-term it would be inappropriate to use for example market values, which are very much affected by the number of years of service left in an asset. It is also necessary to differentiate clearly between gross productive potential, and net productive potential, the latter taking account of higher running costs and any other expenditure which might be predicted to increase with the age of an asset. Usually one is considering potential production rates in gross quantity terms consistent with demand. Industrial plant and machinery, particularly the larger and more expensive production plant such as that used in the chemical, steel or paper industries, is generally expected to increase its production rate during the early years of its life. Later it may have to run a little more slowly or may be restricted to a narrower range of products while newer, faster or more versatile machinery is used for a wider range of products. But the likely effect of age on net, and more particularly gross, output potential should not be over-rated. Although it is difficult to generalize from any particular process, we can be sure that in its last few years of service most machinery will be capable of producing at much more than the small fraction of its original rate which would be implied by taking its written down value.

Indeed few enterprises can be expected to go on providing valuable factory space or to bear overhead and running costs for large quantities of plant with very low production potential This general argument applies to plant that survives the whole or more, of its mean expected service life. It applies more strongly to plant which becomes obsolete before its expected life span is complete particularly when obsolescence is due to replacement of the product it manufactures.

Some of the arguments surrounding the measurement of capital stock confuse net with gross output potential. In particular it is sometimes suggested that older machinery should have a reduced weight in the aggregate because it may be more expensive in its use of labour and maintenance and repair bills. Certainly, higher running costs will reduce output per unit of total input but they do not affect gross output per unit of fixed capital employed. We are reminded that it is only in combination with other factors of production that fixed assets can produce anything and that a given level of capital stock can be combined with different levels of other inputs. In certain circumstances it will be preferable to consider a 'net' concept of output potential which would take into account demands on overheads and on other factors of production, but this is probably not the more common case.

Gross capital stock is therefore the better indicator of the current gross output potential of the current stock of fixed capital assets. Use of the estimates in studies of the medium term future, say the following five or so years, depends upon one's view of the balance of capital expenditures and retirements over that period. The perpetual inventory model can help by indicating the trend in retirements in the medium term future. (See the table at Appendix II.)

It follows that the change in gross output potential is better indicated by the change in gross capital stock than by the change in net capital stock. Changes in gross capital stock, that is capital expenditures *less* retirements, are published for the first time in this year's Blue Book [2]. The estimates are shown at current and 1970 prices and are analysed by industry group.

Net capital stock is however an indicator of the total future output potential of the present stock over the longer term because, as a measure of written down replacement cost, it is an estimate of the services remaining in the stock of fixed capital over the rest of its aggregate service life. The relationship over

‡ More precisely, since the model was revised in 1975[3], expenditures with an attributed life of twenty years are deemed to retire not in their twenty-first year but over the period from the seventeenth to the twenty-fifth year.

time of net stock to gross stock may therefore indicate the age trend of the stock and perhaps the increasing or impending need for replacement investment.

Gross capital stock in preference to net capital stock

The general conclusion therefore is that for an indicator of the current gross output potential of fixed assets the more suitable series is gross capital stock in preference to net capital stock and therefore the growth in gross output potential is more suitably measured by capital expenditure *less* retirements rather than by capital expenditure *less* capital consumption. It is possible to modify the gross capital stock series and thereby perhaps to improve it, to convert it to a 'vintage' series for example, as discussed briefly below under 'Prices and technical change', but one cannot be certain that the series is necessarily improved in that way. The modification of gross capital stock estimates for various purposes is still very much open to debate[7, 8, 9, 10].

Capital consumption as a measure of output potential

Bearing in mind that in this context one is interested in the output potential from a flow of capital services there is another measure which could also be used; and that is capital consumption. A trivial example will illustrate the point. Let us assume that there are only two assets, each with a different function, installed in an industry. They cost £100 each but one is expected to last for ten years and the other for twenty. Both would contribute equally to our initial valuation of gross capital stock which would become £100 + £100 = £200. But their services are unlikely to be of equal value in any given year. The asset which is expected to last the longest will probably provide less service per year. If each were rented instead of being purchased then the respective rents would reflect the different durabilities. Capital consumption also reflects the different durabilities. In the first full year it would be (£100 *divided by* 10 years) *plus* (£100 *divided by* 20 years)= £15. Had both assets been expected to last only 10 years then consumption would have been £20.

The practical difference between the two indicators, gross capital stock and consumption, in this context it is little more difficult to explain. Within a single industry, as far as we recognise it in our perpetual inventory model (for example textiles) we assume that the mix of durabilities or expected asset lives. remain the same over time. What evidence we have supports that general supposition (see Appendix I) and the result is that the growth rates of gross capital stock and capital consumption, within a single type of asset in a single industry, are the same. But insofar as the mix of investment between individual industries within manufacturing differs (say between textiles and food) then gross capital stock and consumption may not show quite the same rates of growth for the industries in aggregate so long as the mean lives in the two industries are different and so long as their individual growth rates are different. This is so because the ratio of consumption to gross stock will differ between the industries. It can be seen from the table in Appendix II that the difference between the growth rates of gross capital stock and consumption is not great for manufacturing as a whole.

It may be argued that any two industries are equally equipped with fixed assets if their gross capital stocks are equal but, since their levels of capital consumption may be different because their mean asset lives are different it may also be argued to the contrary that they are not equally served by fixed capital year by year. Two industries with dissimiliar proportions of buildings in their aggregates of gross capital stock may serve to illustrate the point. Buildings on the whole have longer service lives than do plant or vehicles. Therefore, an industry with a preponderance of buildings in its stock would be expected to have its stock last longer, but to get less service from it per year, than another industry with shorter-lived assets of similar value.

Prices and technical change

It is sometimes argued that net capital stock should be used as an indicator of the current output potential of fixed capital. It is claimed that by depreciating older plant in the estimation of net capital stock one is obliquely allowing for its relative lack of sophistication and its increasing inefficiency. The arguments for and against this contention can be complex but there are one or two points in relation to the application of price indices which, once established, can clarify the issues considerably.

Primarily, it is necessary to be clear about the principles, practices and problems underlying the price indices which are used to bring old and new capital expenditures to a common base.§ Firstly it cannot be said too often that the compilation of price index series is inevitably complex, onerous and subjective. Further, there can be no unique series, for any collection of goods, which would suit all purposes.

To state the underlying principle most simply it may be said that price indices used here, which are mainly members of the family of wholesale price indices, are designed to measure changes in the average or total price of collections of goods of unchanged specification. The difficulty is of course that in practice assets are commonly discontinued or their specifications are changed and any effects of such changes on the prices of assets must be identified and removed when compiling each price index. In practice a variety of methods are used to deal with these changes. Most imply a competitive market in which additional utility will tend to be reflected in an equivalent addition to costs, which will in turn be reflected in an equivalent addition to price. Most of the methods depend too on discussions with the firms who supply the price quotations. In the case of plant and machinery, the firms who supply the data are generally the manufacturers.

Specification changes are of various kinds. For example, automatic control equipment may be included in new machines or they may be built on a bigger scale and higher prices may simply reflect these changes. Both types of change are very common and, in so far as they increase productive capacity in proportion to their additional cost then it can be said that, within the practical limits of price indexing, the effect on prices of such changes are removed in compiling the price indices, and consequently the changes appear as volume changes in the estimates of gross capital stock. The price indices do not, on the other hand, in practice generally take account of any 'costless' changes in machine specifications. That is to say if the quoted price of a machine is unchanged and it costs no more to produce but it is capable of higher production because of some costless design change then it may be argued that in a sense the price has fallen, but in practice the index will probably

§ Most of the indices used for plant and machinery in the capital stock estimates are compiled by the Department of Industry.

not fall on that account. (An example of a costless quality change may arise from the changeover to electronic components from mechanical ones.) Thus the price indices employed are adjusted so that they relate to constant specifications in the case of changes in fixed assets that involve extra costs to their manufacturers but generally not when the changes are costless.

Whether costless productivity changes ought to be allowed to influence price indices, in the context of capital stock, is a moot point for which there is not room for adequate discussion here. If the price effects of all changes and development in fixed assets were to be removed when compiling the price indices then the statistics could show no increase over time in the productivity of capital in the industry which uses it. It is arguable, depending on the intended use of the data, whether that is desirable [12] The weight of argument is probably in favour of the present practice in this general context. Denison [7] and Jorgenson and Griliches [9] have provided some of the fullest discussion on the subject of attributing productivity changes to capital.

In order to allow for unrecognised costless changes, and sometimes other technological improvements, and to allow for declining efficiency in ageing plant some researchers have constructed vintage models which are designed to give progressively less weight to older machinery. The main difficulty however has been in deciding the weights to be applied to different vintages and indeed there is conflicting evidence on the usefulness of introducing a vintage element [10] . The following important consideration which has generally been overlooked in this context, will help to illustrate the possible pitfalls in having to assume that newer plant adds capital services to production at a higher rate than older plant.

Health, safety and pollution control

With increasing attention being given to health and safety at work and to reduction in environmental pollution more money is having to be spent by manufacturers on equipment designed to improve health, safety and the environment. Indeed one of the most common technical changes in machinery is the inclusion of safety equipment. In many cases legislation is forcing users of machinery both here and abroad [13] either to change their processes or to add special plant to their existing stock. Statistics on this subject are scarce but it has been claimed [14] that as much as £100 million of the £800 million expected to be spent on fixed assets in the chemical industry in 1976 will be spent on equipment that does not contribute directly to production. Expenditure on health, safety and pollution control is not new but the cost has certainly increased significantly in recent years to the extent that in some cases it is claimed that factories have had to close because it would have been uneconomic to have installed the necessary new plant [13]

In a sense such expenditures are productive insofar as the result may be to produce cleaner air or cleaner rivers but such production does not feature in convential measures of output nor hence in the value added by the industry using the asset and so will also be missing from a typical production function.

Leasing

It is not intended here to discuss every aspect of the strengths and weaknesses of capital stock measures but a word about leasing may be timely. It is widely recognised that the leasing of fixed assets has become more popular in recent years because of some tax and other advantages both to the users and to the lessors. The effect of increased leasing on the capital stock estimates, which are allocated to industry groups on the basis of ownership rather than use, is to put more under the heading of financial companies and less elsewhere. Some of these effects are quantified for the first time in the notes to the Blue Book published in September 1976. [2] ¶

Of the £500 million expenditure on fixed assets bought for leasing in 1975, at least £100 million was on assets leased to manufacturing industries. Investment equations for both users and lessors would be enhanced by allowing for this.

The measurement of replacement investment

As a rule of thumb in some economic models replacement investment in a given year is taken to be equal to a constant proportion of the gross capital stock at the end of the previous year. But it is very easy to show that such a measure is unlikely to be right [5] and further, that there is a much better alternative readily available. 'Replacement investment' here is taken to mean the expenditure on new assets necessary to maintain gross output capacity.

Perhaps the easiest way to demonstrate the fallacy of the 'fixed proportion of gross capital stock' approach is to consider the following actual case. In the period from 1960 to 1970 the estimated gross capital stock of plant and machinery at 1970 prices of all manufacturing industries taken together went up by half (see Appendix II). Now, if replacement really were a fixed proportion of gross capital stock then that too would have increased by 50 per cent between the two dates. But, apart from a very small quantity of special equipment even the lightest plant and machinery last much longer than 10 years and, on average, it is expected to last more than 30 years (see Appendix I). The necessity to replace plant and machinery, therefore, in 1970 or 1971 is not much affected by the change in gross capital stock over the previous ten years. Replacement investment could be a constant proportion of gross capital stock only if productive capacity deteriorated at a steady exponential rate but, as suggested above in the discussion of output potential, that condition does not hold. In essence, for such a large group of industries as those that make up the whole of the manufacturing sector, replacement is a function of the capital expenditure of much earlier periods on equipment which is now becoming worn out or obsolete. That function is a complex one for which one needs to take into account how much was spent year by year over a period in excess of forty years previous to the year for which replacement investment is being calculated, together with the life expectancies of the assets purchased over those years and the expected spread of scrapping around each of the mean expected lives. Unfortunately that function cannot be surrogated by a simple equation employing a small number of variables: but, fortunately, it is just such a series of calculations which the CSO perpetual inventory model undertakes. Indeed it is necessary to calculate retirements, which represent a more appropriate measure of replacement, in order to maintain the gross capital stock estimates.

¶ Further details are given in *Trade and Industry*, 24 September 1976, (page 801) (HMSO).

For a number of reasons notional retirements as estimated in the perpetual inventory model are not the ideal measure of actual replacement investment. It is likely that retirements in practice are accelerated or held over particularly in the short run depending on the current circumstances of the industry. The considerations which bear on a decision to replace equipment are many and probably not entirely measurable. In particular, for a given industry, some major process may be undergoing rapid change so that an unusually large proportion of available investment funds are taken up with replacement and little is left over for the additions to the stock of fixed assets. Nevertheless, there is no better readily available measure of replacement investment than retirements, particularly as an indicator of the underlying trend.

It is sometimes argued that retirements are possibly poor estimators of replacement investment because they depend heavily on the assumptions one has to make about expected life lengths of fixed assets (see Appendix I). Certainly retirements do depend on those life assumptions, but then so do our estimate of gross capital stock, and therefore to take a fixed proportion of that is only compounding the problem. By definition, as long as gross capital stock is growing, retirements must be replacement investment. If gross capital stock is declining then it follows that retirements are not being fully replaced.

Some of the private fixed investment equations in the Treasury's macro-economic model of the United Kingdom now use retirements as a measure of the underlying trend in replacement. For their purpose however it was necessary for them to interpolate quarterly series from the annual series provided by the CSO perpetual inventory model.

Because the only significant volume of retirements in any year is likely to be fixed assets acquired several years previously it is possible, on the basis of what is known about past capital expenditures, to extend the estimated retirements series forward beyond the current year. In manufacturing industry in general assets with the shortest service lives are expected to begin to be retired after three years (see Appendix I) and so it is possible to extend the retirements series three years further than the latest year for which capital expenditures are known (see Appendix II).

Estimates of retirements, analysed by industry group at current and at 1970 prices, were published for the first time in the Blue Book[2] in September 1976. They have previously been available only on request to the Central Statistical Office.

The measurement of fixed assets in balance sheets and as wealth

The stock of fixed assets in the published balance sheets of business enterprises is generally shown as the aggregate of capital expenditures at their historic costs, that is an aggregate of the actual money costs at the time of each expenditure, *less* depreciation. It is common now for land and buildings to be revalued every few years but it is as yet uncommon for other fixed assets, plant and machinery and vehicles, ever to be revalued. The most usual method of depreciation used is the straight line method, that is to say the same money quantum of depreciation is deducted each year. The average period over which the depreciation is deducted is generally only about a half to one third of our estimate of average service lives (see Appendix I). It is common for fixed assets still to be in daily use and to have very many years of service left but to be completely written out of the balance sheet. In current practice the period over which an asset is to be depreciated is usually fixed at the beginning of its life and is not usually adjusted later even if it becomes clear, as it usually does, that the asset is going to last much longer.

The depreciation rate allowable for tax purposes is not relevant because it is varied in order to encourage fixed investment in plant and machinery, and indeed it is now usual to allow very rapid depreciation unrelated to the expected service life of the assets. The changes in accounting practice which are now just emerging and their possible effect on the official estimates of capital stock are discussed below in the section on the future measurement of capital stock.

The effect of these methods of depreciation and evaluation of fixed assets in the published accounts of businesses has been in general to understate very considerably the value (however the word is interpreted) of the stock of fixed assets. One result of this has been to allow businesses to be bought cheaply and their assets to be sold at a substantial profit.

These accounting methods are in principle intended to provide a conservative measure of the value of the stock of fixed assets to the owners of the business but because of the very short asset lives assumed, and because of infrequent revaluation, the balance sheet figures in aggregate would obviously be inappropriate for the purposes of macro-economic analysis. In our valuation of fixed assets in the CSO perpetual inventory model therefore we have from the outset tried to use realistic average, rather than minimum, asset life assumptions and to revalue capital expenditure so that our 'net capital stock' estimates, that is accumulated capital expenditure *less* capital consumption or depreciation, represent useful measures of the value in terms of written down replacement cost of the stock of fixed assets in a given industry or in an institutional sector. We have not been constrained by considerations of prudence essential in the accounts of a single enterprise. Our estimates of net capital stock represent what might be called the 'unconsumed remainder' of the services provided by the stock of fixed assets so that if the method were to be applied in an 'average' enterprise and the enterprise were to be sold as a going concern one would reasonably expect the net capital stock estimate to equal approximately the value placed on the fixed assets. For example if the plant and machinery had completed one-third of its expected life then it would be valued at two-thirds of its purchase priced updated to present-day values. The net capital stock estimates are therefore useful in calculations of the rate of return on capital and profitability (discussed further below). They are also the most suitable for use in national and sector balance sheets which are now of national and international interest[16] Estimates of the value of fixed assets, in the National Accounts as in company accounts, are of course only very loosely related to the value put on a quoted company by the stock market.

The treatment of land and of second-hand assets

The main drawback of the use of net capital stock estimates in this way is the treatment of land. As explained in the first section of this paper the perpetual inventory model functions broadly by accumulating annual estimates of fixed capital formation by industry. But the purchase of land does not enter into the calculation of capital stock which consists only of reproducible physical assets. This is associated with a further but less serious problem when land and buildings are transferred between different industries. Because in such transactions the land and buildings are rarely valued separately, it is not possible in practice to transfer the building from industry to industry within the capital stock in the national accounts.

Sales of other second-hand assets between industries are not separately identified but simply deducted from the annual capital expenditure of the seller and added to that of the purchaser.

The measurement of rates of return on net capital employed

There are a number of ways of calculating rates of return on capital[17] but in most cases a measure of the value of fixed assets will be required. Of the two estimates of capital stock which are derived from the perpetual inventory model, net capital stock is the more appropriate. The distinction between net and gross capital stock has been explained in the first part of this article. Net capital stock, with the reservations already mentioned in relation to land, is a measure of the written down replacement cost of fixed assets. That value may be said to represent the wealth that remains tied up in fixed capital after deducting depreciation and therefore the capital (perhaps together with stocks of work in progress and other assets) upon which one may wish to calculate a rate of return. In the estimation of gross capital stock, on the other hand, an asset is deemed to contribute equally to the total whether it is new or whether its service life is almost exhausted and its valuation is therefore inconsistent with that of work in progress and other assets.

Profits net of the depreciation of fixed capital

Capital consumption as derived from the perpetual inventory model is, in principle at least, the same as depreciation shown in the accounts of enterprises and indeed in the national accounts tables the term depreciation is used interchangeably with consumption[2]. The main differences between 'consumption' as derived from the CSO perpetual inventory model and 'depreciation' as derived from business accounts are in the periods over which they are calculated and the frequency of revaluation of the original capital expenditures. For the reasons already given above in the previous section capital consumption is the superior measure for most macro-economic purposes.

The future of the measurement of fixed capital stock

Although it would not have been predictable, say five years ago, it now seems that the development of our estimates of capital stock are likely to emerge through revolutionary changes in the methods used in drawing up business accounts.

We of course go on polishing our perpetual inventory model and the data that goes into it but it should be admitted that significant improvements are rare now after about twenty years of development. Some landmarks have included the disaggregation of the manufacturing industries[5] computerisation and the developments of a year ago[3] but it has been concluded that some apparently fertile areas are in practice not amenable to great improvement. For example it would be attractive to review comprehensively and systematically all the life length assumptions for every industry (Appendix I discusses some recent findings) but even if we were able to devote large resources to the job we would still be severely hampered by lack of detailed information at industry level. Fortunately, however, help appears to be imminent from the registered accounts of business. Extraordinarily rapid inflation in recent years has speeded the change from accounting at 'historic cost' to accounting in terms of current costs[6]. This inevitably implies that fixed assets must be regularly revalued and that depreciation must be based on more realistic estimates of assets' lives.

Many large enterprises are already embarked on the change and accountants and auditors throughout the profession are becoming increasingly convinced, with the majority of academic accountants[18], that current cost accounting is both inevitable and desirable.

A Steering Group, under the chairmanship of Mr Douglas Morpeth, has been established by the accounting profession to draw up an accounting standard based on the recommendations of the Sandilands Committee[6]. An 'exposure draft' is expected to be published later this year. It is therefore not yet possible to predict precisely how the new style accounts, the methodology for which is still to be finalised, will be used to improve our estimates of capital stock. It may be possible for example to undertake occasional benchmark enquiries seeking direct information on the stocks of fixed assets in business accounts and to link these benchmarks in intermediate years by means of the perpetual inventory model. It is too early to be more precise but there can be no doubt that better data will eventually emerge, although we shall be left with a host of conceptual problems.

It is also intended that the treatment of cars in the perpetual inventory model be changed to reflect the practice, common in business, of selling cars after only two or three years of their useful lives.

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APPENDIX I

The service lives of fixed assets

Assessing the service lives of fixed assets is complex for a number of reasons. The component parts of process plant are replaced and modified at different times and even the definition of 'service life' is not entirely unambiguous. It has also been, on the whole, very difficult up to now to find good sources of data. The financial accounts of enterprises show depreciation and a value for fixed assets but estimates of asset lives based on these imply lives very far short of what we know to be reasonable on the basis of the data available to us. Engineers usually keep registers of machinery but they are seldom kept in such a way that information on service lives can readily be gleaned from them.

The length of life assumptions used in the original UK estimates of capital stock in the early 1950's[4] were based on lengths of life used for accounting purposes in some parts of the public sector, on lengths of life underlying Inland Revenue depreciation allowances[11] and on other miscellaneous data. The Inland Revenue data are of particular interest because they were adopted for some of the more important industries, including manufacturing. It has not been possible to get similar data from Inland Revenue more recently because it has been the policy of governments since the war to encourage fixed investment by allowing assets to be depreciated very quickly for tax purposes so that their owners could claim early tax relief on their expenditure. The same is true for example of the Internal Revenue Service data in the USA where, in their perpetual inventory model, they use a constant fraction of Bulletin F, 1942 lives: that is to say the lives agreed for depreciation purposes by the US Internal Revenue Service in 1942.

In the United Kingdom we have occasionally in the past cursorilly reviewed the Inland Revenue life lengths and those used on the advice of engineers and accountants in the utilities and other industries but little has been altered over the years[5] and it has not been practical to undertake a thorough comprehensive inquiry across all industries and all assets. We have therefore been particularly fortunate to have got together a wide range of representative data over the last year or so based, in some important cases, on large surveys conducted by the trade associations of the relevant industries.

The initial reaction of most who see for the first time the life assumptions that are used is to feel that they are probably far too long now even if they were correct at some earlier date. It has therefore been surprising to find from the large range of data collected in the last year that the existing life assumptions are remarkably accurate and that fixed assets appear to last as long now as they did thirty years ago despite the increasing pace of technical progress. Of course technical progress, particularly in metallurgy and plastics, has itself contributed to physical durability and the United Kingdom has a reputation for making its machinery last.

The life lengths used for all industries are very numerous but the assumptions used in manufacturing are given in the following table:

Length of life assumptions for estimates of fixed capital stock in manufacturing industry

Percentages of investment in plant and machinery¶ assumed to fall in each category

	Assumed average life lengths (years)**						
	5	16	19	25	34	50	All‡
Food, drink and tobacco		2·0		22·0	68·0	8·0	100·0
Coal and petroleum products		3·4	2·7	6·8	56·9	30·2	100·0
Chemicals and allied industries		3·4	2·7	6·8	56·9	30·2	100·0
Iron and steel			13·8	3·7	77·9	4·6	100·0
Other metals Engineering Metal goods (not elsewhere specified)		1·4	10·0	20·0	56·5	12·1	100·0
Aerospace		3·0		13·0	69·0	15·0	100·0
Motor vehicles‡	45·0	1·7		7·2	38·0	8·1	100·0
Textiles				2·6	89·7	7·7	100·0
Bricks, pottery, glass, etc.		5·0	24·0	19·0	14·0	38·0	100·0
Rubber, leather, clothing, footwear				73·0	4·0	23·0	100·0
Paper, printing, publishing				4·5	54·5	41·0	100·0
Other manufacturing				73·0	4·0	23·0	100·0
Timber, furniture, etc.				76·0	5·0	19·0	100·0

¶ For all manufacturing industries the assumed life length for buildings is 80 years and for road vehicles 10 years.

** The assumed lives are all averages so that some machines in each group are assumed to last longer, and some less, than the number of years given.

‡ In the motor vehicle industry certain tools, varying from year to year, are assumed to have a life of only five years.

The industries within the manufacturing sector for which it has been possible to obtain substantial data over the last year or so include chemical and allied, iron and steel, engineering, vehicles, textiles, rubber and paper. In every case the data have been representative of a very large proportion of the industry. Some of the data were supplied confidentially and some are piecemeal and therefore difficult to summarise but those set out in the following paragraphs are representative of the full range.

The primary conclusion drawn from all the data brought together from a wide range of industries and assets is that plant and machinery is extremely durable such that there is some in excess of 70 years old and very little is retired in under 15 years. One large unexceptional manufacturer of very modern products has plant which was secondhand when it was installed 50 years ago. Obviously plant of that age will have been extensively overhauled and modified to some degree so that its age is in reality a composite of different ages, but substantial plant nevertheless survive such periods. Within the limitations imposed by physical durability the next limiting factor is the age of the process. New processes and new products generally require some new machinery which, once installed, will survive until it becomes too expensive to maintain or until the process it serves is superseded, whichever is the sooner. Basic preparation plant generally survives longer than other equipment and may survive a number of new products or new processes.

One interesting case is that of a major firm in a major industry which experienced more than one technical change in one of its main processes during the 1960s causing unusually rapid obsolescence. The crucial conclusion for the perpetual inventory model is that the life assumptions for that industry were correct in the 1950s and are correct again now for recent expenditure. And, further, despite such a traumatic experience in an important process which brought some plant lives down to very low levels, the average for the industry over that period fell from around 35 years to a trough of no lower than about 25 years before returning again to 35 years.

Had the perpetual inventory model taken account of these rather violently changing life patterns then the gross capital stock of plant and machinery in that particular group would have been about 1½ per cent less than the figure calculated for 1974. The effect would of course be much less for all assets in aggregate for that industry and less still for all manufacturing industries taken together. Similar experiences could be occurring in other industries within manufacturing at any time and so, for those industries, the statistics are biased at those times; but for manufacturing as a whole the particular experience of one industry has much less impact.

For an individual manufacturer another important factor determining the age of his plant is the age of the company. For example a typical factory which is twenty five years old has never scrapped any machines although it has added to its stock of fixed assets and so the age of its plant ranges up to a maximum of twenty five years. In its accounts it uses only two periods over which it depreciates its plant; they are five years and ten years.

A piece of very important evidence in which the industries can be quoted by name is provided[20] by the NEDO monograph *The Age of US and UK Machinery*. The study covered only machine tools, which represent about one eighth of plant and machinery used in manufacturing, but the conclusions are of considerable interest. To quote 'the very surprising result emerges that the life of plant has been very similar in the United States and the United Kingdom over the past 10 years, and this result holds for most types of machine tools over almost the entire range of user industries'. As the table below shows, the average service life was found to be about 25 years which matches the assumptions made in the perpetual inventory model.

Machine tools—service lives and average ages in years by industry of use in the United Kingdom (1971) and in the United States of America (1968).

	Service life		Average age	
	UK	USA	UK	USA
All industry	25·0	23·5	12·00	12·75
Farm machinery	23·5	27·0	10·00	15·00
Metal work	22·5	24·0	11·00	12·50
Construction	24·5	24·5	12·50	13·00
Engines	23·0	25·0	11·75	13·25
Precision	25·0	22·0	11·75	11·75
Electrical	25·5	22·0	11·50	11·25
Shipbuilding	31·5	20·5	16·00	12·75
Motor vehicles	32·0	28·0	12·75	13·50
Aerospace	22·5	21·5	12·75	12·75
Other metal	23·5	22·5	11·75	12·50

Source:– NEDO Monograph 3 *'The Age of US and UK Machinery'* page 50 (HMSO 1974).

The average age of machine tools in the United Kingdom is a little less than half the estimated service life because investment in them has been higher in recent years. Such machinery is of course comparatively light and could be renewed more readily than the major process plant used in for example the steel, paper or chemical industries.

Another quotable study is that undertaken on behalf of the British Paper and Board Industry Federation in 1975. In an analysis of the 384 paper and board making machines in the United Kingdom the start-up years were found to be as follows:

Paper and board making machines
Start-up dates

75 or more years ago	5 per cent
50 to 74 years ago	37 per cent
25 to 49 years ago	26 per cent
24 or less years ago	32 per cent
	100 per cent

In the 15 years previous to the date of the survey 104, or 27 per cent, had been rebuilt and so it is not possible to make precise inferences from the start-up dates given in the table but clearly the implied ages (and therefore service lives) of these machines are very long indeed. They are certainly too long to suggest that any reduction is required in the lives assumed within the model for that industry group.

A further important series of recent studies in which the industries can be named are those which were undertaken in 1974 and 1975 on behalf of the National Economic Development Office (NEDO) by the relevant trade associations in the metal founding industries. Iron castings represent about two-thirds of the total output of these industries taken together.

Metal founding industries age of plant and equipment in years

		Iron	Steel	Bronze and brass	Aluminium	Zinc alloy
Building	average	41	40	22	25	25
	range			*5–70*	*6–40*	*10–50*
Melting plant	average	19	21	17	12	13
	range			*5–30*	*2–20*	*5–25*
Sand plant	average	12	15	25	10	
	range			*5–30*	*6–25*	
Dressing	average	12	13	15	12	
	range			*5–20*	*6–25*	
Diecasting and trimming	average					10
	range					*7–15*
Ancillary equip.	average					11
	range					*8–20*

In this table only ages and age ranges are given but approximate service lives may be inferred. The lower ages of plant in the aluminium and zinc industries is due, in part at least, to the relative newness of those industries.

Plant has been discussed here more than other types of asset because it receives most attention in the context of capital stock. Less information has been collected on buildings but what there is, for example the data above on metal founders, have again tended to confirm the existing life assumptions. For road vehicles however a change seems to be required. The average expected service life of road vehicles may still be ten years but, for cars in particular, it is rare for a company to keep a vehicle for more than about three years. It is therefore intended that the perpetual inventory model be adjusted to reflect the process of buying and selling business cars.

The general conclusion on asset lives is therefore that although it has not been possible to review all the assumptions as comprehensively as one would have liked there is nevertheless sufficient evidence to indicate that they are substantially right and that, surprising though it is, service lives have not changed appreciably in recent years. Only in very rare cases has evidence come to light which would suggest reductions in any of the life lengths used in the perpetual inventory model.

APPENDIX II

Perpetual inventory of fixed assets

£ million

Manufacturing all assets

	At current prices						At 1970 average prices					
	Gross capital form-ation	Retire-ments	Gross stock (end year prices)	Capital consum-ption	Net capital form-ation	Net stock (end year prices)	Gross capital form-ation	Retire-ments	Gross stock	Capital consum-ption	Net capital form-ation	Net stock
1947			8,325·5			4,515·0			19,322·6			10,438·3
1948	320·2	124·1	9,003·5	188·0	132·2	4,926·4	723·4	273·3	19,736·4	423·4	300·0	10,738·2
1949	372·7	123·9	9,459·4	200·0	172·8	5,242·6	821·1	268·8	20,227·5	439·0	382·1	11,120·3
1950	442·9	123·9	10,399·3	215·4	227·6	5,848·6	945·0	263·7	20,845·0	458·5	486·5	11,606·8
1951	515·4	129·9	11,953·7	249·7	265·7	6753·3	1,010·7	255·1	21,692·2	481·6	529·1	12,135·9
1952	553·2	137·9	13,024·7	291·7	261·5	7,377·2	972·2	248·9	22,386·5	505·6	466·6	12,602·5
1953	551·7	152·0	13,523·0	309·9	241·9	7,671·7	950·6	264·9	23,048·5	527·7	422·9	13,025·4
1954	589·9	164·9	14,350·3	324·1	265·8	8,181·0	1,009·6	282·8	23,733·5	549·0	460·6	13,486·0
1955	685·9	184·9	15,667·8	354·4	331·6	8,997·9	1,109·1	299·5	24,493·1	571·4	537·7	14,023·6
1956	837·9	208·3	16,904·0	393·5	444·4	9,910·1	1,276·4	314·5	25,133·5	595·7	680·7	14,704·3
1957	927·7	228·5	17,985·4	429·3	498·5	10,753·0	1,358·2	327·7	25,849·6	622·0	736·2	15,440·5
1958	906·0	240·2	18,614·4	460·4	445·6	11,293·4	1,289·2	334·2	26,502·1	648·8	640·4	16,080·8
1959	865·8	242·8	19,046·9	477·5	388·3	11,697·2	1,233·1	340·0	27,082·5	676·3	556·7	16,637·6
1960	1,021·4	251·4	20,228·0	503·2	518·2	12,490·8	1,439·9	350·8	28,135·8	708·0	731·9	17,369·5
1961	1,248·4	273·2	21,663·3	550·1	698·3	13,565·8	1,702·9	368·3	29,265·2	746·5	956·4	18,325·8
1962	1,181·7	287·9	23,006·8	580·9	590·8	14,548·7	1,576·2	380·7	30,215·8	785·6	790·6	19,116·5
1963	1,068·3	305·7	24,370·2	630·9	437·4	15,367·7	1,386·9	395·7	31,206·9	819·1	567·7	19,684·2
1964	1,232·1	324·5	26,040·7	669·0	563·1	16,407·8	1,570·3	412·4	32,364·9	852·7	717·7	20,401·8
1965	1,422·8	353·0	28,178·6	730·7	692·1	17,773·0	1,737·9	429·0	33,673·8	890·5	847·4	21,249·3
1966	1,516·8	380·8	29,881·2	791·3	725·5	18,860·2	1,785·5	447·2	35,012·1	930·0	855·5	22,104·8
1967	1,485·0	421·3	31,583·9	826·3	658·7	19,923·2	1,743·7	493·0	36,262·7	968·9	774·8	22,879·5
1968	1,638·7	473·2	34,053·8	892·4	746·3	21,493·7	1,852·0	533·1	37,581·6	1,007·1	844·9	23,724·5
1969	1,822·1	523·7	37,517·8	965·7	856·4	23,720·7	1,977·6	566·3	38,992·9	1,046·7	930·9	24,655·3
1970	2,129·2	584·1	42,404·5	1,089·8	1,039·4	26,872·5	2,129·2	584·1	40,538·0	1,089·8	1,039·4	25,694·8
1971	2,186·7	646·8	47,502·2	1,242·8	943·9	30,067·9	1,994·1	589·1	41,942·9	1,132·5	861·6	26,556·4
1972	2,044·4	697·5	53,731·9	1,372·5	671·9	33,865·6	1,740·1	593·7	43,089·4	1,168·1	572·1	27,128·4
1973	2,437·4	772·3	64,513·8	1,556·8	880·6	40,555·7	1,869·6	600·7	44,358·3	1,201·9	667·7	27,796·1
1974	3,144·6	941·3	82,376·9	1,906·8	1,237·8	51,606·7	2,029·7	621·3	45,766·7	1,240·4	789·3	28,585·4
1975	3,449·0	1,283·7	103,476·4	2,513·8	935·2	64,298·8	1,734·1	653·8	46,846·9	1,272·9	461·1	29,046·5
1976								680·7				
1977								710·3				
1978								738·4				
Increasing life assumptions by 20 per cent would produce the following results for:												
1975		1,136·5	111,778·1	2,291·7	1,157·3	71,640·9		580·3	50,642·2	1,161·1	573·0	32,385·2
Reducing all life assumptions by 20 per cent would produce the following results for:												
1975		1,544·9	93,016·8	2,782·8	666·2	55,621·5		784·8	42,069·9	1,408·3	325·7	25,106·5

Notes

1. Retirements can be calculated beyond the current year because they are based on expenditures of three or more years previously.
2. The estimates do not purport to be accurate to the final digit shown.

APPENDIX III

Net additions to fixed capital stock

Gross domestic fixed capital formation *less* capital consumption (net domestic fixed capital formation) at 1970 prices by industry group[1]

£ million

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
Agriculture, forestry and fishing ..	60	46	55	82	63	63	78	107	133	131	86
Mining and quarrying	22	33	47	23	5	4	22	48	73	250	599
Manufacturing	836	844	770	793	982	1,040	858	570	670	784	464
Construction	105	78	92	94	73	61	34	41	68	57	48
Gas, electricity and water	602	702	747	490	308	202	121	–6	–42	–49	–62
Transport and communication	224	189	310	472	413	438	439	484	557	345	285
Distributive trades and other service industries	692	631	675	768	860	944	1,085	1,166	1,368	1,239	949
Dwellings	1,119	1,150	1,315	1,382	1,281	1,123	1,217	1,317	1,177	1,102	1,200
Social and other public services ..	730	763	925	1,044	1,030	1,133	1,190	1,291	1,253	1,060	981
Total	4,390	4,436	4,936	5,148	5,015	5,008	5,044	5,018	5,257	4,919	4,550

[1] That is the change in net capital stock.

Source: National Income and Expenditure 1965–75, (HMSO 1976)

Gross domestic fixed capital formation *less* retirements at 1970 prices by industry group[2]

£ million

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
Agriculture, forestry and fishing ..	108	95	104	131	111	110	124	155	185	189	147
Mining and quarrying	30	40	59	40	26	24	39	66	90	289	687
Manufacturing	1,297	1,327	1,246	1,267	1,463	1,546	1,402	1,144	1,271	1,403	1,083
Construction	150	128	145	150	129	119	90	94	121	112	101
Gas, electricity and water	816	949	1,018	783	613	523	451	322	277	245	208
Transport and communication	267	336	354	509	571	740	611	742	778	576	411
Distributive trades and other service industries	877	830	887	995	1,108	1,218	1,383	1,489	1,727	1,638	1,375
Dwellings	1,367	1,429	1,614	1,697	1,611	1,467	1,575	1,692	1,570	1,512	1,625
Social and other public services ..	815	855	1,026	1,157	1,155	1,271	1,341	1,458	1,437	1,259	1,198
Total	5,727	5,989	6,453	6,729	6,787	7,018	7,016	7,162	7,456	7,223	6,835

[2] That is the change in gross capital stock.

Source: National Income and Expenditure 1965–75, (HMSO 1976)

APPENDIX IV

Gross capital stock at 1970 replacement cost by industry [1]

£ thousand million

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
Agriculture	2·8	2·8	2·9	3·0	3·2	3·3	3·4	3·5	3·7	3·9	4·0
Forestry and fishing	0·3	0·3	0·3	0·3	0·3	0·3	0·3	0·3	0·3	0·3	0·4
Mining and quarrying	2·1	2·2	2·2	2·3	2·3	2·3	2·4	2·4	2·5	2·8	3·5
Manufacturing:											
Food, drink and tobacco	3·6	3·8	4·0	4·2	4·3	4·5	4·7	4·9	5·2	5·4	5·5
Coal, petroleum products, chemicals and allied industries	5·6	5·9	6·2	6·6	6·9	7·3	7·7	8·0	8·1	8·4	8·6
Iron and steel	3·8	3·8	3·9	3·9	4·0	4·1	4·3	4·4	4·6	4·7	4·9
Other metals, engineering and allied industries	12·1	12·6	13·0	13·3	13·7	14·2	14·5	14·7	15·1	15·5	15·7
Bricks, pottery, glass, cement, etc...	1·3	1·4	1·4	1·5	1·6	1·7	1·7	1·8	1·9	1·9	2·0
Timber, furniture, etc.	0·5	0·5	0·5	0·6	0·6	0·6	0·6	0·7	0·7	0·7	0·8
Paper, printing and publishing ..	2·3	2:3	2·4	2·5	2·6	2·7	2·8	2·9	2·9	3·1	3·1
Textiles, leather, clothing and other manufacturing	4·5	4·7	4·9	5·0	5·3	5·4	5·6	5·7	5·9	6·1	6·2
Total	33·7	35·0	36·3	37·6	39·0	40·5	41·9	43·1	44·4	45·8	46·8
Construction	1·6	1·7	1·9	2·0	2·1	2·3	2·4	2·5	2·6	2·7	2·8
Gas	1·7	1·9	2·2	2·4	2·6	2·7	2·8	2·9	2·9	3·0	3·0
Electricity	9·0	9·8	10·5	11·0	11·4	11·7	12·0	12·2	12·4	12·5	12·6
Water	2·9	3·0	3·0	3·0	3·1	3·1	3·2	3·3	3·3	3·4	3·4
Railways	8·0	8·0	8·0	7·9	7·8	7·8	7·7	7·7	7·6	7·5	7·5
Road passenger transport	0·6	0·6	0·6	0·7	0·7	0·7	0·7	0·8	0·8	0·8	0·8
Road haulage and storage	0·9	0·9	1·0	1·1	1·2	1·3	1·3	1·4	1·4	1·5	1·5
Shipping	3·1	3·1	3·1	3·1	3·3	3·5	3·6	3·9	4·2	4·4	4·5
Harbours, docks and canals	1·5	1·5	1·5	1·6	1·6	1·6	1·6	1·6	1·6	1·6	1·6
Air transport	0·8	0·8	0·8	0·9	0·9	1·0	1·1	1·1	1·1	1·2	1·2
Postal, telephone and radio communications	3·6	3·8	4·1	4·4	4·7	5·1	5·5	5·8	6·3	6·7	7·1
Distributive trades and other service industries	13·8	14·7	15·5	16·5	17·6	18·9	20·3	21·8	23·5	25·1	26·5
Private dwellings	29·2	29·9	30·7	31·4	32·1	32·8	33·7	34·6	35·5	36·2	37·0
Public dwellings	14·4	15·1	16·0	16·9	17·8	18·6	19·3	20·0	20·8	21·6	22·4
Roads [2]	3·4	3·6	3·9	4·2	4·6	5·0	5·4	5·8	6·2	6·5	6·9
Other public services	13·4	14·1	14·8	15·7	16·5	17·3	18·3	19·4	20·5	21·4	22·3
Total gross capital stock	146·8	152·8	159·3	166·0	172·8	179·8	186·9	194·1	201·6	208·9	215·8

[1] For an account of the principles of valuation, see *National Accounts Statistics: Sources and Methods,* pages 383—7 and *Economic Trends,* October 1975. Figures relate to end of year.

[2] Excluding the non-renewable element more than 75 years old.

Source: National Income and Expenditure 1965–75, (HMSO 1976)

Gross capital stock at 1970 replacement cost by type of asset [1]

£ thousand million

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
Road vehicles	3·8	4·0	4·2	4·5	4·7	4·9	5·1	5·4	5·6	5·8	5·9
Railway rolling stock, ships and aircraft	6·2	6·2	6·1	6·1	6·2	6·5	6·6	6·8	7·1	7·3	7·3
Plant and machinery	42·0	44·5	47·0	49·5	52·0	54·7	57·3	59·7	62·5	65·3	67·7
Dwellings	43·6	45·0	46·7	48·3	50·0	51·4	53·0	54·7	56·3	57·8	59·4
Other buildings and works	51·2	53·1	55·3	57·6	59·9	62·3	64·9	67·5	70·1	72·7	75·5
Total gross capital stock	146·8	152·8	159·3	166·0	172·8	179·8	186·9	194·1	201·6	208·9	215·8

1 For an account of the principles of valuation, see *National Accounts Statistics: Sources and Methods,* pages 383–7 and *Economic Trends,* October 1975. Figures relative to end of year.

Source: National Income and Expenditure 1965–75, (HMSO 1976)