

## THE STOCK OF CONSUMER DURABLES IN THE UNITED KINGDOM: NEW ESTIMATES 1948-95

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A modified version of the perpetual inventory model is applied to new data on consumers' expenditure in the United Kingdom to establish estimates of that part of personal sector wealth represented by the stock of consumer durables. Current and constant price estimates are provided at an aggregate and disaggregate level for the gross and net stock and for the imputed consumption income over the period 1948-95. The accuracy and consistency of the estimates are evaluated in the context of other approaches.

### I. INTRODUCTION

Most systems of national accounts include some measure of the stock of fixed capital assets held by different sectors in the economy which can be used as a measure of tangible wealth. The size and composition of this stock has important implications for economic growth potential and can be used as a measure of economic capacity. Some national accounting systems, notably that of the United States, include a measure of the stock of durable goods held by the personal sector as part of their estimate of the total tangible assets of the economy as a whole. Under these circumstances, stocks of durable goods can be reckoned as personal sector capital holdings and can be used in the evaluation of the level and distribution of personal sector wealth. In the case of the United Kingdom however, there are gaps in the evaluation of this type of series which this paper attempts to fill.

Knowledge of the level and distribution of personal sector wealth is valuable in its own right and in the United Kingdom, it has a distinguished pedigree dating back to the Cambridge Growth Project of the 1960's (Roe, 1971). A limited number of estimates of the stock of durable goods can be found in related work of that era (Stone and Rowe, 1966; Revell, 1967), however the first systematic estimates were derived by the then Central Statistical Office [now the Office for National Statistics (ONS)] as part of their submission to the Royal Commission on Income Distribution and Wealth in the mid-1970s (Calder, 1976; CSO, 1978).<sup>1</sup> Recent studies of personal sector wealth (Bryant, 1987; Wolff, 1990, 1996) have

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<sup>1</sup>The estimation of this series was curtailed in the 1980s and as a result an official series is only available for a limited definition and for a short sample. The series ALLW (personal sector tangible assets) in the U.K. National Accounts is a measure of the net stock of consumer durables at current prices for the sample 1975-87. See for example Table 12.2 in the 1990 edition of the Blue Book.

included the stock of durable goods in their definition of personal sector marketable assets. This type of study recognises that an accurate measure of the level personal sector wealth and the nature of its allocation across different types of assets including the form of housing, financial holdings such as cash, debt and equities and holdings of household property such as motor vehicles and other durable goods are important in understanding overall consumer behaviour. In particular, changes in the allocation of wealth across these broad categories may have important consequences for the explanation of macroeconomic dynamics. Wolff (1994) argues that stocks of consumer durables may be excluded from a definition of marketable assets on the grounds that they may not be easily marketable and in addition that the goods may have a higher value to their owners because of their potential utility than would be indicated by a valuation based on resale prices.

In order to arrive at a set of estimates for the stock of consumer durables, we apply modified versions of the methodology used to evaluate the fixed capital stock series as described in Griffin (1975, 1976) and CSO (1985). The modifications are consistent with those discussed in Calder (1976) and are based on additional assumptions about the usage and retirement of durable goods. By applying this methodology, we are able to obtain estimates of the gross stock, the net stock and the rate at which the stock is used up, a series often referred to as the imputed flow of services from the stock. In the case where durables are counted as personal sector capital formation, this flow can be reckoned as part of the consumption income from the stock and is in practice exactly equivalent to the capital consumption series available in most national accounts. In addition, the results presented here extend the available sample over the period 1948–95 and across a wide range of goods for series measured at both current and constant replacement cost. In order to arrive at estimates across this range, use has been made of material outside the official United Kingdom sources. In particular estimates of consumption flows based on those of Prest (1954), Stone and Rowe (1966) and Feinstein (1972) have been used as have the new balanced estimates of Sefton and Weale (1995).

The paper is organised as follows. Section II discusses the methodology used to derive the series and the amendments made for this particular study. Section III provides a discussion of the data. Section IV presents the results and considers some of the initial properties of the series. Section V concludes by discussing the consistency and reliability of the estimates.

## II. METHODOLOGY

In his estimate of durables stocks for the United Kingdom, Calder (1976) defines consumer durables as those goods purchased by consumers which last and yield services for more than a year. This definition admits into the class a wider range of goods than would the standard ONS classification of durable goods. In particular, items such as clothing and footwear, which might be defined as semi-durables, are included in his stock figure but excluded from the expenditure figure for the ONS classification. For the purposes of this study we follow the ONS classification but since a measure including the additional items identified in Calder

(1976) may be important in its own right we include these items in the results presented in Section IV.

Estimates of the stock of durables can be made by direct census or by statistical derivation. Mayes and Young (1994) argue that a survey based estimate might be preferred but the strategy adopted in most cases is to apply a version of the perpetual inventory model (PIM) as described originally in Goldsmith (1951). The PIM requires information on the value of the stock in an initial period, the value of additions to the stock (consumption expenditure) in each subsequent period, the average length of the useful life of goods in each category of the classification and changes in the prices of those goods over time. Fortunately, all of this information is available in one form or another from official sources and elsewhere, although clearly the information requirements are large. As an alternative one might adopt a method such as that proposed by Almon *et al.* (1974) and applied in, for example, Hahn and Schmoranz (1984) where the information requirements are less demanding. However the method used in the study here is chosen to match the official United Kingdom methodology as closely as possible. The PIM was first applied to the United Kingdom national accounts by Redfern (1955) and Dean (1964) in their calculations of fixed capital stocks. In this study a revised version of the model is applied which takes account of variations in the retirement of goods from the stock as well as the pattern of expenditures. The model is therefore similar to the revised CSO (now ONS) model described in Griffin (1975, 1976) and allows us to estimate stock series in two broad categories, the gross stock and the net stock. The residual between the two series gives us a measure of consumption from the stock and by applying appropriate price indices we can calculate each of these three series at both current and constant replacement cost.<sup>2</sup>

### *The Model*

The gross stock is simply the value of the accumulated purchases of durable goods less retirements due to obsolescence. Retirements are calculated on the basis of a set of average life lengths for each good specified in advance. So for example, a good with a useful life of ten years will be retired from the stock ten years after it was purchased, that is during the eleventh year. Estimates of the average life lengths can be obtained from direct survey or from expert opinion, those used in the current study are discussed in Section III. The gross stock can be calculated on the following basis:

$$(1) \quad GS_t^i = \sum_{j=0}^{A^i} C_{t-j}^i g_j^i,$$

where  $GS_t^i$  the gross stock of good,  $i$ , at time,  $t$ , and is the sum over the life of the good,  $A^i$ , of the consumption expenditures,  $C^i$ , on that good. The term  $g_j^i$  is the proportion of the good purchased in time  $t-j$  and still in use at time,  $t$ . This

<sup>2</sup>A survey of methods used to estimate capital stock and capital consumption can be found in OECD (1993) and Paccoud (1984). It might be noted in particular that the estimates of the stock of consumer durables by the U.S. Department of Commerce, Bureau of Economic Analysis are calculated on exactly the same basis as the fixed capital stock series, see BEA (1993).

is determined by the survival function used to establish the retirement patterns. The function  $g_j^i$  is defined so that all of the good exists at the start of its life,  $g_0^i=1$ , so that none of the good exists beyond the limit of its usefulness,  $g_{A^i+1}^i=0$  and so that the value of the good declines as its age increases  $g_j^i > g_{j+1}^i$ .

In the current model retirements are calculated using the so-called, "English linear method," in which goods are retired from the stock over a range of  $\pm 20$  percent of the assumed life-length. This assumption takes account of variations in the average life of components in each category and also helps to reduce the effect of erratic expenditure flows on the stock. It will also help in part to take account of the variation in the average life over time. Applying this type of distribution produces the following form for the function  $g_j^i$ :

$$(2) \quad g_j^i = [1 - (j - S)S^{-1}],$$

where we define  $S$ , to be the number of periods in the range of the retirement distribution,  $RD^i = 0.8A^i, \dots, 1.2A^i$ . In the case of a good with a five-year service life for example, the retirement is over year 4, 5 and 6 so that the distribution is over three years and  $S=3$ .

The net stock follows as the value of accumulated purchases less retirements and less consumption or depreciation due to use. A typical formulation is as follows:

$$(3) \quad NS_t^i = \sum_{j=0}^{A^i} C_{t-j}^i g_j^i d_j^i.$$

Where  $NS_t^i$ , is the net stock of good,  $i$ , at time,  $t$  and  $d_j^i$  is the function determining the rate of consumption. The consumption process can be calculated in a number of ways and in the United Kingdom two methods are typically used; the first assumes that the good is consumed at a constant rate during its life and the second assumes that the good is consumed by a constant proportion during each period of its life. The first case more closely measures the value of the stock in terms of the remaining or potential useful services that may be accrued from it; the second more closely measures the value of the stock in terms of replacement cost. In both cases, the resulting series is the imputed value of the flow of services from the stock which may be reckoned as consumption income.

In the case of constant or straight-line consumption, the function  $d_j^i$ , which gives the value at time,  $t$ , of a good of age,  $a^i$ , with an assumed service life of,  $A^i$  is:

$$(4) \quad d_j^i = [1 - (j/A^i)].$$

In the PIM used for this study the retirement distribution implies the function for  $d_j^i$  be of the following form:

$$(5) \quad d_j^i = \left[ 1 - \left( j \sum_{k=0.8A^i}^{1.2A^i} 1/A_k^i \right) \right].$$

In the case of constant proportion or reducing balance consumption, a rate of depreciation,  $\delta^i$ , is chosen to reduce the original purchase value to some small proportion of its cost at a point half a year before the end of its assumed life,  $A^i$ .

In the version of the PIM used here this value is set to equal  $50/A^i$  percent at that point so that depreciation is.<sup>3</sup>

$$(6) \quad \delta^i = 1 - [(50/A^i)/100]^{1/(A^i-0.5)}.$$

When the PIM is modified to allow retirements to be distributed around the assumed service length, the depreciation for each of the ages within the range of the distribution must be taken into account. A general formula for the depreciation rate then becomes:

$$(7) \quad \delta_s^i = \frac{1}{S} \sum_{k=0.8A^i}^{1.2A^i} \delta_k,$$

where  $\delta_s$  is the depreciation taking account of the retirement distribution,  $\delta_k$  is the depreciation calculated in (6) for each of the periods in the distribution range  $RD^i = 0.8A^i, \dots, 1.2A^i$  and  $S$ , is the number of periods in this range as defined earlier.

Both the formulations used for consumption patterns are modified to take account of the flow of expenditures which are assumed to be spread evenly through the year. To allow for this, consumption is levied at half the full rate in the first and last years of the useful life of the good.

Clearly both the estimate of the consumption flow and therefore the net stock will depend upon the assumptions made about life lengths and depreciations. We will see from the results that these differences may not be insignificant.

### III. THE DATA

In order to apply the PIM we need data on expenditure flows and the service lives of goods in each category of our definition. For the purposes of this study, durable goods are defined to be consistent with the classification in the United Kingdom National Accounts. In addition we include a set of series satisfying the definition in Calder (1976) so that in all fifteen individual series are used. Estimates of each category are required over a sample determined by the average useful life assumed for each type of good. In order to arrive at series of sufficient length, information was taken from a selection of studies of national income in the United Kingdom and in particular use was made of the balanced estimates of Sefton and Weale (1995). For the sample 1963–95, official estimates are available in the ONS Business Monitor (MQ24).

In some instances, for example for furniture and floorcoverings, it was necessary to disaggregate the series available in the historical studies to the level available in the official sources. One approach to this type of problem is that adopted in Sefton and Weale (1995) or Weale (1986) which use an optimal least squares method to decompose aggregates into components and to balance the estimates

<sup>3</sup>Unlike the straight-line case, the depreciation mechanism in the reducing balance model allows a small amount of the good to survive as a residual. In the model applied here it is assumed that this residual is consumed in the final period so that the consumption flow from the initial expenditure equals the original cost. An alternative is to assume that the residual is scrapped and therefore not counted as consumption. Under these circumstances the consumption flow from the initial expenditure will not be equal to the original cost which would imply a suboptimal use of the resource.

across accounting matrices. In principle, this methodology yields the optimal estimates for the desired series, however the information and computational requirements are often large in comparison to the gains in accuracy achieved. An alternative method is that adopted by Calder (1976). Here it is assumed that the components of a particular aggregate represent fixed proportions through the sample. So for example, in the case of furniture and floorcoverings it is assumed that furniture represents 60 percent of the total and floorcoverings represent the remaining 40 percent. However, inspection of the disaggregated series from MQ24 reveals that this assumption is almost certainly incorrect since the proportions of each component in the totals change significantly over time as consumption patterns alter.<sup>4</sup>

The disaggregation method used in this study is therefore a compromise between the statistically demanding method of Sefton and Weale (1995) and the expedient used in Calder (1976). Disaggregation is based on proportions, but use is also made of information on expenditure patterns for the components of each class of good to determine the variations in proportions over time. Disaggregate information of this type is available from Prest (1954) and Stone and Rowe (1966) and from the Census of Production and the Census of Distribution for selected years. The disaggregated series derived on this basis were constrained in each case to meet the totals implied by the estimates of Sefton and Weale (1995). Consistency of the series was checked by referring to the details of the category definitions and the derivation techniques used in the course material. On the whole satisfactory decompositions were achieved without too much subjectivity.

A particular feature of the PIM method of stock calculation is that errors that arise in the estimates of the flow series diminish from the stock series due to retirements. Therefore inaccuracies that exist in the historical estimates have less impact on the stock series over time. For the sample and retirement patterns used in the current study, the use of historical estimates for the flow series ought to have less impact on the accuracy of the post-war stock series than would be found in comparable estimates of the stock of fixed capital.

The implied price deflators for each category were derived on the basis of the current and constant estimates provided in the sources which were converted to a common 1990 base. In those cases where suitable estimates were not available, deflators were obtained by extrapolating backward through the sample on the basis of the period on period change in an expenditure deflator for the class total or for total consumers' expenditure. The stock series were calculated using constant price series with the series at current prices derived from these on the basis of the implied deflators. A complete discussion of the flow series and the methods used to derive them is provided in an appendix to this study available from the author on request.

The service life assumptions used follow Calder (1976) and are designed to take account of expected obsolescence; they are presented in Table 1. Ideally service lives should reflect actual experience as closely as possible but as in the case of fixed capital, information of this type is limited. In particular, variations

<sup>4</sup>In the case of furniture and floor coverings these proportions were respectively 62 percent and 38 percent in 1963 and 76 percent and 24 percent in 1995.

TABLE 1  
SERVICE-LIFE ASSUMPTIONS

	United Kingdom Central Statistical Office (CSO) <sup>1,2</sup>			Department of Commerce (BEA) <sup>3</sup>	Stone & Rowe (1966) <sup>3</sup>	
	Weight (%)	Long	Medium			Short
<i>Transport vehicles</i>						
Motor cars	—	12	10	8	10	10.3
Other vehicles	—	15	10	5	10	5.7
<i>Other durable goods</i>						
Furniture	—	40	25	15	14	—
Floorcoverings	—	30	20	10	10	—
Audio-visual	95	10	8	5	9	—
	5	25	20	15	—	—
Major appliances	80	15	10	5	11	—
	20	20	15	10	—	—
<i>Household goods</i>						
Hardware	95	15	10	5	10	—
	5	40	25	15	—	—
Household textiles	—	15	8	5	10	—
DIY goods	—	15	10	5	—	—
<i>Other goods</i>						
Clothing & footwear	—	5	3	2	—	1.7
Spectacles	—	5	3	2	6*	—
Books	—	15	10	5	10*	21.8
Sports goods etc.	25	25	20	15	10	—
	75	8	5	3	—	—
Records	—	8	5	3	—	—
Travel goods etc.	—	8	5	3	—	—

<sup>1</sup>Now United Kingdom Office for National Statistics.

<sup>2</sup>Classification based on standard ONS categories. See appendix C Business Minor MQ23.

<sup>3</sup>Figures here are for nearest corresponding category or (\*) from Musgrave (1979).

over time in the useful life of goods in each category is very difficult to account for as are variations in the quality of goods in each category. To some extent we can correct for these features by providing estimates under different assumptions of longevity, shown here as long, medium and short, or by allowing the PIM to spread retirements as described earlier. Nonetheless the service lives used in Calder (1976) and applied here represent reasonable estimates. Table 1 also shows service lives used by two other sources. The first are from the U.S. Department of Commerce, Bureau of Economic Analysis and are derived from survey estimates and from expert opinion across each category. In general they are consistent with those suggested by Calder (1976) for the medium life group which is chosen as our preferred age length measure.<sup>5</sup> The second set comes from Stone and Rowe (1966) and have been applied in Solomou and Weale (1996). They are very different from the two official sources and give an indication of the changing perception of the useful age length of durables between different eras.

The current study derives stock series using each of the age assumptions from Calder (1976). The results for the medium life group are presented in the next section, those for the other two groups are presented in an appendix available from the author on request.

<sup>5</sup>The weighted average for Sports goods etc. is 8.75 years in Calder (1976) compared to ten years for the BEA estimate.

#### IV. RESULTS

This section provides the results of the stock calculations and presents some of the preliminary properties of the series. In each case the estimates are based on the medium service life assumptions presented in Table 1. These are generally considered to represent actual behaviour more closely than alternatives and are comparable to those used internationally. Tables 2–3 present estimates for the gross stock, the net stock and the imputed consumption flows at both current and constant prices. To save space the estimates are shown at five year intervals; those for the intermittent years are available in Williams (1997). Estimates are provided for each of the categories on the basis of the reducing balance assumption. In the case of the totals, estimates are provided on the basis of both the reducing balance and the straight-line reduction for total durables as defined in Business Monitor MQ24 (1996) and for the total of all goods as defined by Calder (1976). The remaining tables in this section illustrate some of the preliminary properties of the series, although the prospective use of the estimates derived here go far beyond these comparisons.

Total personal sector wealth in the United Kingdom in 1990 was composed of residential assets (49.8 percent), net financial assets (31.8 percent), intangible assets (non-marketable tenancy rights) (8.0 percent) other tangible assets (5.7 percent) and consumer durables (4.7 percent).<sup>6</sup> Table 4 below shows how the stock of durables and semi-durables can be used in the tangible assets component of personal sector balance sheets. Wealth in the form of durables stocks has formed the largest component of this group after residential property, accounting for around 10 percent of the overall total. The share of wealth held in this form has increased during the 1980s and 1990s to just under 13.5 percent.

Current personal sector wealth in the form of durable goods can be used as an indicator of future demand and of the output required to meet that demand. Table 5 shows that personal expenditure on both durables and semi-durables has more than doubled as a proportion of disposal income between 1955–95. Holdings of stocks has as a result increased as a proportion of personal disposable income, in the case of durable goods the ratio is three times as large and in the case of the wider definition it is twice as large. By contrast, personal consumption expenditure has remained broadly constant with respect to the stock of goods, suggesting that consumers hope to consume services from the stock in proportion to other forms of consumption.

It is also possible to look at the growth and distribution of wealth. Table 6 shows the average growth rates for total wealth, per capita wealth and wealth per household in selected years. The two definitions of wealth have grown mostly in line with each other and in value terms reflect inflationary periods quite closely. Growth rates declined during the first half of the 1980s and increased during the second, perhaps reflecting a readjustment of portfolio holdings of wealth in this form as compared to wealth held in other forms. In terms of the distribution, per capita wealth has generally risen more slowly than the total, reflecting the growth in population. Per household wealth has grown even less rapidly largely because

<sup>6</sup>Source United Kingdom National Accounts (Blue Book) 1996, Table 12.2 and current estimates.

TABLE 2  
GROSS STOCK, NET STOCK AND IMPUTED FLOWS AT CONSTANT 1990 PRICES  
(Medium-life assumptions—£ million)

	Transport Vehicles		Other Durable Goods				Household Goods			Clothing and Footwear, Opticians Goods, Books and Miscellaneous Goods						Totals				
	Motor Vehicles	Other Vehicles	Furniture	Floor Coverings	Audio-Visual Photo/Opt. Equipment	Major Appliances	Hardware	Household Textiles	DIY Goods	Clothing & Footwear	Spectacles	Sports & Toy Goods	Records	Travel Goods Novelties & Gifts, Leather	Books	Durable Goods	All Goods	Durable Goods	All Goods	
Gross Stock at Constant 1990 Prices																				
1948	2,407	706	31,747	14,423	384	2,412	7,770	2,149	3,750	14,659	220	1,645	581	1,119	6,660	52,079	90,631	—	—	
1950	2,443	1,154	32,301	14,407	371	2,906	7,575	2,970	4,799	17,507	226	1,586	609	1,164	7,404	53,581	97,420	—	—	
1955	8,167	2,728	32,673	14,347	654	5,379	8,975	4,638	8,082	18,039	256	2,063	649	1,506	8,431	63,947	116,587	—	—	
1960	19,354	3,872	33,703	16,706	985	8,557	11,172	5,959	9,972	22,824	370	3,271	812	2,214	9,250	83,176	149,020	—	—	
1965	36,929	4,262	37,620	21,634	1,232	11,574	15,285	6,941	11,939	26,953	534	4,206	991	2,562	9,453	113,251	192,115	—	—	
1970	54,836	4,768	44,958	26,267	1,465	13,369	19,782	7,997	15,319	30,725	656	5,622	1,455	3,186	9,177	145,664	239,583	—	—	
1975	77,344	6,059	54,715	30,273	3,474	17,666	22,904	9,359	19,331	35,597	747	8,603	2,563	4,333	10,008	189,531	302,978	—	—	
1980	90,743	7,362	64,086	32,423	7,035	22,653	23,278	10,953	22,629	41,558	886	11,502	3,183	5,072	11,278	224,303	354,642	—	—	
1985	106,097	8,810	71,680	33,326	13,273	28,443	23,013	11,350	27,859	49,317	1,037	14,846	3,965	5,863	11,437	261,630	410,317	—	—	
1990	143,513	12,600	81,963	35,543	26,392	39,091	26,946	13,969	39,329	62,318	1,870	20,635	8,010	8,078	11,971	339,100	532,226	—	—	
1995	159,344	15,660	93,854	35,396	41,869	49,604	30,599	18,424	47,477	70,916	2,753	26,329	11,857	9,058	13,575	395,727	626,715	—	—	
																Reducing Balance	Straight-line Balance			
Net Stock of Consumer Durables at Constant 1990 Prices																				
1948	813	397	6,217	2,883	87	891	2,240	917	1,648	6,670	95	409	214	410	2,374	11,288	26,266	28,646	58,681	
1950	1,144	599	6,905	3,466	127	1,158	2,374	1,240	2,052	7,804	99	391	215	408	2,382	13,400	30,366	30,621	63,198	
1955	3,922	1,026	8,217	4,441	245	2,098	2,785	1,605	2,641	8,116	115	731	241	592	2,557	19,949	39,332	39,072	75,344	
1960	8,015	1,286	10,440	5,853	353	3,079	3,797	1,992	3,234	10,224	169	1,239	302	821	2,845	29,027	53,649	53,644	96,434	
1965	14,053	1,302	12,404	6,961	393	3,738	5,192	2,286	3,784	11,912	242	1,567	372	936	2,712	38,852	67,854	71,394	119,889	
1970	18,072	1,518	13,982	7,816	526	4,042	6,369	2,606	5,130	13,535	288	2,001	573	1,196	2,681	45,957	80,335	86,089	141,938	
1975	25,044	1,905	16,739	8,667	1,483	6,127	8,865	3,139	6,106	15,529	334	3,275	985	1,613	3,161	59,964	100,972	109,988	174,784	
1980	27,947	2,414	19,272	8,662	2,618	7,291	6,715	3,503	7,272	18,262	390	4,183	1,212	1,888	3,539	68,203	115,167	124,382	196,394	
1985	35,177	2,771	20,411	8,589	5,268	9,485	6,813	3,641	9,268	22,046	466	5,371	1,507	3,211	4,164	81,701	136,189	147,006	227,961	
1990	48,320	4,684	24,162	9,871	10,144	13,225	8,825	4,769	13,410	27,153	828	7,515	3,350	3,068	3,770	110,406	183,094	192,557	296,535	
1995	47,703	4,895	28,046	9,110	15,233	16,043	9,070	6,286	14,518	31,452	1,244	9,279	4,624	3,256	4,200	121,030	204,958	213,681	333,290	
																Reducing Balance	Straight-line Balance			
Imputed Flows from Stocks of Consumer Durables at Constant 1990 Prices																				
1948	279	117	987	553	36	259	714	350	513	4,691	74	151	119	229	771	2,231	9,844	2,565	9,891	
1950	364	182	1,075	650	46	340	755	481	651	5,690	75	145	120	229	803	2,657	11,606	2,639	11,299	
1955	1,137	322	1,296	845	91	612	864	644	864	5,920	83	268	132	311	850	4,302	14,239	3,546	13,333	
1960	2,457	421	1,635	1,097	136	925	1,175	825	1,068	7,535	121	480	164	445	963	6,670	19,447	5,215	17,676	
1965	4,489	435	1,937	1,311	158	1,154	1,615	953	1,255	8,870	177	597	201	516	921	9,484	24,589	7,706	22,560	
1970	5,913	504	2,195	1,491	198	1,255	2,018	1,098	1,698	10,105	215	762	300	647	916	11,557	29,316	10,295	27,694	
1975	8,420	650	2,612	1,666	545	1,889	2,236	1,299	2,061	11,754	244	1,246	530	881	1,062	15,782	37,095	13,910	34,758	
1980	9,342	796	3,031	1,680	1,001	2,231	2,184	1,488	2,399	13,591	289	1,608	661	1,034	1,163	18,081	42,498	16,778	41,004	
1985	11,586	924	3,327	1,659	1,967	2,883	2,159	1,524	3,029	16,123	342	2,035	809	1,186	1,104	22,256	50,567	19,960	48,037	
1990	16,065	1,482	3,788	1,909	3,837	4,057	2,764	1,9793	4,445	20,651	607	2,846	1,705	1,656	1,255	31,137	69,040	27,043	63,428	
1995	15,900	1,596	4,394	1,787	5,768	4,870	2,905	2,612	4,851	23,317	897	3,555	2,460	1,818	1,416	34,315	78,146	32,395	75,666	

**TABLE 3**  
**GROSS STOCK, NET STOCK AND IMPUTED FLOWS AT CURRENT PRICES**  
 (Medium-life assumptions—£ million)

	Transport Vehicles		Other Durable Goods				Household Goods				Clothing and Footwear, Opticians Goods, Books and Miscellaneous Goods					Totals				
	Motor Vehicles	Other Vehicles	Furniture	Floor Coverings	Audio-Visual Photo/Opt. Equipment	Major Appliances	Hardware	Textiles	DIY Goods	Clothing & Footwear	Spectacles	Sports & Toy Goods	Records	Travel Goods Novelties & Gifts, Leather	Books	Durable Goods	All Goods	Durable Goods	All Goods	
<b>Gross Stock, at Current Prices</b>																				
1948	300	87	3,229	1,393	631	461	855	357	429	2,432	16	200	73	83	249	6,101	10,795			
1950	306	143	3,430	1,452	392	596	860	508	566	3,019	18	204	82	92	294	6,319	11,960	—	—	
1955	1,183	393	3,641	1,518	750	1,197	1,107	863	1,036	3,583	25	329	108	147	414	8,682	16,292	—	—	
1960	3,009	600	3,985	1,876	1,155	1,947	1,336	1,075	1,240	4,639	40	582	150	241	507	12,571	22,382	—	—	
1965	4,624	531	6,051	3,285	1,768	2,884	2,002	1,370	1,611	6,064	77	821	202	331	615	19,143	32,235	—	—	
1970	8,101	703	8,995	4,959	1,928	3,918	3,153	2,041	2,401	7,990	111	1,435	392	514	790	28,605	47,432	—	—	
1975	20,076	1,576	20,272	10,598	4,129	7,828	6,469	4,004	6,267	15,462	217	3,325	1,041	1,266	1,711	64,478	104,240	—	—	
1980	53,728	4,397	43,916	21,021	9,378	17,981	13,505	8,441	13,050	29,174	477	8,050	2,452	2,843	3,784	150,420	232,196	—	—	
1985	73,816	6,131	61,100	26,155	15,279	26,278	18,190	9,822	21,887	41,749	802	12,641	3,732	4,607	8,343	208,759	330,633	—	—	
1990	143,513	12,600	81,983	35,543	26,392	39,091	26,946	13,969	39,329	62,318	1,870	20,635	8,010	8,078	11,971	339,100	532,226	—	—	
1995	186,841	18,304	107,527	43,084	36,025	50,637	35,451	18,581	56,926	73,951	2,770	27,863	13,810	9,521	15,884	442,418	697,175			
<b>Net Stock of Consumer Durables at Current Prices</b>															<b>Reducing Balance</b>	<b>Straight-line Balance</b>				
1948	102	49	632	278	142	170	247	152	189	1,106	7	50	27	30	89	1,374	3,271	3,466	6,633	
1950	143	74	733	349	135	237	269	212	242	1,346	8	50	29	32	95	1,672	3,955	3,812	7,454	
1955	568	148	916	470	281	467	343	299	338	1,612	11	116	40	58	126	2,850	5,793	5,559	10,170	
1960	1,246	199	1,235	657	414	700	454	359	402	2,078	18	220	56	89	156	4,452	8,285	8,206	13,819	
1965	1,759	162	1,995	1,057	564	932	680	451	510	2,680	35	306	76	121	176	6,469	11,505	11,824	18,992	
1970	2,670	224	2,797	1,476	693	1,185	1,015	665	804	3,520	49	511	154	193	231	9,044	16,186	16,792	26,934	
1975	6,501	495	6,202	3,034	1,762	2,715	1,939	1,343	1,980	6,746	97	1,266	400	471	541	20,709	35,490	37,539	58,654	
1980	16,547	1,441	13,206	5,616	3,489	5,787	3,896	2,700	4,194	12,820	210	2,927	933	1,058	1,188	46,087	76,013	83,622	126,920	
1985	24,474	1,928	17,398	6,741	6,064	8,763	5,385	3,151	7,281	18,663	360	4,574	1,418	1,701	2,342	65,368	110,245	117,339	182,904	
1990	48,320	4,684	24,162	9,871	10,144	13,225	8,825	4,769	13,410	27,153	828	7,515	3,350	3,068	3,770	110,406	183,094	192,557	296,535	
1995	55,935	5,722	32,132	11,089	13,106	16,377	10,508	6,339	17,407	32,798	1,251	9,820	5,385	3,422	4,914	13,361	226,206	238,393	371,796	
<b>Imputed Flows from Stocks of Consumer Durables Current Prices</b>															<b>Reducing Balance</b>	<b>Straight-line Balance</b>				
1948	35	14	100	53	60	49	79	58	59	778	6	18	15	17	29	312	1,371	355	1,391	
1950	46	23	114	66	49	70	86	82	77	981	6	19	16	18	32	367	1,683	347	1,637	
1955	165	46	144	89	104	136	107	120	111	1,176	8	43	22	30	42	685	2,343	555	2,198	
1960	382	65	193	123	159	210	141	149	133	1,532	13	85	30	48	53	1,133	3,317	903	3,052	
1965	562	54	312	199	227	288	212	188	169	1,996	26	117	41	67	60	1,641	4,515	1,378	4,221	
1970	874	74	439	282	261	368	322	280	266	2,628	36	195	81	104	79	2,297	6,288	2,051	5,987	
1975	2,186	169	968	583	647	837	631	556	668	5,106	71	482	215	257	182	5,390	13,558	4,660	12,684	
1980	5,532	475	2,077	1,089	1,334	1,771	1,267	1,147	1,383	9,541	155	1,125	509	580	390	12,278	28,376	11,316	27,318	
1985	8,060	643	2,759	1,302	2,265	2,664	1,707	1,319	2,380	13,649	264	1,732	762	932	805	17,693	41,243	15,794	39,158	
1990	16,065	1,482	3,788	1,909	3,837	4,057	2,764	1,973	4,445	20,651	607	2,846	1,705	1,656	1,255	31,137	69,040	27,043	63,426	
1995	18,644	1,866	5,034	2,175	4,963	4,971	3,366	2,634	5,816	24,315	903	3,763	2,865	1,911	1,656	37,653	84,882	35,686	82,274	

TABLE 4  
COMPONENTS OF PERSONAL SECTOR TANGIBLE NET WEALTH  
(Constant 1990 prices)

	£ billion					% In Total Tangible Assets			
	Total Tangible Assets	Residential Buildings	Non-Residential Buildings & Land	Plant & Machinery etc.	Durable Stocks All Goods	Residential Buildings	Non-Residential Buildings & Land	Plant & Machinery etc.	Durable Stocks All Goods
1957	371.5	280.8	26.9	20.3	43.6	75.6	7.2	5.5	11.7
1960	454.4	339.1	39.7	22.0	53.6	74.6	8.7	4.8	11.8
1965	680.4	518.1	67.9	26.5	67.9	76.2	10.0	3.9	10.0
1970	881.3	694.3	73.7	32.9	80.3	78.8	8.4	3.7	9.1
1975	995.5	798.2	67.4	29.0	101.0	80.2	6.8	2.9	10.1
1980	1,136.8	905.2	83.0	33.4	115.2	79.6	7.3	2.9	10.1
1985	1,368.7	1,113.2	86.6	32.7	136.2	81.3	6.3	2.4	10.0
1990	1,473.8	1,158.7	91.3	40.7	183.1	78.6	6.2	2.8	12.4
1995	1,528.4	1,203.3	82.4	37.7	205.0	78.7	5.4	2.5	13.4

Source: United Kingdom *National Accounts* (Blue Book), official price indices and current estimates.

TABLE 5  
 PERSONAL INCOME, EXPENDITURE AND STOCKS OF DURABLE GOODS  
 (Net stock at constant 1990 prices)

	Levels (£ billion)					Ratios					
	Personal Disposable Income	Durable Goods		All Goods		PCE-D /PDI	PCE-A /PDI	PCE-D /NSD	PCE-A /NSA	NSD /PDI	NSA /PDI
		Personal Expenditure	Net Stock	Personal Expenditure	Net Stock						
1950	125.2	3.8	13.4	13.6	30.4	3.0	10.9	28.4	44.7	10.7	24.3
1955	142.7	6.3	19.9	17.6	39.3	4.4	12.3	31.6	44.7	13.9	27.6
1960	169.2	9.1	29.0	23.1	53.6	5.4	13.7	31.2	43.1	17.2	31.7
1965	197.0	11.5	38.9	27.7	67.9	5.8	14.1	29.5	40.9	19.7	34.4
1970	217.7	13.0	46.0	31.8	80.3	5.9	14.6	28.2	39.6	21.1	36.9
1975	253.8	16.6	60.0	38.4	101.0	6.6	15.2	27.7	38.1	23.6	39.8
1980	285.4	19.7	68.2	45.4	115.2	6.9	15.9	28.9	39.4	23.9	40.4
1985	309.7	25.2	81.7	56.5	136.2	8.1	18.2	30.9	41.5	26.4	43.9
1990	378.0	34.7	110.4	75.1	183.1	9.2	19.9	31.4	41.0	29.2	48.4
1995	408.9	39.3	121.0	86.0	205.0	9.6	21.0	32.5	41.9	29.6	50.1

Source: United Kingdom *Economic Trends* (Annual Supplement) and current estimates.

of social changes over the period which resulted in smaller household size and an increase in the number of single person households. Interestingly, there is no indication that the stocks exhibit a steady rate of growth through the sample which raises the prospect that their use in explanations of the dynamics of personal sector behaviour may prove fruitful.

Finally, Table 7 illustrates the changes in the components of the total stock figures. We use gross stocks at constant prices but the behaviour of net stock is qualitatively the same. Of the main categories, motor vehicles and audio-visual goods have increased their share most significantly, by around ten-fold in the first case and by 1,650 percent in the second. The improving share of motor vehicles has been steady throughout the sample whereas the rise in audio-visual goods has been sharpest after the mid 1970s, reflecting a combination of greater availability, relative price changes and improving disposable incomes. Of the other goods, luxury goods, reflecting improving lifestyles, have all increased their share. Items such as furniture and floorcoverings have increased in absolute terms but their relative share of total wealth has declined and perhaps rather dispiritingly, wealth held in the form of books has declined by 1995 to around one-third of its share in 1950.

## V. CONSISTENCY AND RELIABILITY

In this final section we attempt to evaluate the consistency and reliability of the stock estimates presented in Section IV. In practice, a number of approaches are taken to assess the accuracy of national income data. In the United Kingdom the practice adopted by the Office for National Statistics (ONS) is to use the reliability gradings presented in HMSO (1985). These are designed to provide subjective estimates of the margins of error associated with each series.<sup>7</sup> The consumption flow estimates used in this study and the version of the PIM adopted are chosen to be completely consistent with the definitions and methods used by the ONS and so it seems reasonable that their reliability gradings might also be used. In general, the estimates of the flow series are either *B* ( $\pm 3$ –10 percent error) or *C* ( $\pm 10$ –20 percent error) for the components and the totals are graded *A* ( $> 3$  percent error). On this basis, we could offer a grading of *C* ( $\pm 10$ –20 percent error) for the stock series as a whole, much in line with the grading for the stock of fixed capital which are also graded *C*.

Another way of assessing the accuracy of the series is to compare them with estimates available elsewhere. As mentioned earlier there are very few alternatives but three in particular might be used, these are the series in Revell (1967) for 1957–61, Calder (1976) for 1966–76 and the series ALLW for 1975–89 from the United Kingdom National Accounts (Blue Book). Table 8 provides a comparison for estimates of net stock at current prices from these sources.<sup>8</sup> In general there

<sup>7</sup>This approach is also adopted in the historical sources used to derive the flow series for this study see for example Feinstein (1972) or Stone and Rowe (1966).

<sup>8</sup>Stone and Rowe (1966) provide some 5-year average estimates over the sample 1900–55 at constant 1938 prices, as do Solomou and Weale (1996). For the period 1951–55 their estimates are £1,680 million and £2,118 million respectively. When revalued to current prices and to constant 1990 prices these estimates are £2,040 m and £13,802 m for Stone and Rowe and £2,574 m and £17,403 m for Solomou and Weale. The equivalents from the study here are £2,450 m (current prices) and £16,601 m (constant 1990 prices).

TABLE 6  
COMPARATIVE GROWTH RATES  
(Average annual growth over preceding five years)

	Totals				Per Capita <sup>1</sup>				Per Household <sup>2</sup>			
	Current Prices		1990 Prices		Current Prices		1990 Prices		Current Prices		1990 Prices	
	Gross Stock	Net Stock	Gross Stock	Net Stock	Gross Stock	Net Stock	Gross Stock	Net Stock	Gross Stock	Net Stock	Gross Stock	Net Stock
	Durable Goods											
1950	1.84	10.38	1.43	8.95	1.12	9.60	0.72	8.19	0.82	9.28	0.42	7.86
1955	6.76	11.41	3.61	8.33	6.54	11.18	3.38	8.09	5.69	10.29	2.57	7.24
1960	7.73	9.35	5.41	7.82	7.15	8.76	4.84	7.23	6.65	8.26	4.35	6.74
1965	8.78	7.77	6.37	6.01	7.96	6.96	5.57	5.22	7.42	6.43	5.05	4.69
1970	8.38	6.96	5.16	3.42	7.88	6.46	4.67	2.94	7.08	5.67	3.90	2.18
1975	17.82	18.09	5.41	5.53	17.58	17.85	5.19	5.30	16.72	16.99	4.43	4.54
1980	18.51	17.39	3.43	2.63	18.47	17.34	3.39	2.59	17.69	16.57	2.70	1.91
1985	6.78	7.25	3.13	3.69	6.65	7.11	3.00	3.56	5.57	6.04	1.96	2.51
1990	10.20	11.09	5.33	6.22	9.86	10.75	5.00	5.90	9.04	9.92	4.22	5.10
1995	5.48	4.02	3.14	1.88	5.10	3.65	2.77	1.51	3.66	3.17	2.06	0.82
	All Goods											
1950	5.27	9.96	3.68	7.52	4.53	9.19	2.95	6.77	4.22	8.86	2.64	6.45
1955	6.58	8.08	3.67	5.36	6.36	7.86	3.44	5.12	5.51	7.00	2.63	4.30
1960	6.59	7.44	5.03	6.41	6.02	6.86	4.47	5.84	5.53	6.36	3.98	5.34
1965	7.57	6.79	5.21	4.81	6.76	5.99	4.42	4.03	6.23	5.46	3.90	3.51
1970	8.05	7.09	4.52	3.44	7.55	6.59	4.03	2.96	6.75	5.80	3.26	2.19
1975	17.21	17.08	4.81	4.71	16.97	16.84	4.59	4.49	16.12	15.99	3.83	3.73
1980	17.39	16.47	3.20	2.68	17.35	16.43	3.16	2.64	16.58	15.66	2.48	1.96
1985	7.32	7.73	2.96	3.42	7.19	7.59	2.83	3.29	6.11	6.51	1.79	2.25
1990	10.00	10.69	5.34	6.11	9.66	10.35	5.02	5.78	8.84	9.53	4.23	4.99
1995	5.56	4.33	3.32	2.30	5.18	3.95	2.95	1.93	3.49	3.21	2.25	1.23

<sup>1</sup>Source Population: United Kingdom Office of Population Census and Surveys.

<sup>2</sup>Source Households: United Kingdom Department of Environment.

TABLE 7  
COMPONENTS IN GROSS STOCK OF CONSUMER DURABLES AT CONSTANT 1990 PRICES  
(Percent of total using Medium-life assumptions)

	Transport Vehicles		Other Durable Goods				Household Goods			Clothing and Footwear, Opticians Goods, Books and Miscellaneous Goods						Totals	
	Motor Vehicles	Other Vehicles	Furniture	Floor Coverings	Audio-Visual Photo/Opt. Equipment	Major Appliances	Hardware	Household Textiles	DIY Goods	Clothing & Footwear	Spectacles	Sports & Toy Goods	Records	Travel Goods Novelties & Gifts, Leather	Books	Durable Goods	All Goods
1950	2.51 (4.56)	1.18 (2.15)	33.16 (60.28)	14.79 (26.89)	0.38 (0.69)	2.98 (5.42)	7.78	3.05	4.93	17.97	0.23	1.63	0.62	1.19	7.60	55.00 (100.00)	100.00 (181.82)
1955	7.00 (12.77)	2.34 (4.27)	28.02 (51.09)	12.31 (22.44)	0.56 (1.02)	4.61 (8.41)	7.70	3.98	6.93	15.47	0.22	1.77	0.56	1.29	7.23	54.85 (100.00)	100.00 (182.32)
1960	12.99 (23.27)	2.60 (4.65)	22.62 (40.52)	11.21 (20.08)	0.66 (1.18)	5.74 (10.29)	7.50	4.00	6.69	15.32	0.25	2.19	0.55	1.49	6.21	55.81 (100.00)	100.00 (179.16)
1965	19.22 (32.61)	2.22 (3.76)	19.58 (33.22)	11.26 (19.10)	0.64 (1.09)	6.02 (10.22)	7.96	3.61	6.21	14.03	0.28	2.19	0.52	1.33	4.92	58.95 (100.00)	100.00 (169.64)
1970	22.89 (37.65)	1.99 (3.27)	18.77 (30.86)	10.96 (18.03)	0.61 (1.01)	5.58 (9.18)	8.26	3.34	6.39	12.82	0.27	2.35	0.61	1.33	3.83	60.80 (100.00)	100.00 (164.48)
1975	25.53 (40.81)	2.00 (3.20)	18.06 (28.87)	9.99 (15.97)	1.15 (1.83)	5.83 (9.32)	7.56	3.09	6.38	11.75	0.25	2.84	0.85	1.43	3.30	62.56 (100.00)	100.00 (159.86)
1980	25.59 (40.46)	2.08 (3.28)	18.07 (28.57)	9.14 (14.45)	1.98 (3.14)	6.39 (10.10)	6.56	3.09	6.38	11.72	0.25	3.24	0.90	1.43	3.18	63.25 (100.00)	100.00 (158.11)
1985	25.86 (40.55)	2.15 (3.37)	17.47 (27.40)	8.12 (12.74)	3.23 (5.07)	6.93 (10.87)	5.61	2.77	6.79	12.02	0.25	3.62	0.97	1.43	2.79	63.76 (100.00)	100.00 (156.83)
1990	26.96 (42.32)	2.37 (3.72)	15.40 (24.17)	6.68 (10.48)	4.96 (7.78)	7.34 (11.53)	5.06	2.62	7.39	11.71	0.35	3.88	1.51	1.52	2.25	63.71 (100.00)	100.00 (156.95)
1995	25.43 (40.27)	2.50 (3.96)	14.98 (23.72)	5.65 (8.94)	6.68 (10.58)	7.91 (12.53)	4.88	2.94	7.58	11.32	0.44	4.20	1.89	1.45	2.17	63.14 (100.00)	100.00 (158.37)

Note: Figures in parentheses show the proportions of the components in the ONS durables stock definition.

TABLE 8  
 CONSISTENCY WITH OTHER ESTIMATES  
 [Net stock at current prices (reducing balance)]

	Total (£ billion)						Discrepancy Between Current Estimates And:			
	Revell (1967)	Calder (1976)	CSO (ALLW)	Blue Book	Current Estimates		Revell	Calder	ALLW	Blue Book
	Durable Goods	All Goods	All Goods	All Goods	All Goods	Durable Goods				
1957	2.8	—	—	—	—	3.4	0.6	—	—	—
1958	3.0	—	—	—	—	3.7	0.7	—	—	—
1959	3.2	—	—	—	—	4.1	0.9	—	—	—
1960	3.6	—	—	—	—	4.5	0.9	—	—	—
1961	4.0	—	—	—	—	4.8	0.8	—	—	—
1966	—	11.4	—	—	12.1	8.6	—	0.7	—	—
1967	—	12.2	—	—	12.7	7.1	—	0.5	—	—
1968	—	13.3	—	—	13.7	7.7	—	0.4	—	—
1969	—	14.3	—	—	14.6	8.2	—	0.4	—	—
1970	—	15.7	—	—	16.2	9.0	—	0.5	—	—
1971	—	17.6	—	—	18.4	10.5	—	0.8	—	—
1972	—	20.2	—	—	20.8	12.0	—	0.6	—	—
1973	—	24.1	—	—	23.8	13.8	—	-0.2	—	—
1974	—	29.2	—	—	28.7	16.5	—	-0.5	—	—
1975	—	34.3	37.8	37.9	35.5	20.7	—	1.2	-2.30	-2.40
1976	—	39.8	44.6	44.6	40.9	24.2	—	1.1	-3.70	-3.70
1977	—	—	51.4	51.4	48.2	28.9	—	—	-3.20	-3.20
1978	—	—	56.0	60.1	55.9	34.0	—	—	-0.10	-4.20
1979	—	—	66.5	70.1	67.1	41.0	—	—	0.60	-3.00
1980	—	—	73.6	78.7	76.0	46.1	—	—	2.40	-2.70
1981	—	—	77.8	84.1	80.4	48.1	—	—	2.60	-3.70
1982	—	—	82.7	90.0	86.4	52.0	—	—	3.70	-3.60
1983	—	—	89.9	97.7	93.1	55.9	—	—	3.20	-4.60
1984	—	—	96.6	104.9	100.6	60.4	—	—	4.00	-4.30
1985	—	—	104.5	113.2	110.2	65.4	—	—	5.70	-3.00
1986	—	—	114.8	122.4	120.7	70.8	—	—	5.90	-1.70
1987	—	—	127.0	137.1	134.3	79.2	—	—	7.30	-2.80
1988	—	—	142.4	—	152.3	91.5	—	—	9.90	—
1989	—	—	160.0	—	169.1	102.4	—	—	9.10	—
						Mean	0.78	0.50	3.01	-3.30
						STD	0.10	0.49	4.21	0.82

is a good level of agreement between the estimates and differences can be easily accounted for by data revision in the flows used for this study.

The methodology adopted here is also consistent with that adopted internationally. In the case of the United States for example, the estimates produced by the Bureau of Economic Analysis (BEA) use an equivalent version of the PIM as discussed in Musgrave (1979) and BEA (1993). In particular, the recent revisions to the national income accounts in the United States adopt the reducing balance method to calculate consumption flows from the stock. These are described in BEA (1995, 1996).

Recently, Mayes and Young (1994) have raised objections to the use of the PIM as it has been applied in the United Kingdom to estimate the stock of fixed capital. They suggest that although the distribution of retirements around the

service life assumed has very little effect on the overall measure, the actual lives themselves are very important. In particular, they show that the service life assumptions used for the components of the capital stock have been too long in relation to evidence from other sources and by international comparison. As a result, capital goods are retained in the stock measure long after they have been retired so that the estimated series overstates the actual amount of capital in the stock. They show that the measured series may overstate the actual gross stock by 15 percent and the actual net stock by 18 percent when each is measured using more accurate service life assumptions. In contrast, changes in the stock series are hardly affected when shorter service lives are assumed.<sup>9</sup> In the case of durables, the life assumptions used here are in line with international standards and although alternatives might be suggested, there is no clear evidence that those used here are very inconsistent with *a priori* expectations.

Nonetheless, the observation that the service lives chosen affect the overall estimate is a well known feature of the PIM. Table 9 shows the sensitivity of the current stock estimates to the three service life assumptions presented in Table 1. It is clear that the levels estimates are very different with respect to each of the alternative service lives. In the case of the short life assumptions, the levels estimates are around 70 percent of their equivalent when estimated using medium life assumptions. The estimates using the long life assumptions are around 17 percent higher in net terms and around 25 percent higher in gross terms.<sup>10</sup> However, there is as mentioned earlier, no clear evidence that the medium life assumptions preferred in this study are greatly out of line with reasonable expectations and indeed there is a degree of international comparability which supports their use.

Mayes and Young also suggest that there is evidence of variation in the service lives over time which has particular consequences for the profile as well as the level of the stock series. Their evidence suggests that this variation has largely been due to premature scrapping by firms forced into liquidation during the recessionary period of the 1980s. There is however no unambiguous evidence that unexpected obsolescence of this sort would be true of durables goods although there has been some discussion in the U.S. in the context of cars and consumer electronics, (BEA 1995, 1996). A comprehensive study of asset lives would shed more light on the appropriate service lives to be used and may be taken up in a further study.

The controversy surrounding indirect estimates of stock series is well documented and has led some researchers to conclude that estimates based on survey evidence might be more appropriate. In principle this is likely to be true, however direct surveys of asset stocks have in the past been avoided because of expense. In the United Kingdom, surveys of consumer behaviour such as the General Household Survey have looked at ownership concentrations across households rather than at the value of holdings within the household. As a result information

<sup>9</sup>The sensitivity of the fixed capital stock measure to the service lives assumed is also discussed in Hibbert, Griffin, and Walker (1977).

<sup>10</sup>The growth rates by comparison are less divergent overall although the greatest discrepancy is around the start and end of the sample for each of the alternatives. See Williams (1997) for a full comparison.

TABLE 9  
COMPARATIVE PROPERTIES OF AGE LENGTH ASSUMPTIONS  
(levels £ billion)

	Current Prices						Constant 1990 prices					
	Gross Stock			Net Stock			Gross Stock			Net Stock		
	Short	Medium	Long	Short	Medium	Long	Short	Medium	Long	Short	Medium	Long
1955	5.40 (62.21)	8.68	11.80 (135.96)	2.09 (73.39)	2.85	3.41 (119.53)	37.92 (59.30)	63.95	90.44 (141.43)	14.36 (71.96)	19.95	24.11 (120.85)
1960	9.02 (71.71)	12.57	16.87 (134.20)	3.32 (74.50)	4.45	5.20 (116.71)	59.11 (71.06)	83.18	115.91 (139.36)	21.37 (73.63)	29.03	33.98 (117.07)
1965	13.75 (71.83)	19.14	25.45 (132.96)	4.70 (72.61)	6.47	7.63 (118.01)	83.04 (73.32)	113.25	149.85 (132.32)	28.55 (73.48)	38.85	44.89 (115.53)
1970	20.02 (70.00)	28.61	36.81 (128.69)	6.47 (71.50)	9.04	10.72 (118.52)	103.83 (71.28)	145.66	184.88 (126.92)	33.17 (72.18)	45.96	53.38 (116.15)
1975	45.52 (70.59)	64.48	80.16 (124.33)	15.02 (72.52)	20.71	24.25 (117.11)	134.86 (71.15)	189.53	234.15 (123.54)	43.79 (73.03)	59.96	69.10 (115.23)
1980	101.77 (67.66)	150.42	186.80 (124.19)	33.32 (72.29)	46.09	54.05 (117.27)	152.08 (67.80)	224.30	278.32 (124.08)	49.44 (72.49)	68.20	79.31 (116.28)
1985	144.47 (69.21)	208.76	263.29 (126.12)	47.79 (73.10)	65.37	76.75 (117.13)	182.09 (69.60)	261.63	328.98 (125.74)	60.06 (73.52)	81.70	94.71 (115.92)
1990	242.25 (71.44)	339.10	420.47 (123.99)	82.72 (74.92)	110.41	126.33 (114.42)	242.25 (71.44)	339.10	420.47 (123.99)	82.72 (74.92)	110.41	126.33 (114.42)
1995	301.98 (68.26)	442.42	558.44 (126.22)	98.12 (73.02)	134.36	156.46 (116.45)	270.36 (68.32)	395.73	498.85 (126.06)	88.53 (73.15)	121.03	141.35 (116.79)

Note: Figures in parentheses are the values of each alternative as a percentage of the medium life value.

from these sources is of limited use. However, if complete surveys of durable good holdings became available it would be possible to use them for comparison with the current study. In their absence our best strategy is to apply the PIM which is widely used and is also the international standard. This is the approach taken here and allows us to provide the most comprehensive estimates currently available for the United Kingdom which it is hoped will represent a useful resource in applied research.

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