THE CAPITAL STOCK
OF IRELAND,
1950-1984

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GENERAL SUMMARY

1: *Introduction and Background*

Up to the present time no measures have appeared of the total capital stock existing in Ireland, in the form of tangible assets valued at current prices or at constant prices. This Report offers first or "pilot" estimates of such capital stock, at 1980 prices, for the end of each year during the period 1950-1984.

Of its nature, the subject matter is complicated and detailed; the background numerical data are bulky. As a help to readers, the Report is divided into two parts. The first part is aimed at the general economist, and comprises Chapters 1 to 4. For those who seek further detail, there is available the second part of the Report, comprising Chapters 5 to 13 and the six background Appendices.

"Tangible Assets" including land but excluding minerals is a summary description of the scope and coverage of the capital stock being estimated. "Tangible" means "physical". as distinct from "intangible" assets such as loans and securities; all intangibles are excluded. Tangible assets comprise "reproducible" and "non-reproducible" assets. The present Report covers non-reproducible assets by way of land for agriculture and forestry, and other land mainly used by roads and buildings or attached to them.

The reproducible assets covered by the report include fixed assets and inventories of business enterprises, as well as consumer durables. The fixed assets comprise all kinds of plant, machinery and vehicles, as well as all kinds of buildings and engineering constructions such as dwellings, roads, railway tracks, hydroelectric dams. The inventories include agricultural livestock, raw materials and fuels held by business enterprises, all semi-finished items denoted "work in progress". and finished goods including stocks for resale held by wholesale and retail trade and also by manufacturers.

The stocks of tangible assets, including land, are valued at 1980 prices, to correct for effects of price inflation throughout 1950-1984. The year 1980 has been chosen as the price base, to coincide with the same price base of the official National Accounts. In principle, stocks are valued at the end of each calendar year at what it would cost to buy them or put them in place at supposed "normal" average 1980 prices, meaning neither market collapse nor conditions of panic buying.

But fixed assets in existence at the end of any year can be valued either *Gross* or *Net*. *Gross* means valued at full *new* (undepreciated) cost, at supposed 1980 prices. *Net* means valued (after depreciation) according to estimated productive

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life remaining at the end of that year, again at supposed 1980 prices. Both gross and net estimates are presented in this Report.

Analysis of tangible assets by legal *ownership* has not been made. Breakdown is shown according to *users,* rather than owners. The word "domestic". meaning "existing in Ireland". describes the scope of the tangible asset results shown below.

The Report shows the distribution of assets, by the major kinds of economic activity using them. The most important major using sectors or groupings comprise: agriculture, mining, manufacturing, construction, electricity generation, trade, transport and distribution, other services. The consumer durable assets, of course, are used by households. But "Dwellings" are treated as a separate entity; also kept separate are "Roads". For each major using sector, the assets are shown also according to type: (a) plant and machinery, (b) vehicles, (c) buildings and land, (d) inventories, in so far as the data permit. The sectors or sector-groups shown in the report depend on the asset-data sectoral breakdown available from the Central Statistics Office. A further breakdown of services is desirable, but not possible, without special survey results.

Capital Stocks as Described in the Literature

Previous Irish studies are those of Henry (1971) and Vaughan (1980). Gross fixed stocks of Mining, Manufacturing and Construction in Ireland for the period 1953-1968 were reported in Henry (1971). A detailed gross and net treatment of Manufacturing of the period 1945-1973 followed in Vaughan (1980).

Major studies have been made in other countries during the 1950s and 1960s, covering the full range of national wealth. A very detailed example is the Goldsmith (1962) study of the national wealth of the United States in the post-war period. A general impression to be derived from this literature is that agreement on methods and principles of valuation of tangible assets is widespread, whereas inclusion or exclusion of items such as land, standing timber, consumer durables, seems to be a matter of data availability.

Possible Uses of the Tangible Asset Estimates

The literature just referred to mentions many uses for any available estimates of tangible assets or national capital. Three major uses deserve mention here:

(a)   *The distribution of capital and of taxable capacity,* to establish the relative shares of individuals or of groups. Within the context of the present Report, *capital users,* as distinct from capital owners, would be indicated by the estimates.

(b)   *Social accounting and derived economic research.* For a more satisfactory analysis of economic performance, capital stock information is required, in addition to sectoral or national income or Gross Domestic Product.

(c) *Economic development and growth:* Capital is important, both as a symptom and a cause of economic development, being viewed as a group of physical assets which comprise a factor of production and contribute to output. The capital assets may be separated into several groups or categories, and a specific economic analysis can be applied to each group.

2 *How the Asset Values Were Estimated*

A summary description of the main methods used to estimate asset values can go from fairly simple methodology to what is most complex. In increasing order of complexity, we may consider (a) inventories, (b) agricultural holdings, (c) all other fixed assets, including dwellings and roads.

(a) *Inventories*

One major form of working stocks is the agricultural livestock held on farms at the end of the year. Detailed year-end numbers of livestock on farms have been published by the Central Statistics Office (CSO) down through the years. The CSO have specially provided average 1980 market prices for the various livestock categories, thus enabling the author to value the year-end livestock numbers. Due to lack of "hard" information, no allowance was possible for effects of improved quality of recent new breeds of cattle etc.

All inventories have a gross value only; the net concept does not apply. Remaining year-end inventories comprise stocks of goods for sale held by traders generally, and all stocks (raw materials, work-in-progress, finished goods) held by Manufacturing and other producers. The present Report does not cover feed, fertilisers and seeds held on farms. Year-end values of inventories of Manufacturing are estimated by the CSO for each year, with less frequent detailed information available for traders (in the Census of Distribution). The inventory values at current prices are inflated by the most appropriate price indices, so as to be at supposed 1980 average prices. Various wholesale price indices, also produced by CSO, are available for the 1950-1984 period under review.

(b) *Agricultural Holdings (including farmhouses)*

The main objective in this category is the aggregate market value, at 1980 prices, of all agricultural holdings in the State, throughout 1950-1984. By courtesy of the Valuation Office, a 1980 sample of more than 600 usable sales valuations was provided, broken down by size (acreage) of holding, and also broken down by county. The CSO particulars of 1980 numbers of holdings by size-group and by county could thus be valued, to give a national estimate of the 1980 aggregate value of all such holdings. The sales information given by the sample at county level is crucial, to allow both land quality and nearness to (or remoteness from) the large urban centres (e.g., Dublin) to be taken into account.

The 1980 information enabled a 1980 weighted-average price per holding to be estimated for each national size-group of holding (across counties). The CSO data on numbers of holdings by size-group, for earlier years and through 1984, was used with 1980 price-per-holding values, to give *uncorrected* national estimates for years other than 1980.

As a correction of the latter, it was necessary to deduct for each year the 1980 value due to new farmhouses and land improvements which were not in existence in that particular earlier year, such as 1970. Likewise, for 1981-1984, value increases due to similar effects needed to be added on. Depreciation effects were also taken into account because "market value" implies less than the full new price for assets more than one year old. A much more detailed account appears below in Chapter 7 and Appendix 3.

(c) *All Other Fixed Assets*

Several factors come into play, in estimating year-end stocks of all other fixed assets. Gross values and net values are both required.

The basic general method used is known as the "Perpetual Inventory" (PI) method. In effect, the method repeatedly keeps a record or inventory of existing stocks at the end of last year, new additions and scrappings and sales during the present year, and thus calculates an updated value of the stocks existing at the end of the present year. One is supposedly working at constant prices. One year-end valuation gives the gross stock, the other valuation gives the net stock.

To apply the PI system to a given sector or industry, the following items of information are required:

(a)   A benchmark or starting year-end value for (i) the gross stock and (ii) the net stock, of each major kind of asset, in prices of the benchmark year;

(b)   The known or assumed age-structure of the benchmark stocks;

(c)   New purchases of assets of each major kind during each year, at current prices, the Gross Fixed Capital Formation (GFCF);

(d)   Any sales of assets during each year, by major kind;

(e)   Relevant price indices, to inflate (deflate) the benchmark and GFCF values so that all can be valued at constant (say 1980) prices;

(f)   Known or assumed "average useful life" values for each major kind of asset.

Given (a) to (f), one can estimate year-end PI values for each major kind of asset at 1980 prices, by extrapolating forward or backward from the benchmark year, which does not necessarily have to be at the beginning of the period for which the fixed stock series are sought.

In order to estimate gross stock, by forward projection from the benchmark, the benchmark stocks themselves are entered at the end of each year ahead at full gross (benchmark) value, subject to loss by scrapping and sales. The scrapping occurs at the end of the average useful life. The new GFCF values are entered each year, and carried forward in the accounts in exactly the same way as just stated for the benchmark values. At the end of each year, the sum of what is found in the account is the gross stock.

To obtain net stock, the procedure is similar. One starts with the net benchmark values. In addition to scrapping in accordance with average useful life, simple linear depreciation of the new value (at 1980 prices) is applied to each asset throughout its life.

3 *Gross and Net Year-End Values of Tangible Asset Stocks*

The tangible asset stock estimates appearing below in the main report are of a very detailed nature. However, a fairly aggregate and abbreviated framework is now presented, in Tables A and B. Table A shows year-end values of five selected years, at 1980 prices. Table B shows derived volumes, based on 100 for 1960. Both tables give results for the five years 1950, 1960, 1970, 1980 and 1984. Both tables also detail seven economic groups or categories, as well as the aggregate for all seven groups, and a sub-aggregate for all except the Agriculture group.

The first group comprises Agriculture, Forestry and Fishing, but with gross or net farmhouse values omitted from the fixed assets, as not directly usable for agricultural production, in the sense of land, livestock, machinery, animal housing units. The second group, Industry comprises Mining, Manufacturing, Construction, and the production and distribution of Electricity, Gas and Water. The third group combines Trade (Wholesale and Retail) with purchased Transport and with Communication. The fourth group, All Other Services, combines "Finance and Business Services" with "Community, Social and Personal Services" and with "Public Administration". There are also three major categories of fixed assets, namely Roads, Dwellings (including Farmhouses), and Consumer Durables.

Four kinds of year-end asset groupings appear in Table A. The first kind, denoted "Total Gross Fixed Assets" appears as the top section of the table. The estimates denote fixed asset cost or value "as if new". without being depreciated. A convenient unit of value is the £ billion (bn) meaning £1,000 million, to keep the number of digits small, in quoting year-end values. All such values quoted are at 1980 prices, unless otherwise indicated.

We see that the aggregate of Total Gross Fixed Assets has increased from about £36 bn in 1950 to some £77 bn at the end of 1984, most of the growth occurring since the £40 bn of 1960. For the Agriculture group omitted, the growth

Table A: *Total Gross and Net Fixed Assets, and Total Inventories, for each of Seven Economic Groups or Categories, at end of year, at 1980 prices £ million*

Economic Group or Category	1950	1960	1970	1980	1984
	Total Gross Fixed Assets				
Agriculture, Forestry, Fishing (excluding Farmhouses)	17,594	18,069	18,765	20,527	21,024
Industry	1,785	2,384	4,615	9,719	11,998
Trade, Transport and Communication	1,802	2,200	3,554	6,007	6,871
All Other Services (including Finance, etc.)	1,214	1,942	3,489	6,374	8,005
Roads	8,822	9,224	9,703	10,164	10,490
Dwellings (including Farmhouses)	3,327	4,296	6,120	10,860	12,904
Consumer Durables	1,312	1,526	2,725	5,257	5,500
Aggregate Total Gross Fixed	35,856	39,641	48,971	68,908	76,792
Aggregate Gross Fixed (excluding Ag., For., Fishing)	18,262	21,572	30,206	48,381	55,768
	Total Net Fixed Assets				
Agriculture, Forestry, Fishing (excluding Farmhouses)	17,182	17,168	17,495	18,568	18,611
Industry	922	1,598	3,208	6,765	8,027
Trade, Transport and Communication	955	1,400	2,467	3,912	4,411
All Other Services (including Finance, etc.)	693	1,311	2,565	4,517	5,545
Roads	8,822	9,224	9,703	10,164	10,490
Dwellings (including Farmhouses)	1,733	2,765	4,469	8,666	10,300
Consumer Durables	752	975	1,713	3,220	3,146
Aggregate Total Net Fixed	31,059	34,441	41,620	55,812	60,530
Aggregate Net Fixed (excluding Ag., For., Fishing)	13,877	17,273	24,125	37,244	41,919
	Total Inventories				
Agriculture, Forestry, Fishing	1,490	1,553	1,860	1,976	1,967
Industry	416	472	891	1,633	1,564
Trade (Wholesale and Retail)	418	374	506	1,002	955
Aggregate Total Inventories	2,324	2,399	3,257	4,611	4,486
	Total Net Capital (Total Net Fixed plus Total Inventories)				
Agriculture, For., Fishing, (excluding Farmhouses)	18,672	18,721	19,355	20,544	20,578
Industry	1,338	2,070	4,099	8,398	9,591
Trade, Transport and Communication	1,373	1,774	2,973	4,914	5,366
All Other Services (including Finance, etc.)	693	1,311	2,565	4,517	5,545
Roads	8,822	9,224	9,703	10,164	10,490
Dwellings (including Farmhouses)	1,733	2,765	4,469	8,666	10,300
Consumer Durables	752	975	1,713	3,220	3,146
Aggregate Total Net Capital	33,383	36,840	44,877	60,423	65,016
Aggregate Total Net Capital (excluding Ag., For., Fishing)	14,711	18,119	25,522	39,879	44,438

Table B: *Volume Index of Total Gross Fixed Assets and of Total Net Capital, to base 100 for 1960, for each of Seven Economic Groups or Categories, derived from Table A*

Economic Group or Category	1950	1960	1970	1980	1984
	Total Gross Fixed Assets				
Agriculture, Forestry, Fishing					
(excluding Farmhouses)	97.4	100 —	103.9	113.6	116.4
Industry	74.9	100 —	193.6	407.7	503.3
Trade, Transport and					
Communication	81.9	100 —	161.5	273.0	312.3
All Other Services (including					
Finance, etc.)	62.5	100 —	179.7	328.2	412.2
Roads	95.6	100 —	105.2	110.2	113.7
Dwellings (including Farmhouses)	77.4	100 —	142.5	252.8	300.4
Consumer Durables	86.0	100 —	178.6	344.5	360.4
Aggregate Total Gross Fixed	90.5	100 —	123.5	173.8	193.7
Aggregate Gross Fixed (excluding					
Ag., For., Fishing)	84.7	100 —	140.0	224.3	258.5
	Total Net Capital				
Agriculture, Forestry, Fishing					
(excluding Farmhouses)	99.7	100 —	103.4	109.7	109.9
Industry	64.6	100 —	198.0	405.7	463.3
Trade, Transport and					
Communication	77.4	100 —	167.6	277.0	302.5
All Other Services (including					
Finance, etc.)	52.9	100 —	195.7	344.5	423.0
Roads	95.6	100 —	105.2	110.2	113.7
Dwellings (including Farmhouses)	62.7	100 —	161.6	313.4	372.5
Consumer Durables	77.1	100 —	175.7	330.3	322.7
Aggregate Total Net Capital	90.6	100 —	121.8	164.0	176.5
Aggregate Total Net Capital					
(excluding Ag., For., Fishing)	81.2	100 —	140.9	220.1	245.3

since 1950 has been even greater, from some £18 bn to £56 bn through £22 bn in 1960. Readers can see further details for themselves. However, the Agriculture group, mainly agricultural holdings without their farmhouses, shows little change, from some £18 bn in 1950 to £21 bn in 1984. The industry group shows rapid growth, to reach £12 bn in 1984. Other end-of-1984 values are £6.9 bn for Trade, etc., £8.0 bn for All Other Services, £10.5 bn for Roads, £12.9 bn for Dwellings, and £5.5 bn for Consumer Durables.

The next lowest portion of Table A shows "Total Net Fixed Assets," meaning subject to reduction by depreciation, and thus smaller than corresponding gross values. The aggregate of all shows a doubling, from some £31 bn in 1950 to £61 bn in 1984, with a growth of some £14 bn between 1970 and 1980, as against some £5 bn between 1980 and 1984. For the Agriculture group omitted, we see the 1950 value of about £14 bn trebled so as to be some £42 bn in 1984.

For Roads, by convention, there is no depreciation, meaning that gross and net values are the same. For the Agriculture group, the gross and net values are close, because agricultural holdings comprise most of the value, and such land has little meaningful difference between gross and net market values. The other groups show growth of net value in parallel with that of gross. All end-of-1984 net fixed values may be quoted: Agriculture, etc., £18.6 bn; Industry £8.0 bn; Trade, etc., £4.4 bn; All Other Services £5.5 bn; Roads £10.5 bn; Dwellings £10.3 bn; Consumer Durables £3.1 bn.

Total Inventories occupy the next lowest portion of Table A. Their year-end values are on a relatively smaller scale. From £2.3 bn in 1950 they increase, so as to reach £4.5 bn at the end of 1984. Some £1.5 bn to £2.0 bn of this comprises livestock of the agriculture group.

A "Total Net Capital" stock value can be obtained as the sum of Net Fixed Assets and Total Inventories, both at end-of-year. This value is in principle what the total assets would be worth, at "equitable" prices, after due allowance for depreciation. The bottom portion of Table A shows the derived set of year-end Total Net Capital values.

At 1980 prices, the aggregate for the State shows a growth from some £33 bn in 1950 to £65 bn in 1984. Within this, the total value of Agriculture, etc., remains rather stable, increasing from £18.7 bn to £20.6 bn at the end of 1984. The aggregate excluding the Agriculture group shows a trebling of total value, from about £15 bn in 1950 to some £44 bn in 1984, with a growth of £14 bn between 1970 and 1980.

An interesting question is: what might be the Total Net Capital value of the tangible assets described above as existing in Ireland, at present (1989) prices? Since 1980, land prices have decreased considerably whereas other assets (mainly Gross Fixed Capital Formation) have had some 50 per cent rise in prices, according to the information available to the author. One may therefore take ½ of the Table A value of the Agriculture group (excluding Forestry and Fishing), and 1½ times the Table A value of all the rest (plus Forestry and Fishing, see Table 3.10 below), to obtain *a rough order-of-magnitude value* of Total Net Capital at 1989 prices. On this basis, a total end-of-year value of tangible assets held within the State, *at 1989 prices,* in £ billion, may be suggested:

	1950	1960	1970	1980	1984
Agriculture (excluding farmhouses)	9	9	10	10	10
All other groups and categories	22	27	39	60	67
Aggregate Total Net Capital Value	31	36	49	70	77

Readers are asked to note that these Total Net Capital values are highly tentative.

Volume of Assets based on 1960

Table B shows the volume results derived from Table A data, and based on 100 as volume for end of year 1960. This latter year has been chosen as base, for having more reliable values than 1950 which required starting-value estimates, and because 1960 marked the beginning of a period of economic expansion.

The upper part of Table B shows volume growth of total gross fixed assets. Volumes of 1950 are generally smaller than those of 1960, chosen as base. For 1984 compared with 1950, some 94 per cent growth is evident for the aggregate of all such assets. The aggregate for non-Agriculture shows a larger growth, of 159 per cent, because the assets of the Agriculture group have such small growth, a mere 16 per cent. Among other sectors, the largest growth, of 403 per cent, occurs for Industry; All Other Services has 312 per cent growth. Consumer Durables have grown by 260 per cent by the end of 1984, and Dwellings show 200 per cent growth.

The lower portion of Table B has volume growth of Total Net Capital Assets (Net Fixed plus Inventories). These volumes show growth patterns similar to those of Total Gross Fixed Assets, just discussed, with relatively small Inventories having little impact on the sector group aggregates. Again, all 1950 volumes are below the 1960 base volumes of 100. The aggregate of all groups shows 77 per cent growth by the end of 1984. For the Agriculture group omitted, this growth of the aggregate is 145 per cent, with Agriculture showing only 10 per cent. Among other groups, the volume at end-of-1984 shows 363 per cent growth for Industry, and 323 per cent for All Other Services. The Roads net growth (same as gross growth) is a mere 14 per cent. Dwellings show 273 per cent growth, and Consumer Durables 223 per cent, by the end of 1984.

4. *Further Aspects and Conclusions*

Three items comprise the subject matter to be finally considered. The first illustrates how the capital stock estimates can be combined with GDP and employment, to show trends occurring during 1960-1984. The second item is the question of quality (meaning reliability) of the various gross and net fixed stock estimates, and of inventories. The third item is the updating of the stock estimates, and what might be required to improve their general reliability.

(1) *Gross Capital Stock Matched with GDP and Employment*

Gross Capital Stock (Gross Fixed plus Inventories) data from the present report have been matched with Gross Domestic Product (GDP) data from the National Accounts, *also at 1980 prices*. Mid-April Employment data have also been matched, to give derived ratios for six years of the period 1960-1984, as detailed in Chapter

4 below, at the level of four groups of economic activities. The following scheme shows some of the full set of results, confined to four years of the full period:

	1960	1970	1980	1984
	Gross Capital Stock/Employment (£000 per employee)			
Agriculture, Forestry, Fishing	50.31	72.88	107.67	127.02
Industry	11.52	17.65	30.60	42.51
Trade, Transport, Communication	13.27	19.61	30.21	33.02
All Other Services	8.71	13.90	17.41	21.87
Subtotal ex. Agric.etc.	11.09	16.95	26.12	31.88
Total	25.59	31.98	40.86	47.49
	1960	1970	1980	1984
	GDP/Employment (£000 per employee)			
Agriculture, Forestry, Fishing	1.77	2.66	4.74	6.72
Industry	4.00	5.88	8.58	11.57
Trade, Transport, Communication	3.12	4.86	6.49	6.18
All Other Services	6.57	7.04	8.29	8.40
Subtotal ex. Agric. etc.	4.60	5.98	7.95	8.93
Total	3.56	5.09	7.38	8.57

In reviewing the Gross Capital Stock/Employment ratios, we see growth of the ratio, from 1960 to 1984, in all four groups. The Agriculture group shows much larger values than all others, by increasing from about 50 for 1960 to some 127 for 1984, in £000 per person employed. For the other three groups combined, the ratio increases from about 11 for 1960 to about 32 for 1984. The Industry and Trade groups show rather similar values for 1960-1980, with the All Other Services group showing smaller values.

For the GDP/Employment ratios, a persistent increase is apparent for all groups combined, from about 3.6 (£000 per person employed) in 1960 to about 8.6 in 1984. The three groups excluding Agriculture show an aggregate result having larger values than those of all four groups combined, namely a persistent increase from 4.6 in 1960 to about 8.9 in 1984. Agriculture shows relatively low but increasing values for 1960-1980, namely 1.8 to 4.7; but a major increase occurs so as to give 6.7 for 1984, which is about the same as the 6.2 shown for the Trade group.

Some real-world meaning may be supplied to the figures just quoted, in the context of 1984 results. The per employee 1984 ratios for the Agriculture group say that (at 1980 prices) £6,720 of GDP has £127,020 of gross capital stock associated with it. So to get £5,000 of GDP or income (some £100 per week) requires about £95,000 of capital assets of the kind required by Agriculture (with

little effect due to small Forestry and Fishing components). By contrast, to get £5,000 of GDP from the other three groups requires only some £13,000 to £27,000 of gross capital stock.

These results seem to make three points. First, any Capital Stock/GDP relations need sectoral breakdown, to improve their reliability. Second, any projections of Gross Capital Stock relations with GDP had better be done for individual sectors rather than in aggregate. Third, even if one were to halve the 1984 Agriculture ratio of £95,000 per £5,000 GDP, in deference to 1980 high relative prices of land, that revised ratio would still be much larger than those of other groups.

(2) *Quality of the Capital Stock Estimates*

By "quality" of asset estimates is meant how closely or precisely they measure known or (more frequently) unknown real-world gross or net asset values. Central to the meaning of "quality" is *reliability*, which means in its ordinary sense how close the estimate comes to its real-world value. We can see that "closeness" has most meaning for the year of the price-base. In that year, prices as well as values are of a real-world kind, and value distortion does not occur through price-index deflation by "convenient" price indices.

As background to the Irish asset estimates, some six features may be mentioned: (1) Fixed Stock and Inventory estimates and Consumer Durable estimates are intended to be *practical measures* of the volume of assets, or of the cost of assets at constant prices. (2) For work not being done within the CSO itself, one must use some accessible and fairly general, but reliable, price deflators. (3) The researcher generally must accept CSO allocations of capital goods among sectors, which means that he is limited by the maximum number of sectors being used by CSO. (4) Starting values (stock estimates for the year 1950) generally present several problems. (5) *Average Life* assumptions also present problems, partly alleviated by advice from accounting experts or by using the Average Life assumptions applied in other countries. (6) Not all data are fully known: for example, for some years the breakdown between "plant" and "vehicles" is unknown within several economic sectors, and estimates have to be made across sectors, to match a control total for vehicles.

Subject to the background just mentioned, some grading of the Capital Stock estimates can be suggested, in the order of improving quality, from worst towards better:

(a) *Possible.* Farmhouses are the prime example. No direct information is available, on either Gross Fixed Capital Formation or Starting Values.

(b) *Orders of Magnitude.* This is the quality of most of the fixed stock estimates presented in this Report. If the sector's fixed stock time-series approaches

a benchmark estimate obtained independently, then its precision is enhanced. Examples are the Sea Fishing fleet and the aggregate for Transport and Communication.

(c) *More Precise.* This means "of better quality than (b)". It applies to the livestock inventories and agricultural holdings of Agriculture, and to Electricity fixed stock, where the basic numeric data are good.

(3) *Improvement of the Estimates and Updating*

To improve the quality of the estimates presented in this Report, the need is for a sufficiently reliable benchmark estimate of each sector for a recent year, as has occurred for Roads. Given such a benchmark, then the GFCF data would enable backward and forward projections of the benchmark to be made. Major survey work would seem to be required, to provide satisfactory benchmark detail for the fixed stocks of almost all non-Agricultural activities. The Central Statistics Office would appear to be the most obvious candidate, for elaborate survey work, to establish benchmark estimates of Gross and Net Fixed Stocks.

There is the question of future updating of results shown up to the end of 1984 in the present Report. Perhaps once every five years would suffice, with a three-year time-lag to allow fairly complete CIP and other data to become available. Ample description of methodology is given in the present Report, to enable further applications of the Perpetual Inventory method to occur, in the framework and sectoring as described. It is likely that by 1992 a new price-base, such as 1990, may be required for the Capital Stock series, in keeping with any new price-base being used in the National Accounts. An appropriate repricing of the Capital Stock results can be achieved, by linking price indices and applying them in as much detail as possible.

The best way of continuing the present series (ending in 1984) into the future would be to build on to the partial results for 1985 and later, as appearing in the extant work-sheets of the author. This data base would be a better starting point than what could be obtained from any arbitrary projection and scrapping of the 1984 stock, which must occur in the absence of better information.

More detailed sectoral results would be desirable, such as several subsectors of services, if the data permitted. The Gross and Net Stock series can be estimated for any subsector, given (a) benchmark fixed asset values, (b) investment amounts by principal kind of asset for any series of years which includes the benchmark year. The PI methodology can be applied, to give gross and net year-end estimates. However, sectoral detail for subsectors of Services is possible only through direct information such as that obtained by the CIP. Thus there is no way around the fact that specific surveys of Service subsectors are necessary to provide benchmark and time-series estimates of any such subsectors.

PART 1: GENERAL OVERVIEW

Chapter 1

INTRODUCTION AND BACKGROUND

1.1: *Purpose and Scope of this Report*

Up to the present time no measures have appeared of total Capital Stock existing in Ireland, in the form of tangible assets valued at current prices or at constant prices. The Report which follows offers first or "pilot" estimates, although incomplete, of such stock at 1980 prices during the period 1950-1984, at the end of each year.

Of its nature, the subject matter is complicated and detailed; the background numerical data are bulky. As a help to readers, the Report is divided into two parts. The first part comprises Chapters 1 to 4, and is aimed at the general economist. The remainder of the present Chapter 1 defines the capital being measured and outlines possible uses of the results, by drawing on existing reports from other countries. Chapter 2 summarises methods of estimating the various components of the capital being measured. Chapter 3 presents major results at five-year intervals. Chapter 4 offers an overview of the whole exercise and proffers tentative conclusions and suggestions on further work. Many readers may not wish to read further than Chapter 4, although both sections of the report complement each other.

For those who seek further detail, the second part of the Report comprises detailed results and techniques, throughout Chapters 5 to 13 and background appendices. The table of contents appearing above should suffice, to provide descriptive detail of chapter content, in addition to guideline information appearing in the introductory part of each chapter.

A preliminary outline of the scope and coverage of the capital being estimated is appropriate at this point. *"Tangible Assets" including land but excluding minerals* is a summary description. "Tangible" means "physical". as distinct from "intangible" assets such as loans and securities; all intangibles are excluded. Tangible Assets comprise "reproducible" and "non-reproducible" assets. The "non-reproducible" kind includes land and mineral deposits; the scope of this kind of asset wealth covered by the present Report is confined to land of agricultural holdings, land under forestry and land attached to buildings of various kinds including roads. Mineral stocks, however, are excluded, such as any known or potential gas and oil deposits, coal, peat, ores of metals and rock deposits. Works of art, jewellery, and money are also excluded.

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The "reproducible" assets within the scope of the Report cover "fixed" stock and "working" stock (also denoted "Inventories") of business enterprises, as well as "Consumer Durables". The stock of fixed assets comprises all kinds of plant, machinery and vehicles, as well as all kinds of buildings and engineering constructions such as dwellings, roads, railway tracks and hydroelectric dams. The stock of "working" capital assets includes agricultural livestock, raw materials and fuels held by business enterprises, all semi-finished items denoted "work in progress". and finished goods including stocks for resale held by wholesale and retail traders and also by manufacturers. Consumer Durables held and used by persons and households are the household equivalent of fixed stock held by business enterprises; they include goods such as cars and other transport equipment, furniture, cooking equipment, television sets; whereas dwellings themselves are included as one or more of the fixed capital stock categories. Not covered by the Report are consumer semi-durables held and used by persons and households, such as clothing, footwear, and household furnishing textiles; also excluded are consumer non-durables such as food and fuels. But Consumer Durables held and used by persons and households are within the scope of the report.

The stocks of tangible assets, including land, are valued at constant prices,[1] to try to correct for bias due to price inflation. The year 1980 has been chosen as the price base, since this year is already in use as the price base of the official National Accounts. In principle, stocks are valued at the end of the calendar year, at what it would cost to buy them or put them in place or replace them, at supposed "normal" average 1980 prices, meaning neither market collapse nor conditions of panic buying. But fixed assets in existence at the end of any year can be valued at a replacement cost as if purchased new (having full potential productive life ahead), or as if purchased second-hand (having only part of potential productive life remaining). *Gross* Capital Stock is the value of assets if considered at full new replacement cost, subject to correction for price inflation to bring their cost to cost at constant (1980) prices. *Net* Capital Stock is the value of the same assets in terms of supposed or estimated productive life remaining, at the end of any given year, again corrected so as to be at constant prices. The end-of-year valuation of extant assets implies *some* potential working life remaining; assets sold or scrapped during the course of the year or at its end are by definition excluded from end-of-year valuation. We see, therefore, that year-end fixed stock has two possible values: (a) a "gross" value, representing its full replacement cost as if new, corrected for price inflation since (or before) a chosen price-base year; (b) a "net" value, representing a "fair" replacement

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[1] In the literature on tangible assets, the word "real" means "excluding land", it does not mean "at constant prices".

cost, in terms of potential productive life remaining, also corrected to be at base-year prices.

Analysis of tangible asset stock by legal *ownership* has not been made in the results appearing in the present Report. Ownership has several different aspects. The word "domestic". meaning "existing in Ireland". describes the scope of the tangible assets estimated in the Report, as distinct from "national" which would mean "owned by Irish firms and citizens". The "national" definition implies that tangible assets held abroad by Irish firms and citizens would also be taken into account. Information is not available to the extent required to provide dependable "ownership" breakdown of assets; for this reason the "domestic" definition has been used. But within assets existing in Ireland some obvious ownership divisions emerge: (a) Consumer Durables are held by households and persons, as distinct from business enterprises; (b) public roads are legally owned by the Public Authorities, as are the State Forestry enterprises. In terms of annual Gross Fixed Capital Formation by the Public Authorities (Chapter 6 below), some rough overall 20 per cent share of fixed stocks (other than land) in recent years can be postulated as owned by the Public Authorities.

A breakdown of assets by major kind of activity is shown; the most important major sectors or groupings comprise Agriculture, Mining, Manufacturing, Construction, Electricity Generation, Trade, Transport and Distribution, Other Services. *End-of-year stock estimates for fixed and working assets and land are those "in use" in each sector, without reference to legal ownership.* For each sector the total stock (at 1980 prices) is also shown in further detail according to type, e.g., fixed assets subdivided into: (a) plant and machinery, (b) vehicles, (c) buildings and land; and working assets subdivided between: (a) materials and fuels, (b) semi-finished and finished goods, etc. The sector breakdown is not always desirable, but may depend on the asset purchase and sales data available from the Central Statistics Office, and cumulated to give the fixed stock estimates, after adjustment, so as to be at supposed 1980 prices. Transport and communication appear below as a single sector, for this reason; if the data permitted, these two sectors should be separate.

It is well to make clear at this stage that in addition to being complicated, the process of estimating domestic capital at constant prices requires judgement in the use of available data and a careful look at what has been done in other countries, rather than complete direct measurement or the "sample survey" approach. It is not possible in the late 1980s to either measure or sample the values of stocks held by enterprises during 1950-1980, for the obvious reason that records at the level of the firm or enterprise are not generally available now, even if there were no question of a prohibitive volume of data. Some indirect approaches must therefore be used, as implied in the previous paragraph and

to be elaborated further in Chapters 2 and 5 below.

A brief review of relevant work to date in Ireland and in other countries is in order, and appears in the following section, mainly from the aspect of definition and meaning of the Capital Stock being measured.

1.2: *Capital and Stocks as Described in the Literature*

Partial coverage of Capital Stock in Ireland has been achieved in previous studies, such as those of Henry (1971) and Vaughan (1980). Estimates of the Gross Fixed Capital stock of Irish mining, manufacturing and construction appeared in Henry (1971) covering the period 1953-1968. A detailed treatment of manufacturing for the period 1945-1973 followed in Vaughan (1980); both gross and net definitions of fixed capital stock were used in his estimation process.

As indications of much research work in other countries since about 1950, reference will be confined to four major publications spanning the period 1950-1982. The relevant parts of these, denoted (1) to (4), lend background support to the description of Capital Stock given above in the previous section. But they also indicate how much research on national wealth had been completed, even by the early 1960s.

(1)   A paper by R. W. Goldsmith comprises the first part of the Gainsbrugh and Bonnell (1951, editors) volume of proceedings of a 1950 conference on research in income and wealth held by the National Bureau of Economic Research (NBER). The Goldsmith paper has as its theme a Perpetual Inventory of national wealth.

This method of measurement is basically the same as that described in some detail in Chapter 5 below for *net* fixed stock included, rather than gross. "Because it provides a continuous, up-to-date picture of reproducible tangible wealth, and with some closely tied-in additions, of virtually all wealth, it has been called the Perpetual Inventory of National Wealth" (p.9 of Goldsmith paper). The deductions from Gross Fixed Assets at constant prices to give net assets, he refers to as "depreciation".

Asset types omitted from the Inventory (p.35) comprise consumers' (i.e., households' and persons') holdings of semi-durable and perishable commodities, works of art and other collectors' items, military assets, land improvement costs, soil depletion, subsoil assets.

Asset types included are best seen as listed in Table 1 (pp.18-19) which shows estimated national wealth of the United States for various years during 1896-1948, at 1929 prices and also at current prices. The National Wealth aggregate has three major components: (a) reproducible tangible assets, (b) land, (c) net foreign assets. Component (a) shows the most detailed breakdown, which can be summarised under four groups of reproducible

tangible assets: (i) structures, (ii) equipment, (iii) inventories, (iv) monetary gold and silver. "Structures" include dwellings and roads, while "equipment" includes consumer durables; "inventories" include livestock and crops. It appears that the value of land related to non-agricultural "structures" has been included under "land". and that the value of standing timber of forests has also been included under "land". The textual explanations are not very clear on these latter two points.

(2) R. W. Goldsmith and C. Saunders (1959) were the editors of a collection of thirteen papers in a volume entitled *The Measurement of National Wealth;* these papers were in fact presented at the fifth meeting of the International Association for Research in Income and Wealth (IARIW) in August 1957, by researchers from different countries.

The introductory paper by the editors, entitled "A summary survey of national wealth estimates". has some material of relevance and of interest. On pp.3-4 the outline scheme and comments are presented. Most of the country estimates of national wealth permit classification on the following lines:

Domestic Tangible Wealth:
A: *Enterprises:*
    I Reproducible assets — 1. Structures (separating dwellings)
          2. Equipment
          3. Inventories
    II Non-reproducible assets (land)
B: *Government:*
    Subdivided exactly as for A.
C: *Households* (consumers' durables)
D: *Foreign Assets* (net)
Financial claims on other countries are the only "intangibles" included in the scheme. Excluded are "subsoil resources" and "military goods". Standing timber of forests is excluded from national totals, although it appears as a sub-item of "Inventories" in the numerical country results shown in Table 1 (pp.8-10); many countries have measurement problems with this item. The only non-reproducible asset is "land". this is broken down between (a) agricultural, (b) forest, (c) other.

All countries provided "net" valuation of National Wealth, meaning that net values of all structures and equipment (rather than gross values) were included for purposes of inter-country comparability. Many results appear at current prices. Some of the larger countries also provided gross values, and estimates at 1950 prices.

(3) The Goldsmith (1962) major study of the national wealth of the United States in the post-war period is worth notice, if only as indicative of the extensive data demands such a study implies. The main text and tables take some 100 printed pages, with more than 300 pages of background statistical data.

Of present relevance is the substance of Chapter 2 of the study (pp.8-16), which considers the "scope and character of the estimates". Three paragraphs, of main relevance, may be quoted, as follows:

> The exact scope of tangible assets included in an estimate of national wealth is not of great importance so long as the figures are shown in sufficient detail to enable each user to isolate or to combine those types of asset that seem best fitted for his analytical purposes. The estimates presented here are based upon a rather broad definition of national wealth and therefore include separate figures — often unavoidably rough — for categories not always covered by estimates of national wealth, such as consumer durables, government civilian structures, military equipment, forests, and subsoil minerals (pp. 9-10).
>
> For reproducible tangible wealth the estimates are derived by the "perpetual inventory" method: the estimates of the stock of each type of reproducible tangible assets are obtained by cumulating the capital expenditures for that type of assets for a number of years equal to the assumed length of the asset's useful life. New capital expenditures, equal to gross expenditures less retirements during the same period, are used in the estimation of the gross stock and net expenditures, equal to gross expenditures less depreciation, in the calculation of the net stock. (pp.10-11). For agricultural land, census figures and estimates based on them, both representing close approaches to market value, can be used. For public land, vacant lots, forests, and for all subsoil assets, very rough estimates of presumed market value are all that can now be contrived (pp.13).

The full discussion has had to be compressed above, for reasons of space, but is available to readers of the original. He goes on finally to advise that separate estimates be shown for each disputed item; thus users may adjust the totals to suit their particular concepts and definitions of the national wealth.

(4) The Matthews *et al.*, (1982) major study of British economic growth during 1856-1973 has "Capital" as the subject matter of its Chapter 5 and related Appendices F, G, and H. Of present relevance is the "Definition and

Measurement" section of pp.120-123, coming 20 years later than the Goldsmith (1962) study just referred to above. It appears that definitions and terms are still the same:

> The central measure of physical capital input used in this study is the gross stock of domestic reproducible capital, measured at constant prices. Wherever possible, movements in the net stock are also considered. The gross capital stock is defined as accumulated gross investment minus retirement. The net capital stock is defined as accumulated gross investment minus depreciation.
>
> ... Estimates of the (fixed gross and net) stocks at constant prices were generally made by extrapolating backwards or forwards from a benchmark year according to the perpetual-inventory method. ... The post-war estimates of the benchmark-year stocks were built up by aggregating gross fixed capital formation at constant prices over the assumed average lives of the assets in the stocks and, in the case of the net measure, subtracting depreciation at constant prices similarly aggregated. ... Depreciation was calculated on a straight-line basis throughout. ...
>
> Statistics of inventories ... based on the book value of stocks held, are available. (pp.121-123)

Comment and Conclusion

The reasonably extensive quotations and extracts of subject matter from the four books just referred to show good agreement with the points on purpose and scope of the present study, as outlined in Section 1.1 above. A general impression to be derived from the four books referred to is that agreement on methods and principles of valuation of tangible assets is widespread, whereas inclusion or exclusion of items such as land, standing timber, consumer durables, seems to be a matter of data availability. Goldsmith, in book (3) above, speaks about "rough estimates" being unavoidable for some items.

In the quotations from the four books, readers already have had summary descriptions of how the Gross and Net Fixed Stock and Inventory estimates are derived, i.e., the actual methodology. Chapter 2 below will fill out some more detail, but in a less mathematical and technical manner than is used in Chapter 5. This writer has used the main principles and methods of obtaining the constant-price values of domestic tangible assets, as described in the literature quoted above, to provide the Irish estimates appearing in Chapter 3 below, and later chapters.

1.3: *Possible Uses of the Estimates of Tangible Assets*

At this point it will have become clear to the reader that the estimation of tangible assets requires a considerable effort, in assembling basic data, and in organising and calculating the various kinds of gross and net stocks. So far, no reasons have been proffered as to what might be the purpose of such efforts. This present section presents brief outlines of the many uses for tangible asset estimates, drawing on the IARIW volume of papers edited by Goldsmith and Saunders (1959). Three quotations or extracts will suffice:

(1)   The editors in their introductory paper summarise purpose and uses:

> Some authors use estimates of national wealth at different periods of time as indicators of economic growth; others are primarily interested in analysis of the composition of national wealth as a contribution to knowledge of the structure of the economy. The papers show that considerable attention is paid to the analysis of capital-output ratios, which, in spite of great difficulties of interpretation, may be valuable measures for comparison of economic structures both over time and between countries (p.2).

(2)   The paper by Barna on "Alternative methods of measuring capital" devotes its second section (pp.36-44) to "the purpose of measuring capital". He distinguishes between three broad categories of purpose or objective:

(a)   *The distribution of capital and of taxable capacity.* The purpose of estimates of this category is to establish the relative shares of individuals or of groups. This also gives a measure of taxable capacity. For this purpose, capital is understood in the financial sense, and therefore valuation must be based on market prices.

(b)   *Social accounting and economic research based on social accounting.* National income accounts are not a sufficient basis for analysing the behaviour of the economy. For a fuller understanding, a stock-flow type of dynamic analysis requires the support of capital as well as current-flow accounts. Capital accounts can be drawn up for each sector for which we have income-expenditure accounts; and the items in the capital accounts can be classified in various ways.

(c)   *Economic development and growth.* Interest in the measurement of capital stems from its importance as a symptom and a cause of economic development. For this purpose, capital is viewed as a group of physical assets, comprising a factor of production and making a contribution to output. It is advantageous to separate the capital assets into three groups or categories because in many respects a different economic

analysis is appropriate to each, and problems of valuation and measurement are also likely to be different. The first category is inventories as commonly understood. The second includes consumer durables and dwellings and all kinds of social capital, such as schools and hospitals. The third category covers tangible fixed assets of industry in the broad sense, and gives rise to the most acute problems of valuation and measurement, because of such assets being very heterogeneous and having relatively long life.

(3) The National Accounts' Division of the Netherlands' Central Bureau of Statistics have a paper describing their experiences in the "Preparation of a National Balance Sheet". In their paper they list six uses (p.120) of national wealth estimates and national balance sheets:

(a) A picture of the background structure of the national economy.

(b) Data on the credit held by financial institutions as against that held by other groups such as households and commercial banks.

(c) Economic recovery programmes require measures of changes in stocks of capital goods, by main sectors and by main types.

(d) For analysis of inflationary and deflationary tendencies, information is needed on changes in primary and secondary liquidities by main sectors and by broad categories.

(e) Industrialisation programmes require estimates of the average value of fixed assets per employee, in the main branches of industry.

(f) The estimates are used to calculate various ratios, such as public debt to national wealth.

Comment and Conclusion

It is evident that there are plenty of uses for any available estimates of tangible assets or national wealth. Some of the uses quoted above involve national balance sheets — these are outside the scope of the present Report as they require a matching of financial liabilities against the values of the assets in hand. Also outside the scope of this Report are any of the applications or uses of the tangible asset estimates. Such uses and applications offer an interesting prospect for further research, including the possibility of national balance sheets.

Chapter 2

GROSS AND NET VALUATION OF TANGIBLE ASSETS EXISTING IN IRELAND

2.1: *Introduction, including Definitions of Fixed Stock*

This chapter summarises the methods used to estimate values of various components of tangible assets existing in Ireland during 1950-1984, at 1980 prices. The description following is less mathematical and technical than what appears in Chapter 5 below. It is also less detailed than descriptions appearing below in Chapter 5 and later chapters. This present chapter is a bridge or link between the Chapter 1 description of tangible asset assessment in other countries and the summary results of Irish measures of equivalent items for 1950-1984 set out in Chapter 3 below. The content of the present chapter is mainly descriptive, although some of the actual stock estimates are quoted. Readers may perhaps decide to go straight on to Chapter 3, without reading in detail the remainder of this present chapter. However, Chapter 3 should be more comprehensible to the general economist, in the light of what now follows.

The remainder of the present chapter describes briefly the main categories of tangible assets being surveyed, and how their year-end values at 1980 prices have been estimated. Definitions of gross and net fixed stocks of reproducible assets complete the present Section 2.1. Their estimation, and their extent across economic sectors in general, is the topic of Section 2.2. Land Valuation, mainly in agricultural holdings, is addressed in Section 2.3. Inventories are considered in Section 2.4, both as agricultural livestock, and as working or consumable capital of industry and trade. Consumer Durables are the theme of Section 2.5. Two categories having special features get mention in Section 2.6; these are roads and dwellings.

Gross and Net Fixed Stock Defined

Gross and net fixed stocks of reproducible assets form the bulk of tangible assets held in Ireland, as elsewhere. It is therefore necessary to clarify what definition is used for the estimates presented below. Values at constant prices are assumed to apply, unless otherwise stated.

The definition of gross and net fixed stock used in the present Report is that also used by the United Kingdom and is taken from paragraph 12.108 of Central Statistical Office (1985):

Capital stock appears in the Blue Book both before and after depreciation, i.e., as gross capital stock and net capital stock. Both are aggregates of the assets in use. Gross capital stock values the assets in place at their full replacement cost, i.e., their cost to replace anew. Net capital stock is the gross capital stock less accrued capital consumption. Gross capital stock is the measure usually used to measure the productive potential of the current stock of fixed capital: it is assumed that the gross productive capacity of a machine is the same throughout its life. It may be argued that some decline in productive capacity may occur in later years but this is thought likely to be small in most cases. Changes in gross capital stock (i.e., new capital formation less retirements) are most likely to reflect changes in gross productive potential (p. 199).

The quoted paragraph is useful, in defining not only gross fixed stock but also the net derivative in a framework of proposed productive capacity. Other descriptions and definitions of the gross and net concepts appear in Dean (1964), Henry (1971), Vaughan (1980), Paccourd (1983). Papers by Griffin (October 1975 and October 1976) explain and illustrate the UK definitions leading to gross and net fixed stock, as quoted in the previous paragraph.

2.2 *Kinds of Fixed Assets and Their Gross and Net Measures*

We may now look to see what the definitions just quoted mean in practice. We are to consider fixed assets held as capital equipment by "Business" in general, including Government services. We limit the scope to "reproducible" items, so that land in general and mineral wealth are excluded. Military "hardware" is excluded, as are Consumer Durables and non-durables. Also excluded are stocks of "working capital". because such commodities can be used "once only" by Business, as raw materials, or fuels, or finished goods to be traded. The significance of the word "fixed" is that the fixed assets remain in use by Business for several years or many years, as a capital factor of production.

These fixed assets comprise mainly plant and machinery, vehicles, buildings and engineering constructions of all kinds, including roads, dwellings, electric power stations. They also include computers and office machines, furniture, and all durable items used by Business. Land may be included as an incidental but necessary component to provide the site for buildings and engineering constructions, including a "working area" for production activities.

The use of such fixed assets occurs throughout "economic activity". Thus all the major sectors of the economy require the use of fixed stocks of these assets, whether they own them or rent them. With minimum detail, we may refer to agriculture, forestry, fishing, mining, manufacturing, construction, production and distribution of electricity as well as gas and water, transport, wholesale and

retail trade, and all the service activities. Public roads are used by both Business and non-business; these and other peculiar features of roads will receive mention in Section 2.6. Dwellings are conventionally treated as if they were used by Business rather than households, i.e., as capital goods rather than Consumer Durables. It is clear that any national assessment or measure of the fixed stocks of capital assets requires activity-wide coverage, if it intended to be comprehensive in any real sense.

Valuation of Fixed Stocks at Constant Prices

   The fixed assets are valued at supposed constant prices, to correct for price inflation, and to aim at adding meaningful GFCF values together in arithmetic cumulation. The year 1980 is used as the price base for all the actual gross and net stock estimates provided below for Ireland in subsequent chapters. Available price index information has to be used, to re-value annual GFCF current-price values at 1980 prices. It is not possible to re-price each of the millions of capital goods' items on an individual basis. Some quite general re-pricing approach has to be used, to permit a feasible scheme of estimation.

   In cumulating the capital goods' purchases (GFCF) re-priced at supposed constant prices, the "Average Life" of each major category is a necessary feature. "Average" means the length of the useful life of the asset, under average usage and repair and maintenance, and so on. Conventional values used for the Irish results are 10 years for lorries, 25 years for some machinery and plant, 50 years for factory and commercial buildings, 80 years for dwellings.

   The Gross Fixed Stock value or measure means what the stock of assets held by an industry (or "sector") would cost to buy or put in place, if they were all *new*, at supposed constant (1980) prices. This buying and cumulation over the average life of each kind can be simulated arithmetically, given the detailed actual GFCF time-series. A simple numerical illustration follows below. The problem or question of "Starting Stock" will be considered in the next paragraph. Let us suppose a sufficiently long period over which GFCF purchases are known. Let us also make reasonable assumptions about the average life of each major type of asset. It is accordingly feasible to estimate the Gross Fixed Stock *at the end of each year,* provided the Starting Stock problem has been solved, or does not exist.

   The problem of "Starting Stock" occurs in the real-world attempt to simulate the cumulation of GFCF purchases. Given GFCF data for 1950-1984, how is one to estimate the fixed stock known to exist in a typical sector at the end of 1949? This Starting Stock has to be estimated, and scrapped in a reasonable way throughout 1950 and later years according to Average Life assumptions for each major category. All that is intended here is to refer to the existence of Starting Stock, without getting into discussion of how to estimate it.

The Net Fixed Stock value or measure means what the stock of assets held by a sector ought to be worth at a fair selling price, *at depreciated values,* and again at supposed constant (1980) prices. The depreciation normally used is linear, over the average life of each major category. This takes account of the underlying or background assumption that usage of the assets is spread evenly over their average life. The depreciated value supposedly represents a fair or "equitable" price or cost for the asset, in terms of its remaining useful life as a proportion of the assumed average life. Thus the Net Fixed Stock value at the end of a typical year emerges from the arithmetic cumulation of depreciated values, in simulation. The net series for Starting Stock must also be added in, of course. Reasonable net values could be 50 per cent (or less) of corresponding gross values, if better information on the composition of the Starting Stock is not available.

Two further points need clarification:

(1) The GFCF data available typically appear only for whole 12-month periods. Thus, refinements relating to parts of years are generally ignored, so that "end of year" and a whole number of years for Average Life values are universal in the literature. It follows that an item of 10-year average life is counted into the simulation arithmetic 10 times, in getting "end-of-year" gross values.

(2) The net stock receives zero depreciation for its year of first appearance. It is entered at 100 per cent new value for the "end-of-year" simulation of its year of first appearance. Given an item of 10-year average life, 10 per cent of its new value will be removed for entry as second year end-of-year stock, 20 per cent will be removed for the end of the third year and so on. Zero per cent will remain for the end of the eleventh year. This scheme obviously could be refined and modified. For example, 5 per cent could be taken off at the end of the first year, with 5 per cent remaining at the end of the tenth year. This latter scheme assumes a ten-year life from mid-year in the first year to mid-year in the eleventh, rather than from the end of the first year of appearance to the end of the eleventh.

A Simple Numerical Example

A hypothetical simulation exercise is set out in Table 2.1, which is largely self-explanatory. The full time-period shown is the 21 years 1949-1969. All values are in £ million units at supposed 1980 prices. The fixed capital asset we can call "lorries", having an Average Life of 10 years. There is a given Starting Stock of 50 units at the end of 1949. There are ten equal annual GFCF purchases of 10 units by the sector during 1950-1959. The simulation exercise shows how to calculate gross and net fixed stock throughout 1950-1969 for these data,

Table 2.1: *Hypothetical Gross and Net Stock Cumulation over the Period 1949-1969, at 1980 Prices*

£ million

Description	Year 1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
Gross Starting Stock	50	45	40	35	30	25	20	15	10	5	0										
GFCF and cumulate gross		10	10	10	10	10	10	10	10	10	10	0									
„			10	10	10	10	10	10	10	10	10	10	0								
„				10	10	10	10	10	10	10	10	10	10	0							
„					10	10	10	10	10	10	10	10	10	10	0						
„						10	10	10	10	10	10	10	10	10	10	0					
„							10	10	10	10	10	10	10	10	10	10	0				
„								10	10	10	10	10	10	10	10	10	10	0			
„									10	10	10	10	10	10	10	10	10	10	0		
„										10	10	10	10	10	10	10	10	10	10	0	
„											10	10	10	10	10	10	10	10	10	10	0
GROSS STOCK	50	55	60	65	70	75	80	85	90	95	100	90	80	70	60	50	40	30	20	10	0
Net Starting	27.5	22.5	18	14	10.5	7.5	5	3	1.5	0.5	0										
GFCF and cumulate net		10	9	8	7	6	5	4	3	2	1	0									
„			10	9	8	7	6	5	4	3	2	1	0								
„				10	9	8	7	6	5	4	3	2	1	0							
„					10	9	8	7	6	5	4	3	2	1	0						
„						10	9	8	7	6	5	4	3	2	1	0					
„							10	9	8	7	6	5	4	3	2	1	0				
„								10	9	8	7	6	5	4	3	2	1	0			
„									10	9	8	7	6	5	4	3	2	1	0		
„										10	9	8	7	6	5	4	3	2	1	0	
„											10	9	8	7	6	5	4	3	2	1	0
NET STOCK	27.5	32.5	37	41	44.5	47.5	50	52	53.5	54.5	55	45	36	28	21	15	10	6	3	1	0

ignoring any GFCF occurring during 1960-1969. Linear depreciation is assumed, over the 10-year average life.

The gross stock cumulation may be considered first. The Starting Stock of 50 units is here assumed to have been cumulated in 10 equal increments of 5 units during 1940-49. It is therefore scrapped at 5 units per year, so as to show remaining stock of 45 units at the end of 1950, 40 at the end of 1951, and so on, to reach zero at the end of 1959. But, apart from scrapping, the remaining stock is shown at full new purchase cost.

The annual GFCF purchases are shown as 10 units extended over 10 years, starting each year 1950, 1951. ... 1959. Thus, by the end of 1969 all the gross values have reached zero.

The cumulated gross stock shows values increasing by annual increments of 5 units during 1949-1959, from 50 at the end of 1949 to 100 at the end of 1959. From there on, an annual decrease of 10 units is apparent, until zero is reached (through total scrapping) at the end of 1969.

The net stock cumulation is set out in the lower portion of Table 2.1, and is slightly more complicated. Let us ignore the Starting Stock values, for the moment, and consider the annual GFCF purchases. Each of these is shown as 10 units (the full 100 per cent) for the end of the year of first appearance, followed by 9, 8, 7, and so on, in accord with 10 per cent linear depreciation over its 10-year average life.

There is no Starting Stock included in the cumulated results for 1959-1969. In the bottom row we see a rapidly diminishing net stock cumulated value, through 55, 45, 36, etc., so as to reach 1 unit at the end of 1968 and 0 at the end of 1969. We may compare this series with the corresponding gross series shown above, namely 100, 90, 80, and so on. The net stock, as a percentage of gross, shows 55 for 1959, 50 for 1960, 45 per cent for 1961, and so on in diminishing percentages, so as to reach 10 per cent for the end of 1968, and zero for 1969.

The Starting Stock net values for 1949-1959, by analogy, are exactly half those just considered. These latter derive from 100 units at the end of 1959, comprising 10 equal increments of 10 units over the decade 1950-1959, whereas the 1949 starting stock of 50 units was assumed to comprise 10 equal annual increments of 5 units each. It is therefore possible to fill in the correct net series for the latter, through 1950-1959, as half the values appearing as the net cumulation for 1960-69.

The cumulated net stock for 1950-1959 can therefore be ascertained, as shown in the bottom row of the table. Values increase from 27.5 for the end of 1949 to 55 units for the end of 1959. The rate of increase can be observed to diminish by 0.5 units, with each year. It is apparent that the net stock shows relatively complicated results, even for the simple scheme under consideration.

It may be noticed that in the illustrative example the net values of the Starting Stock are about half of the gross values, for the first few years 1949-51. Net as a fraction of gross falls away rapidly in later years. This same rapid decrease can occur, even if the Starting Stock is heavily concentrated in recent years, meaning 1946-1949 for the illustrative example. But for such heavy recent concentration, the net percentage of gross can be 70 or 80 per cent, or even higher, in the early years.

However, in the simulations described in Chapters 7 to 13, total net stock frequently shows about two-thirds of gross, for the different main categories, and across economic sectors. This tendency towards two-thirds occurs in the later years such as 1975-84, when Starting Stock as such takes a zero or trivial component of the aggregate. Thus, out of practical observance of net versus gross, the author has used a more conservative 50 per cent or less, in deriving net Starting Stock from the gross values. As will appear below, on reading Chapters 7 to 13 and the Appendices, the estimates of many Starting Stocks are quite doubtful. From 1960 onwards, their contribution is frequently trivial. Undue attention should not, therefore, be given to either their gross or net estimates. The refined theory of estimation of starting values, as set out at the end of Appendix 2 below, has not generally been used, in view of the tentative nature of much of the basic information.

2.3: *Valuation of Land, mainly Agricultural*

The total land area of the State during 1980-84 is reckoned to be about 6.9 million hectares (HA), according to the 1986 issue of the *Statistical Abstract of Ireland* (Table 3.43). Of this total area, some 5.0 million HA was taken by agricultural holdings of 1 HA and upwards. A further 397,000 HA was allocated to forestry. Some 130,000 HA more was taken by public roads, as a rough order of magnitude estimates by this writer. The residual 1.4 million HA comprised mountain, bog, scrub, swamp, and so on. But it also included land suitable for agriculture but used mainly for other purposes, or commonage grazing or parks not part of the 5 million HA officially listed as agricultural holdings.

No valuation has been attempted for this 1.4 million HA not otherwise classified. Most of it is unsuitable for agriculture, as implied by its description, e.g., mountain, bog. But it does include minor amounts of land potentially usable by agriculture, or in actual use. These amounts include commonages used for grazing and parks or sporting and recreation areas. Land attached to dwellings, of area below 1 HA, is included. The unknown amounts of land implied by "land and buildings" in the fixed stock estimates of all sectors, in subsequent chapters, also comprise parts of this residual 1.4 million HA.

The 397,000 HA taken by forestry has an estimated value of some £100m at 1980 prices, if valued at £252 per HA. Background information appears below

in Appendix 5. On the same basis, the 1950 forestry area of 117,000 HA would be worth about £30m at 1980 prices. These values may be regarded as minimal; larger possible values are mooted in Appendix 5.

The land area taken up by public roads has been valued at some £500m in terms of 1984 prices. This suggests an order of magnitude of £4,000 per HA, which makes sense as a State average price, covering very expensive urban and city land as well as relatively cheap rural land. Background detail and description are available in Chapter 11.

However, the bulk of the land area has comprised agricultural holdings throughout 1950-1984. This area has been slightly reduced from its 1950 estimate of some 5.3 million HA, through allocation to dwelling allotments, housing estates, roads, factories, etc. However, the 1980-84 estimate of 5 million HA indicates its order of magnitude since 1950. Some rough outline now follows, of how this area of agricultural holdings has been valued at 1980 market prices. More elaborate detail occurs in Appendix 3 and Chapter 7.

The first step was to estimate the 1980 sales value of all agricultural holdings of 1 HA and upwards within the State, at 1980 prices. Such market valuation is a net or depreciated value covering land as such, all farm buildings, and farmhouses. Both farm buildings and farmhouses are usually part of the holding, not marketable separately. A total sample of some 650 sales values was kindly made available by the Valuation Office, covering each of 10 size-groups of holding, within each of 20 counties. From these sample data a *national average 1980 sales price per median-size holding* within each of 10 size-groups was estimated, using County numbers of holdings within each size-group as weights. These price-per-holding averages were multiplied by numbers of holdings, in each of 10 size-groups for the State as a whole, to give a 1980 sales-value estimate of all holdings, about £18,900m in aggregate.

The second step was to apply the 1980 average price per holding estimates, just described, to numbers of holdings in each of 10 size-groups, forward to 1984, and backwards to 1950. These State estimates were "preliminary" in the sense that no allowance was made for changes in the quality of land and farmhouses and farm buildings, due to effects of the various land improvement schemes and grants and all new buildings including farmhouses.

The third step was to amend the "preliminary" estimates for improvement since 1950, through 1984. But depreciation was taken account of, in cumulating the gross annual investment effect by way of improvement schemes. The resulting series of values showed some £17,400m for 1950, increasing fairly steadily to about £19,100m in 1984.

A possible fourth step is to consider land and farm buildings, excluding farmhouses' net or depreciated values. These very tentative net farmhouse values suggest major increases with time, from some £500m in 1950 to some £2,000m

in the early 1980s. For this net valuation of farmhouses, the valuation of land and farm buildings, excluding farmhouses, shows stability, from a minimum £16,600m around 1960 to a maximum £17,100m around 1982, all at 1980 prices.

How Realistic is this Valuation of Agricultural Land?

A fair test of the degree of realism of the agricultural land valuation can be devised as follows. Published National Accounts' data are for Agriculture, Forestry and Fishing, combined. Agriculture obviously dominates the group. This also applies to the Agriculture etc. investment data at 1980 prices, shown at the top of Table 4.1 in Chapter 4 below. These values exclude farmhouses, but include land, livestock, buildings, machinery and vehicles. The derived capital/output ratios, shown near the bottom of Table 4.1, lie in the range 17 to 21 for 1975, 1980, and 1984. The inverse of these ratios shows a range of about 5 to 6 per cent, giving the yield of GDP on capital invested in Agriculture etc. These yield ratios are national average rates, effectively for Agriculture. Discussion of Figure 4.1 of Chapter 4 below reveals a *marginal* capital/output ratio of about 16 for the Agriculture group, meaning a yield of about 6.4 per cent.

The textbook Economics of *Irish Agriculture* by S. J. Sheehy and R. O'Connor (1985) quotes accounts for "a farm in the Midlands with dairying, beef and cash crops" (p. 162). The accounts shown on p. 163 enable a 1981 GDP-equivalent value of £20,352 to be derived as the sum of the following: hired permanent labour £5,289; depreciation of machinery and buildings £3,090; interest on farm loan £714; family farm income £11,259.

The corresponding invested capital, at balance-sheet values for 1 January 1981, appears on p. 173. Its aggregate value of £232,400 comprises: land and buildings £182,000; machinery and equipment £10,600; breeding livestock £21,400; trading livestock £17,600.

For this Midland farm, therefore, the capital/output ratio for the year 1981 is 11.4, given by 232,400/20,352. The inverse of this ratio if 8.8 per cent, the 1981 average yield on the capital invested. The farm has an "adjusted area" of 61 hectares (p. 170) which is about 151 acres. The average price per acre is £1,213, given by the land and buildings value £184,800 divided by 151 acres, and agrees well with corresponding "per acre" values shown in Table A3.1, for several Leinster counties (for farms of 150 to 200 acres).

This Midland farm is considerably better (in the sense of being more efficient) than the national average, according to Professor O'Connor. Its percentage yield of up to 9 per cent on the capital invested does not invalidate the national average of 5 to 6 per cent and marginal 6 per cent, quoted above. Putting it otherwise, the latter result is not invalidated by the outcome for the Midland farm. This implies that the agricultural land aggregate values of Chapter 7 are realistic.

2.4: *Inventories of Working Capital*

As distinct from fixed stocks, the consumable or working stocks are held to provide a "once only" input to the production process, by getting used up in producing an output. Broadly, three major categories or groupings of inventories are estimated, for the end of each year, in the present report:

(1)   livestock of agriculture, including breeding stocks;

(2)   raw materials and fuels held by mining, manufacturing, construction and the electricity- gas-water utilities;

(3)   finished goods and "work in progress" held by mining and manufacturing, and all saleable stocks held by wholesale and retail trade.

(1) *Agricultural Livestock*

It can be argued that breeding stocks are fixed capital, because they transform feeding-stuffs into young livestock, milk, and so on. They can do this repeatedly, for a few years at least, if not used for meat production. But non-breeding stocks have use only for meat, hides, etc., apart from horses and donkeys used for sport and recreation. Without further developments of the present discussion, it may be mentioned that the main animal categories have been evaluated for breeding and non-breeding stocks separately. Poultry are not distinguished in this way. The division of the equine stock is tentative, as direct estimates for breeding stock values, as such, are not available.

Average 1980 market prices per animal, for the various livestock categories, have been kindly provided to the writer by the Central Statistics Office. These prices have been applied to the year-end livestock numbers as published in the *Irish Statistical Bulletin*. The full story appears in Chapter 7 below. Other approaches had to be used for horses and donkeys, for which this kind of information was not available. The total livestock year-end values, including breeding stock, show roughly £1,500m for the 1950s, and increase generally for later years so as to show some £2,000m in the 1980s, at 1980 prices. The breeding-stock values are roughly half of the quoted totals.

(2) *Materials and Fuels held by Industry and Utilities*

Data are available annually, in the Census of Industrial Production results published by CSO in various releases, as well as the *Irish Statistical Bulletin*. Year-end values are at current prices. Since commodity detail is neither sought nor estimated, the most relevant price indices must be applied to give estimates at 1980 prices. Detailed description appears in Chapter 12.

The full working stocks of materials and fuels for industry and utilities are estimated at around £300m in 1950, and increase generally so as to reach about £800m in the early 1980s.

(3) *Finished Goods and Trade Stocks*

For finished goods and "work in progress" of mining and manufacturing, the same Census of Production basic information has been available. However, a clarification of coverage is in order. For construction activities, "work-in-progress" as well as finished goods are fixed capital, by their nature. Materials and fuels alone comprise working capital for these activities. The same applies to electricity, gas, and water supply, but for a different reason. The output of these utilities is of its nature instantaneous, rather than storable.

For mining and manufacturing, therefore, finished goods and "work-in-progress" have relevance. At 1980 prices, through price index application, their aggregate year-end stock estimate increases from some £100m in 1950 to about £800m in the 1980s.

Regarding stocks held by trade, basic factual information is comparatively scarce. However, at five-year to ten-year intervals the Census of Distribution particulars are compiled. Tentative estimates for each year of the full period 1950-84 have been made by the writer, as described in Chapter 12, for stocks of wholesale and retail trade. Their value, at 1980 prices, increases from roughly £400m in 1950 to £1,000m in 1984. Negligible stocks are held by hotels, catering, cinemas, etc., according to Census of Distribution results of the period 1950-1966. For more recent years, information on stocks is not available.

2.5: *Consumer Durables*

Consumer durable goods are the household and personal equivalent of the plant and equipment used by Business. They have a life of more than one year, but by convention exclude clothing and footwear. These same durable goods are fixed capital stock when used by Business. For the present report, two categories of durables have been chosen: (a) "durable household goods". (b) "personal transport equipment". Their purchases appear explicitly as two parts of "Expenditure of Personal Income" in the annual CSO publications of the National Accounts. For 1950-52, their purchase values have had to be estimated. For each year of 1953-84, values are available at both current and constant prices. It is therefore possible to estimate the full series of both categories at 1980 supposed prices, by suitable linking of the constant-price sub-series. Details appear in Chapter 13.

The method of estimating year-end gross and net inventories is the same as for fixed stocks of Business. In the present instance the annual purchases, just described, are equivalent to GFCF of Business. Average life chosen values are 12 years for durable household goods and 10 years for transport equipment. Reasonable assumptions had to be made about starting values. For durable household goods, twice the amount purchased during 1953-58 was postulated. For transport equipment, use was made of statistics of numbers of cars and motor

cycles around 1950. Net values were taken as 50 per cent of gross starting values. Appendix 2 refined background theory has not been applied, in the present instance.

The year-end inventory estimates of consumer durables show large growth during 1950-1984. Durable household goods have gross values of about £1,000m in the early 1950s, and increase so as to reach some £3,400m in 1984. Corresponding net values are roughly £600m and £1,900m, respectively. The transport equipment inventories increase on a smaller scale. Their gross value increases from about £300m in the early 1950s to about £2,300m maximum in 1981. The net value series shows about £150m in 1950 and a maximum of about £1,400m in 1981.

2.6: *Roads and Dwellings*

Roads and dwellings are two important categories of fixed capital assets, in Ireland as elsewhere. Their estimated values are quite large, as will appear below. They fulfil essential roles, for land transport, and for living accommodation of the human population, respectively.

Their detailed treatment can be found in Chapter 11 below. What follows here is a very brief look at their characteristics, measurement, and value estimates. Each category will be considered separately. Calculation of their year-end gross and net stock values is fairly standard. Either a starting-value for 1949 is required, or a benchmark equivalent at some later year-end. Then the annual GFCF gross or net values are cumulated, in harmony with the starting-value or benchmark. But both categories of asset have some peculiarities, from an economic aspect, or in definition of economic use. These unusual features will be considered as part of the discussion that follows.

Roads

The road values considered here are of public roads, constructed and maintained by Central Government and Local Authorities. By convention, depreciation of roads is treated as nil in measuring capital stock, meaning that a road holds its full gross value, as if new, for an indefinite period. This method is acceptable, provided that adequate allowance is made for "repair and maintenance". sufficient to keep the road in an "as new" condition. Only genuine new construction or improvement should therefore be entered in the annual National Accounts as Gross Fixed Capital Formation in roads. This principle is generally applied by the CSO in accord with United Nations' guidelines, although some of the roads' experts consider that the CSO-published GFCF amounts are not sufficiently conservative, i.e., include some "repair and maintenance" components.

A peculiar economic feature of roads is that they are treated by the National

Accounts as if they were GFCF and fixed capital stock of Business and Government, although both business and non-business use them. Some share of their value could be allocated to personal and household use, for social and recreational purposes. Another expression of the same idea is that public roads to this extent are consumer durables, not capital assets of Business and Government.

In any event, the published GFCF data were combined with a 1984 benchmark estimate, to yield gross fixed stock estimates of public roads, some as net estimates, for 1950-84 at 1980 prices. The CSO annual data on GFCF are given both at current and at constant prices. It was therefore possible to directly estimate a GFCF series of values at supposed 1980 prices. The 1984 benchmark estimate of £14,900m at 1984 prices was made available with the help of the Department of the Environment. This estimate covers the full cost at 1984 prices, of putting in place what has existed at the end of 1984 in public roads, both the Irish Road System and County Borough and Urban roads. Components separately evaluated are the land area, bridges, the pavement (road surface), drainage, fencing, and earthwork formation.

The benchmark 1984 value is about £10,500m when re-valued at supposed 1980 prices. A 1950 value of some £8,800m is obtained by subtracting GFCF at 1980 prices from the benchmark value, back over the years before 1984. Various qualifications of the value series, as quoted, appear in Chapter 11 below. However, the roads' experts accept as feasible and correct the relatively small increase in value shown by the quoted figures: a mere £1,700m added onto the 1950 value of £8,800. They argue that most of the 1984 structure was in place in 1950.

Dwellings

"Dwellings" mean private dwellings, excluding hospitals, institutions, and so on. Houses rented from Local Authorities are included, as are various kinds privately owned. A further component comprises farmhouses, briefly referred to in Section 2.3 above. All accommodation rented from its legal owners is part of the fixed stock of dwellings.

A peculiar economic aspect of dwellings is that they are treated by the National Accounts as if all were used by Business and Government as productive capital. But some dwellings, if not all, would seem to be as much in the nature of consumer durables as cars. At all events, the National Accounts include an "imputed rent" for owner-occupied private dwellings, as an explicit part of the annual National Income. But, on this point, dwellings differ from roads, for which no "imputed rent" is included in the National Income.

How gross and net stocks of dwellings have been estimated is as follows. Annual GFCF values at 1980 prices have been cumulated and superimposed on a 1949

starting stock, also valued at supposed 1980 prices. A single composite series for all dwellings together is calculable from the available data, without breakdown of the GFCF data among types of dwelling. The CSO annual GFCF data are given at current and at constant prices, enabling a full series (back to 1950) to be estimated at 1980 prices.

An average life of 80 years has been used for gross and net cumulation of annual GFCF since 1950. But an implicit longer life of 100 years has been used, in scrapping the end-of-1949 starting stock at a linear 1 per cent per annum. The basic starting-stock data were kindly provided for the writer by Mr Lucey of the CSO. The details of treatment are unsuitable for inclusion here, but appear below in Chapter 11. Net stock has been taken as 50 per cent of gross, throughout the starting stock time-series.

Starting-value assumptions have more significance for dwellings than for most other sectors. For this reason they are shown in full in Table 11.2, to enable readers to modify them, and thereby modify the full gross and net series. The gross starting values included in the full stock estimates decrease from about £3,200m in 1950 to about £2,100m in 1984. Corresponding net starting values are some £1,600m in 1950 decreasing to £1,052m at the end of 1984.

There appear in Table 11.2 the full gross and net stocks of dwellings (including farmhouses) emerging from the GFCF series and starting values just described. Major growth is apparent in both gross and net series. The gross estimate increases from about £3,300m for 1950 to about £12,900m for the end of 1984. The corresponding net estimate shows some £1,700m for 1950 and £10,300m for the end of 1984. Even major reductions in the 1984 residuals of the starting stock could hardly reduce the 1984 gross estimate below £11,000m, or the net estimate below £9,400m, at 1980 prices.

Chapter 3

GROSS AND NET YEAR-END VALUES OF TANGIBLE ASSETS HELD BY MAJOR ECONOMIC SECTORS, AT GIVEN-YEAR INTERVALS DURING 1950-1984

3.1: *Introduction*

The previous chapter has quoted a few gross and net asset values, at 1980 prices. A more substantial presentation of results will now be attempted, by extracting from the considerable volume of detailed asset estimates appearing below in Chapters 7 to 13, and in the Appendices. The present chapter is designed not to swamp the reader with detail.

What that detail is, in Chapters 7 to 13 and the Appendices, may be mentioned briefly. There are estimates for each of the 35 years 1950-1984. Some 14 groups of economic sectors are treated, as well the three sector-category kinds: roads, dwellings, consumer durables. Within some of these groups, subsectors are distinguished, such as the ten subsectors of Manufacturing. Another dimension of the detail is the distinction between kinds of assets. The first major distinction is between inventories of working capital and fixed stocks. The non-agricultural inventories are broken down between (a) materials plus fuels, (b) finished goods plus work in progress. Agricultural inventories of livestock distinguish between kinds of animals and also distinguish breeding stocks of different kinds of animals. The fixed stocks have estimates of gross and net valuation. A further dimension is the breakdown between (a) plant, machinery and vehicles, (b) buildings and land. Some sectors, e.g., Transport and Communication, show gross and net vehicle values separately. Special treatment is given to land and buildings of Agriculture, with advertence to values of farmhouses. Consumer durables distinguish transport equipment.

Out of all that detail, a representative sample comprises the basic numerical information of the present chapter. The first major reduction is in the number of years. Only eight years are considered, namely 1950, 1955, 1960, and so on to 1984. These selected years are at five-year intervals except for the four-year interval 1980-1984. The economic sectors are combined into six groups, as detailed further below in summarising the substance of the rest of the present chapter. Each sector-group shows two or three sectors of a major kind. In general, two kinds of fixed asset are distinguished, as well as total fixed assets. Gross and net fixed asset values appear, for the same kinds of fixed asset. Total inventories are given, with occasional further detail.

The comparative growth of fixed stock across several sectors is of more interest than the growth for one sector or sector-group alone. The volumes of gross and net fixed stock based on 1960 are discussed for each of the major groups as part of a composite picture. Percentage shares held by major groups are also looked at. Finally, all the net fixed stock and inventory values and consumer durables are brought together, to show how total net assets (i.e., Total Net Capital) have evolved in Ireland since 1950.

Section 3.2 brings together the eight-year data for Agriculture, Forestry and Fishing. Section 3.3 addresses Mining, Manufacturing and Construction, while Electricity with Gas and Water comprise the group of Section 3.4. The commercial and business sectors Trade, Finance, Transport and Communication are treated in Section 3.5. Other services, covered by Public Administration and Community etc., are the subject of Section 3.6. Three unrelated categories are covered by Section 3.7, namely Roads, Dwellings, and Consumer Durables. Section 3.8 describes volume growth of gross and net fixed stocks across sector groups, as well as percentage shares taken by such groups. The evolution of Total Net Capital, in terms of net fixed assets and inventories, is addressed in Section 3.9.

3.2: *Agriculture, Sea Fishing, Forestry Development*

Table 3.1 has selected results for the eight chosen years, and for the three above-named groups of economic activities. Only salient features will be mentioned in the present description, to avoid lengthy discussion. Readers can extract whatever numerical detail they wish. This approach will also be applied for Tables 3.2, etc., following. All values are at 1980 prices. This aspect need not be repeated excessively.

The fixed asset results for Agriculture dominate the three-group entries of Table 3.1. Even with farmhouses excluded the gross fixed stock of Agriculture increases from some £17,400m in 1950 to roughly £20,500m in 1984. Most of this, per column (1), is due to land and farm buildings. Net fixed stock results are similar, due to land gross and net values being almost the same (as detailed in Chapter 7). The net fixed asset values, at 1980 prices, show some £17,000m in 1950, and generally increase so as to comprise £18,100m or so in 1984. Livestock inventories are also considerable, although on a lesser scale. From some £1,500m in 1950 they have a maximum £2,100m or so in 1975, and show some £2,000m for 1980 and 1984.

By comparison with the figures just quoted, the assets of Sea Fishing are negligible. Gross fixed stock shows a total of only £160m in 1984, from £30m back in 1950. Net fixed stock aggregate increases from £16m in 1950 to £102m in 1984. The bulk of these assets comprises ships, boats, and equipment.

Table 3.1: *Fixed Assets and Inventories of Agriculture, Sea Fishing, and Forestry Development, at end of year, at 1980 prices*

£ million

Economic Sector and Year	GROSS FIXED			NET FIXED			INVENTORIES		
	Land and Buildings except Farmhouses	Plant, Machinery, Vehicles	Total Gross	Land and Buildings except Farmhouses	Plant, Machinery, Vehicles	Total Net	Livestock for Breeding	Other Livestock	Total Livestock
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Agriculture									
1950	17,157	276	17,433	16,881	154	17,035	606	884	1,490
1955	17,209	425	17,634	16,807	299	17,106	594	889	1,483
1960	17,311	539	17,850	16,626	335	16,961	661	892	1,553
1965	17,471	697	18,168	16,660	394	17,054	809	972	1,781
1970	17,620	803	18,423	16,688	504	17,192	839	1,021	1,860
1975	17,818	1,166	18,984	16,646	731	17,377	950	1,160	2,110
1980	18,244	1,767	20,011	17,037	1,101	18,138	901	1,075	1,976
1984	18,463	1,990	20,453	17,013	1,133	18,146	929	1,038	1,967

	GROSS FIXED			NET FIXED		
	Harbours and Landing Places	Ships, Boats, Equipment	Total Gross	Harbours and Landing Places	Ships, Boats, Equipment	Total Net
	(1)	(2)	(3)	(4)	(5)	(6)
Sea Fishing						
1950	9	21	30	5	11	16
1955	9	16	25	5	10	15
1960	8	14	22	5	10	15
1965	11	15	26	8	10	18
1970	20	25	45	15	17	32
1975	30	53	83	21	40	61
1980	38	99	137	25	75	100
1984	46	114	160	28	74	102

	GROSS FIXED				NET FIXED			
	Land and Grants for Private Forestry	Nursery and Plantation Estab.	Roads, Construction, All Other Items	Total Gross	Land and Grants for Private Forestry	Nursery and Plantation Estab.	Roads, Construction, All Other Items	Total Net
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
*Forestry Development**								
1950	30	47	54	131	30	47	54	131
1955	34	56	66	156	34	56	65	155
1960	39	73	85	197	39	73	80	192
1965	45	96	103	244	45	96	90	231
1970	50	124	123	297	50	124	97	271
1975	56	150	142	348	56	150	97	303
1980	60	170	149	379	60	170	100	330
1984	71	183	157	411	71	183	109	363

* Excluding standing timber, a possible £280m in 1977 at 1980 prices.

Forestry development, excluding standing timber, is again relatively small. Gross fixed assets show growth, from a total of £131m in 1950 to £411m.in 1984. Net assets have, by definition, the same 1950 value, but reach £363m in 1984. Nursery and plantation establishment takes a major share of these investments. A further major share accrues to road construction, plant and machinery, amenity development, and so on, all combined in columns (3) gross and (7) net. Standing timber might be worth £280m in 1977, at 1980 prices. It would presumably decrease in volume and value as a time series back towards 1950.

3.3 *Manufacturing, Mining and Construction*

We may first consider Manufacturing, as it dominates results set out in Table 3.2. Gross fixed stock displays large growth, from a total £1,066m in 1950 to £7,901m at the end of 1984. Most of this growth appears for years after 1970. Total net fixed stock also displays huge growth, from £534m in 1950 to £5,234m in 1984. For 1975 and later years, more than half of these gross and net totals is taken by plant, machinery and vehicles. Total inventories are also considerable, increasing from £363m in 1950 to £1,455m in 1984. In later years, materials and fuels appear to take about half of total inventories.

Mining (including Bord na Mona) shows a scale about one-tenth of that of Manufacturing, just referred to. Total gross fixed assets again show large growth, from £80m in 1950 to £724m in 1984. A similar growth-rate occurs for the total net fixed assets, from £43m to £504m. The total inventories are negligible in the early years, but show some £40m in later years.

Construction activities display equally impressive growth. Total growth fixed stock increases from £118m in 1950 to £1,128m at the end of 1984. Much of this appears as plant, machinery and vehicles. Total net fixed stock grows from £63m in 1950 to £764m in 1984. Inventories of materials and fuels are probably underestimated, as suggested in Chapter 12. But, at some £20-30m in later years, as shown in column (7), their magnitude could be doubled or trebled and still remain less than one-tenth of inventories of Manufacturing.

The Construction fixed stocks and inventories just discussed exclude such assets used by the ESB and Bord na Mona, for their electricity and peat-mining construction activities. Such related fixed assets and inventories are included with all assets of such enterprises, in Electricity and in Mining sectors, respectively.

3.4: *Electricity, Gas and Water Utilities*

By far the largest fixed stocks are held by Electricity within the three groups or sectors shown in Table 3.3. As just mentioned at the end of Section 3.3, the fixed stock and inventories of materials and fuels held by Electricity (meaning the ESB enterprise) include machinery, vehicles and supplies used for building

Table 3.2: *Fixed Assets and Inventories of Mining, Manufacturing and Construction, at end of year, at 1980 prices*

									£ million
	GROSS FIXED			NET FIXED			INVENTORIES		
Economic Sector and Year	Plant, Machinery, Vehicles	Building, Constr., Land	Total Gross	Plant, Machinery, Vehicles	Building, Constr., Land	Total Net	Total	Materials and Fuels	Work in Progress, Finished Goods
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Mining (including Bord na Mona)									
1950	45	35	80	24	19	43	2	1	1
1955	73	46	119	51	31	82	8	1	7
1960	94	72	166	64	57	121	15	2	13
1965	124	113	237	89	94	183	18	3	15
1970	165	152	317	112	126	238	43	8	35
1975	262	188	450	186	151	337	22	5	17
1980	371	281	652	251	227	478	41	15	26
1984	426	298	724	278	226	504	44	11	33
	GROSS FIXED			NET FIXED			INVENTORIES		
	Plant, Machinery, Vehicles	Building, Constr., Land	Total Gross	Plant, Machinery, Vehicles	Building, Constr., Land	Total Net	Total	Materials and Fuels	Work in Progress, Finished Goods
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Manufacturing									
1950	405	661	1,066	203	331	534	363	247	116
1955	431	720	1,151	291	433	724	419	254	165
1960	491	772	1,263	352	513	865	420	242	178
1965	894	986	1,880	636	734	1,370	548	289	259
1970	1,505	1,369	2,874	1,016	1,089	2,105	762	374	388
1975	2,451	1,876	4,327	1,662	1,495	3,157	1,032	478	554
1980	3,959	2,500	6,459	2,577	1,961	4,538	1,450	658	792
1984	4,954	2,947	7,901	3,006	2,228	5,234	1,455	688	767
	GROSS FIXED			NET FIXED			INVENTORIES		
	Plant, Machinery, Vehicles	Building, Constr., Land	Total Gross	Plant, Machinery, Vehicles	Building, Constr., Land	Total Net	Total	Materials and Fuels	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
Construction									
1950	43	75	118	23	40	63	13	13	
1955	67	86	153	47	54	101	10	10	
1960	83	87	170	52	56	108	11	11	
1965	117	85	202	77	53	130	18	18	
1970	163	102	265	118	64	182	26	26	
1975	311	107	418	231	61	292	23	23	
1980	701	121	822	522	68	590	33	33	
1984	1,009	119	1,128	693	71	764	25	25	

and construction activity by ESB employees. Such capital assets, for construction and engineering purposes, may be taken to comprise only a small fraction of the values shown in the upper portion of Table 3.3. In other words, the Electricity assets shown in this table relate almost completely to generation, transmission and distribution of electric power.

Electricity total gross fixed assets show considerable growth, from £335m in 1950 to £1,663m in 1984. Corresponding total net fixed assets grows from £187m to £1,019m. Major components, both gross and net, comprise assets used in each of Generation, Transmission and Distribution. By comparison, inventories of materials and fuels are relatively small, showing a 1980 maximum £109m related to problems of supply of fuel oil. These inventories of column (11) include negligible amounts for Townsgas and Waterworks, not meriting separate display.

The Waterworks' fixed assets are next in scale within Table 3.3, by reference to values of the 1980s. Total gross fixed stock shows remarkable growth in recent years, from £69m in 1975 to £433m for the end of 1984. Most of this growth appears in "buildings, construction, land" which presumably covers all structural work such as reservoirs and pipes. The total net fixed stock shows similar increase, from £57m in 1975 to £396m for the end of 1984. Prior to 1975, total fixed assets were on a smaller scale, some £20-49m gross and £11-40m net.

Gas activities, mainly townsgas, show decreasing fixed stocks during 1950-1980. This is indicative of the decline of the industry prior to the entry of Kinsale Gas supplying natural gas to the system. Total gross fixed assets show decline, from £166m in 1950 to £90m in 1980. But £149m appears for the end of 1984, due to Kinsale Gas recent effects. In a similar way, total net fixed assets decline from the £84m of 1950 to £56m of 1980, but then show a larger £110m for the end of 1984.

3.5: *Commercial and Business Sectors*

Table 3.4 displays results of a further three major sectors. The largest fixed asset values appears for Transport and Communication, with four components shown, as well as the total. For gross fixed assets, the total increases from £1,101m in 1950 to £4,805m at the end of 1984. A major portion of this is taken by "buildings, engineering construction, and land". A similar growth-rate is shown by total net fixed assets, from £582m in 1950 to £3,182m in 1984.

The data do not permit separation of "Transport" from "Communication". However, we may take the combined vehicle and transport equipment as indicative of Transport as such. These values appear as gross in columns (2) and (3), and as net in columns (7) and (8). The combined gross amount increases from some £200m in 1950 to about £1,100m for 1980 and 1984. Corresponding

Table 3.3: *Fixed Assets and Inventories of Fuels and Materials held by Electricity, Gas and Water Utilities, at end of year, at 1980 prices*

£ million

| | GROSS FIXED | | | | | NET FIXED | | | | | |
Economic Sector and Year	Gener- ation (1)	Trans- mission (2)	Distrib- ution (3)	General Building, Transport Equip., etc. (4)	Total Gross (5)	Gener- ation (6)	Trans- mission (7)	Distrib- ution (8)	General Building, Transport Equip., etc. (9)	Total Net (10)	Inventor- ies held by Electricity, Gas, Water (11)
Electricity											
1950	134	42	134	25	335	82	26	61	18	187	38
1955	218	76	161	33	488	152	51	113	23	339	41
1960	287	80	218	38	623	190	51	153	23	417	26
1965	362	106	280	40	788	206	67	188	23	484	47
1970	426	155	381	47	1,009	213	109	231	36	589	60
1975	508	222	504	78	1,312	258	149	299	59	765	65
1980	572	260	547	95	1,474	352	159	321	70	902	109
1984	652	287	599	125	1,663	395	180	346	98	1,019	40

| | GROSS FIXED | | | NET FIXED | | |
	Plant, Machinery, Vehicles (1)	Building, Constr., Land (2)	Total Gross (3)	Plant, Machinery, Vehicles (4)	Building, Constr., Land (5)	Total Net (6)
Gas (Townsgas)						
1950	77	89	166	39	45	84
1955	70	81	151	36	41	77
1960	64	72	136	34	36	70
1965	54	65	119	29	34	63
1970	44	57	101	24	30	54
1975	45	51	96	30	28	58
1980	39	51	90	24	32	56
1984	50	99	149	30	80	110

| | GROSS FIXED | | | NET FIXED | | |
	Plant, Machinery, Vehicles (1)	Building, Constr., Land (2)	Total Gross (3)	Plant, Machinery, Vehicles (4)	Building, Constr., Land (5)	Total Net (6)
Waterworks						
1950	7	13	20	4	7	11
1955	7	15	22	4	9	13
1960	8	18	26	5	12	17
1965	8	25	33	5	19	24
1970	8	41	49	5	35	40
1975	9	60	69	6	51	57
1980	23	199	222	17	184	201
1984	22	411	433	14	382	396

Table 3.4: *Fixed Assets and Inventories of Commercial and Business Sectors, at end of year, at 1980 prices*

£ million

Economic Sector and Year	GROSS FIXED				NET FIXED				Total Inventories
	Plant and Machinery (1)	Vehicles (2)	Buildings and Land (3)	Total Gross (4)	Plant and Machinery (5)	Vehicles (6)	Buildings and Land (7)	Total Net (8)	(9)
Wholesale and Retail Trade									
1950	176	118	407	701	97	68	208	373	418
1955	176	94	435	705	104	64	245	413	410
1960	169	126	439	734	105	75	258	438	374
1965	195	171	495	861	126	104	318	548	424
1970	273	247	572	1,092	176	154	385	715	506
1975	401	407	640	1,448	270	258	444	972	714
1980	591	663	694	1,948	373	406	475	1,254	1,002
1984	603	731	732	2,066	334	407	488	1,229	955

	GROSS FIXED			NET FIXED		
	Plant, Machinery, Vehicles (1)	Buildings and Land (2)	Total Gross (3)	Plant, Machinery, Vehicles (4)	Buildings and Land (5)	Total Net (6)
Finance and Business Services						
1950	32	175	207	21	97	118
1955	56	244	300	40	160	200
1960	66	274	340	42	185	227
1965	73	298	371	42	203	245
1970	126	406	532	81	296	377
1975	180	508	688	118	372	490
1980	494	588	1,082	349	416	765
1984	897	654	1,551	606	445	1,051

	GROSS FIXED					NET FIXED				
	Plant and Equipment (1)	Motor Vehicles (2)	Other Transport Equipment (3)	Builds., Engineer. Constr., Land (4)	Total Gross (5)	Plant and Equipment (6)	Motor Vehicles (7)	Other Transport Equipment (8)	Builds., Engineer. Constr., Land (9)	Total Net (10)
Transport and Communication										
1950	62	25	187	827	1,101	34	15	105	428	582
1955	69	30	210	957	1,266	44	22	138	566	770
1960	83	50	275	1,058	1,466	56	30	204	672	962
1965	114	65	385	1,266	1,830	78	37	285	867	1,267
1970	183	95	606	1,578	2,462	122	62	436	1,132	1,752
1975	345	160	786	1,994	3,285	248	102	466	1,461	2,277
1980	644	247	884	2,284	4,059	450	148	437	1,623	2,658
1984	964	317	802	2,722	4,805	679	192	389	1,922	3,182

net values show some £120m and £600m, respectively. a fivefold expansion is therefore indicated for Transport, which includes all public transport and all purchased freight, as well as activities of national shipping and airlines.

The "plant and equipment" combined with "building" etc., might be taken as indicative of Communications, meaning the Post Office and Radio Telefis Eireann. These gross combined results show about £900m for 1950, increasing to some £3,700m for 1984. The combined net results show some £460m for 1950 and some £2,600m for 1984. A fourfold expansion is therefore suggested for Communications.

Wholesale and Retail Trade shows the next largest scale of fixed assets. We see total gross fixed stock starting with £701m for 1950 and reaching £2,066m by the end of 1984. Total net fixed stock shows as similar threefold expansion, from £373m to £1,229m. The stock of "vehicles" is seen to comprise roughly one-third of the totals, for more recent years, both gross and net.

Trade year-end inventories appear in column (9). We see a general increase, from some £400m in the 1950s to some £1,000m in the 1980s.

Finance and Business Services are the third group shown in Table 3.4. These include banks and insurance companies. Growth of fixed assets is very large. From £207m in 1950, total gross fixed assets reach £1,551m in 1984. Total net shows £118m increasing to £1,051m, respectively. In recent years we see "plant". etc., dominating "buildings and land". Much of this effect is due to major purchases of computers and office equipment. Very large growth is evident in column (1) gross and column (4) net since 1970, by comparison with smaller absolute growth of "buildings". etc., in columns (2) gross and (5) net.

3.6 *Community, Social and Personal Services, Public Administration*

Very large accumulation of fixed assets is evident for Community etc., Services, as set out in Table 3.5. Three components of the total are shown, for both gross and net. Large growth is apparent for this sector also. Total gross fixed assets increase from £706m for 1950 to £5,533m for the end of 1984, an eightfold expansion. Buildings and land comprise much of the total, and can be explained by included activities such as hospitals, schools, colleges. However, for the 1980s some £300-400m gross stock of vehicles is apparent. Total net stock increases from £420m of 1950 to £3,802m for the end of 1984. Again, buildings and land take the major share of this. Some indicative breakdown between subsectors, such as Health and Education, appears in Chapter 10 section 10.10.

Asset results for Public Administration and Defence also appear in Table 3.5. These display a lesser growth-rate than the Community, etc., figures just discussed. Total gross fixed assets treble, from a 1950 value of £301m to £921m for 1984. Some two-thirds of the total is taken by "building and land" throughout the period. Total net grows from £155m for 1950 to £692m for 1984. Most of

Table 3.5: *Fixed Assets of Community, Social and Personal Services, and of Public Administration, at end of year, at 1980 prices*

£ million

Economic Sector and Year	GROSS FIXED				NET FIXED			
	Plant and Machinery (1)	Vehicles (2)	Buildings and Land (3)	Total Gross (4)	Plant and Machinery (5)	Vehicles (6)	Buildings and Land (7)	Total Net (8)
Community, Social, etc.								
1950	68	10	628	706	48	9	363	420
1955	123	28	922	1,073	88	20	615	723
1960	159	42	1,107	1,308	110	24	780	914
1965	243	55	1,468	1,766	162	33	1,094	1,289
1970	400	98	2,062	2,560	264	65	1,589	1,918
1975	613	179	2,704	3,496	419	116	2,064	2,599
1980	906	324	3,282	4,512	577	205	2,412	3,194
1984	1,274	381	3,878	5,533	819	210	2,773	3,802

	GROSS FIXED			NET FIXED		
	Plant, Machinery, Vehicles (1)	Builds., and Land (2)	Total Gross (3)	Plant, Machinery, Vehicles (4)	Builds., and Land (5)	Total Net (6)
Public Administration						
1950	65	236	301	35	120	155
1955	58	244	302	35	134	169
1960	53	241	294	32	138	170
1965	61	253	314	41	156	197
1970	104	293	397	71	199	270
1975	187	400	587	129	304	433
1980	248	532	780	132	426	558
1984	238	683	921	130	562	692

the growth of both gross and net is shown to occur during 1965-1984.

3.7: *Dwellings, Roads, Consumer Durables*

The three remaining sector-categories have their results set out in Table 3.6. Dwellings may be considered first. Particulars of "farmhouses" are distinguished. The "dwellings except farmhouses" values are the residues obtained by subtracting "farmhouses" values from the "Total". both gross and net. Because "farmhouses" values are tentative, the "dwellings except farmhouses" values are also tentative. In other words, the "Total" is more reliable than either of its components, for both gross and net.

The total gross fixed stock of dwellings shows a fourfold expansion, from

Table 3.6: *Fixed Assets Comprising Dwellings, Roads and Inventories of Consumer Durables, at end of year, at 1980 prices*

£ million

Economic Sector or Category, and Year	GROSS FIXED			NET FIXED		
	Dwellings except Farmhouses (1)	Farm- houses (2)	Total Dwellings Gross (3)	Dwellings except Farmhouses (4)	Farm- houses (5)	Total Dwellings Net (6)
Dwellings						
1950	2,342	985	3,327	1,241	492	1,733
1955	2,703	1,191	3,894	1,612	740	2,352
1960	2,932	1,364	4,296	1,840	925	2,765
1965	3,432	1,559	4,991	2,329	1,104	3,433
1970	4,247	1,873	6,120	3,103	1,366	4,469
1975	5,996	2,212	8,208	4,750	1,613	6,363
1980	8,224	2,636	10,860	6,780	1,886	8,666
1984	9,876	3,028	12,904	8,174	2,126	10,300
	GROSS INVENTORIES			NET INVENTORIES		
	Durable Household Goods (1)	Transport Equipment (2)	Total Gross (3)	Durable Household Goods (4)	Transport Equipment (5)	Total Net (6)
Consumer Durables						
1950	1,041	271	1,312	598	154	752
1955	1,021	392	1,413	697	287	984
1960	1,049	477	1,526	664	311	975
1965	1,315	711	2,026	789	472	1,261
1970	1,735	990	2,725	1,041	672	1,713
1975	2,337	1,414	3,751	1,394	904	2,298
1980	3,126	2,131	5,257	1,871	1,349	3,220
1984	3,427	2,073	5,500	1,891	1,255	3,146
	GROSS FIXED SAME AS NET (1)					
Roads						
1950	8,822					
1955	9,044					
1960	9,224					
1965	9,473					
1970	9,703					
1975	9,927					
1980	10,164					
1984	10,490					

£3,327m for 1950, to £12,904m for the end of 1984. The farmhouse share shows a decrease, from about one-third in the 1950s to about one-quarter in the 1980s. This reduced share is in keeping with reduced shares of agricultural GPD, etc., since 1950, within total GDP. Total net stock increases from £1,733m for 1950 to £10,300m for the end of 1984, a roughly fourfold expansion, also. A diminishing share held by farmhouses is again apparent, from 1950 to 1984.

Roads have the same gross and net fixed stock values, as referred to more than once above. Relatively small growth is apparent, from £8,822m for 1950 to £10,490m for the end of 1984.

Consumer durables are fixed assets, by their nature, although the description "Inventories" is sometimes used for them in the literature. Gross and net estimates are given in Table 3.6. Four-fold expansion is apparent. Total gross stock increases from £1,312m for 1950 to £5,500m for the end of 1984. The corresponding total net stock values are £752m and £3,146m respectively. Some two-thirds of both gross and net, for most of the selected years, is taken by "durable household goods". leaving roughly one-third for "transport equipment".

3.8: *Shares of Total Fixed Assets, and Volume Growth, by Sectors or Groups*

So far, this chapter has reviewed briefly the asset estimates piecemeal, for one sector or group at a time. How the sectors contribute to aggregate fixed assets at 1980 prices, will now be examined. Three tables set out this analysis. Table 3.7 brings together the gross and net total fixed asset data of the selected eight years, in 12 major sectors or groups or categories. Table 3.8 shows percentage shares held by each of these 12 sectors. Table 3.9 shows volume index results of each sector, based on 100 for 1960, to permit comparative growth to be reviewed. Graphical illustration appears in Figures 3.1 to 3.8, for the group results shown in Table 3.7.

Fixed Asset Values for Twelve Sectors or Categories

The basic data on gross and net total fixed assets are assembled in Table 3.7. These data have been commented on above already, and that commentary will not be repeated here. The assets of Agriculture exclude farmhouses, which are included with Dwellings. The Consumer Durables' estimates have been included as part of fixed assets. This inclusion defines Table 3.7 as the fixed asset component of "Domestic Wealth". which we will review in Section 3.9 below, after adding in Inventories. The Table 3.7 aggregates deserve mention. Total gross fixed assets show an approximate doubling of aggregate value, from £35,856m for 1950 to £76,792m for the end of 1984. An approximate doubling is also evident, of aggregate net fixed assets, from £31,059m to £60,530m. A major cumulation of Domestic Wealth in the form of fixed assets is therefore evident, during the 35-year period 1950-1984. The net assets are a more "real-

Table 3.7: Total Fixed Assets, Gross and Net, for each of Twelve Economic Groups or Categories, at end of year, at 1980 prices

£ million

Economic Group or Category	1950	1955	1960	1965	1970	1975	1980	1984
				Total Gross Fixed				
Agriculture (excluding farmhouses)	17,433	17,634	17,850	18,168	18,423	18,984	20,011	20,453
Forestry and Fishing	161	181	219	270	342	431	516	571
Mining and Construction	198	272	336	439	582	868	1,474	1,852
Manufacturing	1,066	1,151	1,263	1,880	2,874	4,327	6,459	7,901
Electricity, Gas, Water	521	661	785	940	1,159	1,477	1,786	2,245
Trade, Finance and Business	908	1,005	1,074	1,232	1,624	2,136	3,030	3,617
Transport and Communication	1,101	1,266	1,466	1,830·	2,462	3,285	4,059	4,805
Community, Social and Personal Services	706	1,073	1,308	1,766	2,560	3,496	4,512	5,533
Public Administration	301	302	294	314	397	587	780	921
Roads	8,822	9,044	9,224	9,473	9,703	9,927	10,164	10,490
Dwellings (including farmhouses)	3,327	3,894	4,296	4,991	6,120	8,208	10,860	12,904
Consumer Durables	1,312	1,413	1,526	2,026	2,725	3,751	5,257	5,500
Aggregate Total Gross Fixed	35,856	37,896	39,641	43,329	48,971	57,477	68,908	76,792
				Total Net Fixed				
Agriculture (excluding farmhouses)	17,035	17,106	16,961	17,054	17,192	17,377	18,138	18,146
Forestry and Fishing	147	170	207	249	303	364	430	465
Mining and Construction	106	183	229	313	420	629	1,068	1,268
Manufacturing	534	724	865	1,370	2,105	3,157	4,538	5,234
Electricity, Gas, Water	282	429	504	571	683	880	1,159	1,525
Trade, Finance and Business	491	613	665	793	1,092	1,462	2,019	2,280
Transport and Communication	582	770	962	1,267	1,752	2,277	2,658	3,182
Community, Social and Personal Services	420	723	914	1,289	1,918	2,599	3,194	3,802
Public Administration	155	169	170	197	270	433	558	692
Roads	8,822	9,044	9,224	9,473	9,703	9,927	10,164	10,490
Dwellings (including farmhouses)	1,733	2,352	2,765	3,433	4,469	6,363	8,666	10,300
Consumer Durables	752	984	975	1,261	1,713	2,298	3,220	3,146
Aggregate Total Net Fixed	31,059	33,267	34,441	37,270	41,620	47,766	55,812	60,530

Figure 3.1: Aggregate Total Gross and
Net Fixed Assets in Ireland 1950–1984
£ Billion at 1980 Prices
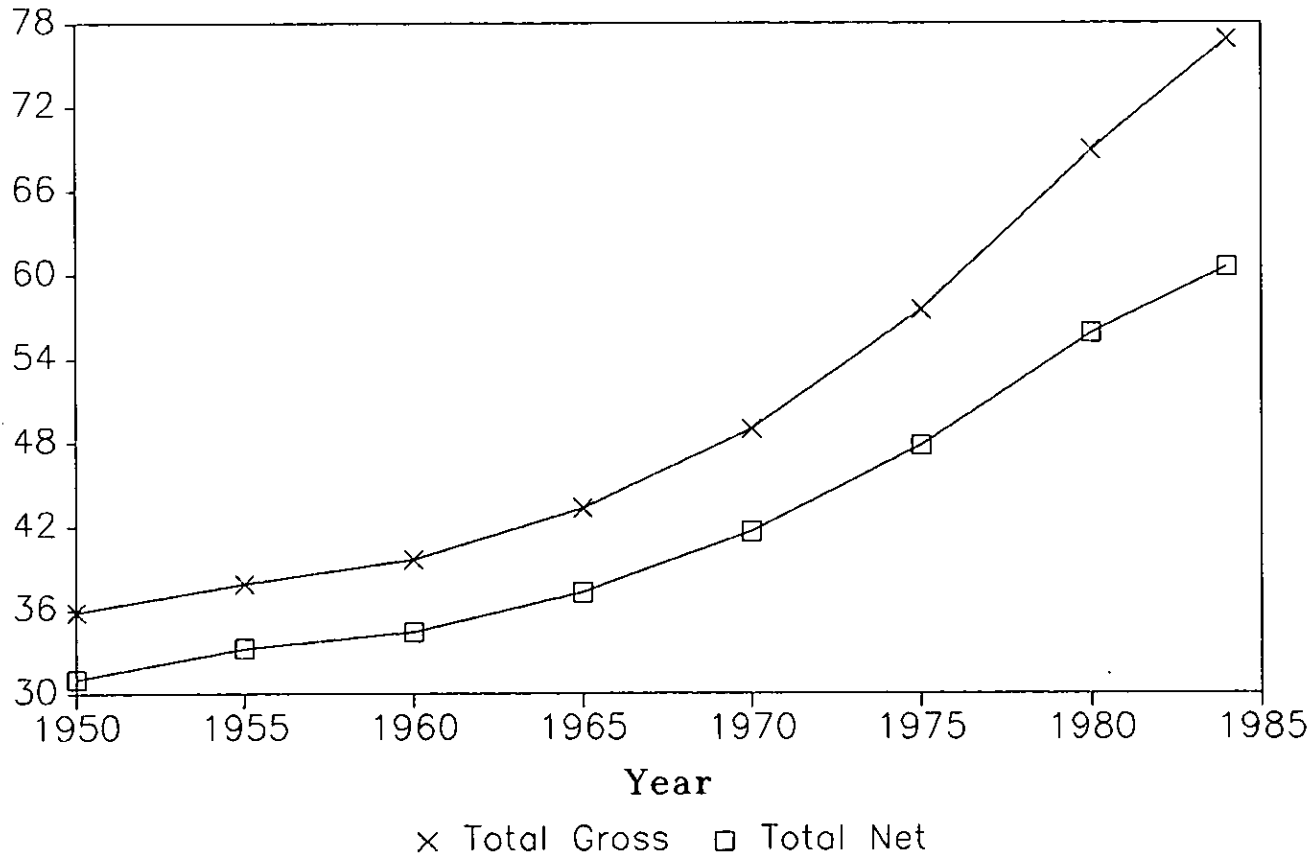
Figure 3.2: Agriculture in Ireland
Gross and Net Fixed Assets 1950–1984
£ Billion at 1980 Prices

× Gross Agriculture   ◇ Net Agriculture
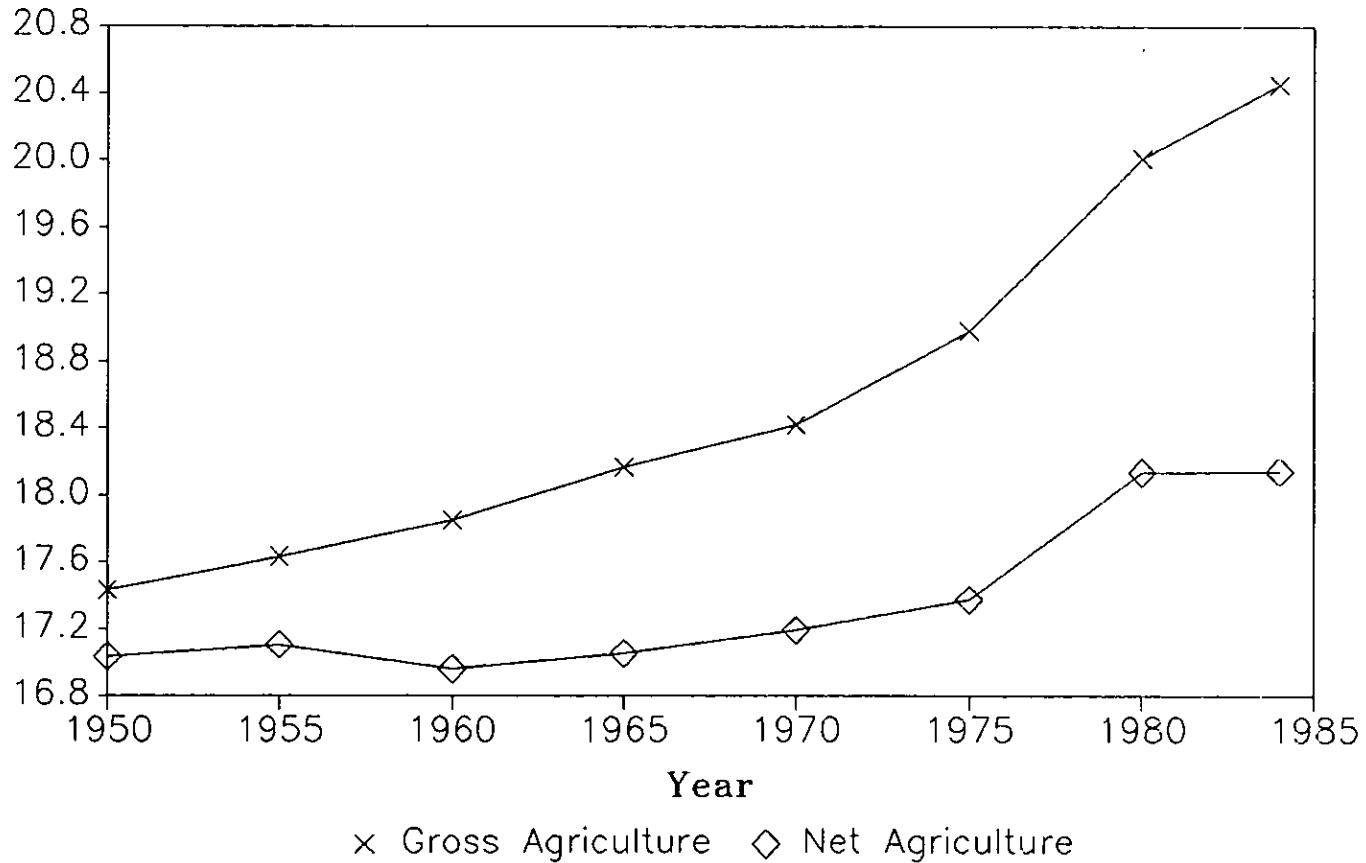
Figure 3.3: Gross Fixed Assets in form
of Roads, Dwellings, Consumer Durables
£ Billion at 1980 Prices

x Roads   □ Dwellings   o Consumer Durables
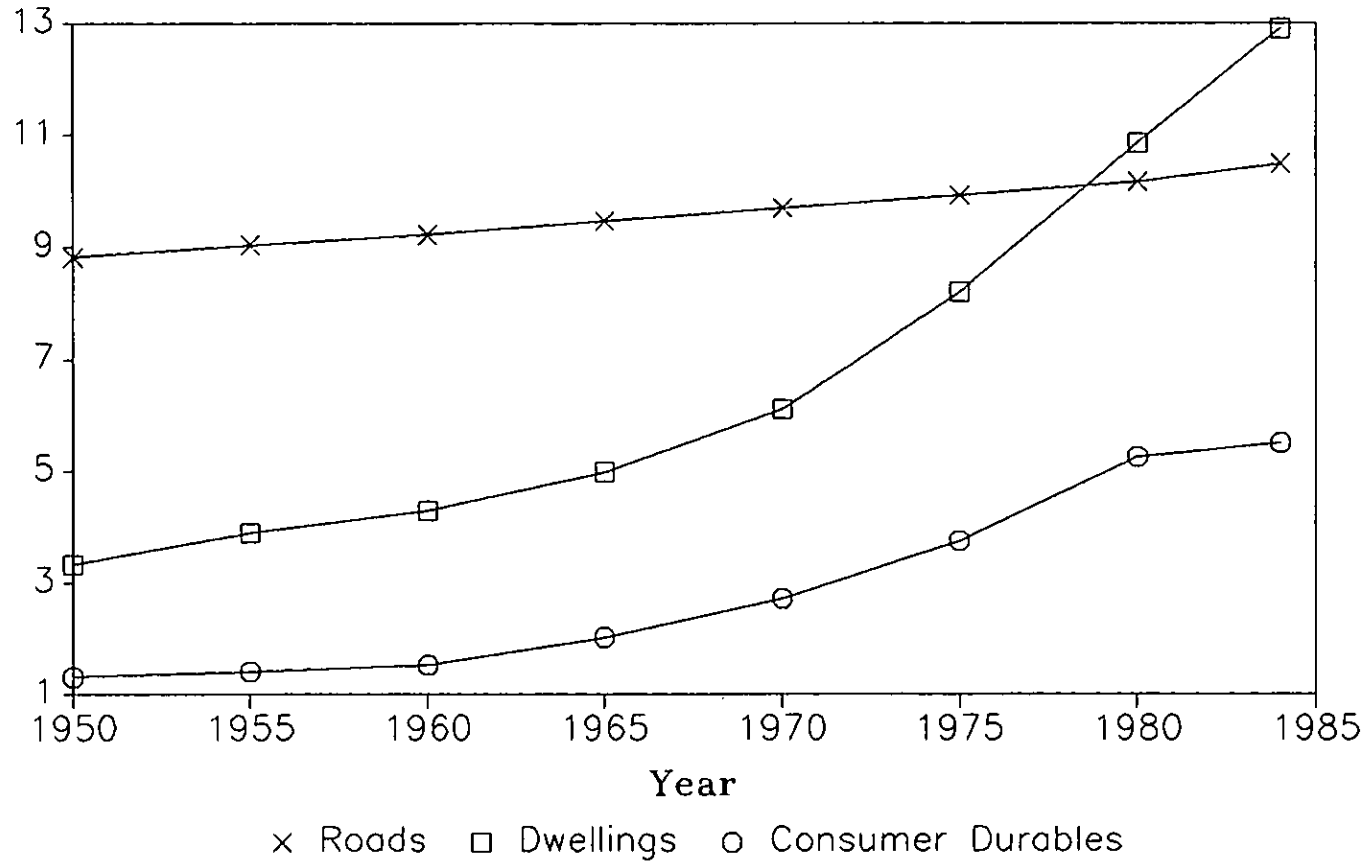
Figure 3.4: Net Fixed Assets in the form of Roads, Dwellings, Consumer Durables
£ Billion at 1980 Prices

x Roads   □ Dwellings   o Consumer Durables
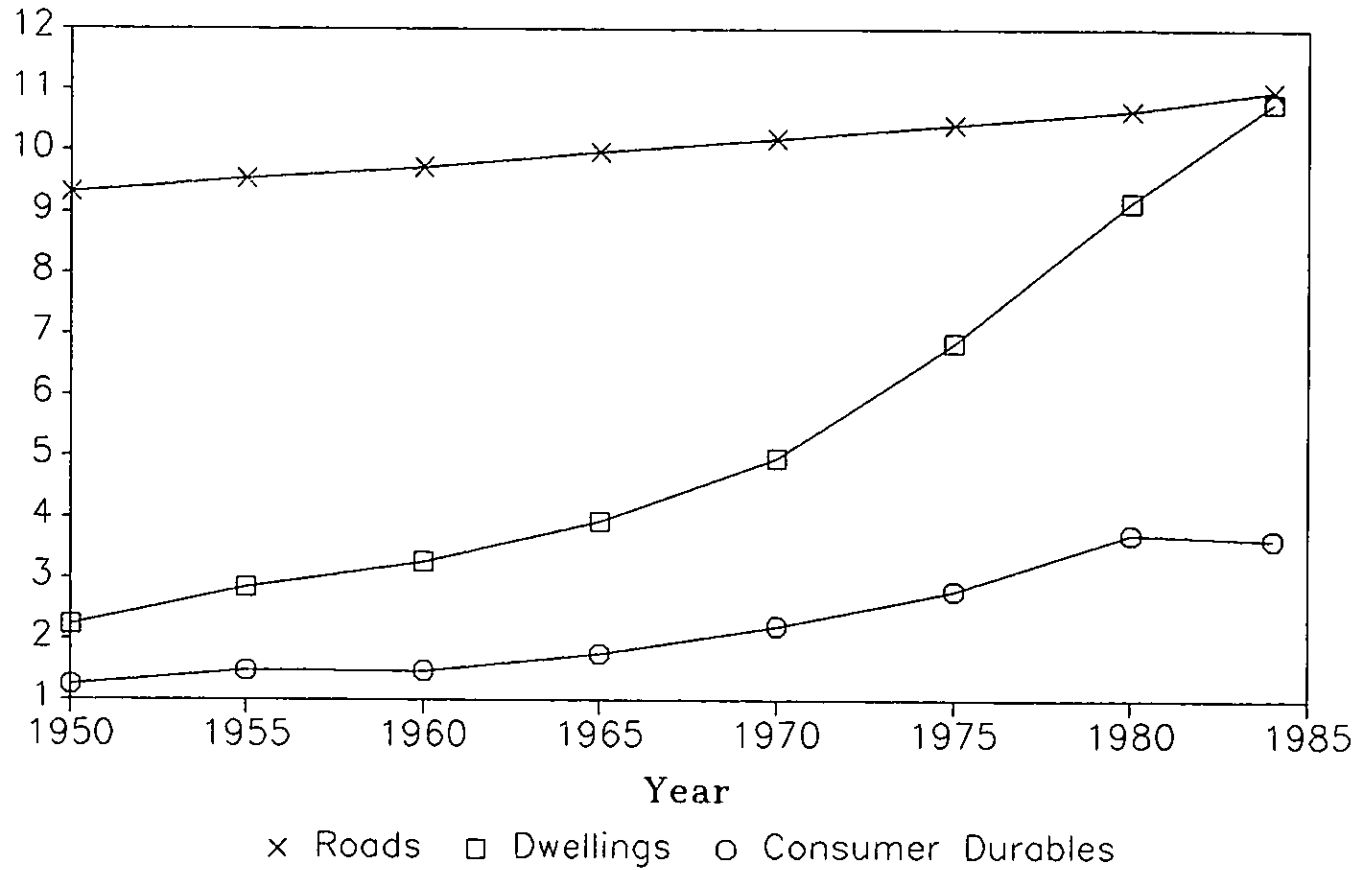
Figure 3.5: Gross Fixed Assets of Mining
of Manufacturing, and Electricity
£ Million at 1980 Prices

YEAR-END VALUES OF TANGIBLE ASSETS
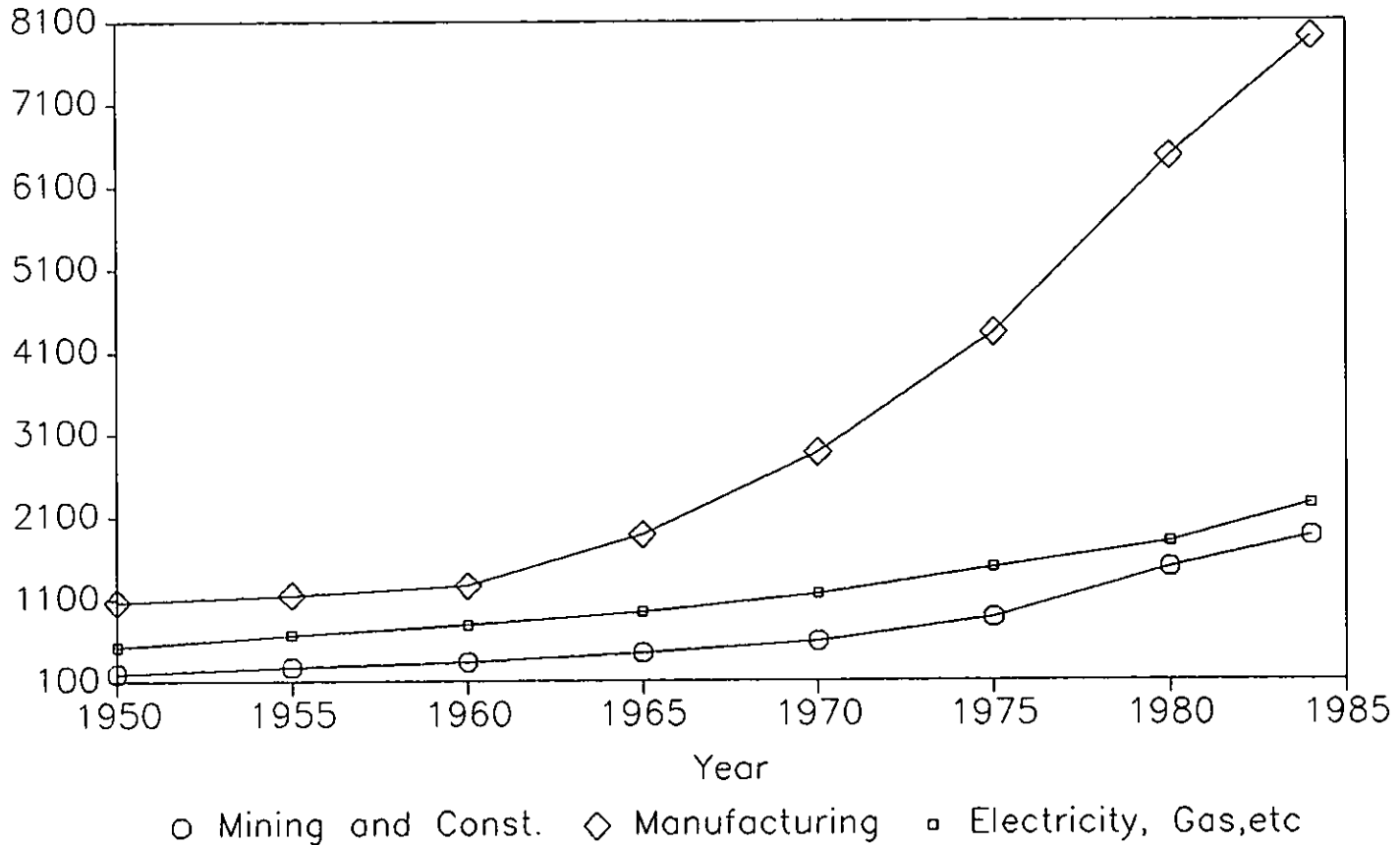
○ Mining and Const.   ◇ Manufacturing   ▫ Electricity, Gas,etc

Figure 3.6: Net Fixed Assets of Mining, Manufacturing, and Electricity,etc
£ Million at 1980 Prices
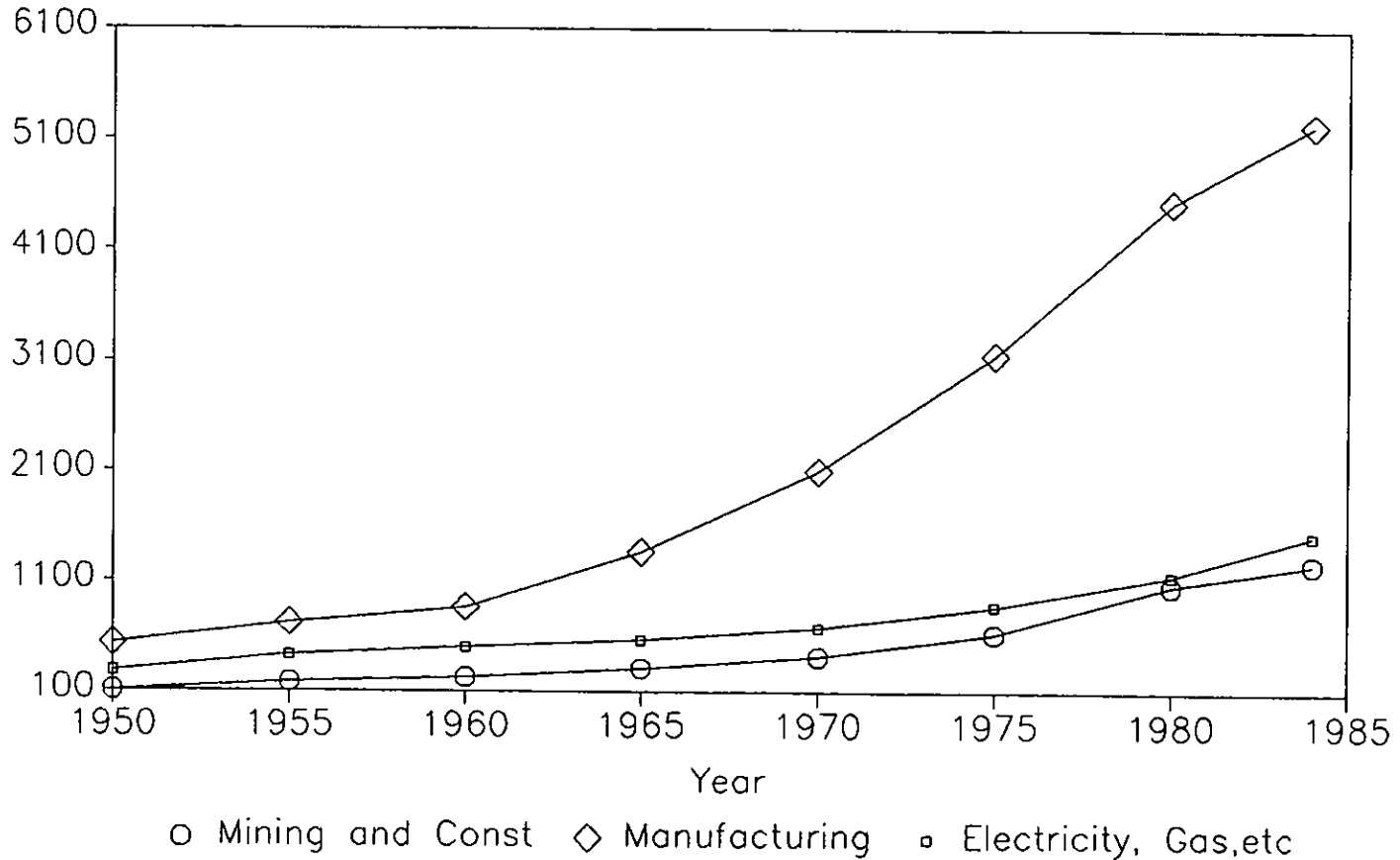
Figure 3.7: Gross Fixed Assets of Trade, Transport, Services, etc
£ Million at 1980 Prices

+ Trade and Finance   × Transport—Comm   □ Services
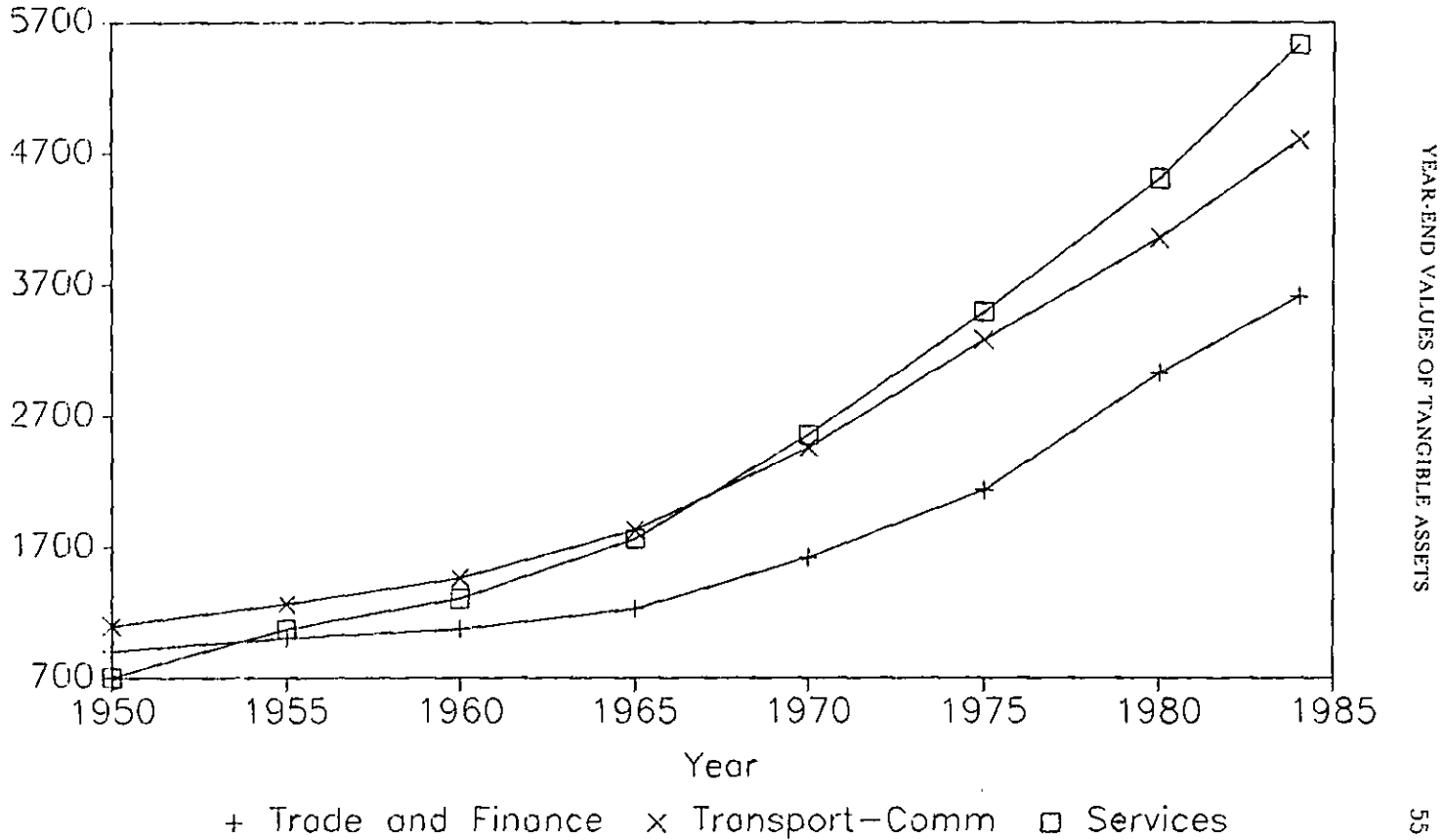
Figure 3.8: Net Fixed Assets of
Trade, Transport, Services, etc
£ Million at 1980 Prices

+ Trade and Finance   × Transport & Comm   □ Services
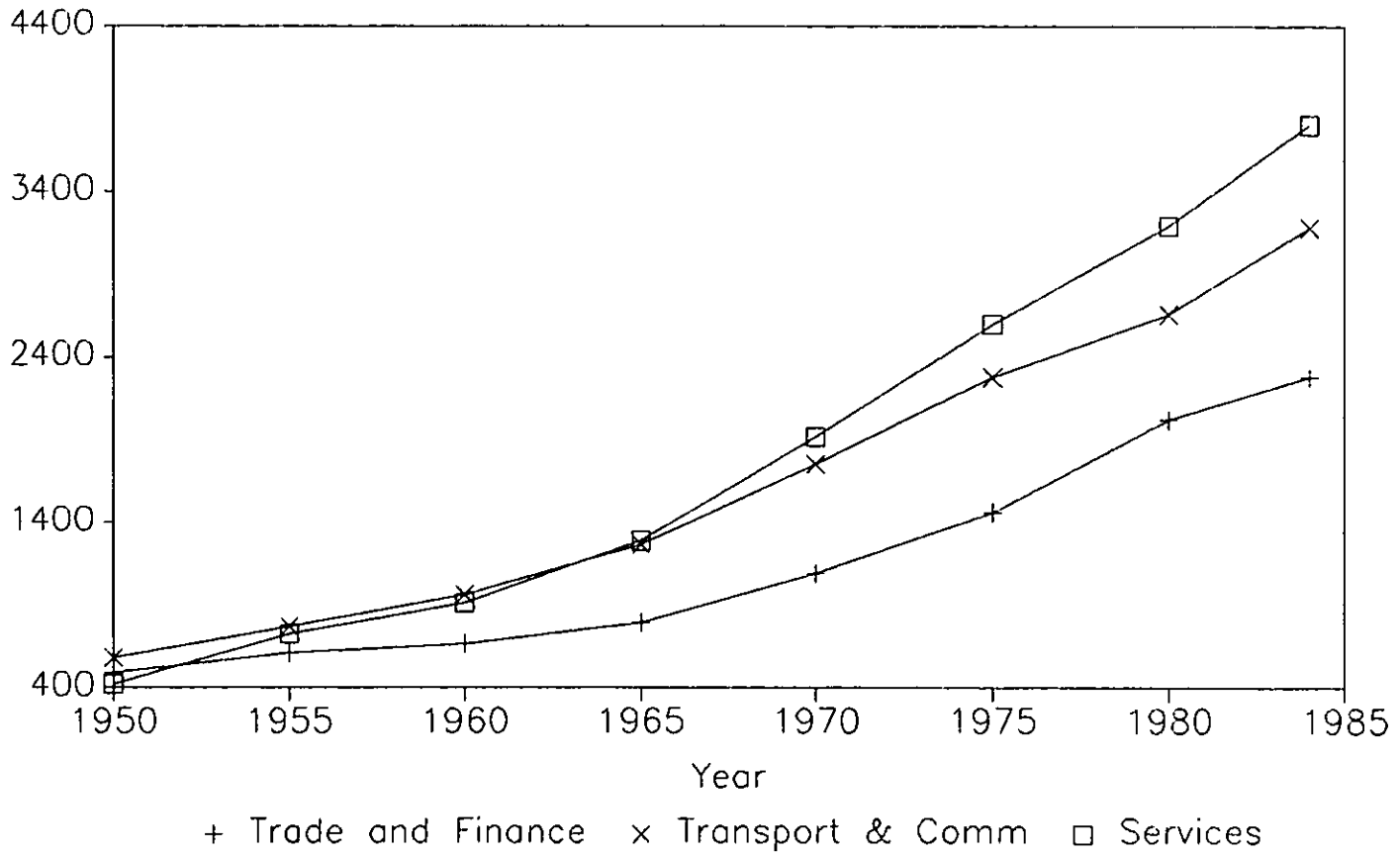
world" concept than are the gross assets. The net assets suggest an equitable price or cost, which allows for "average useful life" remaining in the assets. By contrast, the gross concept is theoretical because it means "as if all assets were at full new cost of purchase or installation".

Sectoral Percentage Shares of Aggregate Fixed Assets

Sectoral shares of gross and net aggregate fixed assets occupy Table 3.8. The percentage results for the somewhat theoretical gross values may be summarised first. For 1984 only four sectors or types have shares exceeding 10 per cent of aggregate gross. These are Agriculture (26.6 per cent), Dwellings (16.8 per cent), Roads (13.7 per cent), Manufacturing (10.3 per cent). The table shows that since 1950 the shares taken by Agriculture and Roads have declined, so as to be almost halved by 1984. By contrast, the Manufacturing share has increased from 3.0 to 10.3 per cent, and that of dwellings from 9.3 to 16.8 per cent. Agricultural land is what makes Agriculture dominate the fixed stock throughout the period, an aspect true also of the net values.

The more realistic net fixed asset shares may now be reviewed. The 1984 picture shows four major shares, namely Agriculture 30.0 per cent, Roads 17.3 per cent, Dwellings 17.0 per cent, and Manufacturing 8.6 per cent. For Agriculture omitted, the percentage shares would increase by about half, so as to give Roads and Dwellings some 25 per cent of the residue and Manufacturing some 12.5 per cent of it. In either context the Manufacturing share is small. Perhaps smaller than might be expected are the 2.5 per cent due to Electricity etc., the 3.8 per cent of Trade, Finance and Business, and the 5.3 per cent of Transport and Communication. The latter is about matched by the 5.2 per cent due to Consumer Durables. These 1984 shares are of better quality than those of the early years which include larger portions of the starting-value estimates. However, the shares of aggregate net value appearing for 1960 may be compared, as of an earlier period. Agriculture dominates, at 49.2 per cent. Roads take 26.8 per cent, and Dwellings 8.0 per cent. We find the gross asset pattern repeated. The Agriculture share declines, with the passing years, as does that of Roads. The shares taken by Dwellings, Manufacturing, and most other sectors, increase.

Volume Growth of Total Fixed Assets, by Sector

Table 3.9 shows volume index results based on 100 for 1960 and derived from Table 3.7 gross and net fixed asset values. The year 1960 is a better base than 1950, because investment of the 1950-1959 decade has been included with 1950 starting values, the latter reduced by a decade of scrapping. A further good aspect of 1960 is that it marks the beginning of a period of economic growth, following the stagnation and recession of the 1950s.

Table 3.8: *Percentage Share of Aggregate Total Fixed Assets held by each of Twelve Economic Groups or Categories, at 1980 prices, derived from Table 3.7 results*

								Per Cent
Economic Gropu/Category	1950	1955	1960	1965	1970	1975	1980	1984
				Total Gross Fixed				
Agriculture (excluding Farmhouses)	48.6	46.5	45.0	41.9	37.6	33.0	29.0	26.6
Forestry and Fishing	0.4	0.5	0.6	0.6	0.7	0.7	0.7	0.7
Mining and Construction	0.6	0.7	0.8	1.0	1.2	1.5	2.1	2.4
Manufacturing	3.0	3.0	3.2	4.3	5.9	7.5	9.4	10.3
Electricity, Gas, Water	1.5	1.7	2.0	2.2	2.4	2.6	2.6	2.9
Trade, Finance and Business	2.5	2.7	2.7	2.8	3.3	3.7	4.4	4.7
Transport and Communication	3.1	3.3	3.7	4.2	5.0	5.7	5.9	6.3
Community, Social and Personal Services	2.0	2.8	3.3	4.1	5.2	6.1	6.5	7.2
Public Administration	0.8	0.8	0.7	0.7	0.8	1.0	1.1	1.2
Roads	24.6	23.9	23.3	21.9	19.8	17.3	14.8	13.7
Dwellings (including farmhouses)	9.3	10.3	10.8	11.5	12.5	14.3	15.8	16.8
Consumer Durables	3.7	3.7	3.8	4.7	5.6	6.5	7.6	7.2
Aggregate Total Gross Fixed	100. —	100. —	100. —	100. —	100. —	100. —	100. —	100. —
				Total Net Fixed				
Agriculture (excluding farmhouses)	54.8	51.4	49.2	45.8	41.3	36.4	32.5	30.0
Forestry and Fishing	0.5	0.5	0.6	0.7	0.7	0.8	0.8	0.8
Mining and Construction	0.3	0.6	0.7	0.8	1.0	1.3	1.9	2.1
Manufacturing	1.7	2.2	2.5	3.7	5.1	6.6	8.1	8.6
Electricity, Gas, Water	0.9	1.3	1.5	1.5	1.6	1.8	2.1	2.5
Trade, Finance and Business	1.6	1.8	1.9	2.1	2.6	3.1	3.6	3.8
Transport and Communication	1.9	2.3	2.8	3.4	4.2	4.8	4.8	5.3
Community, Social and Personal Services	1.4	2.2	2.7	3.5	4.6	5.4	5.7	6.3
Public Administration	0.5	0.5	0.5	0.5	0.5	0.9	1.0	1.1
Roads	28.4	27.2	26.8	25.4	23.3	20.8	18.2	17.3
Dwellings (including farmhouses)	5.6	7.1	8.0	9.2	10.7	13.3	15.5	17.0
Consumer Durables	2.4	3.0	2.8	3.4	4.1	4.8	5.8	5.2
Aggregate Total Net Fixed	100. —	100. —	100. —	100. —	100. —	100. —	100. —	100. —

Table 3.9: *Volume Index of Total Fixed Assets to Base 100 for 1960, for each of Twelve Economic Groups or Categories, at 1980 prices, derived from Table 3.7 results*

Economic Group or Category	1950	1955	1960	1965	1970	1975	1980	1984
				Total Gross Fixed				
Agriculture (excluding farmhouses)	97.7	98.8	100.—	101.8	103.2	106.4	112.7	114.6
Forestry and Fishing	73.5	82.6	100.—	123.3	156.2	196.8	235.6	260.7
Mining and Construction	58.9	81.0	100.—	130.7	173.2	258.3	438.7	551.2
Manufacturing	84.4	91.1	100.—	148.9	227.6	342.6	511.4	625.6
Electricity, Gas, Water	66.4	84.2	100.—	119.7	147.6	188.2	227.5	286.0
Trade, Finance and Business	84.5	93.6	100.—	114.7	151.2	198.9	282.1	336.8
Transport and Communication	75.1	86.4	100.—	124.8	167.9	224.1	276.9	327.8
Community, Social and Personal Services	54.0	82.0	100.—	135.0	195.7	267.3	345.0	423.0
Public Administration	102.4	102.7	100.—	106.8	135.0	199.7	265.3	313.3
Roads	95.6	98.0	100.—	102.7	105.2	107.6	110.2	113.7
Dwellings (including farmhouses)	77.4	90.6	100.—	116.2	142.5	191.1	252.8	300.4
Consumer Durables	86.0	92.6	100.—	132.8	178.6	245.8	344.5	360.4
Aggregate Total Gross Fixed	90.5	95.6	100.—	109.3	123.5	145.0	173.8	193.7
				Total Net Fixed				
Agriculture (excluding farmhouses)	100.4	100.9	100.—	100.5	101.4	102.5	106.9	107.0
Forestry and Fishing	71.0	82.1	100.—	120.3	146.4	175.8	207.7	224.6
Mining and Construction	46.3	79.9	100.—	136.7	183.4	274.7	466.4	553.7
Manufacturing	61.7	83.7	100.—	158.4	243.4	365.0	524.6	605.1
Electricity, Gas and Water	56.0	85.1	100.—	113.3	135.5	174.6	230.0	302.6
Trade, Finance and Business	73.8	92.2	100.—	119.2	164.2	219.8	303.6	342.9
Transport and Communication	60.5	80.0	100.—	131.7	182.1	236.7	276.3	330.8
Community, Social and Personal Services	46.0	79.1	100.—	141.0	209.8	284.4	349.5	416.0
Public Administration	91.2	99.4	100.—	115.9	158.8	254.7	328.2	407.1
Roads	95.6	98.0	100.—	102.7	105.2	107.6	110.2	113.7
Dwellings (including farmhouses)	62.7	85.1	100.—	124.2	161.6	230.1	313.4	372.5
Consumer Durables	77.1	100.9	100.—	129.3	175.7	235.7	330.3	322.7
Aggregate Total Net Fixed	90.2	96.6	100.—	108.2	120.8	138.7	162.1	175.7

Each of the twelve sectors or categories has its own volume index double series, one for gross assets and one for net. We may generally ignore volume index values of 1950 and 1955, being mostly below the 1960 base value of 100 and derived from less reliable values. The gross volumes require brief mention. From

1960 to 1984 the gross aggregate volume almost doubles, reaching 193.7 for the end of 1984. Untypically small growth appears for Agriculture (114.6) and Roads (113.7). Fairly typical is a 1984 volume index in the range 250-350. This includes Electricity, etc., (286.0), Trade, etc., (336.8), Transport, etc., (327.8), Public Administration (313.3), Dwellings (300.4), Forestry and Fishing (260.7). Higher growth appears for Consumer Durables (360.4), Community, etc., (423.0). The largest growth since 1960 appears for the fixed asset gross values of Manufacturing (625.6) and Mining plus construction (551.2). In all sectors growth appears to be continuous between 1960 and 1984.

The net fixed asset values show volume growth rather similar to the growth of gross assets, just outlined. Aggregate net volume reached 175.7 for the end of 1984. Again the highest growths occur in Manufacturing (605.1) and Mining, etc., (553.7). Lesser 1984 volumes, in decreasing order, occur for Community, etc., (416.0), Public Administration (407.1), Dwellings (372.5), Trade, etc., (342.9), Transport, etc., (330.8), Consumer Durables (322.7), Electricity, etc., (302.6), Forestry and Fishing (224.6). Again the lowest two growth-rates occur in Roads (113.7) and Agriculture (107.0).

3.9: *Total Net Capital, Measured by Sectoral Net Fixed Assets plus Inventories*

Total Net Capital, in terms of estimated net fixed assets and inventories, may now be considered. Results closely resemble those just reviewed for fixed assets, because inventories are relatively small by comparison with fixed assets. The Total Net Capital value can be thought of as a notional "Total True Value". being in principle what the total assets are worth, at "equitable" prices, after due allowance for depreciation of fixed assets. This final section of the chapter discusses the Total Net Capital estimates displayed in Table 3.10. The table shows values, shares, and volumes of the same twelve economic sectors or categories as were used for previous tables. Seven sectors or categories show identical values as have appeared in Table 3.7 and the same volumes as of Table 3.9, because these sectors have Total Net Capital by way of fixed assets only, without addition of inventories. Discussion will be brief, for all twelve sectors, so as to minimise repetition of comments on Tables 3.7 to 3.9 above.

Sectoral Values

The top portion of Table 3.10 shows the evaluation of sectoral values at 1980 prices. Total Net Capital nearly doubled between 1950 and 1984, from some £33bn to £65bn, the £billion (bn) unit being £1,000m. For Agriculture omitted, we see a trebling of Capital between 1950 and 1984, from £15bn to £45bn. We see also that most growth occurred from 1960 onwards, the 1960 aggregate being about £37bn.

Table 3.10: *Total Net Capital Value, Share and Volume Held by Each of Twelve Economic Groups or Categories, at end of year, at 1980 prices*

Economic Group or Category	1950	1955	1960	1965	1970	1975	1980	1984
	Value £ million							
Agriculture (excl. farmhouses)	18,525	18,589	18,514	18,835	19,052	19,487	20,114	20,113
Forestry and Fishing	147	170	207	249	303	364	430	465
Mining and Construction	121	201	255	349	489	674	1,142	1,337
Manufacturing	897	1,143	1,285	1,918	2,867	4,189	5,988	6,689
Electricity, Gas, Water	320	470	530	618	743	945	1,268	1,565
Trade, Finance and Business	909	1,023	1,039	1,217	1,598	2,176	3,021	3,235
Transport and Communication	582	770	962	1,267	1,752	2,277	2,658	3,182
Community, Social and Personal Services	420	723	914	1,289	1,918	2,599	3,194	3,802
Public Administration	155	169	170	197	270	433	558	692
Roads	8,822	9,044	9,224	9,473	9,703	9,927	10,164	10,490
Dwellings (incl. farmhouses)	1,733	2,352	2,765	3,433	4,469	6,363	8,666	10,300
Consumer Durables	752	984	975	1,261	1,713	2,298	3,220	3,146
Aggregate	33,383	35,638	36,840	40,106	44,877	51,732	60,423	65,016
	Percentages of Aggregate							
Agriculture (excl. farmhouses)	55.5	52.2	50.3	47.0	42.5	37.7	33.3	30.9
Forestry and Fishing	0.4	0.5	0.6	0.6	0.7	0.7	0.7	0.7
Mining and Construction	0.4	0.6	0.7	0.9	1.1	1.3	1.9	2.1
Manufacturing	2.7	3.2	3.5	4.8	6.4	8.1	9.9	10.3
Electricity, Gas, Water	1.0	1.3	1.4	1.5	1.7	1.8	2.1	2.4
Trade, Finance and Business	2.7	2.9	2.8	3.0	3.6	4.2	5.0	5.0
Transport and Communication	1.7	2.2	2.6	3.2	3.9	4.4	4.4	4.9
Community, Social and Personal Services	1.3	2.0	2.5	3.2	4.3	5.0	5.3	5.8
Public Administration	0.5	0.5	0.5	0.5	0.6	0.8	0.9	1.1
Roads	26.4	25.4	25.0	23.6	21.6	19.2	16.8	16.1
Dwellings (incl. farmhouses)	5.2	6.6	7.5	8.6	10.0	12.3	14.3	15.8
Consumer Durables	2.3	2.8	2.6	3.1	3.8	4.4	5.3	4.8
Aggregate	100.–	100.–	100.–	100.–	100.–	100.–	100.–	100.–
	Volume Index to Base 100 for 1960							
Agriculture (excl. farmhouses)	100.1	100.4	100.–	101.7	102.9	105.2	108.6	108.6
Forestry and Fishing	71.0	82.1	100.–	120.3	146.4	175.8	207.7	224.6
Mining and Construction	47.5	78.8	100.–	136.9	191.8	264.3	447.8	524.3
Manufacturing	69.8	88.9	100.–	149.3	223.1	326.0	466.0	520.5
Electricity, Gas, Water	60.4	88.7	100.–	116.6	140.2	178.3	239.2	295.3

(continued)

Table 3.10 *continued*

Economic Group or Category	1950	1955	1960	1965	1970	1975	1980	1984
				Value £ million				
Trade, Finance and Business	87.5	98.5	100.—	117.1	153.8	209.4	290.8	311.4
Transport and Communication	60.5	80.0	100.—	131.7	182.1	236.7	276.3	330.8
Community, Social and Personal Services	46.0	79.1	100.—	141.0	209.8	284.4	349.5	416.0
Public Administration	91.2	99.4	100.—	115.9	158.8	254.7	328.2	407.1
Roads	95.6	98.0	100.—	102.7	105.2	107.6	110.2	113.7
Dwellings (incl. farmhouses)	62.7	85.1	100.—	124.2	161.6	230.1	313.4	372.5
Consumer Durables	77.1	100.9	100.—	129.3	175.7	235.7	330.3	322.7
Aggregate	90.6	96.7	100.—	108.9	121.8	140.4	164.0	176.5

Agricultural Capital dominates the picture, showing a range of £18.5-20.1bn throughout the period. Most of this wealth is the land value of agricultural holdings. The relative price of land was rather high in 1980, in terms of relative prices based on, say, 1987. But even if we halved the Agricultural Capital values, for effects of supposed relative prices of some other year, Agriculture for 1984 would still be as important as Roads or Dwellings, at some £10bn each in that year, at 1980 prices.

For the early 1980s Roads and Dwellings, after Agriculture, take the next largest amounts, at some £9-10bn each. Manufacturing takes some £6-7bn. Then a further four sectors or categories take £3-4bn each, namely Community, etc., Services, Trade, etc., Transport, etc., and Consumer Durables. The other four sectors have capital of the order of £1bn or less.

Back in 1960, Agriculture had about half of the total £37bn, by taking £18.5bn. Roads, at some £9bn, took a further quarter. Dwellings took some £3bn, while roughly £1bn fell to each of the three sectors Manufacturing (£1.3bn), Trade, etc., (£1bn) and Consumer Durables (£1bn).

An interesting question is: what might be the Total Net Capital Value of the tangible assets described above as existing in Ireland, at present (1989) prices? Since 1980, land prices have decreased considerably, whereas other assets (mainly Gross Fixed Capital Formation) have had some 50 per cent rise in price, according to the information available to the author. One may therefore take one-half of the Table 3.10 value of the Agriculture group, and one-and-a-half times the Table value of all the rest, to obtain a *rough order-of-magnitude* value of Total Net Capital at 1989 prices. On this basis, a total end-of-year value of tangible assets held within the State, *at 1989 prices,* in £ billion, may be suggested:

	1950	1960	1970	1980	1984
Agriculture etc.	9	9	10	10	10
All other groups and categories	22	27	39	60	67
Aggregate Total Net Capital Value	31	36	49	70	77

Readers are asked to note that these Total Net Capital values are highly tentative.

Sectoral Shares

The middle portion of Table 3.10 shows sectoral shares of the aggregate capital. Agriculture and Roads take diminishing shares with the progress of time, from their 1960 percentages of 50 and 25, respectively, to 1984 shares of 31 and 16, respectively, still the two largest shares. All other sectors have faster growth rates of capital, which explains why diminishing shares fall to Agriculture and Roads.

For the early 1980s, Dwellings take about 15 per cent, and Manufacturing 10 per cent. Some 4-6 per cent is taken by the four sectors Trade, etc., Transport, etc., Community, etc., Services, and Consumer Durables. The remaining four sectors take some 2 per cent or less.

Back at 1960, as already mentioned, Agriculture and Roads took 75 per cent between them. Dwellings dominated the remainder, at 7.5 per cent. A further five sectors took 2-4 per cent each, namely Manufacturing, Trade, etc., Transport, etc., Community, etc., Services, and Consumer Durables. The remaining four sectors had some 1 per cent or less, each.

Sectoral Volumes

The selection of 1960 as base has the same reasons as were mentioned above for the fixed assets of Table 3.9. We may again ignore volumes of the 1950s. Aggregate capital showed a volume of 176.5 for the end of 1984, giving a geometric average annual growth-rate of 2.4 per cent since 1960.

The smallest growth is displayed by the two sectors of largest capital, namely Agriculture and Roads. Agriculture (excluding farmhouses) shows only some 9 per cent volume growth, and Roads a mere 14 per cent or so. Perhaps some kernel of supporting reasons may be proffered, out of the whole background discussion. The area of land under agricultural holdings has in fact diminished since 1960, and no major growth of livestock has occurred either. Only a massive reduction in the relative price of land would permit the growth of agricultural machinery and buildings to influence the aggregate agricultural growth-rate. Regarding Road values, if most of the structure was in place back in the 1950s, then the scope for growth is extremely limited.

A growth not shown by the volume index numbers, but still of interest, is that of Total Net Capital other than Agriculture and Roads, between 1960 and 1984. The value figures of the upper portion of Table 3.10 reveal a fourfold expansion (i.e., some 300 per cent increase), from about £9bn in 1960 to about £34bn in 1984. Other similar groupings can be made by readers if they wish to consider composite growth-rates.

Most of the sectors, other than Agriculture and Roads, show 1984 volumes in the range of 300-525. In decreasing order Manufacturing (520.5), and Mining and Construction (524.3) show greatest growth. Then Community etc., Services (416.0), Public Administration (407.1), Dwellings (372.5), Transport and Communication (330.8), Consumer Durables (322.7), and Trade, Finance and Business Services (311.4), take the middle range. The lowest growth is shown by the remaining two sectors, Electricity, etc., (295.3) and Forestry and Fishing (224.6).

Chapter 4

FURTHER ASPECTS AND CONCLUSIONS

4.1 *Introduction*

This present chapter is the last of those intended for the general economist. It breaks some fresh ground. An overview is suggested on the possible uses of the estimates presented in Chapter 3 by way of an illustrative example. Chapter 3 gross capital stock estimates (gross fixed plus inventories) are matched with Gross Domestic Product (GDP) values and employment, in very aggregate form, so as to derive capital/output and capital/employment ratios. This illustration comprises the subject matter of Section 4.2 following.

An important question is the quality of the gross and net fixed stock estimates and of the inventories. Section 4.3 addresses this important but difficult question and includes a quotation from Goldsmith (1962) on the American experience of reliability. Some ground-rules are proposed as criteria for assessing the quality of the estimates. A grading of quality is tentatively outlined. This is unsatisfactory, in the sense that it provides no numerical measurement of error, either by way of applied statistical theory or otherwise.

The concluding Section 4.4 considers how the estimates presented in this Report might be improved so as to make them more reliable. Possible improvement and updating, by way of further work, are outlined. The need for particular surveys and inquiries is acknowledged.

4.2 *An Illustrative Example of Gross Capital Stock Matched with GDP and Employment, to give Capital/Output and Other Ratios*

Calculation of capital/output and capital/employment ratios provides an easy and straightforward example of how the capital stock estimates can be used. Gross capital stock data drawn from the present Report have been matched with National Accounts' and employment data, and used to provide capital/output and other ratios, as detailed in Tables 4.1 and 4.2. This experiment illustrates aspects of Irish economic growth during 1960-1984 that can be seen more easily by means of the capital stock data than otherwise.

Data and Sources

The basic data appear in Table 4.1. The upper portion of that table shows Gross Capital Stock values (gross fixed stock plus inventories) aggregated into

Table 4.1: *Gross Capital Stock and Gross Domestic Product at 1980 Prices, with Employment at Mid-April, for each of four Irish Sector-Groups and for each of six years within 1960-1984*

Sector Group	1960	1965	1970	1975	1980	1984
Gross Capital Stock (£million)						
Agriculture, Forestry, Fishing.	19,622	20,219	20,625	21,525	22,503	22,991
Industry (Mining, Manufact., Constr.						
Electricity, Gas, Water)	2,856	3,890	5,506	7,814	11,352	13,562
Trade, Transport and						
Communication	2,574	3,115	4,060	5,447	7,009	7,826
All Other Services (incl.						
Finance and Business						
Services)	1,942	2,451	3,489	4,771	6,374	8,005
Subtotal excl., Ag. For., Fish.	7,372	9,456	13,055	18,032	24,735	29,393
Total Gross Capital Stock	26,994	29,675	33,680	39,557	47,238	52,384
Gross Domestic Product (GDP) (£ million)						
Agriculture, Forestry, Fishing	689	694	752	991	991	1,217
Industry	992	1,371	1,833	2,286	3,182	3,691
Distribution, Transport and						
Commun.	606	740	1,006	1,211	1,506	1,465
Residue of Total GDP	1,464	1,650	1,768	2,172	2,851	3,075
Subtotal excl., Ag.For., Fish.	3,062	3,761	4,607	5,669	7,529	8,231
Total GDP	3,751	4,455	5,359	6,600	8,530	9,448
Employment at mid-April (thousands)						
Agriculture, Forestry, Fishing	390	340	283	238	209	181
Industry	248	296	312	337	371	319
Trade, Transport and						
Communication	194	206	207	224	232	237
All Other Services	223	227	251	274	344	366
Subtotal excl., Ag., For., Fish.	665	729	770	835	947	922
Total Employment	1,055	1,069	1,053	1,073	1,156	1,103

Footnote on Data Sources: The Capital Stock values are taken mostly from Chapter 3 above. They exclude Roads, Dwellings and Consumer Durables. The GDP data come from various issues of *National Income and Expenditure (NIE)*, with price inflator linkages derived by the writer. For 1980 and 1984 see Table 4 of NIE 1986. For 1975, see Tables A3 and A4 of NIE 1982, using 1975 and 1980 data at level of 4 components, individual linkages. For 1970 see Tables A3 and A4 of NIE 1977, to link 1970 to 1975 at 1975 prices. For 1965, see Table A3 and A4 of NIE 1972, to link 1965 to 1970 at 1968 prices. For 1960 see Tables A3 and A4 of NIE 1968, to link 1960 to 1965 at 1958 prices.

Employment Main Sources: Table 10 of *Economic Review and Outlook* (see Finance, Dept. of, 1986); with supplementary data for Wholesale and Retail Trade from *Labour Force Survey* (see Central Statistics Office, August 1985) or *Census of Population* (see Central Statistics Office, 1976).

Table 4.2: *Capital/GDP, Capital/Employment and GDP/Employment Ratios derived from Table 4.1 data (at 1980 prices)*

Sector Group	1960	1965	1970	1975	1980	1984
	Capital/GDP (capital/output)					
Agriculture, Forestry, Fishing	28.48	29.13	27.43	21.72	22.71	18.89
Industry	2.88	2.84	3.00	3.42	3.57	3.67
Trade, Transport and Communication	4.25	4.21	4.04	4.50	4.65	5.34
All Other Services	1.33	1.49	1.97	2.20	2.24	2.60
Subtotal excl., Ag.	2.41	2.51	2.83	3.18	3.29	3.57
Total	7.20	6.66	6.28	5.94	5.54	5.54
	Capital/Employment (£000 per employee)					
Agriculture, etc.	50.31	59.47	72.88	90.44	107.67	127.02
Industry	11.52	13.14	17.65	23.19	30.60	42.51
Trade,Transport and Commun.	13.27	15.12	19.61	24.32	30.21	33.02
All Other Services	8.71	10.80	13.90	17.41	18.53	21.87
Subtotal excl., Ag.	11.09	12.97	16.95	21.60	26.12	31.88
Total GDP	25.59	27.76	31.98	36.87	40.86	47.49
	GDP/Employment (£000 per employee)					
Agriculture, etc.	1.77	2.04	2.66	4.16	4.74	6.72
Industry	4.00	4.63	5.88	6.78	8.58	11.57
Trade, Transport and Communication	3.12	3.59	4.86	5.41	6.49	6.18
All Other Services	6.57	7.27	7.04	7.93	8.29	8.40
Subtotal excl., Ag.	4.60	5.16	5.98	6.79	7.95	8.93
Total Employment	3.56	4.17	5.09	6.21	7.38	8.57

4 sector-groups, with a subtotal and total also provided. Six years of the period 1960-1984 are covered, the same as those of Chapter 3 above. The middle portion of the table shows approximate matching of GDP data, into corresponding groups, Subtotal and Total. The lower portion of the table shows mid-April employment data, for the same six selected years, and matching the gross capital stock and GDP groupings.

A brief word is in order on the sources of the figures and their arrangement. The capital stock data exclude Roads, Dwellings and Consumer Durables. The first grouping is Agriculture, Forestry and Fishing, distinguished in Chapter 3. The second group, Industry, again combines recognisable Chapter 3 groups Mining and Construction, Manufacturing, Electricity etc. The third group combined Transport and Communication with the "Wholesale and Retail Trade" portion of Trade, Finance and Business (from Table 3.10). The "Finance and

Business" portion of the latter group is included with remaining sector groups (from Table 3.10) to give the fourth Table 4.1 group All Other Services. The Subtotal combines the three Table 4.1 groups other than Agriculture, etc.

The GDP source details appear in the footnote to Table 4.1. Linkages of price inflators is necessary, to reprice all values at supposed 1980 prices. The standard National Accounts' tables show the first three groups exactly as listed, namely Agriculture, etc., Industry, Distribution, etc. The "Residue of Total GDP" is obtained by subtracting values of the three groups just mentioned from the GDP total. This "Residue" therefore includes in full the negative "Adjustment for Financial Services" appearing since about 1970 in the National Accounts. In other words, this "Adjustment" has not been allocated among all four groups, but has been confined to the "Residue". In any case, the example in hand is mainly illustrative. The "Residue" also includes a relatively small value for "actual and imputed" rent of dwellings, which might arguably be omitted, in keeping with omission of the Dwelling stock.

The data sources for the mid-April employment, in thousands, also appear in the footnote to Table 4.1.

Values and Results

The values of the figures themselves may now be considered, by reference to Table 4.1. Among capital stock the Agriculture, etc., group is dominated by the huge value of agricultural land. The group value increases rather slowly, from a 1960 value of £19.6bn to £23.0bn in 1984. Industry has major growth, from some £2.9bn in 1960 to £13.6bn in 1984. Major growth is also apparent for Trade, etc., (£2.6bn to £7.8bn) and All Other (£1.9bn to £8.0bn). For Agriculture, etc., omitted, the aggregate increase is from £7.4bn in 1960 to £29.4bn in 1984, a fourfold expansion. This increase is shown, of course, in the grand total, which grows from £27.0bn in 1960 to £52.4bn in 1984.

In considering the GDP figures, we see how modest the Agriculture, etc., share is, by comparison with its gross capital stock share. The GDP of Agriculture, etc., grows from about £0.7bn in 1960 to £1.2bn in 1984. Industry displays greater growth, from £1.0bn to £3.7bn. Distribution, etc., has £0.6bn increasing to £1.5bn, rather similar to Agriculture, etc. The Residue, corresponding to "All Other" of the gross capital stock series, shows a growth from £1.5bn to £3.1bn. The Subtotal shows £3.1bn to £8.2bn, while the grand Total shows £3.8bn of 1960 to £9.4bn of 1984. We observe that everything seems to increase generally from 1960 to 1984.

The employment figures, in units of one thousand, show greatly differing group trends, within a fairly stable total employment of some 1,100 units. The Agriculture group shows persistent decrease, from 390 units in 1960 to 181 in 1984. Industry shows continuous growth from 248 units in 1960 to 371 in 1980

followed by a decrease to 319 units in April 1984. The Trade, etc., group shows small persistent growth, from 194 units in 1960 to 237 units in 1984. The group All Other Services also shows persistent growth, from 223 units in 1960 to 366 units in 1984, with a major increase during 1975-80. In summary, between 1960 and 1980 the Agriculture group shows persistent decrease, by contrast with the persistent increase shown by the other three groups, whose aggregate grows from 665 units in 1960 to 947 units in 1980.

Before considering the derived capital/output ratios, one might look at the "phasing" of the gross capital stock versus the GDP related to it. The capital stock used is in principle at the end of the years 1960, 1965, etc., whereas the GDP is of the full years 1960, 1965, etc. In a more serious application, one might best take the *average* of year-end stock 1960 and 1961 as most relevant for 1960 GDP, and so on. This possible refinement has not been applied to the illustration in hand.

Table 4.2 shows three sets of ratios derived from pairing the data of Table 4.1. The upper portion of the table shows the derived capital/output ratios, comprising a gross capital stock value divided by the corresponding GDP value, all values being at 1980 prices. For example, the capital/output ratio 7.20 in the "Total" row of the 1960 column is given by 26,994/3,751. A further set of "gross fixed stocks" capital/output ratios could, of course, be calculated, by omitting year-end inventory values and confining the capital to gross fixed stock values. These ratios are pure ratios, being £m/£m.

The middle portion of Table 4.2 shows the derived capital/employment ratios, having the dimension £000 per employee. The lower portion shows the derived GDP/employment ratios (a form of value added per person employed), also having the dimension £000 per employee.

We now review the values of the Table 4.2 ratios,. starting with those of gross capital stock/GDP, denoted capital/output. Agriculture shows a decreasing series in general, from a maximum 29.1 in 1965 to a minimum 18.9 in 1984. All the other series are in great contrast to this, by showing ratios so much smaller, and generally increasing from 1960 to 1984. Industry shows about 2.9 increasing to 3.7. Trade, etc., shows 4.2 increasing to 5.3. All Other Services shows 1.3 increasing to 2.6. And the non-Agricultural Subtotal shows 2.4 increasing to 3.6. The Total values shows 7.2 decreasing to 5.5, because of the dominance of Agriculture, etc.

Capital/employment ratios are set out in the middle portion of Table 4.2. We find growth of the ratio, from 1960 to 1984, in all groups. The Agriculture group shows much larger values than all others, by increasing from about 50 for 1960 to some 127 for 1984, in £000 per person employed. For the other three groups combined, the ratio increases from about 11 for 1960 to 32 for 1984. The Industry and Trade groups show rather similar values throughout 1960-1980,

with the All Other Services group showing smaller values.

The GDP/employment ratios occupy the lower portion of Table 4.2. A persistent increase is apparent, for all groups combined, from about 3.6 (£000 per person employed) in 1960 to about 8.6 in 1984. The three groups excluding Agriculture show an aggregate result having larger values than those of all groups combined, namely a persistent increase from about 4.6 in 1960 to about 8.9 in 1984. Agriculture shows relatively low but increasing values for 1960-1980, namely some 1.8 for 1960 to about 4.7 for 1980; but a major increase occurs so as to give 6.7 for 1984, which is about the same as the 6.2 shown for the Trade group.

Real-World Interpretation

Some economic meaning may be applied to the figures of Table 4.2, in the context of 1984 results. The 18.9 value of the capital/GDP ratio for Agriculture, etc., says that £1,000 of 1984 GDP (at 1980 prices) arising in Agriculture, etc., has on average some £19,000 of land, livestock, farm buildings, etc., associated with it. So to get £5,000 of GDP or income (some £100 per week) requires about £95,000 of capital assets of this kind (with of course an "average" small component re Forestry and Fishing fixed stocks). We may interpret these average results as dominated by gross capital stock and GDP of Agriculture. (Table 3.10 shows how small the Forestry and Fishing capital stock component is by comparison.)

By contrast, a 1984 average £1,000 of GDP at 1980 prices is associated with only some £3,600 of gross capital stock, for aggregate non-agricultural activity, within a capital stock range of £2,600 for "All Other Services". to about £5,300 for "Trade". etc. Thus, to get £5,000 of GDP requires on average only some £18,000 of gross capital stock in the non-agricultural context, one-fifth of the stock required for agricultural activity. In any context of Bank loans to cover gross fixed assets or inventories, the relatively heavy interest charges borne by Agriculture, etc., are apparent.

These "rough and ready" results seem to make two points. First, any capital stock/GDP relations need sectoral breakdown, to improve their reliability, to the extent that the available data permit. Second, any projections of gross capital stock relations with GDP had better be done for individual sectors rather than in aggregate. The apparent decrease of the capital/output ratio of the Total between 1960 and 1984 fails to show that these ratios are increasing in all sectors except Agriculture, etc. Even if one were to halve the 1984 Agriculture, etc., capital/output ratio as shown, in deference to 1980 high relative prices of land, that ratio of revised value about 9 would still be much larger than those of other groups.

A brief graphical picture of the trends implied by Table 4.2 ratios appears as Figure 4.1. This plots GDP/employment (as ordinate) against

Figure 4.1: GDP/Employment plotted against Capital/
Employment, per data of Table 4.2
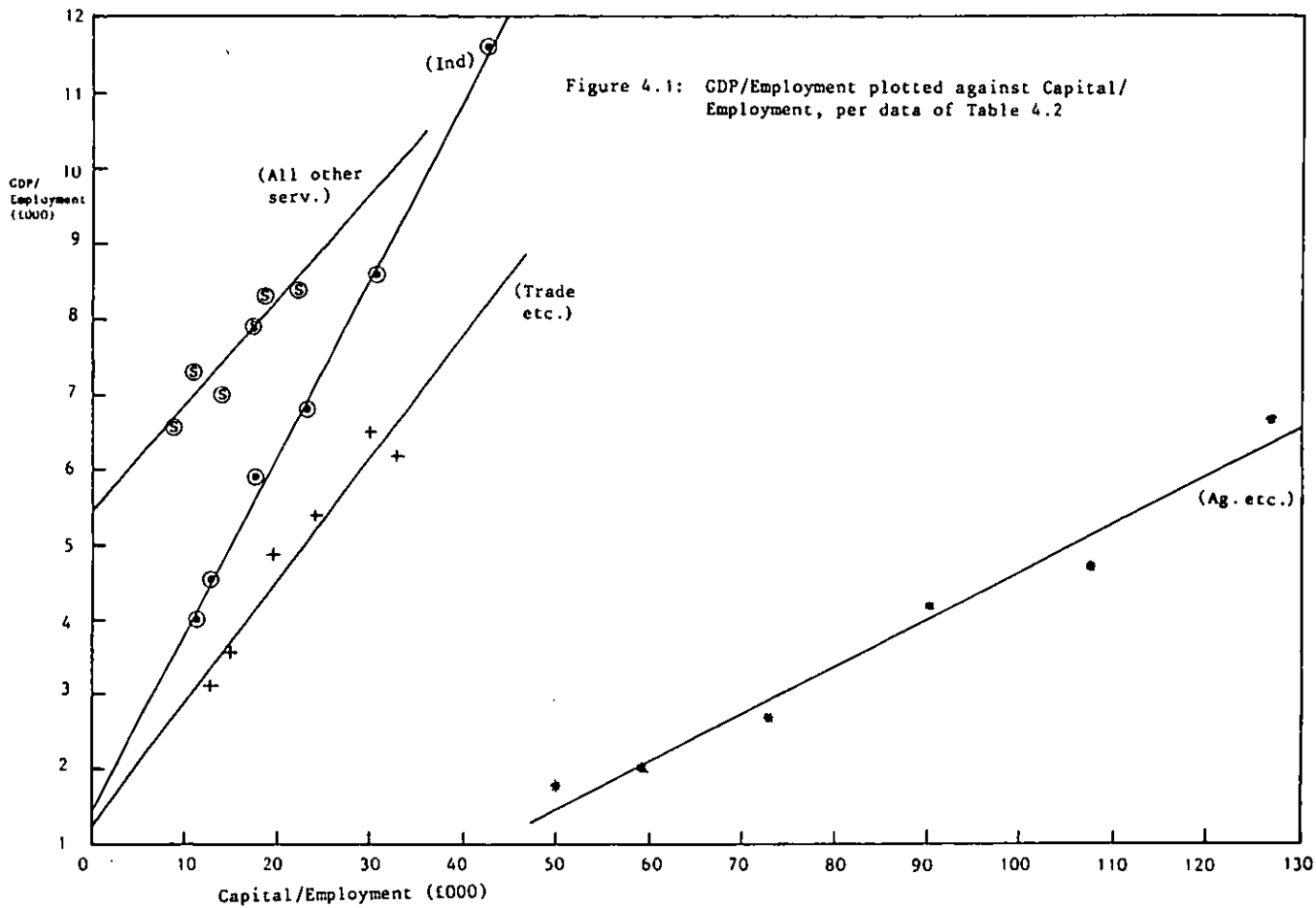
capital/employment for each of the four groups of economic activities. With only six observations, regression analysis is hardly warranted; however, the straight lines appearing on the graph are the outcome of Ordinary Least Squares' (OLS) fitting of the points to a straight line, for each of the four groups.

The OLS results can be summarised as follows, in terms of slope m and constant (intercept) c of the equation

$$GDP/employment = m(capital/employment) + c \qquad (4.1)$$

	Slope m	*Constant c*
Agriculture, etc.	.0638	− 1.715
Industry	.2370	1.431
Trade, etc.	.1644	1.227
All Other Services	.1393	5.465

In Figure 4.1 the straight-line OLS trend-curve of the Agriculture group appears far to the right of those of the other three groups, indicating how capital-intensive this activity is, due to inclusion of land as fixed assets. A rather definite trend is apparent for GDP/employee increasing with capital/employee (between 1950 and 1984). The OLS slope inverse gives a *marginal* capital/GDP ratio of about 16, which is smaller than the *average* values appearing in the upper part of Table 4.2.

By contrast with Agriculture, the other three groups are much less capital-intensive, and their trend-lines appear close together on the left-hand part of the figure. The straight-line OLS trend-curve looks satisfactory for all three groups. Based on six observations, the *marginal* capital/GDP ratios can be derived from the OLS slope inverses as follows: Industry 4.22; Trade, etc., 6.08; All Other Services 7.18.

In summary, this sample of 6 observations and their OLS analysis suggests that the Agriculture Group is between 2 and 4 times as capital-intensive (per unit GDP) *in marginal terms* as the other three major groups. The implications for interest payments on bank-loan investments in these different groups are obvious, with reference to a specified employment.

4.3 *Quality of the Asset Estimates, including Reliability*

By "quality" of asset estimates is meant how closely or precisely they estimate known or (more frequently) unknown real-world gross or net asset values. Central to the meaning of "quality" is *reliability*, which means in its ordinary sense how close the estimate comes to its real-world value. We can see that "closeness" has most meaning for the year of the price-base. In that year prices as well as values

are of a real-world kind, and value distortion does not occur through price-index deflation by "convenient" price indices.

Three aspects of quality or reliability follow. What Goldsmith (1962) has made of this problem will first be presented, by way of quotation, with brief comment. Secondly, features which underly the Irish estimates of the present Report are listed, and considered as making for reliable or unreliable asset results. Finally, a *tentative* grading of quality is proposed for the Irish estimates.

Reliability, as Viewed by Goldsmith (1962)

The following quotation from Goldsmith (1962, p.79) outlines the Reliability aspect of asset estimates and suggests what are the best kind of checks to be made:

> The assessment of the reliability of economic statistics, specifically statistics derived from a system of national accounts, and the estimation of the margins of error to which they are subject are notoriously difficult, both conceptually and ractically.....
>
> In the absence of a theoretical framework or of the practicable methods that would permit a systematic assessment of the margins of error in such estimates, the minimum that readers may ask for is the comparison of the results of a specific estimation or measurement with the results of other measurements of the same magnitude.....
>
> Since we have defined our measure of national wealth as the market value, or the nearest approximation to it, of tangible assets, and since we have derived our estimates of national wealth for most types of reproducible assets by the perpetual inventory method (i.e., by cumulating *gross* capital expenditures, depreciating them, and adjusting them for price changes), we must look for purposes of checking and comparison to bodies of data which reflect the market value of various types of tangible assets that are not derived by the perpetual inventory method.

Goldsmith, in summary, seems to propose direct comparison of asset estimates with real-world market values, as the best check. This implies (a) current-price valuation of asset estimates, (b) net fixed assets plus inventories as most nearly reflecting market valuation. The aspect of current-price valuation means either comparison for a base-year of prices (such as 1980) or that the assets are valued at current prices as well as being valued at constant prices. The US data presented by Goldsmith (1962) have major series shown at current prices, as well as at constant prices.

Goldsmith (1962, p.80) also proposes less satisfactory checks, where direct comparison with market values is not possible;

> For several other important types of tangible assets, particularly plant and

equipment of business corporations and of the federal government, a less
satisfactory though still valuable comparison is possible. For these assets
we may compare the original cost, depreciated or undepreciated, as
calculated by the perpetual inventory method with the figures shown in
the ooks of the owners. This comparison will give us a clue as to whether
the figures for gross capital expenditures used and the assumptions made
regarding the length of life of the different types f tangible assets are
reasonably close to actual capital expenditures as entered on the owners'
books and the depreciation rates applied by them.

In these cases, the written-down or "original cost" values of the assets are the
nearest available equivalent of market values.

In both cases, satisfactory agreement between the asset estimates and either
market valuation or book-keeping values implies that Average Life and
Depreciation assumptions are reasonable.

Features Underlying the Irish Asset Estimates

The assessment of quality of any capital asset estimates is a complex matter.
What follows is an attempt to outline the main features underlying the Irish
estimates, and to explain significant aspects, before attempting any grading of
these asset estimates. The following six major features are suggested:

(1)   *Fixed stock and inventory estimates and consumer durable estimates* are intended
      to be *practical measures* of the volume of assets or of the cost of assets at
      constant prices, rather than abstract concepts such as production functions.
      But the real-world conditions of current prices have been left behind because
      values are required at constant prices, to correct for price inflation. All
      that is needed is some "reasonable" method of deflation of current prices,
      of a fairly simple kind. This aspect affects all assets equally.

(2)   For work not being done within the CSO itself, one must use some accessible
      and fairly general, but reliable, price deflators. The implicit deflators
      derivable from the CSO National Accounts are the obvious best candidates,
      because they are directly relevant to GFCF of Roads, Dwellings, and so
      on. Only within the CSO would it be possible to do more refined constant-
      price calculations on many hundred (or thousand) commodities of capital
      good and Consumer Durables, including imports. It is well to make clear
      that detailed deflation is not a simple matter. It implies all of the problems
      arising in volume index compilation.

(3)   The researcher generally must accept CSO allocations of capital goods
      among sectors. This means he is limited by the maximum number of sectors
      being used by CSO, unless the researcher can make special surveys, or

avail of company reports, and so on. Manufacturing offers the greatest details of sectors for Census of Production fixed asset purchases and inventories.

(4) *Starting values* generally present several problems. In Chapters 7 to 13 below, the main exceptions are for Agriculture, Roads, and Electricity. In Agriculture, 1950 livestock and holdings had factual numbers or estimates available, to work with. The basic roads' benchmark data relate to 1984, and all other estimates depend on these. For electricity, the ESB stock has been cumulated from 1927 to 1950 in considerable detail. This is the ideal way of approaching a starting value at end-of-1950 for each major type of asset.

Other sectors generally fall under two heads: (a) some Census of Industrial Production (CIP) written-down book values for 1950 (or thereabouts) are available; (b) no such estimates are available, in which case UK data (per capita, or per person employed in the sector) are used. It can be argued that data (a) are better than data (b), (a) at least being factual for Irish conditions.

But, in either case, (a) and (b) usually have to be scaled up from written —down to gross values, if one is compiling gross stock estimates. There is a further correction necessary, on the assumption that written- down values are an amalgam of purchases (or cost) at pre-1950 current prices. The correction is that the written-down values need a scaling-up to be at, say, 1950 prices. Thus a double scaling-up is required, *before* any inflation towards valuation at 1980 prices. Vaughan (1980) derived and used a factor of 4 or thereabouts for the double scaling, relating to values at 1950 prices derived from investments since the 1930s. His refined theory of gross and net starting values appears below at the end of Appendix 2.

A further assumption about Starting Values is the assumption concerning useful life and scrapping rates. The detailed treatment of the ESB data is the nearest approach one can make to a complete solution of this assumption, and yet even here the answer is not factual. A more detailed follow-through of individual "vintages" of stock would be necessary, for a full answer on scrapping.

(5) *Average Life* assumptions are very much along the lines of the previous paragraph. Accounting experts can advise on various kinds of equipment. But only a detailed "vintage" follow-through can identify physical removal of stock. In principle, the use of data on Average Life from other countries is the same as getting advice of experts, although arguably not so precise as that for local or national conditions.

(6)   Not all data are known fully. The global scaling-up of CIP data to cover non-respondents introduces inaccuracies at the sector level. For some years the breakdown between "plant" and "vehicles" is unknown within several sectors, and estimates have to be made across sectors, to match a control total for vehicles. These allocation problems illustrate some of the obstacles to be overcome, in detailing the GFCF at current prices among sectors in conditions of less than full information. Major estimation problems have occurred for inventories of Wholesale and Retail Trade, which for most years have no information available.

A Grading of Quality

Within the framework of the six major features discussed above, some grading of the asset estimates can be suggested, in the order of improving quality, from worst towards better.

(a)   *Possible.* Farmhouses are the prime example. No direct information is available, on either GFCF or starting values. The estimation is made indirectly. This is the lowest or worst quality, whether gross or net stock is involved.

(b)   *Orders of Magnitude.* This is the quality of most of the fixed stock estimates set out in Chapters 7 to 11, except for those mentioned in (c) below. Grade (b) is also applicable to Consumer Durables. Starting values are not known precisely, the factor 4 or some analogous parameter being guessed at, and this imprecision affects results, mainly in the earlier years. Discussion with accounting experts for each major sector might cause changes in average life assumptions, so improved precision from this aspect is also possible. If the sector's fixed stock time-series approaches a benchmark estimate obtained independently, then of course this enhances its precision. Examples encountered below are the Sea Fishing fleet of Chapter 7 and the Transport and Communication aggregate of Chapter 10.

(c)   *More Precise.* This is to be taken to mean "of better quality than (b) above". It applies to the Livestock inventories and agricultural holdings of Agriculture, and to Electricity fixed stock, where the basic numeric data are good. It also applies to the Roads estimate, directly linked to the 1984 benchmark. Manufacturing and Mining inventories are candidates for Grade (c), subject to the imprecision of the "convenient" price inflators used, and of the scaling factor used to cover CIP non-respondents.

4.4:   *Possible Improvements of the Estimates and Updating, by Further Work*

One concluding question is how the estimates presented in the present Report

might be improved, so as to make them more reliable? Possible improvement is implied by the discussions of Section 4.3 above, as to the quality and reliability of the present estimates. Most of the fixed stock estimates (gross and net) have been awarded Grade (b) meaning "orders of magnitude".

To improve these latter estimates, it seems to the author that the need is for a sufficiently reliable benchmark estimate of each sector for a recent year, as has occurred for Roads. Given such a benchmark, then the GFCF data would enable backward and forward projections of the benchmark to occur. The benchmark itself, of course, has the same nature and characteristics as any starting-stock estimate. It needs to be known as a structure of gross and net values of different asset categories, and some schedule of scrapping is necessary for each asset category.

Major survey work would appear to be required to provide satisfactory benchmark detail for the fixed stocks of almost all non-agricultural activities, as well as a benchmark for Dwellings. Stratified random or systematic sampling would seem to be implied, along the lines of the system used for estimating Wholesale and Retail 1952-54 Sales (see Central Statistics Office, 1956). Sectors such as Electricity, Transport and Communication having only one or a few enterprises of significance are quite exceptional. The typical industry or sector can have from 5 to 500 firms or enterprises, even in a small economy such as Ireland. In other words, the convenience of a readily available aggregate balance sheet or asset schedule does not exist. Sampling techniques need to be applied to obtain this information in an efficient way. This appears to be the only feasible approach to more reliable asset estimates.

The Central Statistics Office would appear to be the most obvious candidate, for elaborate survey work to establish benchmark estimates of gross and net fixed stocks. A specific allocation of resources, by Government, would be required in order to achieve this objective.

Future Updating of Present Results

A further question concerns the future updating of the results shown up to the end of 1984 in the present Report. Perhaps once every five years would suffice, with a three-year time-lag to allow fairly complete CIP and other data to become available. So, for example, in 1992 all series might be updated to cover 1985-1989, with possible revision of 1984 results appearing in the present Report.

Four aspects of any updating procedure present themselves:

(1) *Methodology:*
   Ample description of methodology is given in the present Report, to enable further application of the Perpetual Inventory (PI) method to occur, in the framework and sectoring as described.

(2) *Possible Repricing:*

By 1992 it is likely that a new price-base, such as 1990, may be in use for the National Accounts. An appropriate repricing of the capital stock series is required. This can be done by linking implicit price indices and applying them at the level of detail shown in the tables of the present Report. However, a better outcome would result from more detailed repricing, at the level of the sub-series on the work-sheets and computer print-outs of the author. These particulars are available for future use. It is presumed that the GFCF, etc., data of 1985-1989 would be initially repriced at the supposed 1990 constant prices, before use for updating the stock series beyond the end of 1984.

(3) *Continuation of the Present Series, Repriced:*

The best way of continuing the present (1984) results into the future would be to build onto the partial results for 1985 and later, as appearing in the extant work-sheets of the author. These data are available for future use also. As "starting stock" for 1985-89 (leaving aside possible revisions of 1984 results as now estimated) these are the best resources. Repricing, so as to be at supposed 1990 prices, would be necessary. This data base would be a better input than what could be obtained from any arbitrary projection and scrapping of the 1984 stock, which must occur in the absence of better information.

(4) *More Detailed Sectoral Results:*

Several subsectors of services would be desirable if the data permitted. Some relative magnitudes for Health and Education have appeared for recent years. The gross and net stock series for any subsector can, of course, be estimated, given (a) benchmark fixed asset values, (b) investment amounts by principal kind of asset for any series of years which includes the benchmark year. The PI methodology can be applied to give gross and net estimates.

Without special (survey) information such as now exists in the CIP, detailed allocation of some kinds of capital goods among sectors creates problems for the CSO. The international recommendations are followed, in reaching feasible data such as those used to give the sectoral results of the present Report. However, finer sectoral detail is possible only through direct information such as that obtained by the CIP. Thus, there is no way around the fact that specific surveys of service sub-sectors are recessary, to provide benchmark and time-series estimates of any such sub-sectors.

PART 1: TECHNIQUES AND DETAILED RESULTS

Chapter 5

METHODOLOGY OF ESTIMATING FIXED STOCK

5.1: *Introduction*

Working stocks require only inflation by suitable price inflators, in order to provide the end-of-year working capital estimates required. Agricultural livestock estimation is described in Chapter 7; the working stocks of non-agricultural sectors generally are derived in Chapter 12. The bulk of the estimation process comprises gross and net fixed stock compilation, to be described in the present chapter. For definitions of gross and net stock, see section 2.1 of Chapter 2 above.

The rest of this chapter comprises three parts. The first part gives a brief and general algebraic description of the basic measurement of gross and net fixed capital stock. The second part considers Survival Functions and Average Life, as described in the fairly recent literature of relevance. The third part of the chapter gives an empiric description of the methodology used for the capital stock calculations providing the numerical results comprising Chapters 7 to 11. Specific data descriptions of starting values, etc., for particular sectors appear as Appendices which are referred to in the text of Chapters 7 to 11. Readers can go directly to Part 3 of the chapter for a pragmatic description of methodology, thus avoiding the theoretical and general aspects comprising Parts 1 and 2.

PART 1: BASIC ALGEBRAIC FORMULATION

5.2: *The Algebraic Model*

The simplest version of the model considers only new capital goods of category i having an average life of ni years, repriced to be at constant prices, and having 100 per cent capacity thoughout the n_i years (n_i taken to be an integer) before being scrapped after n_i years in use. Let there be L distinct categories of capital goods. Let year t be any year whatsoever, and let year T be the specific year at the end of which K^G_{iT} is new gross capital stock available for use (repriced to be at constant prices) brought into commission during year T, of category i, within i = 1 to L. Let year 0 be a starting year, as far back before t as makes sense, e.g., year 0 might be the year of start-up of a sector or industry, but

we suppose it is at least as early as any relevant T. Then, the *gross* capital stock at the end of any typical year t is given by KGt, where

$$\sum_{i=1}^{L} \sum_{j=0}^{t} K^{G}_{ij} = K^{G}_{t} \tag{1}$$

summation i being over L categories and j over years 0 to t subject to three conditions:

$$K^{G}_{ij} = 0 \text{ for } t < (T + 1) \tag{2}$$

meaning there is nothing during the years before year (T + 1) at the beginning of which K^{G}_{iT} becomes available:

$$K^{G}_{ij} = K^{G}_{iT} \text{ for } (T + 1) \leqslant t \leqslant (T + n_i) \tag{3}$$

the second condition meaning the full gross new value (at constant prices) is entered for each year of its average life n_i, starting with year (T + 1);

$$K^{G}_{ij} = 0 \text{ for } (t\text{-}T) > n_i \tag{4}$$

the third condition meaning the capital good i has passed through its average (useful) life n_i years and been scrapped, within the period of years between the end of the year of commission T and year t being considered.

The definition of *net* capital stock K^{N}_{t} at the end of typical year t can be deduced, by the additional device of a linear depreciation function d_{ij} of capital good i in year j, to modify condition (3) above, so that condition (3) becomes

$$K^{N}_{ij} = K^{G}_{iT}.d_{ij} \text{ for } (T + 1) \leqslant t \leqslant (T + n_i) \tag{5}$$

where multiplicative depreciation function d_{ij} is given by

$$(1 - k/n_i) = d_{ij} \tag{6}$$

with k taking values 0 for t = (T + 1)
$\qquad\qquad$ 1 for t = (T + 2)
$\qquad\quad (n_i - 1)$ for t = (T + n_i).

Thus the *net* stock equivalent of (1) above becomes

$$\sum_{i=1}^{L} \sum_{j=0}^{t} K^{N}_{ij} = K^{N}_{t} \quad \text{at the end of year t.} \tag{7}$$

Conditons (2) and (4) apply equally for the net stock.

5.3: *Modifications or Complications of the Basic Model*

The simple model above assumes complete knowledge of all relevant facts, meaning or implying full statistical detail of the assets brought into commission, appropriate price deflators being available, average life of each asset being known, and so on. Still within the context of fairly complete knowledge, some four modifications of the basic model may be considered, namely: (a) sales of assets before scrapping; (b) purchases of second-hand (partly-used) assets; (c) scrapping assets over several years, not just after n_i years; (d) starting values for partly-used capital stock.

(a): *Sales of Assets before Scrapping*

All this implies is that basic conditions (3) and (5) above are modified to shorten the period of n_i years during which K^G_{ij} and K^N_{ij} are non-zero.

(b): *Purchases of Second-Hand Assets*

Given enough information, basic conditions (3) and (5) are again modified. For gross measure, K^G_{ij}, the asset should be valued as if new (at constant prices), and kept in the system for the period of remaining useful life, smaller than n_i. For net measure, K^N_{ij}, the asset should be valued and kept, according to linear depreciation and remaining useful life, respectively.

(c): *A Spread of Useful Life about the Average*

In the fairly recent "Survival Function" approach, to be discussed in Part 2 below, the simulteaneous exit of all K^G_i and K^N_i after n_i years is called "Simultaneous Exit". This simultaneous removal of assets i of year T was used above. A "Linear Exit" means that assets i available for use at the end of year T are scrapped in a regular fashion over several years centred on the end of year $(T + n_i)$; an easy application would be five years, year $(T + n_i - 2)$ being the first, and year $(T + n_i + 2)$ being the last, and 20 per cent per year being the rate of scrapping.

It is clear that this effect is the same (for both the gross and net stocks) as a version of condition (5) above: a d_{ij} linear function over 5 years takes successive values: .8,.6,.4,.2,.0, the value .8 to apply to the end of year $(T + n_i - 2)$, and the d_{ij} for each year to apply as a multiplicative factor to the appropriate K^G_{ij} or K^N_{ij} of the basic model given above, *but* with K^G_{ij} and K^N_{ij} given extended life beyond $(T + n_i)$, as required by the Linear Exit.

(d): *The Problem of Starting Values of the Stock*

Given complete information, as assumed for the basic model above, the end of any year t can be thought of as a point of reference, for starting a gross and

net capital stock series. There are no data problems, because the phasing of each T and n_i are known.

But in the real-world situation, capital stock estimates may be required, starting from say 1950, with industries and capital stock in existence for several years before 1950.

The complete answer would seem to be a repeat of (b) above, namely the correct treatment of second-hand assets. In this way both a gross and net projection of the existing (end-of-1950) assets could be made, with or without further application of (c) above, depending on whether or not Linear Exit were deemed appropriate.

The real-world conditions create many more problems and complications than those addressed above. Attempts to cope with information problems by means of mathematical techniques can be found in Chapter 2 of Vaughan (1980) if readers wish to see them. Appendix 2 below summarises Vaughan's approach to these problems, including his refined mathematical theory of how to estimate benchmark and starting values.

PART 2: SURVIVAL FUNCTIONS AND AVERAGE LIFE

5.4: *Survival Functions as Described in the Literature*

Paccourd (1983) describes EUROSTAT calculations for capital stock of the four major EEC countries: UK, France, FRG, Italy, covering the years 1940-1980. Both gross and net stock are estimated at 1975 prices at the end of each year. Eight survival functions are described, the UK linear form of which has attractive features perhaps for the service sectors, adapted to terminate an asset over 5 years centred on the end-year of its average useful life. Unfortunately, the Paccourd study is confined to mining, manufacturing and construction (NACE CLIO Code R25 groups 06, 13 to 48, 53) so there is no help towards average life of service-used assets. Motor vehicle treatment is not shown separately.

The original survival function, denoted "Simultaneous Exit" in Paccourd (1983), gave 100 per cent capacity of an asset up to the end of its average life n years. The other survival functions described in Paccourd (1983) all gradualise or smooth out the "Simultaneous Exit" treatment, by starting to reduce capacity before year n and keeping some capacity after year n. In statistical terms, this means a probability distribution of actual termination of useful life about the average termination, the latter coinciding with the end-year of average useful life. The unsmoothed version "Simultaneous Exit". was used by Henry, (1971) and Vaughan (1980). This is again used by the writer in calculating the results described below.

Reducing capacity from 100 per cent to 0 per cent linearly over the period 0.8n to 1.2n is the UK approach described as "Linear" in Paccourd (1983, p. 37). In view of all the uncertainties underlying the capital stock estimation, a 5-year period of reducing capacity would seem reasonable. Other UK survival functions are implicit or explicit in Dean (1964) and Griffin (1975 and 1976); the term "survival function" does not appear in these papers.

Blades (March, 1983) provides an interesting parallel description to that of Paccourd (1983), within the framework of 13 OECD countries. The Blades report *Service Lives of Fixed Assets* provides a wealth of information on average life of different kinds of fixed assets in Tables 2 to 5 of that report. These data will be referred to below in the third part of this chapter.

5.5: *Average Life as Described in the Literature*

A brief discussion will suffice, to cover salient aspects. The literature, as represented by the references quoted, seems to have concentrated mostly on Mining and Manufacturing, with little or no advertance to Services. This is, of course, explicitly the case for Henry (1971) and Vaughan (1980); it is found true for Griffin (1975) and Paccourd (1983).

Some help emerges from the following. Table 13 of Paccourd (1983) shows EC "Community" average life of 23 years for "plant and machinery" and 50 years for "buildings" within Manufacturing. Table 1 of "Appendix to Section II" of Dean (1964, p. 346) shows that 94 per cent of "plant and machinery" for "Distribution and other services" was assumed to have an average life of 25 years or longer. Appendix 1 of Griffin (1976) has a detailed and useful discussion of the service life of fixed assets in Manufacturing; average service life of plant was found to be about 25 years (p. 128); and "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" (p. 139). But the vehicle is not scrapped at this stage; if it is sold to some private person it becomes a "consumer durable", whereas it was a capital asset when owned by the company.

Further clues emerge from the "Asset lives" sub-section of the "Stock of Fixed Capital" part of Central Statistical Office (1985, pp. 200-201). "The lack of knowledge about asset lives is one of the principal problems in the application of the perpetual inventory method. Few companies keep records which show the age at which assets are scrapped." An average life of 80 years is still used for commercial buildings; regarding plant and machinery installed since 1970, "for most industries the average is around 25 years; for the distribution, transport and communications, and banking finance insurance etc., industries the average is 30 years, distributed as 6 per cent with a 16 year life, 54 per cent 25 years,

28 per cent 34 years and 12 per cent 50 years". Roads, in accordance with international guidelines, are not depreciated.

The most detailed data on average lives of different assets, as far as this writer knows, appear in Tables 2 to 5 of Blades (March, 1983); they have already been referred to in Section 5.4 above. Quite wide variation can appear across countries, e.g., road freight vehicles (Table 5) are quoted as having a 5-year life in Japan, compared with a 10-year life for the UK. Among the Blades data, those for the UK seemed to this writer to be most relevant for Irish conditions. Further reference to them will appear in the next part of this chapter.

In view of these quotations and excerpts from the literature, the Average Life and Survival Function parameters used by the writer for the Irish data of 1950-1984 appear reasonable. It also appears that the Perpetual Inventory Method provides estimates which would require massive detailed investigation to check for precision at individual firm or establishment level.

PART 3: PRAGMATIC DESCRIPTIONS OF METHODOLOGY USED FOR FIXED STOCK CALCULATIONS OF PRESENT REPORT

5.6: *Methodology of Calculating the Irish Fixed Capital Stock Estimates of 1950-1984*

The system of estimation to be described below is known in the capital stock literature as the "Perpetual Inventory Method". This method keeps an on-going inventory of the value (at constant prices) of all fixed capital assets in existence at the start of each year, those installed during the year, and those scrapped or sold during the year, to the extent that the data permit. What follows describes the particular form of the method used, to give the Irish fixed stock numerical results quoted below for the period 1950-1984. The stock calculations start at 1950 and results for 1950-1959 could be ignored by readers to allow a 10-year "start-up" period, during which starting values become less significant as effects of new investment grow larger. Excluding the special treatment needed for farmland (Chapter 7), for public roads (Chapter 11), and for consumer durables (Chapter 13), the system of computation can in general be summarised under seven headings:

1. Assemble GFCF data at current prices for each year 1950-1984, as available from various data sources, mainly those of the Central Statistics Office. Readers are asked to note that the CSO National Accounts' annual control totals for GFCF by major sectors are treated as absolute, meaning that any supplementary data may need to be modified to harmonise with these control totals. Thus, one has to scale up results for respondents of the Census of Industrial Production so as to match the given CSO annual control totals, in principle purchases less sales. Vaughan (1980) refers to the scaling-up problem for Manufacturing respondents of the period 1947-1971 in Section

3.7 of his report. The problem is still relevant.

2. The scaled-up GFCF data at current prices for each year 1950-1984 should be revalued at 1980 prices, divided among the economic sectors and among at least 6 types of assets:

    (a) building and construction, other than dwellings, and roads;

    (b) motor vehicles;

    (c) other transport equipment (such as rail, air, sea);

    (d) other machinery and equipment;

    (e) dwellings;

    (f) roads.

    Part of category (d), namely office and data processing machinery, is treated separately in some sectors for the period 1971-1984. Dwellings and roads are treated as being both types and sectors. The conversion of data at current prices to values at 1980 prices by appropriate price inflators is explained in Chapter 6 below. The GFCF data *of each sector* should in principle be purchases net of sales; data on purchases and sales of used assets, however, were not generally available as separate parts of control totals for individual sectors.

    Vaughan (1980) gave considerable attention to purchases and sales of second-hand assets of Manufacturing sectors in his paper and the underlying program of computing their value by sector (see Appendix 2 below). The Central Statistics Office used to obtain them in detail in the Census of Industrial Production. It is evident that they used to get a lot of attention. If one had perfect information, one should include their purchases *less* sales as "values as if purchased new", to keep consistency for all items at *gross new cost*. But they would typically last, before scrapping, for half the full expected average of new assets; for example, 5 years for a 5-year-old lorry as against 10 years for a new lorry. To ignore their second-hand nature worsens the estimates. And their sale matters for the sector which sells them: if the food sector sells plant which is still usable and not scrap, then its gross (and net) capital stock is reduced by this amount. The reasonable practice normally used is that annual second-hand purchases less sales are used for each sector as the net second-hand annual increase, so far as the data permit. For inclusion as gross stock, some scaling-up is obviously required. Further comment on second-hand net purchases for Manufacturing appears in Section 8.1.

3. Decide on a scheme of *average life and survival function* for each type of asset within each sector. Numerical details of average life of Irish assets applied

in the present study appear below in Section 5.7 and Table 5.1. The average life of n years after the year of investment means the average number of years of useful life provided by the asset before scrapping. All values of n are chosen as integers. And for all sectors the "simultaneous exit" survival function has been used. The data limitations do not warrant refined

Table 5.1: *Selected Average Life Values, in Years, Compared with those of Earlier Studies*

SECTOR (with NACE-CLIO Groups) and item detail	Plant and Machinery			Vehicles except road freight and passenger cars		Engineering Construction	
	Present study	Vaughan (1980) Table 3.2	Blades (March 1985) Tables 2 and 3	Present study	Blades Table 5	Present study	Blades Table 4
Agriculture Land improvement						25	30(UK)
(011,014) farm tractors				10	10(UK)		
machinery and equipment	15		15(Canada)				
Forestry (020)	20		20(Sweden)			25	25(Sweden)
Fishing (030) fishing boats				25	25(UK)		
other items	18		18(Italy)			25	25(UK)
Mining, Quarrying and Turf (11,21,23)	30		30(UK)	10		60	60(Sweden)
Manufacturing							
Food (411-423)	20	13-41	20(Sweden)				
Drink and Tobacco (424-429)	20	23-60	20(Sweden)				
Textiles (43)	20	19-30	20(Sweden)				
Clthg., f/wear, leather (44,45)	20	23-40	20(Sweden)				
Timber and wood furniture (46)	18	25-34	18(Italy)				
Paper and printing (47)	20	25-32	20(France)				
Chemicals including man-made fibres (25,26)	18	24-38	15-20(Sweden)				
Non-metallic mineral prods. (24)	16	21-22	16(Italy)				
Metals & engineering (21,31-37)	20	35-48	15-25(Sweden)				
Misc. manufact. (14,48-49)	20	33-47	20-30(Sweden)				
Building and Civil Engineering (505-509)	18		18(Italy)	10		30	30(Canada)
Electricity (161) Hydro Station:							
Plant and machinery	20						
Structures						50	
Other Generation	20					20	
Transmission	30					30	
Distribution	25					25	
General Buildings						50	
Other items	7 (includes computers etc.)			10			

Table 5.1 *(continued)*

SECTOR (with NACE-CLIO Groups) and item detail	Plant and Machinery			Vehicles except road freight and passenger cars		Engineering Construction	
	Present study	Vaughan (1980) Table 3.2	Blades (March 1985) Tables 2 and 3	Present study	Blades Table 5	Present study	Blades Table 4
Gas (132, 162)	22		22(UK)	10		47	47(UK)
Water Supply (170)	25		25(UK)	10		70	70(Canada)
Services (NACE-CLIO R44):							
Trade (55,57)	20		20(Canada)	10		55	55(Canada)
Transport and Communications (61,63,65,67)							
Railways	25		25(UK)			55	55(Canada)
Road passenger and freight	25		25(UK)			60	55-65 (C)
Airports	20		20(UK)			50	50(Canada)
Harbours, Docks	25		25(UK)			50	50(Canada)
Broadcasting	15		15(Canada)			40	40(Sweden)
Telecomm. etc.	25		25(Canada)			40	40(Sweden)
Ships				25	25(UK)		
Buses				10	10(UK)		
Railway rolling stock				30	30(UK)		
Road freight				10	10(UK)		
Aircraft				10	10(UK)		
Finance and Business (69A)	20		20(Sweden)			50	
Community, Social and Personal Services (59,71-79, 85, 89, 93)							
Education	20		20(UK)			50	50(Canada)
Health	15		15(UK)			50	50(Canada)
Personal Services	20		20(Sweden)			30	30(France)
Public Administration and Defence (81)	20		20(UK)	10		80	80(Sweden)

treatment of a "linear exit" survival function.

4. For each type of asset within each sector, cumulate the capital stock from 1950 onwards, using the GFCF data at 1980 prices, and applying the survival function in conjunction with average life n, as described in 3 above, towards *gross* fixed stock estimates.

5. *Starting (or benchmark) values of capital stock* at 1980 prices, at the end of 1950, are required for each type of asset within each sector, and the projection of such starting values over later years. These in principle have been grossed up so as to be at estimated full new cost, roughly following the refined procedures described in Appendix 2 below, in order to meet the *gross* stock definition. Following chapters below provide details of sources and values, implying the indicative or general treatment as follows:

Assume some wastage each year, 1 per cent linear for dwellings (thus

34 per cent gone after 34 years 1951-1984), 1½ per cent linear for other buildings, nothing for roads.

For motor vehicles, take off ⅙ over 1951-1954, 1/12 over the next 4 years.

For other transport equipment, take off 6 per cent over 1951-1962, 4 per cent over the following 7 years.

For other machinery and equipment, take off 5 per cent over 1951-1965, 2½ per cent over the following 10 years.

These rates of removal allow for partly used assets among starting stock.

6. Add results of 4 and 5 to give combined gross fixed stock at the end of each year.

7. For *net* fixed stock, all gross values of point 4 need to be reduced by annual average increments over the full average life (new stock) or assumed remaining life (second-hand stock) and all gross starting values of point 5 need initial reduction for useful life already gone, and successive reduction over remaining life.

5.7: *Average Life Values Chosen for the Present Study*

In reviewing the selected Average Life (of use or of service) values for application to the Irish GFCF data of 1950-1984 repriced at 1980 prices, it is to be remembered that data from the period 1950-1970 are not as detailed as those of 1971-1984. To the extent that the data available to the writer permit, the following general Average Life values of *new* assets have been applied:

Dwellings: 80 years

Other buildings in general: 50-80 years

Roads: indefinitely long Road freight vehicles and passenger cars: 10 years

Computers and office machinery: 8 years (per Blades' data for USA). These values are in complete agreement with Table 3.3 of Vaughan (1980), and in broad agreement with similar data in Blades (March, 1983), especially his Tables 4 and 5.

Details of chosen Average Life values of other items, with reference to Blades (March, 1983) and Vaughan (1980) where relevant, appear in Table 5.1. This table is mostly self-explanatory; little comment is therefore required.

NACE-CLIO groupings are shown, for all 23 sectors listed in Table 5.1. In order to avoid confusion, the five Services' sectors are classified under NACE-CLIO R44 groupings, to identify them with discussion and explanatory build-up in Appendix 1 below.

Average life data for electricity generation, transmission and distribution equipment come from the Electricity Supply Board, *Annual Report 1986,* supplemented by further details kindly supplied by Mr Jack Egan. He also provided parallel detail on investment values for Hydro Stations, broken down between "Structures" and "Plant and Machinery".

Chapter 6

GROSS FIXED CAPITAL FORMATION DURING 1950-1984

6.1: *Assembling the Data*

The estimated gross value of the stock of reproducible fixed assets is the result of cumulated GFCF at constant prices. The theme of the present chapter is to display and discuss organised GFCF data at current prices, and then its re-estimated value at 1980 prices, together with the appropriate price inflators.

This first part of Chapter 6 describes the data sources and methods used to assemble Tables 6.1 to 6.4. Table 6.1 shows GFCF at current prices, for major economic sectors; one source is Central Statistics Office (1986) and earlier issues, for dwellings, roads, public authorities' capital formation, and (to some extent) control totals for aggregate GFCF. Another source is United Nations (1986) and earlier issues, for Ireland GFCF data by major sector. In using both sources, the writer has attempted to select the latest figures available for each year. Some extrapolations were required for some items in the period 1950-1953. A third source for 1971-1984 is the data supplied by Mr M. Lucey of the CSO.

Table 6.2 shows GFCF at current prices by type of asset. Central Statistics Office (1986) and earlier issues was the main source; "Land Improvement". however, came from United Nations (1986) and earlier issues.

Table 6.3 data of implicit price inflators for Table 6.2 types (except Land Improvement) are derived completely from Central Statistics Office (1986) and earlier issues, as the quotient of values at current prices by corresponding values at constant prices, with linking as required, to bring the series through from 1950 to 1984. The same source was used for the price inflators of personal consumption expenditure

In order to calculate the sectoral aggregate GFCF of Table 6.4 at 1980 prices, each sector's GFCF aggregate at current prices (as appears in Table 6.1) must be sub-divided between the types of capital asset. Whereas the GFCF aggregate of each type (across all sectors) appears in Table 6.2. This Report does not show the detailed tables of sector aggregate GFCF (at current prices, and then at 1980 prices) broken down by type, for each sector. More than sufficient detail (by type within sector) has been kindly supplied to the writer by Mr M. Lucey of the Central Statistics Office, for 1971-1984.

For the years 1950-1970 some estimation was necessary, to allocate type aggregate GFCF (at current prices) by type among sectors. There is no problem

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Table 6.1: *Gross Fixed Capital Formation by Major Sector, with related Gross Physical Capital Formation by the Public Authorities at Current Prices*

£ million

Year	Agriculture Forestry Fishing (1)	Industry (Mining, Manufacturing, Construction, Electricity, Gas, Water) (2)	Services (3)	Dwellings (4)	Roads (5)	Total (6)	Sub-sectors of (3) Services					Public Authorities'			G.Ph.C.F.
							Trade, Wholesale and Retail (7)	Transport and Communication (8)	Finance and Business (9)	Community, Social, Personal (10)	Public Admin. and Defence (11)	Central Govt. (12)	Local Author. (13)	Combined (12) plus (13) (14)	(14) as percentage of (6) Total (15)
1950	6.6	19.0	19.8	15.0	4.6	65.0	3.8	4.6	2.0	8.80	0.60	Not Avail.			
1951	8.4	19.9	21.8	15.4	4.8	70.3	3.9	5.8	2.2	9.10	0.80	,,			
1952	10.2	21.2	23.7	15.8	5.0	75.9	3.9	7.0	2.4	9.40	1.00	,,			
1953	12.0	22.1	25.9	16.3	5.1	81.4	4.0	8.8	2.6	9.80	1.20	4.25	18.95	23.20	28.50
1954	15.1	23.4	28.5	14.9	5.0	86.9	5.2	8.8	3.2	10.20	1.10	4.85	17.81	22.66	26.10
1955	15.2	28.8	27.1	15.8	5.0	91.9	5.2	8.6	3.2	8.90	1.20	5.11	18.01	23.12	25.20
1956	12.5	27.3	30.3	17.0	4.5	91.6	4.5	12.5	3.4	9.30	0.60	5.59	17.58	23.17	25.30
1957	14.0	25.2	25.2	11.7	4.1	80.2	4.1	10.5	3.2	7.00	0.40	4.90	12.58	17.48	21.80
1958	14.7	20.9	28.4	11.6	4.4	80.0	5.5	11.5	0.8	9.90	0.70	5.81	11.09	16.90	21.10
1959	15.5	23.9	26.3	12.8	4.5	83.0	5.4	10.1	0.9	8.70	1.20	7.06	10.37	17.43	21.00
1960	15.1	28.1	28.4	14.6	5.0	91.2	6.3	10.0	1.0	9.60	1.50	7.61	10.21	17.82	19.50
Year	Agri.	Ind.	Serv.	Dwell.	Roads	Total	Trade	Trans.	Finance	Commun.	Public	Centr.	Local	Comb.	%
1961	18.0	32.3	35.9	16.1	6.6	108.9	7.4	13.7	1.2	12.40	1.20	9.1	13.1	22.2	20.4
1962	19.5	41.0	42.8	19.0	6.7	129.0	8.7	15.1	1.8	15.30	1.70	11.5	14.4	25.9	20.1
1963	21.5	50.3	47.3	23.4	6.9	149.4	9.7	16.3	1.8	17.70	1.80	13.4	17.2	30.6	20.5
1964	25.4	57.2	55.5	31.5	7.8	177.4	11.2	19.1	2.3	20.70	2.20	16.1	22.4	38.5	21.7
1965	25.0	58.7	68.0	40.5	7.9	200.1	12.6	24.8	3.0	24.00	3.60	17.5	26.2	43.7	21.8
1966	26.5	59.1	68.9	37.5	8.0	200.0	12.8	23.0	3.9	26.10	3.10	16.1	26.2	42.3	21.2
1967	26.0	65.8	74.9	46.2	7.9	220.8	13.7	24.3	5.9	28.20	2.80	16.8	31.6	48.4	21.9
1968	31.6	75.7	93.3	50.1	7.7	258.4	15.3	24.2	9.2	39.70	4.90	18.7	35.2	53.9	20.9
1969	37.4	100.9	128.6	57.2	8.4	332.5	19.9	48.6	11.3	42.50	6.30	24.9	41.6	66.5	20.0
1970	37.1	113.3	134.6	61.7	10.6	357.3	22.9	46.9	9.6	47.10	8.10	29.3	41.9	71.2	19.9

Table 6.1 *continued*

Year	Agri.	Ind.	Serv.	Dwell.	Roads	Total	Trade	Trans.	Finance	Commun.	Public	Centr.	Local	Comb.	%
1971	50.7	133.3	160.0	81.9	11.4	437.3	27.5	60.9	8.7	54.70	8.20	32.8	52.0	84.8	19.4
1972	60.7	130.4	165.3	120.4	11.1	507.7	33.2	44.2	11.8	63.30	12.80	43.0	57.9	100.9	19.9
1973	75.3	197.7	233.9	150.1	13.7	670.7	46.9	76.1	16.2	76.20	18.50	59.1	74.2	133.3	19.9
1974	81.9	216.7	244.7	203.4	19.6	766.3	47.2	72.7	16.1	88.80	19.90	72.0	109.1	181.1	23.6
1975	102.5	267.2	286.6	209.7	19.3	885.3	51.8	88.9	18.6	99.60	27.70	98.3	129.8	228.1	25.8
1976	164.6	382.4	341.4	251.6	16.9	1156.9	62.9	94.1	45.2	117.30	21.90	92.9	130.5	223.4	19.3
1977	232.1	434.8	415.9	304.0	27.2	1414.0	89.0	117.1	37.3	143.60	28.90	110.7	150.7	261.4	18.5
1978	266.1	589.5	569.9	400.7	36.6	1862.8	135.0	145.4	65.0	187.60	36.90	154.7	166.4	321.1	17.2
1979	331.8	771.2	723.5	558.2	46.9	2431.6	154.4	221.0	84.0	219.90	44.20	198.4	221.4	419.8	17.3
1980	307.2	942.7	833.1	578.0	57.2	2718.2	149.3	229.8	127.1	270.10	36.80	279.1	273.6	552.7	20.3
Year	Agri.	Ind.	Serv.	Dwell.	Roads	Total	Trade	Trans.	Finance	Commun.	Public	Centr.	Local	Comb.	%
1981	355.4	1046.2	1161.9	708.5	78.3	3350.3	160.0	378.3	144.8	401.60	77.20	298.4	347.7	646.1	19.3
1982	334.2	1178.0	1147.7	709.3	98.6	3467.8	134.4	356.7	167.2	401.90	87.50	252.2	426.4	678.6	19.6
1983	294.5	1015.9	1104.2	799.8	121.2	3335.6	125.5	354.3	165.1	383.40	75.90	176.0	467.6	643.6	19.3
1984	297.0	1130.7	1145.9	724.0	125.0	3422.6	132.7	357.4	202.9	383.10	69.80	126.2	492.6	618.8	18.1

Table 6.2: *Gross Fixed Capital Formation by Type of Asset, at Current Prices*

£ million

Year	Dwellings (1)	Roads (2)	Land Improve- ment (3)	Other Building and Construction (4)	Transport Equipment (5)	Agricul- tural Machinery (6)	Other Machinery and Equipment (7)	Total (8)
1950	15.0	4.6	2.2	17.2	6.8	4.0	15.2	65.0
1951	15.4	4.8	2.8	18.8	7.1	4.3	17.1	70.3
1952	15.8	5.0	3.4	22.7	7.4	4.6	17.0	75.9
1953	16.3	5.1	4.0	23.8	7.7	4.9	19.6	81.4
1954	14.9	5.0	5.0	25.9	11.1	6.4	18.6	86.9
1955	15.8	5.0	5.1	30.3	10.5	5.4	19.8	91.9
1956	17.0	4.5	4.2	30.4	13.5	3.2	18.8	91.6
1957	11.7	4.1	4.7	26.4	11.7	5.0	16.6	80.2
1958	11.6	4.4	4.9	22.4	14.1	5.0	17.6	80.0
1959	12.8	4.5	5.2	23.1	13.1	5.0	19.3	83.0
1960	14.6	5.0	4.8	25.9	12.9	4.6	23.4	91.2
Year	Dwellings	Roads	Land	Oth. Bld.	Transport	Agric.	Oth. Mach.	Total
1961	16.1	6.6	5.0	30.1	16.8	6.3	28.0	108.9
1962	19.0	6.7	5.3	39.4	18.0	6.2	34.4	129.0
1963	23.4	6.9	5.9	45.3	18.5	7.1	42.3	149.4
1964	31.5	7.8	6.4	55.6	22.0	7.9	46.2	177.4
1965	40.5	7.9	5.9	61.6	26.8	7.9	49.5	200.1
1966	37.5	8.0	6.2	65.6	24.6	8.3	49.8	200.0
1967	46.2	7.9	7.5	70.6	26.5	8.6	53.5	220.8
1968	50.1	7.7	7.6	83.2	31.6	13.4	64.8	258.4
1969	57.2	8.4	8.3	101.3	55.8	16.8	84.7	332.5
1970	61.7	10.6	8.5	108.6	53.6	17.4	96.9	357.3
Year	Dwellings	Roads	Land	Oth. Bld.	Transport	Agric.	Oth. Mach.	Total
1971	81.9	11.4	9.3	130.3	65.8	15.7	122.9	437.3
1972	120.4	11.1	8.6	146.6	47.9	22.1	151.0	507.7
1973	150.1	13.7	9.2	192.0	87.1	25.4	193.2	670.7
1974	203.4	19.6	11.1	194.4	78.8	28.2	230.8	766.3
1975	209.7	19.3	9.1	221.4	89.9	37.4	298.5	885.3
1976	251.6	16.9	14.2	271.6	142.5	57.2	402.9	1156.9
1977	304.0	27.2	16.6	300.8	208.2	94.5	462.7	1414.0
1978	400.7	36.6	21.0	390.5	290.9	115.3	607.8	1862.8
1979	558.2	46.9	25.5	585.2	355.0	116.1	744.7	2431.6
1980	578.0	57.2	40.2	732.2	311.4	71.4	927.8	2718.2
Year	Dwellings	Roads	Land	Oth. Bld.	Transport	Agric.	Oth. Mach.	Total
1981	708.5	78.3	46.3	912.4	363.8	85.6	1155.4	3350.3
1982	709.3	98.6	53.4	952.9	347.3	78.2	1228.1	3467.8
1983	799.8	121.2	48.6	749.6	344.0	78.7	1193.7	3335.6
1984	724.0	125.0	60.1	648.9	370.0	86.5	1408.1	3422.6

Table 6.3: *Inflators of Gross Fixed Capital Formation and Personal Consumption Expenditure derived from National Accounts, to base 1.0 for 1980*

Year	Dwellings (1)	Roads (2)	Other Building and Construction (3)	Agricultural Machinery (4)	Transport Equipment (5)	Other Machinery and Equipment (6)	Total Gross Fixed Capital Formation (7)	Personal Consumption Expenditure (8)	Year
1950	9.244	8.872	9.004	7.575	5.944	5.071	7.323	7.108	1950
1951	9.244	8.873	9.004	7.581	5.944	5.071	7.323	7.108	1951
1952	9.241	8.872	9.004	7.587	5.944	5.071	7.323	7.108	1952
1953	9.245	8.873	9.004	7.592	5.944	5.071	7.323	7.108	1953
1954	9.426	9.050	9.179	7.343	5.999	5.101	7.409	7.101	1954
1955	9.241	8.872	8.979	7.019	5.888	4.857	7.210	6.917	1955
1956	8.644	8.282	8.458	6.625	5.547	4.656	6.818	6.659	1956
1957	8.291	8.007	8.077	6.220	5.385	4.497	6.531	6.388	1957
1958	8.112	7.864	7.916	6.220	5.311	4.479	6.438	6.115	1958
1959	8.234	8.084	8.081	6.060	5.263	4.481	6.489	6.132	1959
1960	8.098	7.808	7.838	6.000	5.230	4.455	6.376	6.114	1960
1961	7.622	7.515	7.522	5.794	5.114	4.365	6.106	5.959	1961
1962	7.362	7.128	7.159	5.629	5.046	4.299	5.914	5.729	1962
1963	6.748	7.122	7.093	5.648	5.011	4.257	5.796	5.589	1963
1964	6.273	6.595	6.591	5.532	4.916	4.114	5.512	5.227	1964
1965	5.837	6.395	6.394	5.329	4.725	4.057	5.310	4.989	1965
1966	5.763	6.143	6.113	5.120	4.596	3.964	5.156	4.808	1966
1967	5.469	5.813	5.891	4.942	4.408	3.898	4.973	4.664	1967
1968	5.268	5.666	5.658	4.694	4.436	3.771	4.808	4.433	1968
1969	4.851	5.136	5.107	4.363	4.032	3.601	4.421	4.128	1969
1970	4.512	4.592	4.591	4.006	3.768	3.404	4.079	3.820	1970
1971	4.070	4.160	4.156	3.701	3.314	3.251	3.727	3.493	1971
1972	3.555	3.762	3.749	3.294	3.141	3.038	3.391	3.183	1972
1973	3.234	3.309	3.313	2.866	2.806	2.749	3.032	2.854	1973
1974	2.638	2.505	2.508	2.245	2.422	2.315	2.444	2.465	1974
1975	2.215	2.098	2.094	1.840	1.982	1.949	2.042	2.015	1975
1976	1.872	1.799	1.797	1.483	1.601	1.649	1.720	1.679	1976
1977	1.667	1.537	1.533	1.171	1.335	1.431	1.475	1.471	1977
1978	1.467	1.393	1.393	1.030	1.198	1.230	1.324	1.363	1978
1979	1.198	1.203	1.203	1.066	1.090	1.148	1.162	1.186	1979
1980	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1980
1981	0.824	0.876	0.876	0.889	0.898	0.886	0.871	0.825	1981
1982	0.737	0.794	0.794	0.790	0.800	0.834	0.795	0.722	1982
1983	0.706	0.751	0.751	0.736	0.732	0.785	0.750	0.656	1983
1984	0.691	0.704	0.701	0.679	0.678	0.738	0.711	0.611	1984

Table 6.4: *Gross Fixed Capital Formation by Major Sector, at 1980 Prices*

£ million

Year	Agricul., Forestry, Fishing (1)	Industry (Mining, Manufac., Construct., Electricity, Gas, Water) (2)	Services (3)	Dwellings (4)	Roads (5)	TOTAL (6)	Trade, Wholesale and Retail (7)	Transport and Communication (8)	Finance and Business (9)	Commun., Social, Personal (10)	Public Admin. and Defence (11)	Year	Agriculture etc. (12)	Industry (13)	Services (14)	Dwellings (15)	Roads (16)	TOTAL (17)
							Sub-Sectors of (3) Services						Percentage Distribution Across Sectors					
1950	53.1	129.9	139.4	138.7	40.8	501.9	22.6	31.7	14.6	66.5	4.0	1950	10.6	25.9	27.8	27.6	8.1	100.0
1951	67.9	130.4	157.8	142.4	42.6	541.1	24.7	42.1	16.1	69.5	5.4	1951	12.5	24.1	29.2	26.3	7.9	100.0
1952	82.7	142.1	175.4	146.0	44.4	590.6	24.7	52.6	17.5	73.8	6.8	1952	14.0	24.1	29.7	24.7	7.5	100.0
1953	98.2	137.9	196.7	150.7	45.3	628.8	27.0	62.2	20.0	77.8	9.7	1953	15.6	21.9	31.3	24.0	7.2	100.0
1954	122.2	156.9	213.1	140.5	45.3	678.0	33.7	65.7	24.8	81.0	7.9	1954	18.0	23.1	31.4	20.7	6.7	100.0
1955	119.7	195.7	198.4	146.0	44.4	704.2	34.1	63.5	23.2	69.5	8.1	1955	17.0	27.8	28.2	20.7	6.3	100.0
1956	94.9	178.8	201.9	146.9	37.3	659.8	25.2	81.6	23.0	69.2	2.9	1956	14.4	27.1	30.6	22.3	5.7	100.0
1957	100.0	156.4	163.6	97.0	32.8	549.8	23.5	66.4	22.2	49.0	2.5	1957	18.2	28.4	29.8	17.6	6.0	100.0
1958	102.8	122.3	175.5	94.1	34.6	529.3	30.1	70.4	5.0	65.8	4.2	1958	19.4	23.1	33.2	17.8	6.5	100.0
1959	109.0	142.4	163.1	105.4	36.4	556.3	29.5	61.9	5.8	58.6	7.3	1959	19.6	25.6	29.3	18.9	6.5	100.0
1960	103.5	161.4	174.9	118.2	39.0	597.0	34.2	61.5	6.2	64.0	9.0	1960	17.3	27.0	29.3	19.8	6.5	100.0
	Agricul.	Industry	Services	Dwellings	Roads	TOTAL	Trade	Transport	Finance	Commun.	Public		Agricul.	Industry	Services	Dwellings	Roads	TOTAL
1961	117.3	177.6	213.7	122.7	46.9	680.9	38.5	82.0	7.2	79.0	7.0	1961	17.2	26.1	31.4	18.0	7.3	100.0
1962	122.6	222.0	249.1	139.9	47.8	781.4	45.5	87.9	10.8	95.3	9.6	1962	15.7	28.4	31.9	17.9	6.1	100.0
1963	134.4	263.0	278.7	157.9	49.1	883.1	52.2	95.1	10.7	110.7	10.0	1963	15.2	29.8	31.6	17.9	5.6	100.0
1964	150.4	289.9	310.2	197.6	51.4	999.5	57.4	107.2	12.6	121.3	11.7	1964	15.0	29.0	31.0	19.8	5.1	100.0
1965	143.1	288.8	369.3	236.4	50.5	1088.1	63.0	134.9	16.4	135.9	19.1	1965	13.2	26.5	33.9	21.7	4.6	100.0
1966	145.8	285.8	360.9	216.1	49.1	1057.7	61.3	121.1	20.7	142.1	15.7	1966	13.8	27.0	34.1	20.4	4.6	100.0
1967	137.5	308.8	379.7	252.7	45.9	1124.6	64.2	124.5	29.7	147.5	13.8	1967	12.2	27.5	33.8	22.5	4.1	100.0
1968	158.9	347.1	455.0	263.9	43.6	1268.5	68.7	116.1	45.8	201.5	22.9	1968	12.5	27.4	35.9	20.8	3.4	100.0
1969	171.3	424.3	567.3	277.5	43.1	1483.5	81.1	212.6	50.7	195.8	27.1	1969	11.5	28.6	38.2	18.7	2.9	100.0
1970	154.8	437.7	546.7	278.4	48.7	1466.3	87.6	190.0	39.1	197.8	32.2	1970	10.6	29.9	37.3	19.0	3.3	100.0

Table 6.4 *continued*

	Agricul.	Industry	Services	Dwellings	Roads	TOTAL	Trade	Transport	Finance	Commun.	Public		Agricul.	Industry	Services	Dwellings	Roads	TOTAL
1971	194.8	477.8	583.7	333.3	47.4	1637.0	93.8	219.3	32.5	208.3	29.8	1971	11.9	29.2	35.7	20.4	2.9	100.0
1972	208.6	493.3	563.0	428.1	41.8	1734.8	106.4	153.9	40.5	219.0	43.2	1972	12.0	28.4	32.5	24.7	2.4	100.0
1973	225.3	581.8	708.6	485.4	45.3	2046.4	134.8	230.1	50.3	237.0	56.4	1973	11.0	28.4	34.6	23.7	2.2	100.0
1974	193.7	515.2	596.3	536.6	49.1	1890.9	113.2	178.2	39.0	217.8	48.1	1974	10.2	27.2	31.5	28.4	2.6	100.0
1975	201.3	531.8	578.3	464.4	40.5	1816.3	103.1	179.0	37.6	202.1	56.5	1975	11.1	29.3	31.8	25.6	2.2	100.0
1976	270.1	645.0	575.6	470.9	30.4	1992.0	103.3	158.4	75.6	200.5	37.8	1976	13.6	32.4	28.9	23.6	1.5	100.0
1977	312.4	627.9	597.4	506.7	41.8	2086.2	122.7	168.2	54.3	209.7	42.5	1977	15.0	30.1	28.6	24.3	2.0	100.0
1978	316.8	748.6	722.7	587.8	51.0	2426.9	165.3	184.1	81.7	243.3	48.3	1978	13.1	30.8	29.8	24.2	2.1	100.0
1979	376.5	894.2	829.8	668.5	56.4	2825.4	173.5	250.8	97.1	256.7	51.7	1979	13.3	31.6	29.4	23.7	2.0	100.0
1980	307.2	942.7	833.1	578.0	57.2	2718.2	149.3	229.8	127.1	270.1	56.8	1980	11.3	34.7	30.6	21.3	2.1	100.0
	Agricul.	Industry	Services	Dwellings	Roads	TOTAL	Trade	Transport	Finance	Commun.	Public		Agricul.	Industry	Services	Dwellings	Roads	TOTAL
1981	314.2	924.7	1027.6	584.0	68.6	2919.1	142.7	334.3	128.1	354.5	68.0	1981	10.8	31.7	35.2	20.0	2.4	100.0
1982	267.7	963.7	929.8	522.7	78.3	2762.2	108.2	288.3	138.2	325.1	70.0	1982	9.7	34.9	33.7	18.9	2.8	100.0
1983	221.2	779.6	839.4	564.5	91.0	2495.7	93.6	268.6	128.5	291.5	57.2	1983	8.9	31.2	33.6	22.6	3.6	100.0
1984	207.9	822.0	815.8	500.0	88.0	2433.7	92.0	253.2	148.8	272.7	49.1	1984	8.5	33.8	33.5	20.5	3.6	100.0
1950-59	950.5	1492.8	1784.9	1307.7	403.9	5939.8	275.1	598.1	172.2	680.7	58.5	1950-59	16.0	25.1	30.0	22.0	6.8	100.0
1960-69	1384.8	2768.7	3358.8	1982.9	469.1	9964.3	566.1	1142.9	210.8	1293.1	145.9	1960-69	13.9	27.8	33.7	19.9	4.7	100.0
1970-79	2454.3	5953.3	6302.1	4760.1	452.4	19922.2	1203.7	1912.0	547.7	2129.2	446.5	1970-79	12.3	29.9	31.6	23.9	2.3	100.0
1980-84	1318.2	4432.7	4445.7	2749.2	383.1	13328.9	585.8	1374.2	670.7	1513.9	301.1	1980-84	9.9	33.3	33.4	20.6	2.9	100.0

for dwelling and roads which are separate sectors, nor for land improvement and agricultural machinery which obviously go to agriculture. The problem arises for distribution of "other buildings etc.," "transport equipment", "other machinery and equipment" among all sectors. Factual information on inputs of these types as GFCF among "Industry" (mining, manufacturing, construction, electricity, gas, water) is available through the Census of Industial Production for 1950-1970, in the form of "Changes in Fixed Capital Assets"; these data appear in Central Statistics Office (March, 1974) and earlier issues. But they relate only to Census respondents, and have to be grossed up to cover non-respondents. Supplementary data on transport equipment appear in United Nations (1986) and earlier issues. By using the available factual information, and by projecting backward trends in asset patterns during 1971-1977 (from CSO detailed data), the writer obtained an estimated distribution of the asset types among all sectors for the period 1950-1970, at current prices. Application of Table 6.3 inflators gave value estimates at 1980 prices, before aggregation by sector to give Table 6.4 results.

6.2: *GFCF by Major Sector at Current Prices (Table 6.1)*

Total national GFCF at current prices for each year of the period 1950-1984 is shown in Table 6.1, of which columns (1) to (11) show its distribution among sectors of use. The approximate share of the national total owned by Public Authorities appears in columns (12) to (15), for which 1950-1952 data are not available. The inclusion of Post Office stocks' changes with GFCF is likely to have only a minor effect on the fixed capital content. The national total of each year appearing in column (6) is divided among five major sectors or types occupying columns (1) to (5): (1) Agriculture, Forestry and Fishing; (2) Industry (covering Mining, Manufacturing, Construction, Electricity, Gas, Water); (3) Services (a break-down of which occupies columns (7) to (11)); (4) Dwellings; (5) Roads. Further details of the services appear in Appendix 1. The five major divisions of services shown in columns (7) to (11) comprise: (7) Trade (wholesale and retail) and storage; (8) Transport and Communications; (9) Finance and Business services (including insurance but excluding in principle any renting of dwellings); (10) Community, Social and Personal services; (11) Public Administration and Defence. GFCF data are available in much greater sector detail within services for 1971-1984; the present Report, however, is concerned with consistent continuity through the period 1950-1984.

At current prices, the national total GFCF is seen to increase from £65m for 1950 to £3,423m for 1984, the latter being about 53 times the former. But when both figures are re-expressed as values at 1980 prices (Table 6.4) the 1984 aggregate is only about 5 times that of 1950. Any discussion, therefore, of values at current prices (without correction for price inflation) is not very informative.

The Public Authorities' share of the national GFCF aggregate, however, is

of significance. Central and Local Government amounts of gross physical capital formation (taken as proxy for GFCF) appear in columns (12) and (13), with their combined total in column (15), the latter value as a percentage of the national total appears in column (15). Between 1953 and 1960 we see this percentage decreasing from about 29 to 20. Throughout the 24 years 1961-1984 the proportion remains remarkably stable (in view of massive price inflation), lying within the range 17 to 22 per cent, except for some 24-26 per cent in the years 1974-1975.

Considerable detail of the types of GFCF included in the Public Authorities' gross physical capital formation appear in tables such as Table A23 of Central Statistics Office (1986). Much of it is building and construction (roads, dwellings, other building and construction). Time did not permit a separate gross capital stock estimation derived from Public Authorities' data of columns (12) to (14) of Table 6.1 to be included in the present draft report. It is, however, possible to deduce that about 20 per cent of the national capital stock of recent years would emerge from the Public Authorities' 17-22 per cent share of GFCF quoted in the previous paragraph. In other words the Public Authorities "own" about one-fifth of present day national gross fixed capital stock, in the same sense as they "own" the aggregate appearing in Table 6.1 column (14), which is GFCF, apart from Post Office stock changes (assumed to have only minor effect).

6.3: *GFCF by Type of Asset, at Current Prices (Table 6.2)*

The same annual GFCF aggregates as occurred in Table 6.1 appear in Table 6.2 broken down between seven types, two of which (dwellings and roads) have appeared already in Table 6.1. The other five types comprise: (3) land improvement (within agriculture); (4) other building and construction; (5) transport equipment; (6) agricultural machinery (for agriculture); (7) other machinery and equipment, this latter an extremely heterogeneous collection of capital assets.

Because these asset types are at current prices over a 35-year period, little useful discussion is possible, in conditions of severe price inflation. However, a brief comment on the 1981-1984 figures is possible. Dwellings are seen to take some one-fifth of total GFCF; other buildings between one-fifth and one-quarter, transport equipment about one-tenth, other machinery and equipment one-third or more.

6.4: *Price Inflators of GFCF and PCE (Table 6.3)*

Implicit price inflators of GFCF types of assets and of Personal Consumption Expenditure (PCE) appear in Table 6.3, based on unity for 1980. Between 1950 and 1980 it is apparent that dwellings, roads, other building and construction all showed the greatest price inflation, so as to make GFCF values of those items

at 1980 prices some 9 times their values at 1950 prices. The GFCF total, and agricultural machinery, showed lesser rates of above 7 times, which also occurred for PCE. The PCE price inflator is included for purposes of comparison, and appears near the middle of the range of values shown by the different series in general. A much lower rate of about 5 to 6 times occurred, for transport equipment, and other machinery and equipment; those types were necessarily imported, to a large extent, whereas the various construction types were Irish-built.

The price inflators of Table 6.3 may be used to obtain GFCF estimates valued at prices of any selected year, in two stages, as follows. (a) The item or type is first valued at 1980 prices, by multiplying by the relevant price inflator for that year. (b) The *inverse* of the relevant price inflator of Table 6.3 is multiplied by the value at 1980 prices, to give a value estimate at prices of the year selected. For example, the value of 1974 dwellings at 1980 prices is £536.6m, shown in Table 6.4 column (4). If values at 1984 prices are required, one first finds the 1984 dwellings inflator of Table 6.3 which has the value .691, of which the inverse is 1.44718. Then £536.6m x 1.44718 fl £776.6m, which is the estimated value of 1974 dwellings at 1984 prices.

6.5: *GFCF by Major Sectors at 1980 Prices (Table 6.4)*

Estimated values of GFCF at 1980 prices appear in Table 6.4, with national aggregates broken down within columns (1) to (11) in the same way as in Table 6.1. The right-hand columns (12) to (17) show percentage distribution across major sectors. Because Table 6.4 contains annual detail over 35 years, three 10-year averages have been formed, as well as the 5-year average for 1980-1984. These four averages will be used for discussion in what follows.

The national total GFCF at 1980 prices shows an annual average of £594m for the decade 1950-1959; the average is £996m for the decade 1960-1969, about 68 per cent larger than that of the previous decade. For 1970-1979 the annual average is £1,992m which is 100 per cent larger than that of the previous decade. For 1980-1984 the average is £2,666m; this is 34 per cent larger than the average for 1970-1979 and we observe continuing growth in the early 1980s, by comparison with the 1960s and 1970s, but at a slower average rate than occurred in previous decades.

The major sectors of columns (1) to (4) all have growth patterns in rough agreement with that outlined for the total. Roads, however, show fairly stable average annual GFCF of £40-47m over the three decades 1950-1980, with the 1980-1984 average GFCF some 70 per cent more than that of the previous decade. The 1980-1984 general increase of GFCF average amounts, by comparison with those of 1970-1979, is indicated by the following percentages, expressing 1980-1984 GFCF average annual amounts as percentages of those for 1970-1979;

Agriculture 107; Industry 149; Services 141; Dwellings 116; Roads 169.

The percentage distribution of GFCF across sectors, as shown in Table 6.4 columns (12) to (17), may be observed briefly. We see Agriculture declining in share with passage of time, from 16 per cent of the total during 1950-1959 to 10 per cent for 1980-1984. Industry's share increases steadily, from 25 to 33 per cent. The Service's share is 30 per cent for the 1950s, but roughly 33 per cent for the more recent three periods. Dwellings take 20-24 per cent of the total. The Road's share declines steadily, from 7 per cent for the 1950s to between 2 and 3 per cent for the 1970s and 1980-1984.

Chapter 7

TANGIBLE ASSET ESTIMATES FOR AGRICULTURE AND SEA FISHING

7.1: *Introduction*

This chapter is divided into two parts, one for agriculture and one for sea fishing. In terms of investment and capital stock, sea fishing is negligible by comparison with agriculture, as will appear below in the numerical results. Following Chapters 2 and 5 above, only a summary description of methodology will be given in the present chapter. However, Appendix 3 gives details of how agricultural holdings are valued at 1980 market prices and of how farmhouse values are estimated. A discussion of Forestry Development appears in Appendix 5.

Some items of machinery, equipment, and building, etc., within the data of Gross Fixed Capital Formation had to be broken down by this writer between Agriculture, Forestry and Fishing, as CSO does not provide such a breakdown. Other items, such as farm machinery and boats, obviously belong to one sector or another. Where breakdown problems arose, all available information was used by the writer to establish GFCF amounts for Forestry and Fishing within the group type. Deduction of these two amounts from the three-sector GFCF corresponding aggregate left the residue as the estimated GFCF amount available for agriculture itself.

It is well to remember at this point that both GFCF and Capital Stock values (whether at current or at estimated 1980 prices) are valid only on the assumption that purchases and sales have occurred or would occur at normal or moderate rates, so as to neither flood the market (causing price collapse) nor create scarcity conditions (causing severe price inflation).

Part 1 following addresses Agriculture, with numerical results given in Tables 7.1 to 7.3. Section 7.2 describes the types of capital asset included in the estimates. Results for livestock are presented in Section 7.3, with breeding stocks shown separately. Gross values of reproducible fixed assets comprise the subject matter of Section 7.4, with advertence to farmhouses. Net stocks of agricultural assets, including land, are the theme of Section 7.5. Three different notional sales or purchase values of the aggregate farming enterprise of the Nation is considered in Section 7.6. Both gross and net measures of reproducible assets are presented.

Part 2 below treats Sea Fishing, with results shown in Table 7.4. Asset types and data sources are discussed in Section 7.7, with starting values described

in Section 7.8. Gross Stock estimates are presented and commented on in Section 7.9. The net estimates are discussed in Section 7.10.

7.2: *Description of Capital Asset Items or Types*

For Agriculture, a fairly comprehensive set of tangible capital assets has been included in the present study, and presented as year-end stock for 1950-1984 in the present chapter. As *working* capital, the five major livestock groups are evaluated. But year-end stocks of feed, seeds and fertilisers held on farms are not included. For Fixed Capital, farm land and buildings are included, as are agricultural machinery and all other machinery, vehicles and equipment allocated by CSO to Agriculture, Forestry and Fishing, after the writer's deduction of amounts allocated to Forestry and Fishing. Thus both reproducible and non-reproducible assets of Agriculture are covered by the estimates shown below.

7.3: *Livestock*

To provide the numerical results shown in Table 7.1, livestock numbers at (or near) the end of the calendar year have been priced at 1980 market prices in general. But a different approach was necessary for the horse group, as will appear below. The December or January livestock enumeration has appeared in various issues of the *Irish Statistical Bulletin* back over the years, covering cattle, sheep, pigs and poultry of different age groups and types. For 1980 and more recent years, the breakdown within each animal group is more detailed than occurred in earlier years.

By the kind co-operation of Mr Gerry O'Hanlon of the CSO, 1980 average (per animal) market prices were made available to the writer. These prices are given for each of 6 categories of cattle, 3 categories of sheep, 6 of pigs and 4 of poultry. This set of 19 average price-per-animal values was used to value the livestock numbers at 1980 prices, with weighted averages used for earlier years where less detailed data were available.

The appearance of new categories of "alternate" livestock, such as deer, in recent years may not be very significant, and the CSO statistics do not record their numbers. However, various breeders' groups have organised themselves in societies and probably compile statistics for their own use. All such alternate livestock are excluded from the scope of the present Report, which includes only the stated categories as recorded by the CSO.

Table 7.1: *Agricultural Livestock at End of Year, 1950-1984, at 1980 Prices*

£ million

	ALL LIVESTOCK					LIVESTOCK FOR BREEDING				
Year	Cattle (1)	Sheep (2)	Pigs (3)	Poultry (4)	Horses, Asses, etc. (5)	Total Livestock (1)to(5) (6)	Cattle (7)	Sheep (8)	Pigs (9)	Horses, Asses, etc. (10)	Total for Breeding (7) to (10) (11)
1950	1,114.1	69.8	21.1	23.7	260.8	1,489.5	485.0	49.7	6.1	65.2	606.0
1951	1,094.4	71.8	22.6	22.7	242.7	1,454.2	466.0	51.0	7.2	60.7	584.9
1952	1,098.5	75.9	30.8	22.7	224.5	1,452.4	466.6	53.8	9.3	56.1	585.8
1953	1,135.3	79.9	34.8	21.3	216.9	1,488.2	479.2	57.3	10.2	54.2	600.9
1954	1,129.4	82.3	31.8	19.2	208.4	1,471.1	477.4	59.3	8.7	52.1	597.5
1955	1,148.7	89.2	26.9	19.2	198.8	1,482.8	472.1	64.1	7.9	49.7	593.8
1956	1,143.3	92.8	29.9	18.9	188.9	1,473.8	493.8	68.5	9.1	47.2	618.6
1957	1,132.4	104.0	35.2	17.5	194.0	1,483.1	498.7	77.0	10.6	48.5	634.8
1958	1,155.9	112.1	31.6	16.8	183.4	1,499.8	510.5	82.2	9.0	45.9	647.6
1959	1,214.2	116.8	35.2	16.9	179.9	1,563.0	525.4	86.2	10.5	45.0	667.1
1960	1,205.0	113.3	38.1	16.2	180.2	1,552.8	519.5	85.3	11.6	45.0	661.4
1961	1,178.5	122.6	42.9	15.3	173.6	1,532.9	523.0	91.1	13.0	43.4	670.5
1962	1,224.2	122.2	40.2	15.2	173.9	1,575.7	534.8	93.4	12.4	43.5	684.1
1963	1,249.7	124.5	40.1	14.5	172.5	1,601.2	566.2	95.9	12.1	43.1	717.3
1964	1,304.7	127.7	45.9	16.6	168.9	1,663.8	620.2	99.8	14.9	42.2	777.1
1965	1,419.4	127.9	43.5	16.4	173.3	1,780.5	653.5	99.8	11.9	43.3	808.5
1966	1,469.3	113.5	36.6	15.5	172.3	1,807.2	652.9	89.9	10.6	43.1	796.5
1967	1,439.8	109.6	40.2	15.9	147.1	1,752.6	653.9	84.0	11.5	36.8	786.2
1968	1,457.6	105.2	42.2	16.0	146.6	1,767.6	665.7	82.0	12.4	36.7	796.8
1969	1,496.4	103.3	42.3	15.5	145.5	1,803.0	677.3	81.3	12.4	36.4	807.4
1970	1,548.8	104.6	46.2	15.9	144.3	1,859.8	707.3	81.5	14.0	36.1	838.9
1971	1,586.9	106.0	45.4	18.2	148.6	1,905.1	742.2	83.3	13.6	37.1	876.2
1972	1,718.4	106.1	40.1	23.5	149.1	2,037.2	828.2	82.9	12.1	37.3	960.5
1973	1,901.6	107.3	41.1	24.1	150.2	2,224.3	911.0	82.1	12.2	37.6	1,042.9
1974	1,952.7	103.4	31.6	21.7	148.0	2,257.4	887.5	77.6	9.2	37.0	1,011.3
1975	1,823.1	96.9	35.1	21.4	133.9	2,110.4	831.2	73.5	11.3	33.5	949.5
1976	1,843.0	94.5	38.7	22.4	124.3	2,122.9	836.6	71.9	11.9	31.1	951.5
1977	1,840.8	92.1	39.3	22.8	121.7	2,116.7	838.5	69.4	11.9	30.4	950.2
1978	1,817.8	89.3	44.6	23.2	120.0	2,094.9	842.3	69.7	13.3	30.0	955.3
1979	1,822.3	86.9	43.6	22.8	117.9	2,093.5	824.1	67.2	12.7	29.5	933.5
1980	1,707.1	86.8	42.4	22.9	116.3	1,975.5	791.3	68.3	12.1	29.1	900.8
1981	1,686.4	89.0	42.2	23.2	116.7	1,957.5	797.0	70.5	12.6	29.2	909.3
1982	1,684.5	90.4	44.4	24.4	113.7	1,957.4	808.3	72.5	13.0	28.4	922.2
1983	1,692.7	94.5	43.1	22.5	110.7	1,963.5	810.2	75.7	12.7	27.7	926.3
1984	1,695.4	100.2	40.4	22.5	109.5	1,967.0	808.9	80.3	12.1	27.4	928.7

All Livestock

The left-hand side of Table 7.1 shows year-end estimates for all livestock, including stocks for breeding, the latter shown separately in columns (7) to (11). A brief look at the end-of-year values shown in columns (1) to (6) of this table is in order for all livestock.

Cattle: It can be argued that the quality of cattle livestock has improved between the 1950s and the 1980s, because the average annual milk yield per cow has increased from some 500 gallons to some 800 gallons per year, and because all breeds of steers show heavier carcase weights in more recent years. These increased outputs per animal, the argument implies, are attributable to new breeds of cattle, which began to appear in the National Herd about 1960.

But an equally cogent argument is that feed and treatment have in fact improved since the 1950s, and these to a large extent account for larger milk and meat output per animal, the meat output, especially in recent years, being boosted by hormone implants. In other words, the cattle breeds of the 1950s had capacity for greatly increased output, if given the feed and hormone treatment of the 1980s.

The Department of Agriculture and Food does not have any measures of the output effects of new breeds as such, after allowance for effects of better feed and of hormone implants. The author therefore decided, under advice from Professor O'Connor, to keep the 1980 average market price per animal unchanged, for each category of cattle, throughout the 1950-1984 period.

The cattle group dominates the livestock values, taking at least two-thirds of the aggregate in each year of 1950-1984, at 1980 prices. The group shows a range of some £1,100m to £2,000m. It had a range of about £1,100m to £1,200m during 1950-1962; it then grew steadily towards a maximum of some £1,950m for 1974; it subsequently declined, but has been fairly stable at about £1,700m during 1981-1984.

Sheep: This group has a range of some £70-£130m. Between 1950 and 1965 it grew steadily from £70m to £128m. From 1966 to 1974 it was fairly stable in the range £103-£144m. Since 1974 no major trend is apparent within the range £87-£100m.

Pigs: The pigs' group shows a smaller range of values than that for sheep, as it lies within some £20-£46m. No attempt will be made here to describe "hog cycle" effects. For recent years, 1977-1984, the values are some £39-£44m, thus lying at the upper end of the range quoted for the full period 1950-1984.

Poultry: The poultry group shows values on a yet smaller scale than that for pigs; the poultry values lie within a range of £15-£24m. Since 1972 values are relatively steady in the range £21-£24m.

Horses, Asses etc.: End-of-year livestock numbers were not available, so June enumeration data were obtained from the *Statistical Abstract of Ireland*. A 1980

market price of £450 for a "working horse" was provided by Dr. E. Attwood of the Department of Agriculture. But the writer had considerable difficulty in obtaining suitable average prices for the categories "thoroughbred", "other horses and ponies", "asses, mules etc.", as various expert persons were unwilling to quote average prices. The following working hypotheses have been applied: For "other horses" a price of £1,000 per animal was derived from 1979-80 import and export statistics in special detail from the CSO. For "thoroughbred" animals a price of £4,700 was derived from 1980 export data for "Total" shown in Table 9 (p.38) of the Killanin (July 1986) report on the thoroughbred horse-breeding industry, and this price is based on 2,900 animals exported during 1980. For "asses" etc., value of £50 per animal has been used, on the advice of the Department of Agriculture and Food.

Other problems were also encountered, such as changes in classification of types of horse, and missing data on donkeys, during 1950-1984. At all events, a joint estimate has been made for the equine group and appears in column (5) of Table 7.1. It shows a fairly steady decrease, from some £261m for 1950 to some £110m for 1984. A minor apparent increase during 1971-74 may be due to data errors. The steady decrease throughout the period is due to the virtual disappearance of working horses and donkeys since 1950: working horses numbered 319,000 in 1950 and 9,000 in 1984, while asses, etc., were reckoned at 119,000 in 1950 and perhaps 18,000 in 1984. By contrast "thoroughbreds" combined with "other horses" show numbers which appear to have held steady at almost 50,000 for many years.

Total Livestock: One may consider the aggregate livestock value (at 1980 prices) as a significant indicator of Irish agricultural working capital. Its value is shown in column (6) of Table 7.1. We find it increasing slowly during 1950-1963 from some £1,500m to £1,600m. From 1964 to 1971 it grows to £1,900m and during 1973-1974 it reaches its maximum which is £2,257m for 1974, the year after Irish entry to the EEC. Since 1974 it has declined towards a fairly steady level of some £1,970m for 1980-1984. But this latter level is 31 per cent greater than the £1,500m approximate level of 1950-1958.

Livestock for Breeding

Estimated values of year-end stocks of livestock for breeding occupy columns (7) to (11) of Table 7.1 at 1980 prices. With poultry omitted, there are four groups: (1) cattle, (2) sheep, (3) pigs, (4) horses and donkeys. Some international definitions of *Fixed* Capital Formation require changes in the volume of livestock for breeding to be included as a component of GFCF of any given 12-month period or calendar year. This is one reason for showing Irish data in Table 7.1. But these items have an intrinsic interest, and appropriate categories are well documented as individual items in the CSO statistics. The writer, however, has

had to choose the most relevant available listed items as breeding stock. It is possible therefore that more detailed data would provide more refined or relevant measures of breeding stock as such.

Cattle: Cows, heifers in calf, and bulls, comprise the three items chosen. The aggregate value of breeding stock, given in column (7), is less than half the value of all cattle throughout the period 1950-1984. Breeding-stock cattle accordingly show values below £500m in the early 1950s, with a general increase apparent up to some £900m at the end of 1973, and some reduction towards about £800m in the early 1980s. Cows comprise at least 80 per cent of the total, throughout the period.

Sheep: The column (8) results include ewes for breeding and rams. From £50m or so in the early 1950s they increase to a peak of about £100m in 1964-65, and then decrease to a trough of some £67m in 1979, with subsequent growth to £80m by the end of 1984. These breeding stock comprise 70-80 per cent of all sheep throughout the period, as appears from comparison of column (8) figures with those of column (2).

Pigs: Column (9) data show rather small values, covering boars, sows and gilts. Values lie in a range of £6-14m and comprise roughly 30 per cent of total pig year-end stocks, as given in column (3).

Horses: No direct information is available on breeding stock values for horses and donkeys. On the advice of the Department of Agriculture and Food, the writer has taken 25 per cent of equine stocks of column (5) as the estimated value of breeding stocks of horses and donkeys set out in column (10). These estimates decline fairly steadily, in line with total equine stocks, from £65m in 1950 to £27m in 1984.

Total Breeding Stock: Column (11) figures are the aggregate of those in columns (7) to (10). From some £600m in the early 1950s they increase so as to reach a peak of about £1,040m in 1973; they then decrease somewhat to a range of roughly £900-1,000m for 1975-1984. The aggregate thus estimated for breeding stocks is roughly half the total year-end value of all livestock, shown in column (6), thoughout the full period 1950-1984.

7.4: *Gross Values of Reproducible Fixed Assets*

Possibly the most interesting capital asset information about agriculture lies in Table 7.3, which shows *net* stock values, equivalent to notional aggregated sales or purchases of Irish agricultural enterprises at "equitable" market prices of 1980, to the extent of tangible assets, without inclusion of intangibles. However, further information on *gross* capital values is available, and this is presented in Table 7.2, as the theme of the present section of the chapter.

In columns (1) to (5) of Table 7.2 there appear gross values of five groups or items of fixed assets; a partial aggregate is given in column (6). The items in columns (1) to (3) are of the nature of building and construction; those in

Table 7.2: *Gross Values of Agricultural Reproducible Fixed Assets at End-of Year, 1950-1984, at 1980 prices*

£ million

Year	Land improve- ment since 1949 (1)	Farm- houses Gross Stock (2)	Other building and construct. since 1949 (3)	Agricult- ural Machinery Gross Stock (4)	Other Machinery, Vehicles and Equipment Gross Stock (5)	Reproducible Fixed Assets except land improvement and farmhouses (3) to (5) (6)
1950	19.8	984.6	1.8	275.2	1.2	278.2
1951	45.0	1,029.0	9.0	294.2	3.6	306.8
1952	75.6	1,057.6	21.6	315.5	7.6	344.7
1953	111.6	1,102.2	41.4	339.1	12.0	392.5
1954	157.5	1,149.6	62.5	372.5	19.4	454.4
1955	203.3	1,190.5	88.5	396.8	28.4	513.7
1956	238.8	1,234.8	118.1	404.4	36.2	558.7
1957	276.8	1,262.0	142.3	421.9	42.0	606.2
1958	315.6	1,287.9	166.0	439.4	50.3	655.7
1959	357.6	1,327.1	191.9	456.1	59.5	707.5
1960	395.2	1,364.4	218.5	470.1	68.4	757.0
1961	432.8	1,386.7	247.8	493.0	78.7	819.5
1962	470.7	1,438.0	281.4	514.3	90.1	885.8
1963	512.5	1,488.2	316.9	540.8	101.6	959.3
1964	554.7	1,523.7	359.7	570.9	114.8	1,045.4
1965	592.4	1,559.3	401.9	569.1	127.5	1,098.5
1966	630.3	1,611.4	445.3	565.4	141.4	1,152.1
1967	674.5	1,677.3	475.9	559.4	143.5	1,178.8
1968	717.5	1,756.9	507.6	571.4	152.9	1,231.9
1969	759.9	1,793.7	539.3	597.7	165.8	1,302.8
1970	798.9	1,872.7	563.6	629.5	173.7	1,366.8
1971	837.6	1,928.6	627.6	666.4	191.6	1,485.6
1972	869.8	1,988.1	691.0	712.1	214.9	1,618.0
1973	900.3	2,066.4	746.3	749.8	262.9	1,759.0
1974	928.1	2,147.2	779.7	782.8	309.1	1,871.6
1975	947.2	2,212.4	833.7	824.0	341.7	1,999.4
1976	972.7	2,283.1	920.5	872.3	386.7	2,179.5
1977	998.1	2,365.6	1,011.3	948.1	455.5	2,414.9
1978	1,027.4	2,448.1	1,100.0	1,026.8	510.8	2,637.6
1979	1,058.1	2,542.1	1,233.4	1,106.9	569.3	2,909.6
1980	1,098.3	2,636.0	1,329.4	1,136.2	630.6	3,096.2
1981	1,138.9	2,731.4	1,430.9	1,169.8	687.5	3,288.2
1982	1,181.3	2,828.3	1,506.8	1,189.1	738.4	3,434.3
1983	1,217.8	2,924.6	1,552.5	1,184.1	777.4	3,514.0
1984	1,259.9	3,027.6	1,577.6	1,169.5	820.4	3,567.5

columns (4) and (5) comprise plant, machinery and vehicles. No information from any source is available on starting values (end of 1949 or 1950) of "land improvement" of column (1), nor of "other building and construction" of column (3). However, some useful information is conveyed by cumulating their annual gross investments throughout the period since 1950, as these construction-type items have a much longer average useful life (50-80 years) than do machines and vehicles (10-15 years).

A brief consideration of each column is in order:

Land Improvement since 1950

The column (1) data shows the build-up of value of this type of investment in Agriculture since 1950. It includes land drainage, removal of rock and scrub, and so on. By the end of 1960 it had reached some £400m. About the same increase occurred again during the 1960s, to show some £800m by the end of 1970. During the following decade some £300m was added, to show an aggregate of about £1,100m in 1980. A somewhat similar rate of investment has continued during the early 1980s, to show £1,260m at the end of 1984.

Farmhouses

The estimated gross stock of farmhouses, at 1980 prices, is shown in column (2). Some detail of the methodology of estimation is given in Appendix 3. The same methodology has been applied to years not covered in Appendix 3, so as to relate farmhouse gross values to number of holdings, by means of a trend parameter for farmhouse value per holding. These column (2) gross values supposedly take account of improved *quality* of housing on farms occurring with the passing of time. This and other aspects are discussed in Appendix 3.

The farmhouse coverage is supposedly complete. The values, however, are highly tentative. We find a value of some £1,000m in the early 1950s, increasing to some £1,500m by the mid-1960s. It reaches some £2,200m by 1975, and about £3,000m by the end of 1984. We find, therefore, a trebling of value, between 1950 and 1984, according to the estimates available.

Other Farm Building and Construction since 1950

The cumulation of other building and construction activity on farms since 1950 appears in column (3). This activity includes a broad spectrum of item, such as haysheds, cattle byres, pigsties, silage pits. By 1960 the cumulated investment, at 1980 prices, had exceeded £200m. By 1970 it was more than £500m, and by 1980 more than £1,300m. Further major cumulation brings the aggregate to almost £1,600m by the end of 1984.

A Notional Valuation of the Gross Starting Stock of Land

For consistency with gross valuation of total fixed stock of other sectors, a

notional "gross" valuation of agricultural land excluding farm buildings may be
examined. What is required is a "starting stock" of land as such at the end of
1949, subject to a schedule of "scrapping" in the sense of deterioration. The basic
idea is feasible. If the farm land at the end of 1949 were left unimproved, it
would deteriorate in several ways. A certain amount of maintenance is required
by land, to keep it from deteriorating. This maintenance includes scrub removal,
drainage, fencing, etc., much of it is done by farmers without being recorded.

In this Report we assume that the Land Project work carried out in the 1950s
was about sufficient to maintain the stock of land at its 1950 level of value. This
work (at estimated 1980 prices) has been added on each year as an improvement,
but to some extent also taken off by way of depreciation. We assume that the
useful life of work of this nature is about 25 years.

We have taken a *notional* rate of £30m per year, at 1980 prices, as a depreciation
equivalent to scrapping. The £30m is the major portion of the annual average
£36m shown for 1950-1959 "land improvement" in column (1) of Table 7.2.

Given this supposed scrapping schedule, the "gross" valuation at any year-
end is the sum of the depreciated land value and the gross cumulated values
of "land improvement" appearing in the same column (1).

The land value in question excludes farm buildings. These must be removed
from the starting stock of land and farm buildings. In column (3) we see that
£192m of gross new building occurred during 1950-59. Let us take three times
this, i.e., £576m, as the *gross* estimate of farm buildings at the end of 1950, and
£300m as the *net* estimate. This leaves £16,581m as the value of land including
land improvement at the end of 1950 (given by Table 7.3 column (1) £16,881m
less £300m). Take off £20m for new gross 1950 addition included and add £30m
to replace scrapping, to obtain a "land only" gross value of £16,591m at the end
of 1949. This is the "land only" gross starting stock value, to be reduced annually
by £30m for depreciation equivalent to scrapping.

The following "gross" land values (excluding farm buildings) emerge:

	£m		£m
1950	16,581	1970	16,760
1955	16,614	1975	16,758
1960	16,656	1980	·16,759
1965	16,703	1984	16,801

The 1980 value of £16,759m at 1980 prices is given by £15,661m depreciated
starting stock, plus £1,098m cumulated land improvement shown in Table 7.2
column (1).

To get combined "land and farm buildings" (but still excluding farmhouses), cumulated column (3) "other building" values must be added, as well as the gross starting values of farm buildings reduced by scrapping. The starting stock estimate, already quoted as £576m gross, may be scrapped over 40 years, meaning a linear £14m or so per year.

From this proposed scheme of calculation, the following gross "land and farm buildings" series emerges, at 1980 prices:

	£m		£m
1950	17,157	1970	17,620
1955	17,209	1975	17,818
1960	17,311	1980	18,244
1965	17,471	1985	18,463

The 1980 value of £18,244m is given by £156m reduced starting stock, plus £1,329m new building since 1949 (column (3) of Table 7.2), plus £16,759m. gross value of land alone, quoted above.

Agricultural Machinery, Equipment and Vehicles

Gross estimates for "agricultural machinery" appear in column (4), and those for "other machinery, vehicles and equipment" are given in column (5). The combined gross estimate for the two items is recommended as better than that of either, especially for the earlier years which have almost all starting stock (see next paragraph) concentrated in agricultural machinery. However, this latter item has some intrinsic significance, being derived from the explicit GFCF item of the same name appearing in the published National Accounts since the early 1950s.

Gilmore (September, 1959) showed agricultural "land and buildings" at a balance-sheet value of £500m at the end of 1958, with "machinery" valued at £40m and including one-half the value of the family car. No detail is given of how these two aggregates were built up. For Gilmore's £40m "machinery" at the end of 1958, the writer assumed a book value half the *new* replacement cost; and by means of "agricultural machinery" (Table 6.3) implicit inflator 6.2, thus estimated £496m as the gross cost new at the end of 1958 at 1980 prices. This £496m can be broken down into £303.3m agricultural machinery purchased since 1949, and a residual of £192.7m machinery and vehicles. In summary, and without full detail, the estimated gross stock of machinery, vehicles and equipment at the end of 1950 was about £276m at 1980 prices; this allows for some £14m drop-out of such items each year during 1951-1958 through scrapping. The writer

has allocated all of this, except £1.2m, to "agricultural machinery".

The combined results of columns (4) and (5) show a massive growth of the stock of farm machinery, equipment and vehicles, from £276m for the end of 1950 to £1,990m for the end of 1984, through £803m for the end of 1970. A slow-down of growth, however, is apparent for end-of-year values during 1980-1984.

The end-of-year gross stocks of columns (4) and (5) have been built up by cumulating annual GFCF amounts of starting stock progressively reduced by scrapping. The CSO allocations of GFCF to Agriculture include "farm share of family car", and used for the business of farming, as well as farm trucks, trailers, etc.

Farm Buildings, Machinery and Vehicles, Combined

A partial aggregate of some interest appears in column (6) of Table 7.2, as the combination of columns (3) to (5). This aggregate shows gross investment in Agriculture, excluding land improvement and farmhouses. It therefore covers buildings, machinery and vehicles used in farming. Column (3) entries are admittedly incomplete, being built up only since 1950. However, one may start at 1965, with a cumulated £400m of post-1949 farm building.

The 1965 column (6) aggregate is some £1,100m. By the end of 1975 it has reached £2,000m and by the end of 1980 it is about £3,100m. It approaches £3,600m by the end of 1984. A threefold expansion is apparent, therefore, during the 20 years 1965-1984.

7.5: *Net Stocks of Agricultural Assets, including Land*

Estimated net stocks of agricultural assets appear in Table 7.3 at 1980 prices. Individual items or types occupy columns (1) to (5), and are the subject matter of the present section. Land of agricultural holding (with related farm buildings and structures except farmhouses) is valued in column (1), while net or depreciated reproducible assets not included with land are shown in columns (2) to (5).

A summary of the methodology of sales valuation of agricultural holdings will appear in Section 7.6 below. A breakdown of such valuation, at supposed 1980 prices, provides the estimates of columns (1) and (2). Column (2) shows net (depreciated) estimates of farmhouses. Deduction of these estimates from those of agricultural holdings (column (6)) leaves the residual values of column (1), namely the sales value of land including farm buildings and including land improvement since 1949, depreciated. It may be noted that the sales values of agricultural holdings implicitly include farmhouses and all other farm structures and buildings, none of which is assumed to be marketable as a separate item apart from the land of the holding. The estimated value of land and farm

Table 7.3: *Net Stock of Agricultural Assets including Land, at End of Year, 1950-1984, at 1980 prices*

£ million

Year	Land incl. farm buildings excl. farmhouse (1)	Farmhouses Net (2)	Agricult. Machinery Net (3)	Other Machinery Vehicles, Equipment Net (4)	Total Livestock (5)	Agricult. Holdings including Farmhouses (1) + (2) (6)	Net Tangible Fixed Assets (1) to (4) (7)	Net Tangible Assets: Equivalent Market Value (1) to (5) (8)
1950	16,881.4	492.3	152.8	1.2	1,489.5	17,373.7	17,527.7	19,017.2
1951	16,754.3	547.5	176.6	3.5	1,454.2	17,301.8	17,481.9	18,936.1
1952	16,840.7	585.5	200.5	7.2	1,452.4	17,426.2	17,633.9	19,086.3
1953	16,828.8	638.5	224.4	10.7	1,488.2	17,467.3	17,702.4	19,190.6
1954	16,817.4	693.0	255.5	17.0	1,471.1	17,510.4	17,782.9	19,254.0
1955	16,807.0	739.7	274.5	24.1	1,482.8	17,546.7	17,845.3	19,328.1
1956	16,790.3	788.7	274.3	29.3	1,473.8	17,579.0	17,882.6	19,356.4
1957	16,728.7	819.1	282.6	31.4	1,483.1	17,547.8	17,861.8	19,344.9
1958	16,692.3	847.2	288.6	35.6	1,499.8	17,539.5	17,863.7	19,363.5
1959	16,658.7	887.9	291.9	40.0	1,563.0	17,546.6	17,878.5	19,441.5
1960	16,626.4	925.2	290.5	44.4	1,552.8	17,551.6	17,886.5	19,439.3
1961	16,624.2	946.6	296.3	50.4	1,532.9	17,570.8	17,917.5	19,450.4
1962	16,625.9	996.1	297.6	57.9	1,575.7	17,622.0	17,977.5	19,553.2
1963	16,632.2	1,043.3	302.1	65.3	1,601.3	17,675.5	18,042.9	19,644.2
1964	16,645.0	1,074.2	287.5	76.4	1,663.8	17,719.2	18,083.1	19,746.9
1965	16,659.7	1,103.7	308.5	85.3	1,780.5	17,763.4	18,157.2	19,937.7
1966	16,666.3	1,149.0	309.0	94.4	1,807.2	17,815.3	18,218.7	20,025.9
1967	16,671.4	1,206.1	308.9	99.3	1,752.6	17,877.5	18,285.7	20,038.3
1968	16,678.5	1,275.8	328.3	102.2	1,767.6	17,954.3	18,384.8	20,152.4
1969	16,685.3	1,300.3	363.4	108.2	1,803.0	17,985.6	18,457.2	20,260.2
1970	16,688.3	1,366.4	393.4	110.1	1,859.8	18,054.7	18,558.2	20,418.0
1971	16,688.7	1,406.9	409.7	122.1	1,905.1	18,095.6	18,627.4	20,532.5
1972	16,686.3	1,459.8	437.7	139.0	2,037.2	18,146.1	18,722.8	20,760.0
1973	16,680.3	1,509.1	463.6	178.7	2,224.3	18,189.4	18,831.7	21,056.0
1974	16,657.8	1,569.7	476.8	216.6	2,257.4	18,227.5	18,920.9	21,178.3
1975	16,646.0	1,612.6	493.4	237.9	2,110.4	18,258.6	18,989.9	21,100.3
1976	16,700.9	1,659.3	523.2	271.2	2,122.9	18,360.2	19,154.6	21,277.5
1977	16,763.9	1,715.8	575.8	313.3	2,116.7	18,479.7	19,368.8	21,485.5
1978	16,831.4	1,770.3	631.3	347.9	2,094.9	18,601.7	19,580.9	21,675.8
1979	16,942.7	1,824.1	686.8	384.0	2,093.5	18,766.8	19,837.6	21,931.1
1980	17,037.0	1,885.6	684.4	416.6	1,975.5	18,922.6	20,023.6	21,999.1
1981	17,089.3	1,947.1	684.8	450.3	1,957.5	19,036.4	20,171.5	22,129.0
1982	17,116.0	2,007.1	668.5	474.9	1,957.4	19,123.1	20,266.5	22,223.9
1983	17,105.2	2,064.1	647.2	489.7	1,963.5	19,169.3	20,306.2	22,269.7
1984	17,013.4	2,125.7	626.9	506.1	1,967.0	19,139.1	20,272.1	22,239.1

buildings, excluding farmhouses, is shown in column (1) at supposed 1980 sales prices. All such structures, including land improvement, are therefore implicitly depreciated to provide an "equitable" sale or purchase valuation. The values of land and farm buildings are quite large, ranging from about £16,600m about 1960 to a larger £17,100m in 1983, with an increase occurring fairly regularly throughout the period. A small decrease in value during the 1950s is acceptable, in keeping with a long-term decrease of 6 per cent in area of land of such holdings, from some 14.3 million acres in 1951 to 13.5 million acres in 1980, according to estimates by the writer based on median acreages multiplied by size-group number of holdings.

Readers might note that the combined value of land and farmhouses is more reliable than separate estimates of either. The combined value, that of the "holding" is derived from 1980 actual sample sales data, to be summarised in Section 7.6 following, and with detail available in Appendix 3. But even the combined value series derives from assumptions about depreciation rates of land improvement and farm buildings throughout the period 1950-1984. The combined value, as shown in column (6), shows steady growth throughout the period, from about £17,400m in 1950 to about £19,100m in 1984. It is clear therefore that increasing net estimated values of farmhouses have left a fairly constant residual for land and other farm buildings and structures.

The farmhouse net or depreciated estimates appear in column (2). The starting stock used for gross values was halved, and 50 per cent of gross values taken thoughout the period. All new farmhouse estimated annual gross increments (GFCF) were depreciated at 2 per cent linear, in deriving the net values shown in column (2). These net farmhouse values are the combined outcome of cumulating depreciated GFCF and adding on the net starting values. A steady expansion is evident, from about £500m in 1950 to about £2,100m in 1984. This growth in value reflects assumed improvement in quality of farmhouses, as described in Appendix 3. These net estimates, like their gross counterparts, are highly tentative; but there is no obvious method of finding alternative estimates with which to compare them.

Depreciated values of agricultural machinery appear in column (3). Linear depreciation of GFCF over 15 years has been combined with a halving of starting stock values, to obtain these net estimates. Again, a very large growth is evident, from some £150m in 1950 to almost £700m in 1980, with a decrease towards £600m in later years.

The net values of other machinery, equipment, and vehicles (including the farm share of the family car) are shown in column (4). As mentioned in the gross stock content, these figures are best combined with those of column (3); however, the column (4) estimates reach £500m in 1984 from a near-zero beginning in 1950, and some £40m in 1960. The motor vehicle share has been

depreciated over a 10-year average life, with 15 years used as average life for the machinery component.

Total livestock is shown in column (5), as a part of year-end agricultural assets. The livestock has already had detailed discussion in Section 7.3, related to Table 7.1. Livestock values do not expand many-fold over the period 1950-1984 in the way of farmhouses and machinery, etc., as set out in columns (2) to (4). A relatively modest growth of livestock value is apparent, from about £1,500m in the 1950s to a peak of about £2,300m in 1974 (the beginning of Ireland's membership of the EEC), followed by a decline to below £2,000m in the early 1980s.

7.6: *A Sales' Value of the National Aggregate Farming Enterprise*

Three different notional sales' or purchase values of the aggregate farming enterprise of the nation are now proposed. These values comprise the aggregate estimates shown in columns (6) to (8) of Table 7.3. They become progressively larger (and more comprehensive), as one moves from column (6) to column (8). Each aggregate may now be considered briefly:

Agricultural Holdings including Farmhouses

The first notional sales' value comprises agricultural holdings. Column (6) shows the estimated sales values of the land and buildings and farmhouses comprising Irish agricultural holdings of 1 acre and upwards, for the period 1950-1984. A summary description of the methodology of estimation is given in Part 1 of Appendix 3. The writer is grateful to Messrs Dillon and McDaid of the Valuation Office for sample data on 1980 sales of holdings of different sizes, in many counties. Part 2 of Appendix 3 estimates orders of magnitude of values of farmhouses.

Some clarification of the meaning of the sales values is advisable. The values include farmhouses (dwellings) and all other farm buildings; these are assumed not to be marketable as separate items. Such dwellings and buildings are in principle valued at sales' prices, not necessarily the same as values of new items because of depreciation. The values for years before and after 1980 take account of quality changes due to land improvement, new farmhouses and new farm buildings and depreciation of existing buildings and land improvement (e.g., drainage) structures. The chosen area of farm holdings omits land not on holdings (parks, commonages, etc.,) used for grazing. And the method of valuation takes account of the fact of the diminishing area of agricultural land, due to continuous purchase of land for housing estates, roads and so on, by perhaps 1 million acres during 1950-1984, as mentioned in Section 7.5 above.

The estimated values shown in column (6) are impressively large. They dominate the capital stock structure of Agriculture, by comparison with livestock

(column (5)) and machinery, etc. (columns (3) and (4)). These land and building estimates increase from a minimum of about £17,300m for 1951, to some £19,200m at the end of 1983. The growth of value is mainly due to the tentative growth of depreciated farmhouse values, as shown in column (2).

How realistic are these estimates? The final part of Section 2.3 of Chapter 2 argues that they are realistic, rather than too large.

Net Tangible Fixed Assets of Agriculture

The second, and more comprehensive, notional sales' values of the national aggregate of agricultural enterprises includes machinery and vehicles and equipment, in addition to the land, buildings, and farmhouses. These aggregate estimates appear in column (7) of Table 7.3. A picture of steady growth emerges. Minimum values of about £17,500m occur around 1950, and from then onward persistent growth is apparent, up to the £20,300m level of 1982-84.

Net Tangible Assets including Livestock

The third, and most comprehensive, notional sales' value of the national aggregate of agricultural enterprises includes livestock, as well as machinery and vehicles and farmhouses and buildings and land. These asset aggregates appear in column (8) of Table 7.3.

Fairly persistent growth of value is apparent, from about £19,000m in 1950 up to about £22,300m in 1983, with a slight decrease apparent in 1984. The aggregate persistent growth is the net result or outcome of quite different apparent trends in the different major components. Farmhouses, machinery and vehicles have all shown major growth of net values. Land including farm buildings has shown fairly stable values. Livestock values have shown moderate growth throughout the period, when compared with farmhouses, and vehicles.

PART 2: SEA FISHING

7.7: Asset Types and Data Sources

The capital stock investigation has been confined to fixed assets of sea fishing, without attempting to estimate assets of inland fishing, which are negligible by comparison with those of sea fishing. In view of the tentative nature of the fixed stock estimates for sea fishing, as will be explained below, the significance of inland fishing is likely to be marginal. Sea fishing is as defined in the O'Connor *et al.,* (July, 1980) Report.

Three kinds of GFCF and fixed stock have been distinguished: (a) public expenditure on fishery harbours and landing places; (b) ships and boats engaged full-time or part-time in sea fishing; (c) the equipment and gear used by (b)

for sea fishing activity. Both gross and net stock estimates are presented in Table 7.4.

The core data on Government capital expenditure on fishery harbours and landing places appears as Table 4.3 (p.135) of O'Connor *et al.*, (July, 1980). This covers financial years 1966 to 1977, and shows current-price data in the range £191,000 for 1966 to £1,153,000 for 1976. Approximate matching data for 1950-1965 have been found in the Public Works Vote item "Capital Expenditure on Agriculture" giving a trend (at current prices) of some £29,000 for 1950 to £175,000 for 1965. Corresponding data for 1978-1984, again giving a trend, have been found in the Fisheries Vote item "Main fishery harbour works" plus the Roinn na Gaeltachta Vote item "Muiroibreacha"; these combined show maximum values of about £4m for 1981 and 1982. The Vote data appear in Finance, Department of, *Estimates for Public Services,* and the related *Appropriation Accounts,* annually. These current price GFCF values have been revalued at 1980 prices by means of the inflator "Other building and construction" of Table 6.3. A 25-year life has been applied to these items.

In view of the uncertainty underlying the mixture of "full-time" and "part-time" vessels engaged in sea fishing, it was decided to use as GFCF the Bord Iascaigh Mhara (BIM) funded investment, if possible. Mr Pat Keogh of BIM kindly provided these data for 1952-1987, at current prices, for "total investment in new and secondhand vessels, modernisation, fishing gear and equipment". At current prices this ranged from some £100,000 for the early 1950s to some £10-£20m for the early 1980s. These BIM-funded investments were repriced at 1980 prices by means of the Table 6.3 inflator "Transport equipment".

This writer decided to take about one-third of the annual BIM-funded GFCF as "equipment and gear" in view of the *net* stock proportion of about one-fifth shown in Table 3A.3 (p.112) of O'Connor *et al.*, (July, 1980). The equipment gross stock must comprise a larger proportion than one-fifth, in view of its 18-year average life, versus 25 years for the vessel. Thus, in the capital stock results of Table 7.4, equipment is shown separately from ships and boats; but their combined value is probably more reliable, and this appears also in columns (5) and (10) of that table.

7.8: *Starting Values of Sea Fishing*

As always, the stating values imply scrapping rates as well as initial gross estimates. For harbours, etc., a notional starting value (end-of-1949) of £9m was chosen, as three times the aggregate GFCF of this kind for the decade 1950-59, at 1980 prices. The underlying principle is that GFCF for the 10 years 1950-1959 was replacement gross stock for a fixed amount of 30-year life on average. These figures are very small, within the context of the 35-year period under review, and therefore need not be given undue significance. They have

Table 7.4: *Gross and Net Fixed Capital Stock of Sea Fishing at End of Year, 1950-1984, at 1980 prices*

£ million

Year	GROSS STOCK					NET STOCK				
	Ships and boats (1)	Equip-ment (2)	Harbours and places (3)	Total landing (1) to (3) (4)	Ships, boats and equip. (1) + (2) (5)	Ships and boats (6)	Equip-ment (7)	Harbours and landing places (8)	Total (6) to (8) (9)	Ships, boats and equip. (6) + (7) (10)
1950	14.2	6.7	8.9	29.8	20.9	7.2	3.4	4.6	15.2	10.6
1951	13.5	6.2	9.0	28.7	19.7	7.0	3.2	4.8	15.0	10.2
1952	12.9	5.8	8.9	27.6	18.7	6.9	3.1	4.9	14.9	10.0
1953	12.4	5.4	8.8	26.6	17.8	6.9	3.0	5.0	14.9	9.9
1954	11.9	5.2	8.8	25.9	17.1	6.9	3.0	5.1	15.0	9.9
1955	11.5	4.9	8.9	25.3	16.4	6.9	2.9	5.3	15.1	9.8
1956	11.0	4.6	8.9	24.5	15.6	6.9	2.8	5.4	15.1	9.7
1957	10.7	4.2	8.7	23.6	14.9	6.9	2.7	5.3	14.9	9.6
1958	10.2	3.9	8.5	22.6	14.1	6.8	2.6	5.1	14.5	9.4
1959	10.0	3.7	8.3	22.0	13.7	6.9	2.5	5.0	14.4	9.4
1960	10.4	3.9	8.3	22.6	14.3	7.3	2.6	5.1	15.0	9.9
1961	10.6	3.9	8.3	22.8	14.5	7.4	2.7	5.2	15.3	10.1
1962	10.7	4.0	8.7	23.4	14.7	7.5	2.6	5.6	15.7	10.1
1963	10.9	4.0	9.4	24.3	14.9	7.6	2.6	6.3	16.5	10.2
1964	11.1	4.0	10.1	25.2	15.1	7.6	2.6	6.9	17.1	10.2
1965	11.2	4.2	10.8	26.2	15.2	7.6	2.5	7.5	17.6	10.1
1966	11.5	4.3	11.6	27.4	15.8	7.8	2.5	8.3	18.6	10.3
1967	12.4	4.7	12.9	30.0	17.1	8.4	2.8	9.4	20.6	11.2
1968	14.3	5.5	15.4	35.2	19.8	10.1	3.5	11.6	25.2	13.6
1969	15.5	5.9	17.8	39.2	21.4	10.9	3.8	13.6	28.3	14.7
1970	17.6	6.9	19.8	44.3	24.5	12.5	4.5	15.1	32.1	17.0
1971	20.5	8.1	21.2	49.8	28.6	14.8	5.7	15.8	36.3	20.5
1972	23.5	9.4	23.7	56.6	32.9	17.1	6.7	17.5	41.3	23.8
1973	27.1	10.9	25.8	63.8	38.0	19.8	8.0	18.8	46.6	27.8
1974	31.2	12.7	28.2	72.1	43.9	22.9	9.4	20.3	52.6	32.3
1975	37.3	15.6	29.9	82.8	52.9	28.0	11.8	21.1	60.9	39.8
1976	42.9	18.3	31.5	92.7	61.2	32.5	14.0	22.1	68.6	46.5
1977	47.8	20.9	32.5	101.2	68.7	36.0	15.9	22.3	74.2	51.9
1978	51.4	22.7	33.3	107.4	74.1	38.3	16.8	22.2	77.3	55.1
1979	56.4	25.4	35.0	116.8	81.8	41.8	18.5	22.9	83.2	60.3
1980	67.7	31.2	38.0	136.9	98.9	51.5	23.0	25.2	99.7	74.5
1981	72.7	33.6	41.2	147.5	106.3	54.4	24.1	27.2	105.7	78.5
1982	74.9	34.9	44.1	153.9	109.8	54.4	23.7	28.7	106.8	78.1
1983	77.0	36.1	45.7	158.8	113.1	54.0	23.2	28.8	106.0	77.2
1984	77.5	36.5	46.4	160.4	114.0	52.3	21.9	28.0	102.2	74.2

had a scrapping rate of 4 per cent per year applied for 1950-1969, and a 1 per cent rate thereafter.

Details of 1949 fishing vessels, by number, tonnage, and type, appear in Appendix No. 9 (p.26) of Agriculture, Department of (Fisheries Branch) (1951). These were valued at estimated 1980 prices, for each of 8 different kinds, and showed an aggregate value of £15m. The assumed related equipment was valued at about £7m at 1980 prices. The 3,329 ships and boats included in these aggregates comprised those engaged "solely" or "partially" in coastal fishing, and excluded 915 vessels "laid-up".

These 1980 prices and equipment values were derived from the "average current selling value" data of Table 3A.2 (p.111) of O'Connor *et al.*, (July, 1980), for 1978 conditions. The Table 3A.2 boat and equipment values were increased by 80 per cent, to bring them to 1980 prices and to estimate gross cost from supposed written-down cost inherent in "selling value".

The scrapping rate applied to ships and boats of 1949 was 7 per cent over 10 years, 2.5 per cent over the next 10 years, and 1 per cent over the remaining 5 years of the supposed 25-year life-span. This scrapping pattern takes account of a supposed half-life contained in the starting values: 70 per cent of the *gross* starting value is gone after 10 years and 80 per cent after 14 years. For equipment of 1949 and an assumed 18-year life, the scrapping rate used was 8 per cent over the first 10 years and 2.5 per cent over the remaining 8 years. But these rates of scrapping of the starting stock in fact dispose of the assets *more quickly* than on average: for a 25-year life the average disposal rate would be 4 per cent and for 18 years it would be about 5.5 per cent (100/18). The accelerated scrapping rates make a concession to supposed post-War obsolescence.

7.9: *Gross Stock Estimates of Sea Fishing*

The gross stock results appear in columns (1) to (5) of Table 7.4. Column (5) has the combined estimate for ships, boats and equipment to be considered first. This shows a decrease between 1950 and 1960, from £21m to some £14m, possibly due to the scrapping pattern applied to the starting stock. A slow growth to about £25m is apparent for 1961-1970. Considerable growth occurs later, to show £114m for end of year 1984.

A check is available for 1978 year-end, which shows £74m in column (5). Some £58m appears (for about that time) in Table 3A.3 (p.112) of O'Connor *et al.*, (July, 1980) at 1978 prices, for "estimated total current selling value of all boats and other items of capital equipment". After application of 23 per cent for price inflation, the £58.2m becomes an estimated £71.6m at 1980 prices. This is a little smaller than the £74.1m of Table 7.4 column (5), but lends credence to the latter, which is supposed to be "gross", whereas the "current selling value" of £71.6m implicitly includes some depreciation of gross values. In view of the

uncertainty underlying the capital stock estimates this 1978 concordance with some known benchmark is satisfactory.

A notional breakdown between ships, etc., and equipment appears in columns (1) and (2). The equipment is roughly one-third of the combined total, which may be too large a share; perhaps one-fifth would be more appropriate, as an estimate.

Harbours and landing places have estimates shown in column (3). Up to about 1963 these show little change from the notional starting value of £9m. An apparent decrease of some £0.7m between 1950 and 1960 is due to the chosen average life of 25 years (Table 2.1) coming into play on the starting values, for negligible occurrence of new investment. But through 1964 to 1984 the stock increases through £10m to reach £46m by the end of 1984. Thus this 20-year span shows a growth of some £37m.

Total gross stock estimates are given in column (4). The figures show £30m around 1950, a dip to £22m around 1960, and a slow climb to £30m by the end of 1967. Regardless of starting value and scrapping assumptions it is clear that GFCF was fairly stagnant during the 18 years 1950-1967. By contrast, considerable growth has occurred during 1968-1984, from £30m to £160m, a growth of £130m.

All the quoted stock figures are to be regarded as orders of magnitude only. The following aspects make for imprecision of the estimates. The 1980 ship and equipment prices applied to the 1949 fleet may be inaccurate. This also applies to the scrapping rates and "average life" values assumed. Should the omitted 915 "laid-up" vessels of the 1949 fleet be included as part of the stock? The better answer here is "no", because under the gross concept the value of stock is related to use. Should part-time fishing vessels have their full value in principle included, as has occurred in the stock results quoted? The answer here is that part-time vessels are presumably used for fishing and for recreation. Strictly speaking, an estimate such as half of their value should be attributed to fishing, and the other half to some other activity. Since there is no catering of obvious relevance for the latter, the full capital value of part-time boats has been charged to sea-fishing. It is clear that a major study would be required to address all these aspects for the period 1950-1984.

7.10: *Net Stock Estimates of Sea Fishing*

The net stock results appear in columns (6) to (10) of Table 7.4. To obtain those net estimates, linear depreciation of GFCF over the stated average life of each type of asset has been combined with a halving of starting stock values.

Column (10) has the combined estimate for ships, boats and equipment. This decreases from some £11m in the early 1950s to about £9m in the late 1950s. Growth is apparent in subsequent years, through £17m in 1970 and £55m at

the end of 1978, so as to reach a peak of about £79m in 1981, with a fall off to some £74m at the end of 1984.

The estimate of £55m net value at the end of 1978 may be compared with the £72m estimate (at 1980 prices) from O'Connor *et al.*, (July, 1980) referred to in Section 7.9 above, as "the estimated total current selling value of all boats and other items of capital equipment". A net estimate of about £75m for the end of 1980 appears in column (10) of Table 7.4, indicating that the net estimate has been growing rapidly through 1978-1980. Under these conditions of rapid growth the end-of-1978 net estimate of £55m is not in serious conflict with the £72m obtained by repricing the O'Connor *et al.*, benchmark figure which was £58m at assumed 1978 prices.

The notional breakdown between ships, etc., and equipment appears in columns (6) and (7). As for the comparison of gross values, the equipment is roughly one-third of the combined total, which may be too large a share. Possibly one-quarter or one-fifth of the combined total would give an improved estimate of equipment.

The net estimates for harbours and landing places appear in column (8). These small values stay at about £5m during 1950-1962, then increase steadily to reach some £27-29m in the early 1980s.

Total net fixed stock estimates are shown in column (9). During 1950-1960 some £15m obtains. By 1970 a doubling of this level has occurred, to show £32m at the end of 1970. Fairly rapid growth ensues, so as to reach £100m at the end of 1980. A peak of £107m appears at the end of 1982, with slight reduction through 1983-1984.

These and all net stock estimates are to be regarded as orders of magnitude only, in parallel with their gross stock counterparts. The aggregate net stock is generally some two-thirds of the corresponding gross value. Under conditions of growth of stock, new stock takes relatively more weight than depreciated stock, thus net stock will exceed half the value of gross stock. By contrast, under stable conditions the net stock will on average be about half the value of the gross stock.

Chapter 8

FIXED CAPITAL STOCK ESTIMATES FOR MANUFACTURING

8.1: *Introduction*

The content of the present chapter is confined to fixed assets of Manufacturing. Chapter 12 presents and discusses year-end inventories of working capital, such as materials, fuels, finished goods, held in stock at the end of the business year. The fixed assets now considered are shown according to the usual 10 manufacturing groups. They are valued at supposed 1980 prices, with separate estimates for gross and net values. Estimates are presented as at the end of the calendar year. End-of-business-year level is assumed to be a valid estimator of the level at the end of the calendar year, where differences of timing occur.

This present introductory Section 8.1 briefly puts the fixed stock estimates in the context of those of Vaughan (1980), and mentions average life values chosen. Coverage of CIP non-respondents is explained, as well as the problem of second-hand assets. Section 8.2 gives some detail of how starting values have been obtained and treated by assumed scrapping. Gross estimates of fixed stock are addressed in Section 8.3, with Section 8.4 treating the net estimates. Section 8.5 presents Vaughan's gross and net estimates of 1950-1973, revalued at 1980 prices, for comparison with the new estimates of the present report.

Gross fixed stock estimates for each of 10 manufacturing groups appear in Tables 8.1 to 8.3 of this chapter, with net fixed stock estimate shown in Tables 8.4 to 8.6. These update those of Vaughan (1980) for 1945-1973 appearing in Tables 4.13 and 4.14 of that paper, and valued at 1958 prices. The Vaughan estimates, repriced at 1980 prices, are discussed in Section 8.5 of this chapter, and are given in Tables 8.7 and 8.8. A minor re-arrangement of the Vaughan groups was necessary to match the NACE sectoring following in the present Report and listed in Table 5.1: Vaughan included leather tanning and leather goods with the tenth group Miscellaneous (Other) manufactures, whereas these leather industries are now included with clothing and footwear in Tables 8.1 to 8.6 and also in the repriced Vaughan results of Tables 8.7 and 8.8.

As methodology has been detailed in Chapter 5, only brief discriptive mention need be made here. Average life values for each of the 10 groups are given in Table 5.1; 10 years is used for vehicles and 50 years for buildings. Seven of the 10 groups have 20 years allotted for plant and machinery; 18 years applies for timber, etc., and for chemicals, while 16 years applies for the non-metallic

minerals' group. Smallish amounts of "other" assets during 1973-1984 have been given 10 years, as relating to office and calculating machines, etc.; this detail does not appear in Table 5.1. The "simultaneous exit" is applied to assets at the end of their average life.

Scaling up of CIP respondents so as to match National Accounts' control totals for GFCF of Manufacturing is still relevant, as mentioned in Chapter 5 Section 5.6 point 1. Vaughan (1980) shows in Table 3.6 (p.37) that for 1961-1972 the grossing factor for Manufacturing in aggregate was about 20 per cent or less. This writer has found the same order of scaling to apply for 1973-1984. This single scaling factor for any year is applied to all 10 groups' GFCF, and makes for some loss of precision of the estimates. Conditions would be better if the scaling-up could be allocated more precisely among individual groups.

Second-Hand Assets

In this context of imprecision, detailed formal treatment of second-hand assets was not attempted in the way proposed in point 2 of Chapter 5 Section 5.6. Since 1973, the CIP detail of fixed asset purchases does not seek separate particulars of second-hand assets as such. At the establishment level, only a single aggregate value is sought for sales of assets (presumably second hand) by each establishment to unspecified purchasers. Thus the basic data themselves do not permit the full detail of Vaughan's treatment for 1945-1972. In fact a breakdown of type of purchases and sales of second-hand assets ceased in 1968. Estimates were made of such detail for 1968-1973 towards the Vaughan capital stock estimates through 1950-1973. The approach used towards the results of this present chapter in effect assumes the structure of purchases of fixed assets to be uniformly scaled up. It thus treats all purchases as if they were new.

A fact not explicitly mentioned by Vaughan is that assets sold for scrapping are irrelevant — it is only assets *sold before their useful life is ended* that are relevant to either the gross or net stock estimate. There are no explicit details of such assets in the CIP sales' figures, but it is these alone which are required. The implicit assumption of the CIP treatment is that such sales are not for scrap as such.

A short clarification may be in order at this point. Under ideal conditions, the CIP collects (or would collect) data on cost of purchases of second-hand assets, and receipts for sales of such assets. The latter are assumed to *exclude* scrap, implying that they have further useful life inherent in their value to the purchaser. Both purchases and sales would be broken down by major type of asset: plant and machinery, buildings, vehicles, land, for example. No information need be sought as to who buys such asset sales, or who sells to the purchaser. But for each CIP industry or sector being considered, the purchase data could be aggregated. The same applies to the sales' data, for each major type of asset.

Thus a net second-hand purchase (given by purchases less sales) of each major type of asset is (or would be) available for the CIP industry or sector being considered. Thus the treatment proposed in point 2 of Chapter 5, Section 5.6 could be applied.

8.2: *Starting Values of Manufacturing*

The Vaughan (1980) gross capital stock estimates for 1950 end-of-year are the obvious starting values, as considerable work has gone into their preparation. But leather tanning and leather goods are now included with clothing and footwear, and removed from the "miscellaneous" (other) manufactures' group. In general, each group has its 1950 gross stock value at 1958 prices repriced so as to be at 1980 prices, by means of the three price inflators of Table 6.3: "other building", etc., of value 9.004; "transport equipment" of value 5.944; "other machinery", etc., of value 5.071. The aggregate end-of-1950 starting value of gross stock for each of the 10 groups appears in the top row of Table 8.1 and again similarly in Table 8.7. Its value for aggregate manufacturing is £1,066m at 1980 prices.

Across groups a fairly uniform scheme of scrapping of these starting stock values has been used. As explained in Section 7.8 above for Sea Fishing, the scheme scraps at a higher than average rate in the earlier years for plant and buildings. For plant, the first 10 years have scrapping at 8 per cent, and the remaining 10 years or less at 2 per cent, with "simultaneous exit" at 16 or 18 years as relevant. For vehicles, a steady 10 per cent is applied over 10 years. For buildings, the first 20 years have scrapping at 3 per cent; and a steady 2 per cent applied from 1970 through 1984.

8.3: *Fixed Stock Gross Estimates of Manufacturing*

The gross fixed stock estimates for Manufacturing appear in three tables. Table 8.1 has total stock; Table 8.2 shows plant, machinery and vehicles; Table 8.3 shows buildings with an unknown, presumed small, component of land. If entries in Tables 8.2 and 8.3 are combined, they give corresponding values in Table 8.1. In view of all this detail, for each of 10 sectors and over the 35 years 1950-1984, only short comments on major aspects will be made below, to avoid a long dissertation. Readers can select among the tabular data whatever particulars they wish. The imprecise nature of the GFCF grossing-up process referred to in Section 8.1 above means similar imprecision in the sectoral stock estimates; this is a further reason for curtailed comment.

The total gross capital stock of Table 8.1 can first be looked at in aggregate for all 10 sectors combined. We observe a massive growth, from £1,066m for 1950, to £7,901m for 1984, the latter value being more than 7 times that of 1950. Little growth is apparent between 1950 and 1960; but then a doubling

Table 8.1: *Total Gross Fixed Stock in each of 10 Manufacturing Groups at end of year, 1950-1984, at 1980 prices*

£ million

Year	Food (1)	Drink and Tobacco (2)	Textiles (3)	Clothing footwear leather (4)	Timber and wood furn. (5)	Paper and print. (6)	Chemicals including man-made fibres (7)	Non-metallic mineral products (8)	Metals and engin. (9)	Miscell. (other) manufac- tures (10)	TOTAL MANU- FACTUR- ING (11)
1950	338.5	158.7	109.5	68.5	33.4	89.9	47.9	59.5	127.1	33.3	1,066.3
1951	334.8	160.5	108.5	68.5	33.2	89.6	49.5	58.4	126.4	33.0	1,062.4
1952	347.8	161.0	111.2	70.2	33.6	89.6	52.0	62.1	131.5	34.0	1,093.0
1953	353.1	163.3	113.2	70.6	33.8	92.2	51.9	66.3	131.9	35.3	1,111.6
1954	352.6	166.1	114.0	69.2	34.0	94.3	52.7	68.9	133.5	34.9	1,120.2
1955	360.5	170.7	116.9	69.2	35.9	96.2	55.1	71.2	138.7	36.0	1,150.4
1956	366.8	172.0	117.6	68.8	36.1	98.7	57.0	73.4	140.1	37.8	1,168.3
1957	374.9	172.3	118.2	67.5	36.7	99.6	51.7	74.6	138.6	38.1	1,172.2
1958	373.6	170.0	117.2	67.2	36.4	98.4	62.3	74.0	137.6	53.1	1,189.8
1959	377.6	171.2	119.1	67.0	36.8	98.3	64.9	73.3	140.5	57.5	1,206.2
1960	386.1	175.4	128.0	69.2	38.5	100.8	75.0	74.0	155.1	60.8	1,262.9
1961	403.9	183.6	136.0	71.9	39.5	107.3	89.6	80.6	168.9	67.1	1,348.4
1962	432.7	196.9	148.6	76.2	45.0	114.2	97.7	84.7	190.3	76.0	1,462.3
1963	468.0	210.5	159.2	79.7	48.2	122.3	102.7	94.9	218.6	84.5	1,588.6
1964	498.3	227.7	172.5	83.9	52.3	131.1	108.0	116.8	242.7	94.4	1,727.7
1965	538.0	243.9	185.1	88.8	54.8	142.7	119.0	131.6	264.8	111.2	1,879.9
1966	571.9	255.8	193.6	93.8	56.0	149.2	153.4	144.7	288.0	120.2	2,026.6
1967	607.1	274.2	212.9	100.2	58.4	157.1	170.0	154.6	308.0	129.9	2,172.4
1968	667.0	293.8	238.5	110.0	66.2	172.6	184.2	166.1	333.1	147.1	2,378.6
1969	708.1	318.4	271.5	120.3	79.4	182.1	194.1	177.6	366.6	187.2	2,605.3
1970	763.5	344.2	308.4	129.4	86.8	193.6	204.0	220.4	408.0	215.9	2,874.2
1971	815.1	366.0	345.7	135.3	92.3	201.0	258.7	245.5	444.2	238.8	3,142.6
1972	856.5	384.4	368.7	140.5	96.2	211.5	285.7	306.3	522.9	256.7	3,429.4
1973	946.4	407.0	379.7	145.1	103.9	224.1	310.0	337.8	588.8	274.4	3,717.2
1974	1,032.5	440.3	392.3	149.0	111.7	236.4	349.3	365.9	636.6	288.4	4,002.4
1975	1,117.3	469.6	407.9	152.6	114.2	251.5	407.0	407.9	701.0	297.2	4,326.2
1976	1,178.1	479.6	441.8	155.5	119.2	258.9	522.4	456.3	762.7	310.2	4,684.7
1977	1,240.2	504.1	486.9	160.6	121.7	265.2	604.8	493.9	819.5	326.7	5,023.6
1978	1,357.1	527.7	515.0	167.6	126.8	287.6	691.5	532.1	909.1	339.8	5,454.3
1979	1,493.0	550.6	608.2	173.7	134.0	309.8	763.9	568.1	1,007.6	356.3	5,965.2
1980	1,623.8	597.4	617.3	181.5	144.0	329.1	807.0	637.4	1,145.7	375.8	6,459.0
1981	1,718.4	633.5	619.1	187.2	154.7	340.3	858.4	714.7	1,275.9	394.3	6,896.5
1982	1,796.5	658.8	617.6	187.6	160.7	347.6	891.1	784.9	1,477.9	412.8	7,335.5
1983	1,867.0	674.1	616.4	190.5	163.3	352.4	933.3	818.7	1,568.8	423.0	7,607.5
1984	1,924.2	700.9	612.8	191.1	171.7	357.4	982.0	829.9	1,698.4	432.8	7,901.2

Table 8.2: *Gross Fixed Stock of Plant, Machinery and Vehicles in each of 10 Manufacturing Groups at end of year, 1950-1984, at 1980 prices*

£ million

Year	Food (1)	Drink and Tobacco (2)	Textiles (3)	Clothing footwear leather (4)	Timber and wood furn. (5)	Paper and print. (6)	Chemicals including man-made fibres (7)	Non-metallic mineral products (8)	Metals and engin. (9)	Miscell. (other) manufac-tures (10)	TOTAL MANU-FACTUR-ING (11)
1950	125.6	55.1	47.4	22.4	10.2	39.5	17.0	22.7	54.2	11.3	405.4
1951	122.7	53.6	46.2	21.7	10.3	38.3	16.8	21.9	51.2	10.9	393.6
1952	129.0	53.6	47.2	21.0	10.7	38.4	16.6	23.1	51.3	11.3	402.2
1953	133.2	57.4	48.5	21.0	10.8	39.9	16.6	25.8	50.6	11.8	415.6
1954	132.5	59.5	48.6	20.1	11.0	40.3	17.1	28.2	49.1	11.6	418.0
1955	135.9	63.9	49.3	19.6	12.0	42.1	18.0	28.6	49.2	12.0	430.6
1956	139.9	66.0	50.2	19.3	12.2	43.8	19.2	29.3	48.8	12.6	441.3
1957	143.9	67.2	50.5	18.6	12.7	45.5	20.4	29.5	47.3	13.0	448.6
1958	143.6	67.2	50.0	18.2	12.7	44.9	20.6	29.1	46.3	19.0	451.6
1959	146.1	68.6	51.7	18.4	13.0	44.9	22.0	28.8	47.8	21.6	462.9
1960	150.0	72.0	57.9	19.1	14.1	46.9	25.9	29.2	52.8	23.2	491.1
1961	163.6	80.0	63.7	21.5	15.2	52.3	32.2	35.0	60.9	26.5	550.9
1962	181.4	88.9	72.2	24.1	18.4	57.7	36.7	37.9	72.4	31.5	621.2
1963	204.8	97.1	80.1	26.6	20.3	63.4	39.4	45.9	95.1	37.2	709.9
1964	225.9	104.8	89.9	29.6	22.7	70.1	42.6	62.3	105.8	43.2	796.9
1965	249.2	115.8	99.5	32.4	24.1	76.6	49.7	73.4	118.7	54.6	894.0
1966	270.0	126.6	106.3	35.0	25.0	81.5	73.2	81.9	130.2	60.4	990.1
1967	291.0	136.9	118.5	37.7	26.7	87.2	82.3	86.4	139.8	66.9	1,073.4
1968	328.0	151.1	136.8	41.0	30.9	97.7	93.2	92.6	154.7	78.1	1,204.1
1969	357.5	166.3	155.1	46.4	39.2	104.6	100.3	97.8	172.4	103.1	1,342.7
1970	394.2	184.2	181.1	51.1	43.8	111.5	106.7	113.1	197.1	122.4	1,505.2
1971	422.3	199.2	209.6	54.1	47.2	115.8	141.3	124.9	215.1	135.1	1,664.6
1972	444.4	210.8	226.1	57.2	49.3	120.1	162.3	170.9	257.1	147.9	1,846.1
1973	497.1	224.1	235.0	60.0	53.4	127.6	181.2	188.1	309.0	161.5	2,037.0
1974	553.5	239.2	245.6	63.1	57.3	136.8	208.5	211.0	340.5	172.1	2,227.6
1975	605.1	254.3	258.7	65.8	58.6	146.2	254.8	246.2	382.2	178.7	2,450.6
1976	652.4	262.0	275.5	68.0	62.3	152.8	343.1	292.0	418.0	187.6	2,713.7
1977	699.6	282.3	309.2	71.8	64.3	158.7	403.1	326.3	455.8	202.1	2,973.2
1978	786.1	301.6	324.0	76.4	68.0	174.8	466.2	358.9	516.5	209.5	3,282.0
1979	881.2	318.9	368.4	81.1	72.2	192.1	526.3	389.0	581.6	222.3	3,633.1
1980	976.7	350.3	369.8	83.4	78.5	207.4	550.6	450.4	658.8	232.9	3,958.8
1981	1,047.2	378.1	369.2	86.1	84.8	215.5	575.7	519.6	732.2	246.1	4,254.5
1982	1,101.8	391.8	366.9	86.4	87.6	221.4	597.3	574.8	868.1	261.0	4,557.1
1983	1,149.6	403.4	364.5	87.6	88.0	224.4	630.6	606.9	925.8	268.5	4,749.3
1984	1,189.5	423.6	360.2	87.7	93.0	227.8	653.1	614.4	1,028.7	275.8	4,953.8

Table 8.3: *Gross Fixed Stock of Buildings and Land in each of 10 Manufacturing Groups at end of year, 1950-1984, at 1980 prices*

£ million

Year	Food (1)	Drink and Tobacco (2)	Textiles (3)	Clothing footwear leather (4)	Timber and wood furn. (5)	Paper and print. (6)	Chemicals including man-made fibres (7)	Non-metallic mineral products (8)	Metals and engin. (9)	Miscell. (other) manufac-tures (10)	TOTAL MANU-FACTUR-ING (11)
1950	212.9	103.6	62.1	46.1	23.2	50.4	30.9	36.8	72.9	22.0	660.9
1951	212.1	106.9	62.3	46.8	22.9	51.3	32.7	36.5	75.2	22.1	668.8
1952	218.8	107.4	64.0	49.2	22.9	51.2	35.4	39.0	80.2	22.7	690.8
1953	219.9	105.9	64.7	49.6	23.0	52.3	35.3	40.5	81.3	23.5	696.0
1954	220.1	106.6	65.4	49.1	23.0	54.0	35.6	40.7	84.4	23.3	702.2
1955	224.6	106.8	67.6	49.6	23.9	54.1	37.1	42.6	89.5	24.0	719.8
1956	226.9	106.0	67.4	49.5	23.9	54.9	37.8	44.1	91.3	25.2	727.0
1957	231.0	105.1	67.7	48.9	24.0	54.1	31.3	45.1	91.3	25.1	723.6
1958	230.0	102.8	67.2	49.0	23.7	53.5	41.7	44.9	91.3	34.1	738.2
1959	231.5	102.6	67.4	48.6	23.8	53.4	42.9	44.5	92.7	35.9	743.3
1960	236.1	103.4	70.1	50.1	24.4	53.9	49.1	44.8	102.3	37.6	771.8
1961	240.3	103.6	72.3	50.4	24.3	55.0	57.4	45.6	108.0	40.6	797.5
1962	251.3	108.0	76.4	52.1	26.6	56.5	61.0	46.8	117.9	44.5	841.1
1963	263.2	113.4	79.1	53.1	27.9	58.9	63.3	49.0	123.5	47.3	878.7
1964	272.4	122.9	82.6	54.3	29.6	61.0	65.4	54.5	136.9	51.2	930.8
1965	288.8	128.1	85.6	56.4	30.7	66.1	69.3	58.2	146.1	56.6	985.9
1966	301.9	129.2	87.3	58.8	31.0	67.7	80.2	62.8	157.8	59.8	1,036.5
1967	316.1	137.3	94.4	62.5	31.7	69.9	87.7	68.2	168.2	63.0	1,099.0
1968	339.0	142.7	101.7	69.0	35.3	74.9	91.0	73.5	178.4	69.0	1,174.5
1969	350.6	152.1	116.4	73.9	40.2	77.5	93.8	79.8	194.2	84.1	1,262.6
1970	369.3	160.0	127.3	78.3	43.0	82.1	97.3	107.3	210.9	93.5	1,369.0
1971	392.8	166.8	136.1	81.2	45.1	85.2	117.4	120.6	229.1	103.7	1,478.0
1972	412.1	173.6	142.6	83.3	46.9	91.4	123.4	135.4	265.8	108.8	1,583.3
1973	449.3	182.9	144.7	85.1	50.5	96.5	128.8	149.7	279.8	112.9	1,680.2
1974	479.0	201.1	146.7	85.9	54.4	99.6	140.8	154.9	296.1	116.3	1,774.8
1975	512.2	215.3	149.2	86.8	55.6	105.3	152.2	161.7	318.8	118.5	1,875.6
1976	525.7	217.6	166.3	87.5	56.9	106.1	179.3	164.3	344.7	122.6	1,971.0
1977	540.6	221.8	177.7	88.8	57.4	106.5	201.7	167.6	363.7	124.6	2,050.4
1978	571.0	226.1	191.0	91.2	58.8	112.8	225.3	173.2	392.6	130.3	2,172.3
1979	611.8	231.7	239.8	92.6	61.8	117.7	237.6	179.1	426.0	134.0	2,332.1
1980	647.1	247.1	247.5	98.1	65.5	121.7	256.4	187.0	486.9	142.9	2,500.2
1981	671.2	255.4	249.9	101.1	69.9	124.8	282.7	195.1	543.7	148.2	2,642.0
1982	694.7	267.0	250.7	101.2	73.1	126.2	293.8	210.1	609.8	151.8	2,778.4
1983	717.4	270.7	251.9	102.9	75.3	128.0	302.7	211.8	643.0	154.5	2,858.2
1984	734.7	277.3	252.6	103.4	78.7	129.6	328.9	215.5	669.7	157.0	2,947.4

occurs by about 1970, and more than a doubling again by 1980; and a definite slow-down of growth, about one-quarter, by the end of 1984.

The food sector takes the largest share thoughout the period. At £339m for the end of 1950, its stock is about one-third of aggregate stock of Manufacturing. By the end of 1984 its share has declined slightly, so as to be about one-quarter of the aggregate. The second largest at the end of 1984 is the metals and engineering group; with stock of £1,698m it shows only slightly smaller value than the food group. But back in 1950 it took third place, at £127m, compared with the second largest value of £159m taken by drink and tobacco. This latter sector reached only £701m by the end of 1984 to take fifth place, being exceeded by food, metals, chemicals and non-metallic minerals.

The gross stock estimates for plant, machinery and vehicles comprise Table 8.2. The manufacturing aggregate increases twelvefold between 1950 and 1984, from £405m to £4,954m. This is a faster growth than that of total capital stock (some sevenfold) referred to above, implying that buildings and land increase more slowly than the total. For plant, etc., the food sector again dominates. At £126m for end-of-1950, it takes about one-third of the manufacturing aggregate. At end-of-1984 it shows £1,190m, which is about one-quarter of the aggregate. We find the metal sector again in second place at end-of-1984 having £1,029m. Chemicals and non-metallic minerals again exceed the drink and tobacco sector which shows £424m and thus takes fourth place at the end of 1984.

Buildings and land estimates appear in Table 8.3. They increase more than fourfold for all manufacturing sectors combined, from £661m for end-of-1950 to £2,947m for the end of 1984. The food sector share closely resembles that for gross stock already mentioned above. At £213m for the end of 1950 it is about one-third of the manufacturing aggregate, and for the end of 1984 it comprises £735m which is about one-quarter of the aggregate. The metals group again takes second place with £670m at end-of-1984. Chemicals has £329m, to be the third largest. Drink and tobacco shows £277m and thus takes fourth place at end-of-1984.

8.4: *Fixed Stock Net Estimates of Manufacturing*

Net stock estimates at 1980 prices appear in Tables 8.4 to 8.6. Those net estimates are the outcome of linear depreciation of gross new values over the stated average life of relevance, combined with 50 per cent valuation of the starting gross stock during its time schudule of scrapping, as used for the gross estimates. These starting-stock estimates are less refined than those of Vaughan (1980) described at the end of Appendix 2.

A brief reference to each table will suffice. The total net stock of each group appears in Table 8.4. The aggregate of all 10 groups increases from £553m in 1950 to £5,234m at the end of 1984. The net aggregate therefore comprises an

Table 8.4: *Total Net Fixed Stock in Each of 10 Manufacturing Groups at end of year, 1950-1984, at 1980 prices*

£ million

Year	Food (1)	Drink and Tobacco (2)	Textiles (3)	Clothing footwear leather (4)	Timber and wood furn. (5)	Paper and print. (6)	Chemicals including man-made fibres (7)	Non-metallic mineral products (8)	Metals and engin. (9)	Miscell. (other) manufac-tures (10)	TOTAL MANU-FACTUR-ING* (11)
1950	169.2	79.4	54.8	34.3	16.7	44.9	24.0	29.8	63.5	16.6	533.2
1951	174.1	85.0	56.6	35.9	17.3	47.1	26.7	30.2	66.2	17.2	556.3
1952	195.0	89.0	62.1	38.1	18.4	49.3	30.3	34.3	74.4	18.9	609.8
1953	206.9	94.5	66.3	40.9	19.2	53.8	31.3	39.7	77.6	20.9	650.9
1954	211.9	100.0	69.2	40.7	20.0	57.7	32.7	43.2	81.7	21.1	678.2
1955	224.6	106.8	73.9	41.9	22.3	60.9	35.7	46.2	89.1	22.7	724.1
1956	234.5	109.9	76.0	42.5	23.2	64.5	38.1	48.5	92.2	24.8	754.2
1957	245.1	111.5	77.7	42.0	23.3	66.3	43.0	49.8	92.2	25.4	776.3
1958	245.2	110.0	77.5	42.5	23.1	65.6	43.5	49.1	92.4	40.5	789.4
1959	249.8	111.9	80.1	43.0	23.5	65.8	46.0	48.2	96.3	44.6	809.2
1960	257.8	116.3	89.2	45.5	25.1	68.5	55.7	48.4	111.4	47.2	865.1
1961	271.9	123.2	95.6	48.1	25.9	73.7	68.9	53.8	123.5	52.4	937.0
1962	297.5	134.7	106.2	52.2	31.0	79.0	75.3	57.1	142.7	60.0	1,035.7
1963	327.5	145.5	114.3	55.1	33.6	85.3	78.2	66.0	167.9	66.8	1,140.2
1964	350.4	159.3	124.5	58.5	37.2	92.0	81.2	85.7	187.9	74.7	1,251.4
1965	382.4	171.8	133.6	62.6	39.1	101.0	88.9	97.0	204.9	89.0	1,370.3
1966	406.4	178.9	137.9	66.4	39.6	104.3	121.3	104.7	222.1	94.9	1,476.5
1967	430.6	191.7	152.3	71.3	40.9	108.7	133.5	112.0	235.1	101.1	1,577.2
1968	477.3	204.9	172.3	79.5	47.5	120.2	142.4	119.4	252.6	114.2	1,730.3
1969	503.2	222.4	198.6	88.0	59.6	125.2	147.8	129.2	277.5	149.6	1,901.1
1970	541.9	240.0	227.7	94.9	65.1	131.8	152.3	169.3	309.0	172.3	2,104.3
1971	577.5	253.9	257.2	98.6	68.7	135.1	201.3	188.0	334.3	188.3	2,302.9
1972	609.9	265.0	272.9	101.3	70.6	142.1	220.5	242.0	403.7	199.0	2,527.0
1973	686.8	283.9	275.8	106.1	76.2	152.6	235.7	262.9	456.4	209.0	2,745.4
1974	751.4	310.9	278.7	104.8	81.4	161.0	265.4	278.4	486.6	214.0	2,932.6
1975	814.4	334.7	284.0	105.5	81.6	172.7	311.6	305.8	532.8	213.2	3,156.3
1976	849.4	335.3	307.5	105.5	83.6	176.0	410.1	337.8	572.7	216.7	3,394.6
1977	881.7	348.9	340.2	107.3	82.4	178.1	450.7	359.7	604.2	222.8	3,576.0
1978	963.6	359.1	353.3	110.7	84.1	193.7	533.7	378.2	666.5	230.5	3,873.4
1979	1,060.6	368.7	432.7	113.9	89.4	208.3	579.2	396.7	736.7	238.4	4,224.6
1980	1,147.5	392.9	424.3	118.7	96.9	220.8	589.8	455.3	845.6	246.8	4,538.6
1981	1,194.3	406.2	416.7	121.5	103.9	225.0	607.5	511.4	940.3	254.1	4,780.9
1982	1,224.4	417.8	400.0	119.1	107.6	225.0	603.9	554.8	1,106.7	262.4	5,021.7
1983	1,260.2	419.6	385.2	119.6	107.5	223.8	603.2	557.2	1,169.7	264.4	5,110.4
1984	1,276.7	433.1	369.8	118.1	113.8	223.9	647.1	534.5	1,253.3	263.9	5,234.2

* Due to rounding from 2 decimal places to one, the decimal fraction in column (11) may not always coincide with the sum of those in columns (1) to (10).

Table 8.5: *Net Fixed Stock of Plant, Machinery and Vehicles in each of 10 Manufacturing Groups at end of year, 1950-1984, at 1980 prices*

£ million

Year	Food (1)	Drink and Tobacco (2)	Textiles (3)	Clothing footwear leather (4)	Timber and wood furn. (5)	Paper and print. (6)	Chemicals including man-made fibres (7)	Non-metallic mineral products (8)	Metals and engin. (9)	Miscell. (other) manufac-tures (10)	TOTAL MANU-FACTUR-ING* (11)
1950	62.8	27.6	23.7	11.2	5.1	19.7	8.5	11.4	27.1	5.6	202.7
1951	65.2	28.3	24.5	11.5	5.7	20.2	8.9	11.5	26.5	5.8	208.1
1952	76.3	30.4	27.3	10.6	6.4	21.8	9.4	12.6	28.6	6.6	230.0
1953	84.4	36.1	30.1	12.4	6.8	24.6	10.0	16.1	29.8	7.5	257.8
1954	86.5	39.5	31.5	12.2	7.3	26.1	10.9	19.0	30.1	7.6	270.7
1955	92.1	45.0	33.2	12.3	8.4	28.7	12.2	19.5	31.6	8.3	291.3
1956	97.4	47.6	34.9	12.6	9.0	30.9	13.6	20.2	32.4	9.0	307.6
1957	101.9	49.0	35.7	12.2	8.8	33.0	14.8	20.1	31.9	9.4	316.8
1958	100.9	48.7	35.5	12.2	8.6	32.4	14.8	19.4	31.6	15.4	319.5
1959	102.3	49.7	37.2	12.6	8.7	32.3	16.0	18.7	33.8	17.7	329.0
1960	103.9	52.4	43.2	13.4	9.5	34.1	19.5	18.5	39.0	18.7	352.2
1961	112.5	58.1	47.1	15.3	10.1	37.8	24.4	22.9	45.3	21.0	394.5
1962	125.8	64.3	53.3	17.4	12.7	41.3	27.5	24.8	54.7	24.9	446.7
1963	143.1	69.0	58.4	19.1	14.0	44.9	28.4	31.4	74.6	29.2	512.1
1964	156.2	72.8	65.0	21.0	15.7	49.3	29.8	45.7	81.8	33.5	570.8
1965	171.6	79.7	71.1	22.9	16.6	53.1	34.1	53.4	90.4	42.8	635.7
1966	182.7	85.7	73.8	24.2	16.8	54.8	56.2	56.7	96.8	46.0	693.7
1967	193.3	90.3	81.3	25.4	17.4	57.1	61.7	58.9	100.7	49.7	735.8
1968	218.2	98.2	94.4	27.2	20.5	63.8	68.3	61.3	109.6	57.5	819.0
1969	234.1	106.7	106.4	31.2	27.9	66.4	71.9	65.5	120.5	78.7	909.3
1970	256.1	117.0	125.5	34.0	30.7	68.7	74.2	78.8	137.5	93.1	1,015.6
1971	271.7	125.3	147.6	35.6	32.7	69.7	104.4	85.6	147.5	100.4	1,120.5
1972	288.9	131.2	158.5	36.9	33.4	71.4	119.4	126.7	183.5	107.7	1,257.6
1973	333.2	142.5	161.1	38.8	35.9	77.7	131.2	135.3	226.3	115.5	1,397.5
1974	373.5	153.2	163.8	39.6	37.9	84.1	150.9	148.0	244.5	118.8	1,514.3
1975	409.4	165.1	168.5	40.4	37.5	91.3	188.0	171.0	272.7	117.9	1,661.8
1976	437.7	166.1	176.9	40.8	38.9	95.1	261.9	203.1	292.0	119.3	1,831.8
1977	462.4	178.2	200.6	42.3	38.1	98.1	283.3	224.4	310.2	125.5	1,963.1
1978	521.4	187.0	203.0	44.3	39.1	108.7	346.2	240.1	350.0	129.7	2,169.5
1979	585.9	194.0	236.5	47.2	42.3	120.0	383.5	255.7	393.4	136.1	2,394.6
1980	646.7	206.0	224.2	47.7	46.9	130.1	379.6	309.3	448.8	138.0	2,577.3
1981	679.2	214.4	218.3	48.9	50.5	132.9	375.7	360.7	495.5	142.6	2,718.7
1982	696.4	218.1	205.0	47.7	52.1	133.4	366.1	392.4	605.6	149.9	2,866.7
1983	720.6	220.2	193.1	48.0	51.1	132.2	362.0	396.8	646.7	151.9	2,922.6
1984	731.5	231.2	181.3	47.4	55.2	132.5	385.5	374.2	715.5	151.8	3,006.1

* Due to rounding from 2 decimal places to one, the decimal fraction in column (11) may not always coincide with the sum of those in columns (1) to (10).

Table 8.6: *Net Fixed Stock of Buildings and Land in each of 10 Manufacturing Groups at end of year, 1950-1984, at 1980 prices*

£ million

Year	Food (1)	Drink and Tobacco (2)	Textiles (3)	Clothing footwear leather (4)	Timber and wood furn. (5)	Paper and print. (6)	Chemicals including man-made fibres (7)	Non-metallic mineral products (8)	Metals and engin. (9)	Miscell. (other) manufac-tures (10)	TOTAL MANU-FACTUR-ING* (11)
1950	106.4	51.8	31.3	23.1	11.6	25.2	15.4	18.4	36.5	11.0	330.5
1951	108.8	56.6	32.1	24.5	11.6	26.9	17.7	18.7	39.8	11.4	348.1
1952	118.7	58.6	34.8	27.5	12.0	27.5	20.8	21.7	45.8	12.3	379.7
1953	122.6	58.4	36.2	28.5	12.4	29.2	21.1	23.6	47.8	13.4	393.2
1954	125.5	60.5	37.7	28.5	12.7	31.5	21.7	24.2	51.6	13.5	407.4
1955	132.5	61.9	40.7	29.6	13.9	32.2	23.5	26.7	57.5	14.4	432.9
1956	137.1	62.3	41.1	29.9	14.2	33.6	24.5	28.3	59.8	15.8	446.6
1957	143.3	62.5	42.0	29.8	14.5	33.3	28.2	29.7	60.3	16.0	459.6
1958	144.2	61.4	42.1	30.3	14.5	33.1	28.7	29.7	60.7	25.1	469.8
1959	147.5	62.2	42.8	30.3	14.8	33.5	30.0	29.5	62.5	26.9	480.0
1960	153.8	64.0	46.0	32.2	15.6	34.4	36.3	29.9	72.4	28.6	513.2
1961	159.4	65.1	48.5	32.9	15.8	35.9	44.5	31.0	78.2	31.4	542.7
1962	171.7	70.4	53.0	34.8	18.3	37.7	47.8	32.3	88.0	35.1	589.1
1963	184.5	76.5	55.9	36.1	19.7	40.4	49.8	34.5	93.3	37.7	628.4
1964	194.2	86.5	59.5	37.5	21.4	42.7	51.4	40.0	106.1	41.2	680.5
1965	210.8	92.1	62.5	39.7	22.5	47.9	54.8	43.6	114.5	46.2	734.6
1966	223.8	93.3	64.1	42.2	22.9	49.5	65.1	48.0	125.2	48.9	783.0
1967	237.3	101.4	71.0	45.8	23.5	51.6	71.8	53.1	134.4	51.4	841.3
1968	259.1	106.7	78.0	52.3	27.1	56.4	74.2	58.0	143.0	56.6	911.4
1969	269.1	115.7	92.2	56.9	31.8	58.8	75.8	63.7	157.0	71.0	922.0
1970	285.8	123.0	102.2	61.0	34.3	63.0	78.2	90.5	171.6	79.2	1,088.8
1971	305.8	128.5	109.6	63.1	36.0	65.4	96.9	102.3	186.8	87.9	1,182.3
1972	321.0	133.8	114.4	64.4	37.3	70.7	101.1	115.3	220.2	91.3	1,269.5
1973	353.6	141.4	114.8	67.3	40.3	74.9	104.6	127.6	230.1	93.6	1,348.2
1974	377.9	157.7	114.9	65.2	43.6	76.9	114.5	130.4	242.1	95.2	1,418.4
1975	405.0	169.6	115.5	65.1	44.1	81.4	123.6	134.8	260.1	95.4	1,494.6
1976	411.7	169.2	130.6	64.8	44.7	80.9	148.2	134.6	280.7	97.4	1,562.8
1977	419.3	170.7	139.6	65.0	44.4	80.0	167.4	135.3	294.0	97.3	1,613.0
1978	442.2	172.1	150.3	66.4	45.0	85.0	187.5	138.1	316.4	100.9	1,703.9
1979	474.7	174.7	196.2	66.6	47.1	88.3	195.8	141.0	343.3	102.3	1,830.0
1980	500.8	186.9	200.1	71.0	49.9	90.7	210.2	145.9	396.8	108.9	1,961.2
1981	515.0	191.8	198.4	72.6	53.4	92.1	231.8	150.8	444.8	111.6	2,062.3
1982	528.0	199.7	195.0	71.4	55.5	91.7	237.7	162.4	501.1	112.5	2,155.0
1983	539.6	199.4	192.0	71.6	56.5	91.6	241.1	160.3	523.0	112.5	2,187.6
1984	545.2	201.9	188.5	70.7	58.7	91.3	261.7	160.3	537.9	112.1	2,228.3

* Due to rounding from 2 decimal places to one, the decimal fraction in column (11) may not always coincide with the sum of those in columns (1) to (10).

increasing share of its Table 8.1 gross counterpart, from one-half in 1950 to about two-thirds in 1984. We may recall that the net starting values (end-of-1950) have been chosen at half the level of their gross counterparts. But with growth in annual GFCF levels, especially since 1960, the net stock proportion of gross will increase above 50 per cent. The net amounts for food and metals take major shares in recent years, thus reflecting the gross stock situation.

Net stock estimates of plant, machinery and vehicles are shown in Table 8.5, corresponding to the gross estimates of Table 8.2. The net aggregate of all 10 groups displays a fifteenfold growth, from about £200m in 1950 to some £3,000m at the end of 1984. This net aggregate also comprises some two-thirds of its gross counterpart (Table 8.2) in the early 1980s. A similar proportion if apparent for individual groups.

Net stock of buildings and land occupies Table 8.6, in parallel with Table 8.3 gross estimates. As before, the net aggregate of £331m at the end of 1950 is half the gross aggregate. The net aggregate of £2,228m at the end of 1984 is about three-quarters of the corresponding gross aggregate value. Similar results hold at group level. The net stock of buildings will generally form a larger share of gross stock than obtains for plant, etc., under conditions of increasing annual GFCF. The underlying cause is the relatively small depreciation and scrapping rate applied to buildings, in view of their 50-80-year average life, compared with 10-20 years for plant and vehicles.

8.5: *Comparative Vaughan Gross and Net Estimates for 1950-1973*

The Vaughan (1980) Table 4.13 group estimates of gross fixed stock at 1958 prices have been repriced at 1980 prices and appear in Table 8.7 of the present Report. The leather and leather goods activities are in the clothing, etc., group (4) of Table 8.7. In this same table the miscellaneous (other) manufacturers' group (10) comprises mineral oil refining, rubber, and plastics, as major components, with several other minor activities. The repricing was done as described in Section 8.2 above for the end-of-1950 starting values. Table 6.3 inflators were used for three components of the Vaughan gross stock, as detailed in Tables A.2 to A.11 (pp. 84-93) of Vaughan (1980).

It is to be expected that the Vaughan repriced gross estimates of Table 8.7 would be larger than those of Table 8.1 for two reasons: (1) The starting values have been scrapped at a faster than average rate in compiling the gross estimates of Table 8.1; (2) A second reason is that average life values used for Table 8.1 results are generally shorter than corresponding Vaughan values, as shown in Table 5.1 for plant and machinery. The same value of 10 years is used for vehicles in both studies. But Vaughan uses 80 years for buildings (of manufacturing) as indicated in his Table 3.3 (p.33), whereas the present study uses 50 years, as shown in Table 5.1.

Table 8.7: *Vaughan (1980) Results at 1980 Prices: Total Gross Fixed Stock in each of 10 Manufacturing Groups at end of year, 1950-1973, at 1980 prices*

£ million

Year	Food (1)	Drink and Tobacco (2)	Textiles (3)	Clothing footwear leather (4)	Timber and wood furn. (5)	Paper and print. (6)	Chemicals including man-made fibres (7)	Non-metallic mineral products (8)	Metals and engin. (9)	Miscell. (other) manufactures (10)	TOTAL MANU-FACTUR-ING (11)
1950	338.5	158.7	109.5	68.5	33.4	89.9	47.9	59.5	127.1	33.3	1,066.3
1951	357.0	178.1	117.9	74.4	36.2	98.3	56.0	62.5	138.0	36.0	1,154.4
1952	383.3	175.9	122.8	77.5	37.4	100.2	58.8	67.3	148.6	37.7	1,209.5
1953	397.0	182.0	128.9	78.1	37.9	105.6	57.6	72.7	153.7	39.3	1,252.8
1954	408.9	193.8	134.2	77.0	39.0	112.6	60.3	79.4	160.5	40.1	1,305.8
1955	424.8	203.4	140.0	79.3	40.5	115.8	64.2	82.9	171.3	42.2	1,364.4
1956	438.8	208.8	143.9	80.4	42.0	120.2	67.5	85.3	174.4	44.0	1,405.3
1957	546.9	214.9	148.2	81.4	42.1	124.4	72.8	87.9	174.6	45.2	1,448.4
1958	470.9	219.4	152.9	83.6	42.8	127.2	76.3	90.0	179.8	72.5	1,515.4
1959	481.8	225.1	158.1	84.5	43.2	128.8	80.9	90.0	187.8	78.1	1,558.3
1960	497.9	234.0	170.6	89.3	45.3	135.2	93.1	91.9	208.8	81.6	1,647.7
1961	514.2	242.8	178.2	92.4	46.0	142.6	107.4	99.6	223.6	87.2	1,734.0
1962	537.6	253.2	187.8	96.6	50.7	148.5	114.3	103.5	243.3	94.7	1,830.2
1963	571.9	267.0	199.9	101.0	53.8	156.1	119.3	114.7	271.6	102.1	1,957.4
1964	602.3	287.0	213.0	105.4	57.5	165.4	123.1	138.2	297.4	113.1	2,102.4
1965	638.3	304.8	224.4	109.1	59.6	174.4	131.7	152.8	316.8	127.9	2,239.8
1966	677.2	318.1	232.6	113.8	61.4	181.1	172.3	166.9	337.7	137.4	2,398.5
1967	716.6	343.3	250.7	121.0	62.5	190.6	189.4	182.4	358.5	147.9	2,562.9
1968	768.7	350.0	274.2	129.5	69.8	205.6	202.6	193.2	378.9	164.9	2,737.4
1969	811.1	378.2	305.6	139.8	82.3	213.9	212.6	207.3	408.6	204.4	2,963.8
1970	859.1	399.1	338.6	147.7	87.2	233.6	226.2	251.2	446.2	226.4	3,205.3
1971	911.9	412.8	375.3	149.4	92.0	228.4	276.5	274.2	477.9	250.7	3,449.1
1972	957.8	441.1	404.7	155.1	97.5	236.0	305.9	352.0	573.5	272.2	3,795.8
1973	1,038.0	468.8	424.1	156.8	106.6	253.8	331.7	381.8	649.2	294.5	4,105.3

The decision to revise Vaughan's average life figures has been taken in the light of the more recent and comprehensive information underlying Table 5.1. There is also the question of consistency, by way of using a single chosen average life for each type of asset throughout the full 35-year period being analysed. In conditions of much fuller information on Irish usage, perhaps different life values should be applied to a specified asset for different sub-periods.

The Vaughan gross estimates of Table 8.7 do behave as expected. Both sets of starting values, at the end of 1950, are identical. But by the end of 1973, the manufacturing aggregate estimate for Vaughan is £4,105m, compared with £3,717m of Table 8.1; thus Vaughan exceeds the latter results by some £400m. This £400m difference emerges about 1962 and continues through later years.

It also appears that the Vaughan estimates across all 10 sectors exceed those of Table 8.1 for end-of-1973. We find similar results in comparisons for earlier years. For aggregate manufacturing, the Vaughan gross estimates are some 10-15 per cent larger than those of the present study appearing in Table 8.1. One may therefore surmise that the Vaughan parameters, if applied to more recent data, would give results 10-15 per cent larger than those shown in Table 8.1.

Vaughan Net Estimates

Repricing of the Vaughan (1980) Table 4.14 net estimates has provided the results shown in Table 8.8 valued at 1980 prices. The methods of repricing and minor re-arrangement of sub-groups within Manufacturing are exactly the same as have been explained above for the gross stock.

These repriced Vaughan net fixed stock estimates of Table 8.8 may be compared with the completely new set of net estimates shown in Table 8.4. Total net stock of each group appears in both tables, as well as the group aggregate in column (11) of each table. In parallel with the gross results, the aggregate column (11) repriced Vaughan series is larger than corresponding values of Table 8.4. The Vaughan estimates show some £150m more for 1950, gradually increasing so as to show some £330m more at the end of 1973. The relatively complicated and refined estimation process underlying the Vaughan estimates explains why these should be larger for 1950 (see final section of Appendix 2). As happened for the gross estimates, faster scrapping of starting stock and shorter average life values again make for Table 8.4 net estimates being smaller than their repriced Vaughan counterparts of Table 8.8. This effect applies independently of any differences of starting values. There is an argument in favour of using the Vaughan 1950 repriced net starting values, in harmony with the use of his 1950 repriced gross starting values, as has occurred for Tables 8.1 to 8.3 above.

At the level of individual groups, the Vaughan repriced estimates generally exceed corresponding Table 8.4 values. Thus there is consistency of difference between the two sets of figures.

Table 8.8: *Vaughan (1980) Results at 1980 Prices: Total Net Fixed Stock in each of ten Manufacturing Groups at end of year, 1950-1973, at 1980 prices*

£ million

Year	Food (1)	Drink and Tobacco (2)	Textiles (3)	Clothing footwear leather (4)	Timber and wood furn. (5)	Paper and print. (6)	Chemicals including man-made fibres (7)	Non-metallic mineral products (8)	Metals and engin. (9)	Miscell. (other) manufac-tures (10)	TOTAL MANU-FACTUR-ING* (11)
1950	211.3	101.5	69.4	44.3	21.6	58.5	31.9	34.4	85.2	19.7	677.8
1951	229.5	111.7	77.4	47.8	23.5	64.9	37.0	37.3	94.6	22.5	746.1
1952	251.3	111.5	81.7	48.8	24.5	66.6	38.3	41.6	104.8	24.0	793.0
1953	261.8	116.6	86.2	49.2	24.8	71.4	37.7	47.0	108.9	25.4	828.8
1954	269.1	126.4	90.5	48.3	25.5	75.6	40.7	53.3	114.3	26.2	869.8
1955	280.2	134.1	95.1	49.2	26.6	78.4	43.3	55.7	121.3	28.0	911.9
1956	289.0	136.9	96.9	49.8	27.3	82.1	45.6	57.6	123.6	29.6	938.4
1957	300.2	139.7	99.1	50.1	27.3	84.6	50.8	58.9	123.6	46.3	980.5
1958	309.7	142.3	102.0	52.0	27.5	85.9	53.6	60.3	127.7	57.7	1,018.5
1959	315.9	144.8	105.4	52.5	27.6	86.5	56.7	59.8	133.2	62.0	1,044.4
1960	327.1	151.2	115.6	55.9	29.5	90.8	65.8	61.1	151.2	64.3	1,112.5
1961	340.2	157.7	120.8	58.1	30.0	95.9	78.6	67.6	163.9	69.0	1,181.8
1962	358.7	165.5	128.6	61.0	34.2	99.2	83.4	70.4	179.4	75.5	1,255.8
1963	387.9	176.7	137.1	63.4	36.8	104.6	86.3	79.9	205.7	82.1	1,360.5
1964	411.6	192.0	146.7	68.5	40.2	110.8	88.4	101.3	224.9	91.5	1,475.8
1965	441.5	205.0	155.5	69.5	41.9	116.9	95.1	113.1	242.0	105.4	1,585.8
1966	472.1	213.2	160.9	73.2	42.8	121.1	133.6	123.7	258.0	113.2	1,711.6
1967	503.8	228.4	177.6	78.3	43.6	127.9	148.8	134.2	271.2	121.7	1,835.3
1968	547.7	234.7	196.8	84.7	49.4	138.6	158.3	140.6	290.8	135.2	1,976.9
1969	576.9	254.6	223.6	92.6	60.0	143.6	165.0	150.5	316.7	170.5	2,154.0
1970	613.4	269.8	251.3	98.1	63.7	149.7	170.6	188.1	348.7	190.9	2,344.2
1971	651.4	283.3	281.0	100.1	67.4	152.7	220.1	205.8	375.4	209.7	2,546.8
1972	691.9	302.4	303.2	104.5	70.5	160.0	245.1	274.5	463.9	227.1	2,843.1
1973	748.7	325.1	316.1	106.8	77.4	173.7	260.9	294.4	526.8	248.1	3,078.0

* Due to rounding from 2 decimal places to one, the decimal fraction in column (11) may not always coincide with the sum of those in columns (1) to (10).

Chapter 9

FIXED STOCK ESTIMATES FOR MINING, CONSTRUCTION
AND UTILITIES

9.1 *Introduction*

This chapter discusses 5 sectors: (1) mining and quarrying including Bord na Mona; (2) construction and building; (3) gas production and distribution; (4) waterworks' activities; (5) electricity generation, transmission and distribution by the Electricity Supply Board (ESB). The chapter's subject matter is fixed stock, with gross and net estimates shown separately. Inventory estimates for materials and fuels appear below in Chapter 12.

The chapter is divided into 5 parts, each describing one of the 5 sectors. The investment data and fixed stock estimates for the ESB are more reliable than those for the other 4 sectors, due to the kind co-operation of Mr Jack Egan of the ESB. The data for the other 4 sectors are mainly derived from annual CIP returns, adjusted to fit CSO control totals for National Accounts' GFCF tables, with further CSO detail for the more recent years 1971-1984. Some input from the Bord na Mona (1950) annual report and those of other years has also been availed of.

The 5 sectors are not related in any way. Grouping them together in the present chapter is a way of avoiding short chapters for each of the sectors. Each part of the present chapter may be regarded as a separate short chapter, not as part of a larger group.

PART 1: MINING AND QUARRYING, INCLUDING BORD NA MONA

9.2: *Data and Starting Values*

Bord na Mona investments were not included among the mining and quarrying GFCF data for 1950-1954 in the earlier CIP listing then in use. The writer has remedied this deficiency, by using the Bord na Mona (1950) annual report and those following to provide new investment data for 1950-1954 business years.

As shown in Table 5.1, an average life of 30 years has been used for plant and machinery, with 10 years for vehicles and 60 years for buildings and construction structures. In mining and Bord na Mona, the distinction in meaning and classification between "plant" and "constructed structures" is not as clear as in other sectors. For example, railways and their equipment are more in the nature of "construction" than "plant", although they are classified as "plant". For :his reason, the combined estimates for "plant", etc., and "buildings", etc., in

Table 9.1 are more reliable than their separate estimates, although the latter do convey some further information.

Starting values for Bord na Mona for about the end of 1949 are based on historic data. The Bord na Mona annual report for the year ended 31 March 1950 showed (in the Capital Accounts' section) net assets at a written-down value of £3.168m. These were divided by this writer between plant, etc., and construction, etc., and repriced at 1980 prices. Their values were scaled up to take account of peat mining by some Local Authority employees and also some private enterprises (per Census of Population 1951 employment data, Central Statistics Office, 1954). Values were further doubled, to take account of depreciation and price inflation effects prior to 1949. Vaughan's methodology of Appendix 2 suggests a fourfold increase. But the writer judged that doubling was more appropriate for newer assets of Bord na Mona (rather than assets going back to say 1930) having major weighting in the stock. The final end-of-1949 "equivalent-new" gross stock values at 1980 prices were estimated to be £27.86m for plant, etc., and £29.37m for construction etc. No separate estimate was attempted for "vehicles" as such. The plant, etc., was scrapped at 1 per cent per year over 20 years followed by 8 per cent per year over a further 10 years. The construction, etc., has been scrapped at 2 per cent per year over 50 years through 1984.

For the rest of mining and quarrying, the basic source of starting values comprised £0.872m of written-down stock at the end of 1949. This source was given by CIP results appearing in the June 1951 issue of the *Irish Trade Journal* (see Central Statistics Office, March 1974). Again, 1951 Census of Population data on employment were used to estimate for CIP non-respondents. Following Vaughan's methodology, a grossing factor of 4 was used to correct for combined pre-1949 price inflation and depreciation effects. After re-pricing at 1980 prices, plant, etc., starting value gross was estimated to be £14.55m, and construction, etc., gross £1.88m. The scrapping rates applied were 3⅓ per cent per year for plant, over 30 years, and 2 per cent per year for construction, etc., over 50 years through 1984.

9.3 *Fixed Stock Gross and Net Estimates for Mining and Quarrying, including Bord na Mona*

The gross stock results for mining, quarrying, and Bord na Mona, all together, appear in columns (1) to (3) of Table 9.1. Before brief comment on the numerical results, the quality of the estimates needs to be appraised. It has already been mentioned that the combined plant, etc., and construction, etc., results, appearing in column (3) of the table, are more reliable than either the plant, etc., results of column (1) or the construction, etc., results of column (2). The method of estimating starting values, described in Section 9.2 above, shows that these are possible orders of magnitude, rather than precise estimates. The scrapping of

Table 9.1: *Gross and Net Fixed stock of Mining (including Bord na Mona) at end of year, 1950-1984, at 1980 prices*

	GROSS STOCK			NET STOCK		
Year	Plant, machinery, and vehicles (1)	Buildings, construction, land (2)	Total (1)+(2) (3)	Plant, machinery and vehicles (4)	Buildings, construction, land (5)	Total (4)+(5) (6)
1950	44.8	34.6	79.4	24.0	19.3	43.3
1951	48.2	38.0	86.2	27.7	22.9	50.6
1952	52.7	40.1	92.8	31.7	25.3	57.0
1953	59.2	43.7	102.9	38.6	29.0	67.6
1954	66.4	44.7	111.1	45.4	30.0	75.4
1955	73.0	46.0	119.0	51.1	31.4	82.5
1956	75.2	47.9	123.1	52.3	33.3	85.6
1957	78.4	49.5	127.9	54.2	34.9	89.1
1958	87.3	55.6	142.9	61.6	40.9	102.5
1959	90.5	67.1	157.6	63.1	52.2	115.3
1960	93.5	72.4	165.9	64.4	57.1	121.5
1961	97.4	79.6	177.0	66.6	63.8	130.4
1962	102.8	83.2	186.0	70.3	66.8	137.1
1963	98.5	89.4	197.9	74.3	72.3	146.6
1964	111.1	102.6	213.7	75.4	84.7	160.1
1965	124.2	113.2	237.4	88.7	94.3	183.0
1966	131.6	118.9	250.5	91.2	98.8	190.0
1967	140.5	127.5	268.0	97.3	106.1	203.4
1968	143.7	133.2	276.9	97.6	110.2	207.8
1969	153.8	142.4	296.2	103.7	117.9	221.6
1970	165.0	151.7	316.7	111.5	125.5	237.0
1971	177.2	159.6	336.8	120.5	131.4	251.9
1972	190.3	161.0	351.3	129.6	130.7	260.3
1973	216.9	163.8	380.7	151.3	131.5	282.8
1974	242.4	168.7	411.1	171.3	134.2	305.5
1975	262.3	187.9	450.2	185.8	151.2	337.0
1976	283.0	231.6	514.6	198.6	192.3	390.9
1977	297.4	242.2	539.6	204.6	199.6	404.2
1978	323.2	258.6	581.8	221.0	212.5	433.5
1979	350.6	274.9	625.5	239.1	225.1	464.2
1980	371.1	281.1	652.2	251.2	227.2	478.4
1981	386.4	287.7	674.1	258.7	229.5	488.2
1982	399.8	292.8	692.6	264.2	230.4	494.6
1983	414.5	295.1	709.6	273.3	228.3	501.6
1984	425.5	297.5	723.0	278.2	226.2	504.4

£ million

stock through depletion or abandonment of mines, quarries, or bogs, has not been taken account of. And a detailed follow-through of Bord na Mona investment would undoubtedly improve the estimates. Discussion with mining experts, if possible, would also make for improvement. But, for the time and resources available to the writer, all this was not possible. In the circumstances, therefore, the estimates are to be treated as rough orders of magnitude.

The total gross values of column (3) may be considered first. They show a ninefold growth between 1950 and 1984, all quotations relating to "end of year", from £79m for 1950 to £723m for 1984. We see a doubling of value between 1950 and 1960, and a further doubling by 1970, with roughly again yet another doubling by 1980, and little further growth through 1984. This growth gains some credence by resembling closely that described in Chapter 8 for total manufacturing.

The share estimated for "plant, machinery and vehicles" in column (1) takes slightly more than half of the aggregate throughout the period. It follows that "building, construction and land" takes slightly less than half of the aggregate throughout 1950-1984.

Net Stock Estimates

Net stock estimates appear in columns (4) to (6) of Table 9.1. They are the cumulative outcome of linear depreciation of new GFCF over the stated average life of each category, combined with 50 per cent of the gross value of each kind of starting stock throughout its schedule of scrapping.

The total net stock of column (6) shows massive increases throughout the period, from some £43m in 1950 to about £500m in 1984. This shows net stock soon increasing from about half the 1950 gross value, so as to be two-thirds or more, throughout most of the period. As a reflection of the gross stock situation, more than half of the net total relates to plant, machinery, and vehicles, as set out in column (4).

PART 2: CONSTRUCTION AND BUILDING

9.4: *Data and Starting Values*

The CSO fixed investment GFCF estimates for 1971-1984, kindly provided by Mr Michael Lucey were used for these years, which did not present any problems. The problematic period was 1950-1970. End-of-1949 starting values will be considered below separately as a further problem.

The 21-year period 1950 to 1970 presented two major problems: (1) It appeared that respondents to the CIP represented only about half of all those employed in "private" building and construction, and some three-quarters of those employed

by Local Authorities and Government Departments. Estimates of total employment in these industries are derived from various Census of Population enumerations at 5-year intervals. (2) It appeared that gross investment by respondents showed excessive "building and construction", due to some wrong interpretation of CIP instructions. In effect they might be including some of their gross output, instead of *only* the buildings used to run their business. The buildings of relevance are the premises of the construction firms, including Local Authority offices, etc., used by construction employees, engineers, and so on.

The writer has attempted to solve both problems. Employment data did suggest grossing factors, to cover CIP non-respondents as well as respondents. And much of the "building" was omitted, to leave data more in accord with the structures of GFCF provided by CSO for 1971-1984. It follows that such GFCF estimates are reasonable orders of magnitude, for 1950-1970, and not actual data nor precise estimates.

As indicated in Table 5.1, average life values used are 18 years for plant and machinery, 10 years for vehicles, and 30 years for buildings.

Starting values were available for end-of-1949, as part of CIP results for that year (see reference in Section 9.3 above). Private building, etc., showed £1.36m written-down stock, while Local Authority construction activity showed about the same amount, £1.48m. These were scaled up for non-response, by employment data of 1951 Census of Population. The grossing factor 4 was used, to cover depreciation and price inflation effects before 1949. They were then repriced at 1980 prices, to give a combined end-of-1949 gross starting stock of £112.42m, comprising £40.61m of plant, etc., and £71.81m of buildings. No explicit estimate was made for "vehicles" as such. The scrapping scheme applied to these starting values of plant, etc., was 6 per cent per year over 10 years, followed by 5 per cent per year over 8 years. For buildings, etc., a scheme of 2 per cent per year over 50 years through 1984 has been applied.

9.5: *Fixed Stock Gross and Net Estimates for Construction*

Gross fixed stock estimates for construction activities are given in columns (1) to (3) of Table 9.2. In view of what has been mentioned in Section 9.4 above as to the tentative nature of the GFCF estimates, the derived capital stock results are also to be regarded only as rough orders of magnitude.

Total fixed stock, as given in column (3), may be considered first. This shows a growth of more than ninefold between 1950 and 1984 (all estimates relating to end-of-year), being £117m for 1950 and £1,127m for 1984. But the pattern of growth differs from that of mining etc., of Section 9.3 above, which showed doubling during 10-year intervals, to grow ninefold also, by 1984. For construction, growth of total fixed stock by 1960 is only about 40 per cent of the 1950 level. By 1970 there is a further growth of about one-half of the 1960

Table 9.2: *Gross and Net Fixed Stock of Construction at end of year, 1950-1984, at 1980 prices*

£ million

Year	GROSS STOCK			NET STOCK		
	Plant, machinery, and vehicles (1)	Buildings, construction, land (2)	Total (1)+(2) (3)	Plant, machinery and vehicles (4)	Buildings, construction, land (5)	Total (4)+(5) (6)
1950	42.5	74.9	117.4	23.4	40.2	63.6
1951	45.5	80.5	126.1	27.4	46.8	74.2
1952	48.8	82.6	131.4	31.1	49.6	80.7
1953	54.4	84.5	138.9	36.6	52.1	88.7
1954	62.2	86.8	149.0	43.9	54.9	98.8
1955	66.9	85.8	152.7	47.3	54.2	101.5
1956	69.8	86.1	155.9	48.3	54.8	103.1
1957	70.6	85.0	155.6	46.9	53.9	100.8
1958	75.4	84.4	159.8	49.2	53.3	102.5
1959	80.7	85.6	166.3	51.5	54.6	106.1
1960	82.8	86.6	169.4	52.0	55.5	107.5
1961	86.4	86.6	173.0	54.5	55.3	109.8
1962	91.3	87.5	178.8	57.6	56.0	113.6
1963	98.3	86.8	185.1	63.0	54.9	117.9
1964	108.0	86.3	194.3	71.0	54.0	125.0
1965	116.6	85.4	202.0	76.9	52.7	129.6
1966	125.3	87.9	213.2	81.5	54.6	136.1
1967	136.1	92.6	228.7	86.5	58.6	145.1
1968	150.9	95.9	246.8	96.3	61.0	157.3
1969	168.5	99.2	267.7	109.2	63.2	172.4
1970	162.8	101.6	264.4	118.3	64.3	182.6
1971	181.0	102.7	283.7	132.9	63.8	196.7
1972	203.1	104.1	307.2	151.9	63.7	215.6
1973	242.9	105.3	348.2	185.5	63.2	248.7
1974	277.0	108.0	385.0	210.2	64.0	274.2
1975	311.2	107.3	418.5	231.2	61.4	292.6
1976	348.5	106.4	454.9	256.0	58.4	314.4
1977	411.9	107.7	519.6	304.7	57.5	362.2
1978	495.2	109.4	604.6	368.2	57.1	425.3
1979	591.0	112.7	703.7	440.8	58.1	498.9
1980	700.9	120.6	821.5	522.3	67.7	590.0
1981	795.9	121.5	917.4	587.9	72.6	660.5
1982	875.5	121.3	996.8	634.8	72.8	707.6
1983	943.9	120.7	1,064.6	668.3	72.5	740.8
1984	1,008.6	118.6	1,127.2	693.4	71.0	764.4

level. We observe a 1980 level some three times that of 1970. A further 40 per cent or so occurs over the 1980 level by the end of 1984.

Plant, machinery and vehicles have their combined gross estimate shown in column (1). This component grows faster than either buildings (in column (2)) or the totals discussed in the previous paragraph. We see plant, etc., increase from some £43m for 1950 to £1,009m for 1984. The latter value is about 25 times that of 1950. We see plant, etc., comprising about one-third of total stock in the early 1950s and steadily increasing its share so as to take about nine-tenths by 1984.

Only about 60 per cent growth occurs for the gross value of buildings and land between 1950 and 1984. From a 1950 value of £75m it increases to £119m at the end of 1984, as shown in column (2) of Table 9.2. But employment in the building group has been declining in the 1980s, to be some 83,000 in April 1984 (Table 10 of Department of Finance, 1986). And in April 1951 the corresponding employment was 85,000 (Table 1 of Central Statistics Office, 1958). A modest growth in office accommodation of those engaged in construction activities therefore makes sense. One would not expect major growth of this asset.

Net Stock Estimates

Net stock estimates appear in columns (4) to (6) of Table 9.2. These were derived in the usual way, by linear depreciation over the stated average lives, and 50 per cent of the gross starting stock throughout its scrapping schedule.

The total net stock of column (6) shows enormous growth from some £64m at the end of 1950 to £764m at the end of 1984. Most of this growth occurs in plant, etc., of column (1), which reaches £693m in 1984, from about £23m in 1950. The predominance of plant, etc., in the net stock reflects its predominance in gross stock, already commented on above. By contrast, the net value of buildings, etc., increases from about £40m to only about £73m, between 1950 and 1981-82, with a small decline in evidence through 1984.

PART 3: GAS PRODUCTION AND DISTRIBUTION

9.6: *Data and Starting Values*

For most of the period 1950-1984 the gas activities comprised gasworks' production and distribution of town-gas, of which Dublin Gas had a major share. But for the early 1980s the GFCF and fixed stock results show evidence of Kinsale Gas activities including pipeline construction.

Little amendment has been required to the CIP data of 1950-1970, because response to the CIP has been fairly complete. The CSO data of GFCF for 1971-1984 National Accounts have been used, without amendment. Gas activities

comprise a sector (like mining) where the distinction between "plant" and "construction" is not as obvious as in other sectors. The combined results of "plant" and "construction" are therefore probably more reliable than either separately, in the fixed stock results shown in Table 9.3.

Average life values are taken to be the same as those of the UK, namely 22 years for "plant" and 47 years for "construction", as appears in Table 5.1. But the writer chose a relatively stable structure of the starting stock (end-of-1949) to limit a major apparent decrease during 1950-1962, as will be described further in a paragraph below.

The 1949 CIP end-of-year written-down stock values were £3.46m for plant, etc., and £2.26m for building, etc. These were increased slightly for apparent non-response (in terms of employment) and grossed by a factor 4, to cover pre-1949 price inflation and depreciation. They were valued at 1980 prices to give end-of-1949 gross equivalent-new starting values of £78.36m for plant and machinery and vehicles, and £90.90m for construction and buildings and land. Thus the combined estimate of all gross starting values is £169.26m at 1980 prices, at the end of 1949.

The GFCF data show very small values during most of the period 1950-1980. And there is evidence of some reductions in town-gas activity during that period. The CIP data show 25 establishments producing gas in 1950, progressively decreasing to 18 in 1964, 11 in 1974 and 9 in 1978 and in 1982, increasing to 11 in 1984. Employment, however, was relatively stable, from about 2,200 in 1950, through 2,100 in 1964, 1,800 in 1974, 1,500 in 1978 and 1,600 in both 1982 and 1984. It seemed, therefore, that care should be taken to keep the fixed stock relatively stable, by choosing conservative scrapping rates for the starting stock. Of this latter, plant, etc., was scrapped at 2 per cent for the 10 years 1950-1959, and 4 per cent per year was applied thereafter. Construction, etc., has also been scrapped at 2 per cent for the 10 years 1950-1959, and 2 per cent per year has been applied thereafter. These scrapping rates give improved stability by limiting the decrease in the gross and net results, now to be considered.

9.7: *Fixed Stock Gross and Net Estimates for Gas Production and Distribution*

Gross fixed year-end estimates appear in columns (1) to (3) of Table 9.3. Column (3) total stock shows a major decrease occurring fairly steadily between 1950 and about 1979. The total gross stock estimate is £167m for the end of 1950, and successive annual estimates are generally smaller until a minimum of £88m is reached at the end of 1979. Major increases occur thereafter, towards a gross fixed maximum estimate of £149m at the end of 1984.

The successive reductions are also apparent in the plant, etc., estimates of column (1) and those of construction in column (2). These items also show growth during 1980-1984. The plant estimates range from £77m in 1950 through the

Table 9.3: *Gross and Net Fixed Stock of Gas Production and Distribution at end of year, 1950-1984, at 1980 prices*

						£ million
	GROSS STOCK			NET STOCK		
	Plant, machinery, and vehicles	Buildings, construction, land	Total	Plant, machinery and vehicles	Buildings, construction, land	Total
Year	(1)	(2)	(1)+(2) (3)	(4)	(5)	(4)+(5) (6)
1950	77.1	89.4	166.5	38.8	44.8	83.6
1951	75.9	87.8	163.7	38.3	44.2	82.5
1952	74.6	86.1	160.7	37.7	43.3	81.0
1953	73.2	84.3	157.5	37.1	42.4	79.5
1954	71.8	82.4	154.2	36.4	41.5	77.9
1955	70.4	80.6	151.0	35.8	40.6	76.4
1956	70.6	78.9	149.5	36.6	39.7	76.3
1957	69.3	77.1	146.4	36.0	38.8	74.8
1958	67.9	75.3	143.2	35.3	38.0	73.3
1959	66.7	73.5	140.2	34.6	37.0	71.6
1960	64.3	71.8	136.1	33.7	36.2	69.9
1961	61.5	70.0	131.5	32.2	35.3	67.5
1962	59.3	63.2	122.5	31.3	34.4	65.7
1963	58.5	66.9	125.4	31.8	34.0	65.8
1964	56.0	66.1	122.1	30.5	34.0	64.5
1965	53.5	64.7	118.2	29.2	33.5	62.7
1966	50.9	63.1	114.0	27.7	32.7	60.4
1967	48.9	61.7	110.6	26.8	32.2	59.0
1968	46.0	60.1	106.1	24.9	31.4	56.3
1969	46.3	58.4	104.7	26.2	30.6	56.8
1970	43.6	56.8	100.4	24.3	29.8	54.1
1971	43.5	55.7	99.2	25.1	29.5	54.6
1972	42.7	54.4	97.1	25.5	29.0	54.5
1973	44.1	53.7	97.8	27.8	29.1	56.9
1974	45.6	52.7	98.3	30.0	28.9	58.9
1975	45.1	51.2	96.3	30.0	28.1	58.1
1976	44.4	49.8	94.2	29.5	27.5	57.0
1977	44.5	48.0	92.5	29.8	26.5	56.3
1978	40.6	51.1	91.7	27.4	30.3	57.7
1979	37.6	50.6	88.2	24.7	30.4	55.1
1980	38.6	51.1	89.7	24.2	31.5	55.7
1981	39.4	53.9	93.3	23.5	34.9	58.4
1982	40.7	85.2	125.9	23.7	66.6	90.3
1983	43.5	93.0	136.5	25.1	74.1	99.2
1984	49.8	99.0	148.8	30.3	79.8	110.1

minimum £38m in 1979, to reach £50m in 1984. The construction estimates show £89m for 1950, through the minimum £48m in 1977, towards a maximum of £99m in 1984.

The 1980-84 growth is easily explained, as due to Kinsale Gas and Bord Gais Eireann activities related to the offshore gas field. The decline during 1950-1979 has CIP evidence to support it, as quoted above for numbers of establishments and employment. However, the extent of the reduction in the gross fixed stock *depends crucially upon the scrapping assumptions made about the starting stock,* for this industry. Much smaller scrapping rates would have the effect of keeping plant, etc., at about £80m throughout 1950-1973, with slow growth to about £90m in 1984. In a similar way, very conservative scrapping rates for construction, etc., would keep its level within £90m-95m during 1950-1973, with a drop to £84m in 1977, and growth through £90m in 1981 to reach £135m in 1984. These very conservative scrapping rates were used by the writer for previous estimates, just quoted. Readers are free to choose the latter, if they wish to. Perhaps some compromise, between the gross estimates of Table 9.3 and those just quoted, is a better solution still.

Net Stock Estimates

Net fixed year-end estimates appear in columns (4) to (6) of Table 9.3. These were derived in the usual way, by linear depreciation over the stated average lives, and half of the gross starting stock throughout its scrapping schedule.

Total net stock appears in column (6). Its magnitude to some extent reflects that of total gross stock. The net total declines from £84m in 1950 to reach £54m in 1970. It stays within £54-59m during 1971-1981, then increases to reach £110m by the end of 1984.

The net stock of plant, etc., in column (4) shows less drastic reduction, from £39m in 1950 to about £24m in 1970. During 1965-1984 this net stock shows several up and down movements within a range of about £24-30m. The net stock of construction, etc., in column (5) decreases from £45m in 1950 to £27m in 1977. Major growth occurs during 1982-1984, so as to show £80m at the end of 1984.

The net estimates are also affected, but to a lesser extent, by the scrapping assumptions applied to the starting stock. The net 1950 value would still be £84m and lesser decreases during 1950-1970, or even increases, would derive from more conservative assumptions than those used in estimating the values shown in column (4) to (6).

PART 4: WATERWORKS

9.8: *Data and Starting Values*

The data sources for waterworks' activities resemble those of gasworks described

in Section 9.6 above, in all respects. The CIP starting values for end-of-1949 comprise a total of £1.45m of written-down stock, having as components £0.72m of plant, etc., and £0.73m of construction, etc. The distinction between "plant" and "construction" may not be particularly clear; so that, for this sector also, the combined outcome is probably more reliable than either. After revaluing at 1980 prices, the total end-of-1949 gross equivalent-new starting stock has been estimated at £20.45m. Of this, plant, etc., is £7.32m and construction, etc., £13.13m.

The chosen scrapping rates applied to starting stock of plant, etc., are 2 per cent per year over 20 years and 12 per cent over 5 years. For construction and structures such as pipes, no change was made for the 10 years 1950-1959, and then 2 per cent per year applied thereafter, through 1984.

For new plant and construction, the Table 5.1 relevant average lives were applied: 25 years for plant, and 70 years for engineering constructions such as reservoirs, pipes, and general buildings. The writer does not know how appropriate these are for Irish conditions. Improved estimates might be possible, through discussion with engineers and experts.

9.9 *Fixed Stock Gross and Net Estimates for Waterworks*

The waterworks' gross fixed estimates appear in columns (1) to (3) of Table 9.4. The combined total of column (3) shows a 20-fold growth between end-of-1950 and end-of-1984, from about £21m to about £434m. Very little growth appears between 1950 and 1960; then a doubling appears by 1970. The end-of-1980 value £222m is more than four times the estimated £49m for end-of-1970. And the £434m for end-of-1984 is almost twice that for end-of-1980. Waterworks are constructed and run by Local Authorities. EEC funding since 1973 is an obvious reason for the major increase in gross stock during 1974-1984.

Within the total, plant, etc., values of column (1) show a relatively modest trebling, from £7m for 1950 to £22m for 1984. Even if these values are not good estimates they indicate that most of the waterworks' stock comprise the "construction" components such as reservoirs and pipelines.

By contrast with gasworks, the waterworks' fixed gross stock has grown more than eightfold between 1970 and 1984. For waterworks, therefore, the starting-value assumptions are not of great significance beyond 1970.

Net Stock Estimates

The net fixed stock estimates appear in columns (4) to (6) of Table 9.4. Total net stock in column (6) increases from £10m in 1950 so as to be £395m in 1984. From about half of gross stock in 1950, the net values take increasing shares. By 1960 the net share is roughly two-thirds, and by 1970 it is about four-fifths of the gross value. Thereafter it takes even larger shares, because of the rapid

Table 9.4: *Gross and Net Fixed Stock of Waterworks at end of year, 1950-1984, at 1980 prices*

£ million

Year	GROSS STOCK			NET STOCK		
	Plant, machinery, and vehicles (1)	Buildings, construct-ion, land (2)	Total (1)+(2) (3)	Plant, machinery and vehicles (4)	Buildings, construct-ion, land (5)	Total (4)+(5) (6)
1950	7.2	13.3	20.5	3.6	6.8	10.4
1951	7.2	13.5	20.7	3.7	6.9	10.6
1952	7.2	13.6	20.8	3.7	7.0	10.7
1953	7.2	13.6	20.8	3.8	7.0	10.8
1954	7.1	14.6	21.7	3.8	8.0	11.8
1955	7.2	14.9	22.1	3.9	9.3	13.2
1956	7.5	15.7	23.2	4.1	10.2	14.3
1957	7.6	16.2	23.8	4.4	10.5	14.9
1958	7.7	16.5	24.2	4.5	10.8	15.3
1959	7.7	17.1	24.8	4.6	11.3	15.9
1960	7.8	17.9	25.7	4.6	12.2	16.8
1961	7.8	18.6	26.4	4.7	12.9	17.6
1962	7.9	19.3	27.2	4.7	13.6	18.3
1963	8.0	20.0	28.0	4.8	14.4	19.2
1964	8.1	22.9	31.0	4.9	17.2	22.1
1965	8.2	25.1	33.3	4.9	19.4	24.3
1966	8.1	26.1	34.2	4.8	20.3	25.1
1967	8.1	26.7	34.8	4.7	20.9	25.6
1968	8.2	29.2	37.4	4.7	23.2	27.9
1969	8.4	33.1	41.5	4.8	27.0	31.8
1970	7.9	41.1	49.0	4.6	34.8	39.4
1971	8.4	44.5	52.9	5.4	37.9	43.3
1972	8.8	48.6	57.4	6.0	41.5	47.5
1973	9.0	53.7	62.7	6.3	46.2	52.5
1974	8.7	55.9	64.6	6.1	47.9	54.0
1975	9.3	59.6	68.9	6.3	51.1	57.4
1976	19.0	82.4	101.4	15.8	73.2	89.0
1977	23.3	100.6	123.9	19.4	90.5	109.9
1978	23.7	118.3	142.0	19.1	107.0	126.1
1979	23.7	155.0	178.7	18.2	142.3	160.5
1980	23.4	198.6	222.0	17.2	183.8	201.0
1981	23.2	.247.8	271.0	16.3	230.4	246.7
1982	22.7	301.7	324.4	15.4	281.0	296.4
1983	22.5	358.6	381.1	14.5	333.8	348.3
1984	22.3	411.2	433.5	13.6	381.5	395.1

growth of gross stock, which dominates the net valuation, as new net stock. By 1984 the net value is £395m of the £434m gross value.

The net stock of plant, etc., shown in column (4) remains relatively small as happens also for its gross counterpart. The net stock is about £4m in the 1950s, reaches a maximum of some £19m about 1977, and declines to some £14m in 1984.

Most of the net stock comprises building and construction items, as shown by the figures in column (5). From £7m in the early 1950s, the estimate reaches some £20m in 1966, £46m in 1973, £184m in 1980, and £382m by the end of 1984. Because of the rapid growth of gross stock during the decade 1975-1984, the net stock comprises a large proportion of corresponding gross stock values. For example, in 1976 net stock is £73m out of £82m gross, and in 1984 net stock comprises £382m out of the gross estimate £411m. In conditions of such rapid growth of stock, the 1950 starting-value assumptions have trivial significance.

PART 5: ELECTRICITY GENERATION, TRANSMISSION AND DISTRIBUTION

9.10 *Data and Starting Values*

The basic data sources are the more recent Capital Assets' section and the earlier Capital Accounts' section of the annual reports of the ESB, such as Electricity Supply Board (1987). The annual accounting period has been April-March up to March 1986. Thus all "end-of-year" data pertain to the end of March following the nominal year used in the fixed stock estimates of Tables 9.5 and 9.6. In general, GFCF "additions less retirements" during the year, or "capital expenditure less amounts written off", is shown for: (a) Generation, (b) Transmission, (c) Distribution, (d) other items such as "General Buildings". Where some detail of "retirements" appears in more recent reports, the writer has enlarged items (a) to (d), to show actual or estimated full gross cost of additions during the year. For earlier years, a 5 per cent increase has been applied, to attempt to compensate for reductions due to "amounts written off". In view of the imprecise nature of the 1980 price inflators, to be described below in a later paragraph, mistaken zeal for GFCF precision needs to be kept under control.

Mr Jack Egan of the ESB provided invaluable assistance to the writer by way of additional data:

(a) the Capital Accounts' section of the ESB annual reports from its beginning in 1927, through the period 1927-1945;

(b) a breakdown of "other" assets ((d) above) between estimated amounts for

each of "general buildings". "transport equipment", "working equipment", for each year since 1950 and for some years of 1928-1949;

(c)   For hydro-electric stations, a breakdown of the capital value between "structures" and "plant and machinery" and the date of the year in which they were commissioned.

These additional data permit increased use of different "average life" values, to improve the capital stock estimates.

The "average life" values used appear in Table 5.1. They are generally taken from recent ESB annual reports. Hydro station structures are given 50 years, as are "general buildings". Apart from hydro structures, all generation plant and structures are given 20 years, including hydro station generation plant. All transmission plant and structures are given 30 years; all distribution plant and structures 25 years. Transport equipment is given 10 years; and other items including "working equipment" 7 years. This latter includes computers, and has a range of perhaps 5-10 years, per Mr Egan.

The writer decided to start the gross capital stock estimates in 1927, with the start of the ESB. This means that reasonable price inflators are required back to 1927, to re-price all the GFCF of the ESB at estimated 1980 prices. Three of the Table 6.3 price inflator series have been projected back to 1927 by means of Vaughan (1980) Table 3.4 (p. 34). The three inflators are: (a) "other machinery and equipment" showing an estimated 14.73 for 1927; (b) "transport equipment" showing 17.27 as its 1927 estimate; (c) "other building and construction" showing 19.44 as its 1927 estimate.

The GFCF data of 1927-1984 at current prices have been broken down into 7 categories, by means of all the information available, as follows: (1) hydro structures, (2) rest of generation, (3) transmission, (4) distribution, (5) general buildings, (6) transport equipment, (7) working equipment. To estimate values at 1980 prices, the "other building" inflator of the previous paragraph was applied to (5), the "transport equipment" inflator was applied to (6) and the inflator "other machinery", etc., was applied to the remaining 5 categories. It may be noticed that this latter inflator shows a trend of lower value than that of "other building", etc. It increases from 1.0 for 1980 through 5.071 for 1950 to 14.73 for 1927, by comparison with the "other building" , etc., price inflator. This latter increases from 1.0 for 1980 through 9.004 for 1950 to 19.44 for 1927. The lower trend values seem more appropriate for ESB conditions of careful control of costs. But there is admittedly some uncertainty about the relevance of the price inflator. Only the ESB could research this price movement by means of their own detailed cost data. Choice of the higher inflator trend would mean larger stock estimates than the results given below.

Because Tables 9.5 and 9.6 cover only the period 1950-1984, some quotation of aggregate gross stock values for 1927-1949 is in order at this point. The stock estimates *exclude* any electricity undertakings other than the ESB. Starting from £0.1m of general buildings in 1927, the Shannon Scheme effects show an aggregate £151m at end-of-1930, at 1980 prices. Various developments show an aggregate stock of £201m at end-of-1935, and £244m at end-of-1939. The war conditions during 1939-45 slowed down growth in various ways, so that £266m is the estimate for end-of-1945. A level of £309m was achieved by the end of 1949, mainly consisting of £126m generation, £36m transmission and £123m distribution.

9.11 *Fixed Stock Gross and Net Estimates for Electricity*

Gross fixed estimates for 1950-1984 are given in Table 9.5. These comprise 5 components, as well as their aggregate. This aggregate, shown in column (6), is £335m for end-of-1950 and has grown to £1,663m at the end of 1984, indicating a fivefold expansion during 1950-1984. The growth rates are uneven, however. For 1950-1960 the increase in gross stock is 86 per cent of that at the start of the period, for 1960-1970 it is 62 per cent, for 1970-1980 it is 46 per cent, and for 1980-1984 it is 13 per cent. Thus a decrease in growth rate, through succeeding decades, is apparent. There is seen to occur, for electricity also, the general slow down, or cessation, of growth of capital stock in many sectors for 1980-1984, described above in this and earlier chapters. Since 1960 the schemes for Rural Electrification have become fewer, because the system of electrification has been approaching completion. It follows that the scope for major expansion of the capital stock has become much more limited. The writer will not venture beyond this suggestion, as a possible reason for the successive reduction of the growth rate.

The generation and distribution gross values, in columns (1) and (3) respectively, take two roughly equal shares of the total, each more than one-third, throughout the period. Generation gross stock increases from £134m for 1950 to £652m for 1984. That of distribution shows £134m for 1950 and £599m for 1984. Throughout the period the generation stock tends to be larger than that of distribution, sometimes by as much as £100m as occurs for 1971.

The other three gross stock items are smaller in magnitude. Transmission values increase from £42m for 1950 (end-of-year) to £287m for 1984. General buildings show £22m for end-of-1950 and £93m for end-of-1984. Transport and working equipment is much smaller, being below £3m for 1950 end-of-year. It shows most of its growth from the £7m of 1973 to £32m for end-of-1984.

The figures in all columns show decreases sometimes, due to the "simultaneous exit" method of accounting used for the cumulation of gross stock. A decrease of the aggregate of column (6) is shown in 1979, by some £19m, due to a drop of £34m in the column (1) generation stock. This occurs because some of the

Table 9.5: *Gross Fixed Stock of Electricity Generation, Transmission and Distribution at end of year, 1950-1984, at 1980 prices*

						£ million
Year	Gener- ation (1)	Trans- mission (2)	Distrib- ution (3)	General buildings (4)	Transport and working equipment (5)	Total (1)+(5) (6)
1950	133.5	41.6	134.4	22.4	2.6	334.5
1951	163.2	50.2	146.4	23.8	2.7	386.3
1952	167.4	57.0	160.9	24.5	4.1	413.9
1953	173.9	64.5	177.0	25.7	4.6	445.7
1954	192.5	71.9	170.1	26.5	4.6	465.6
1955	217.8	75.8	161.1	28.4	4.9	488.0
1956	243.3	78.6	176.7	29.4	5.1	533.1
1957	271.1	82.3	189.7	30.7	5.2	579.0
1958	277.1	82.3	199.0	30.7	5.0	594.1
1959	285.3	85.4	207.2	32.0	4.7	614.6
1960	287.4	80.1	217.5	33.0	4.6	622.6
1961	295.2	81.7	224.2	33.3	5.1	639.5
1962	306.1	82.0	232.5	33.8	4.1	658.5
1963	331.1	86.4	244.4	34.4	3.7	700.0
1964	361.2	94.5	260.1	34.8	4.4	755.0
1965	361.9	105.9	280.2	36.1	4.1	788.2
1966	383.1	112.5	300.2	38.1	3.8	837.7
1967	410.4	121.5	320.3	39.5	3.8	895.5
1968	407.5	143.2	328.8	40.9	4.0	924.4
1969	429.3	146.4	351.8	48.1	4.6	980.2
1970	425.8	154.7	381.2	42.1	5.0	1,008.8
1971	506.7	166.0	410.5	46.4	4.8	1,134.4
1972	503.3	186.3	436.1	57.3	5.0	1,188.0
1973	550.6	199.3	459.4	59.6	7.2	1,276.1
1974	536.8	208.4	483.3	66.9	8.0	1,303.4
1975	507.8	221.5	503.7	69.3	8.3	1,310.6
1976	532.5	226.4	516.5	72.7	9.0	1,357.1
1977	544.7	233.1	524.8	76.3	9.4	1,388.3
1978	594.2	248.8	530.4	80.1	10.1	1,463.6
1979	560.4	250.8	540.7	80.3	12.1	1,444.3
1980	572.1	260.2	547.3	79.7	14.8	1,474.1
1981	592.8	259.3	558.0	82.4	18.7	1,511.2
1982	642.0	269.4	571.1	85.4	23.4	1,591.3
1983	670.0	280.3	579.2	94.2	27.1	1,650.8
1984	652.4	286.9	598.8	93.3	31.5	1,662.9

Table 9.6: *Net Fixed Stock of Electricity Generation, Transmission and Distribution at end of year, 1950-1984, at 1980 prices*

£ million

Year	Gener-ation (1)	Trans-mission (2)	Distrib-ution (3)	General buildings (4)	Transport and working equipment (5)	Total (1)+(5) (6)
1950	81.6	26.2	61.2	15.9	1.9	186.8
1951	107.3	33.4	67.9	16.9	1.7	227.2
1952	108.2	38.5	76.5	17.0	2.8	243.0
1953	112.9	44.1	88.0	17.7	2.9	265.6
1954	128.9	49.4	97.1	18.0	2.8	296.2
1955	151.7	50.9	113.0	19.4	3.2	338.2
1956	174.6	51.2	125.5	19.9	3.2	374.4
1957	197.2	52.3	136.4	20.6	3.0	409.5
1958	195.0	51.3	142.5	20.0	2.4	411.2
1959	197.5	51.7	147.2	20.6	2.2	419.2
1960	190.0	50.5	153.3	21.0	2.1	416.9
1961	187.9	50.2	155.5	20.7	2.4	416.7
1962	188.2	49.8	160.3	20.5	2.5	421.3
1963	201.8	52.5	166.8	20.4	2.2	443.7
1964	219.3	58.5	176.1	20.1	2.8	476.8
1965	205.8	67.3	187.7	20.8	2.4	484.0
1966	213.3	71.4	198.4	22.0	2.1	507.2
1967	226.7	77.8	208.0	22.7	2.1	537.3
1968	212.2	99.0	204.5	23.3	2.2	541.2
1969	226.3	103.8	214.8	29.6	2.8	577.3
1970	212.8	109.2	230.6	32.6	3.0	588.2
1971	277.5	116.5	245.7	35.9	2.9	678.5
1972	258.3	131.8	257.3	45.7	3.1	696.2
1973	294.2	138.9	271.0	46.6	4.9	755.6
1974	279.6	141.6	286.5	52.5	5.6	765.8
1975	258.1	148.5	298.8	53.4	5.2	764.0
1976	293.1	146.7	303.4	55.2	5.3	803.7
1977	300.1	146.3	305.6	57.3	5.1	814.4
1978	335.2	155.3	308.2	59.6	5.2	863.5
1979	317.5	152.1	313.4	60.0	6.8	849.8
1980	351.7	158.5	321.1	59.3	10.8	901.4
1981	355.3	157.4	328.8	62.5	14.5	918.5
1982	388.9	165.7	337.5	69.2	17.8	979.1
1983	412.8	175.1	336.6	78.2	19.3	1,022.0
1984	395.0	179.8	345.5	77.0	21.0	1,018.3

Ardnacrusha hydro structures have completed 50 years "average life" and thus have their exit in the arithmetic of gross stock cumulation.

Net Stock Estimates

Net Stock estimates appear in Table 9.6 corresponding to their gross counterparts shown in Table 9.5. The net estimates have been computed from 1927 forward through 1984 because gross annual data have been available for the full time series. Linear depreciation has been applied to each of 7 categories of stock, over the stated average life of each, in cumulating the net stock estimates.

Total net stock results appear in column (6). These are £187m for 1950, and reach £1,018m at the end of 1984. They thus comprise less than two-thirds of corresponding gross values throughout the period, but considerably more than 50 per cent of them.

The two major net components are again stocks of generation and distribution. Generation stock has a net value of £82m in 1950, and becomes nearly five times as large by reaching £395m in 1984, a slight reduction on its 1983 value of £413m. These net values are again less than two-thirds of their gross counterparts. Distribution net stock shows £61m in 1950, and nearly six times as much at the end of 1984, comprising £346m. During the early 1950s the net stock is about half of the gross value. By 1960, and throughout later years, the net values approach two-thirds of corresponding gross values.

Transmission equipment shows net stock growth from £26m in 1950 to £180m at the end of 1984. The net values comprise roughly two-thirds of matching gross values. General buildings show net stock on a smaller scale, from £16m in 1950 to £77m in 1984. This net stock series generally exceeds two-thirds of the gross series because of a relatively small 2 per cent depreciation over a 50-year average life.

Chapter 10

FIXED STOCK ESTIMATES FOR FIVE GROUPS OF SERVICES

10.1: *Introduction*

This chapter discusses gross and net fixed stock estimates for five groups of services. Each group includes a wide range of heterogeneous activities. Helpful detail is available in Appendix 1. Starting values generally are derived from UK data, as summarised in Appendix 4. This fact indicates that data resources are scarce. Here, as with most other sectors, the CSO data on GFCF for 1971-1984 are both more detailed and more reliable than data of 1950-1970. Separate treatment of computers and office machines is also possible, for an assumed 10-year average life. Inventory estimates for wholesale and retail trade appear below in Chapter 12. The present chapter confines its subject matter to fixed stock.

The chapter is divided into two parts. The first part discusses three groups receiving a minimal standard treatment, indicating that information about them is very limited. These three groups comprise (a) wholesale and retail trade, (b) finance and business services, (c) public administration and defence. The second part of the chapter discusses two further groups of services. The latter two groups comprise: (d) transport and communication services, (e) community social and personal services. A more elaborate treatment of these two groups is possible, because more information is available, to permit indicative shares of recent fixed stock for subsectors such as Health and Education.

If the data permitted, one would wish to show capital stock estimates for an activity group, such as "Leisure and Tourism". Given the importance of the latter category to the Irish economy, some work on this aspect might occur in future. However, it is well to recognise that the "Leisure and Tourism" group includes *parts of* at least seven activities, in terms of Appendix 1 Table A1.3 col. (2), namely: 6A: Trade (retail); 7A: Transport; 7B: Communication; 8A: Financial; 6B: Restaurants and hotels; 9C: Recreational and cultural services; 9D: Personal and household services. *Other parts* of these activities are paid for by business in general, or by individuals and households resident in any given area. It would first be necessary to clarify further how "Leisure and Tourism" should be distinguished from business expenditure as such, or from expenditure of local residents. Given some appropriate breakdown of receipts for each activity, a "pro rata" share of the gross and net fixed capital assets would be feasible.

PART 1: TRADE, FINANCE, PUBLIC ADMINISTRATION

10.2: *(a) Wholesale and Retail Trade*

Fixed capital stock results for wholesale and retail trade appear in Table 10.1 which shows gross and net estimates. The underlying Average Life values may be mentioned as specified in Table 5.1. For vehicles and computers, etc., a 10-year life applies. For plant and machinery 20 years is used, and for buildings, etc., 55 years.

Gross stock estimates appear in columns (1) to (4) of Table 10.1, Column (4) shows that total gross stock of Trade increased from £701m for 1950 (end-of-year) to £2,066m for 1984. Thus roughly threefold growth is apparent. Little growth occurred during the 1950s as the estimate for 1960 is only £733m. The end-of-1970 value of £1,092m shows a growth of 49 per cent since 1960. And the 1980 value of £1,948m is 78 per cent greater than that of 1970. A growth of only 6 per cent is apparent between 1980 and 1984. The major growth therefore is seen to have occurred during 1960-1980, with little growth before or since.

Buildings and land estimates are given in column (3). This group item shows little growth, increasing by only 80 per cent from its end-of-1950 value of £407m to £732m at the end of 1984. Plant and machinery stock appears in column (1). This stock increases by 242 per cent between 1950 and 1984, from £176m to £603m. Thus it shows a larger growth than that of total stock. There is no noticeable growth of plant, etc., between 1950 and 1964, after which time growth is continuous until 1981.

The fastest rate of growth is shown by the gross stock of vehicles, as detailed in column (2). From £118m at the end of 1950, it reaches £731m, about six times as large, by the end of 1984. Continuous growth is apparent only from 1959 onwards. Very substantial growth appears between 1970 and 1982, from £247m to £730m.

Net Stock Estimates

The net stock estimates appear in columns (5) to (8) of Table 10.1. These are obtained in the usual way. GFCF annual amounts, at 1980 prices, are depreciated linearly over the stated average life of each category and cumulated. Also added in is the contribution of the starting stock, namely 50 per cent of the gross values used throughout their respective schedules of scrapping.

Total net stock, in column (8), increases fairly regularly from £373m in 1950 to a maximum £1,286m at the end of 1981. The series shows values some two-thirds of their gross counterparts since the mid-1960s, with values nearer one-half of the gross series for the earlier years. Buildings and land, having values in column (7), show growth from about £200m in 1950 to almost £500m in the 1980s. The vehicle net estimates increase at a faster rate, as shown in column

Table 10.1: *Gross and Net Fixed Stock of Wholesale and Retail Trade at end of year, 1950-1984, at 1980 prices*

£ million

Year	GROSS FIXED				NET FIXED			
	Plant and machinery	Vehicles	Buildings and land	TOTAL GROSS (1) to (3)	Plant and machinery	Vehicles	Buildings and land	TOTAL NET (5) to (7)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1950	176.3	117.7	406.5	700.5	96.8	68.4	207.8	373.0
1951	183.2	117.1	413.0	713.3	99.0	67.1	212.7	378.8
1952	181.4	107.0	415.0	703.4	100.9	64.9	217.5	383.3
1953	178.8	95.6	421.5	695.9	101.5	60.5	226.7	388.7
1954	177.6	91.0	426.4	695.0	103.3	62.0	234.1	399.4
1955	176.1	93.6	434.7	704.4	104.4	64.4	244.6	413.4
1956	175.2	96.0	433.7	704.9	105.7	65.2	245.6	416.5
1957	171.8	97.0	434.9	703.7	104.1	63.5	248.7	416.3
1958	169.2	104.7	435.1	709.0	103.1	67.4	250.6	421.1
1959	167.6	120.5	435.5	723.6	102.7	72.7	252.7	428.1
1960	169.0	125.6	438.8	733.4	105.0	75.2	257.5	437.7
1961	172.0	134.5	441.0	747.5	108.3	81.1	261.1	450.5
1962	177.4	142.7	448.5	768.6	113.5	85.3	269.8	468.6
1963	182.1	152.4	463.0	797.5	117.3	89.1	285.2	491.6
1964	188.5	158.5	478.0	825.0	122.1	94.9	300.8	517.8
1965	195.1	170.7	494.9	860.7	126.3	103.7	317.9	547.9
1966	208.1	181.0	510.2	899.3	133.9	109.1	333.0	576.0
1967	223.6	189.2	529.4	942.2	143.2	110.0	351.6	604.8
1968	239.6	199.6	543.7	982.9	152.0	119.0	364.8	635.8
1969	259.3	222.9	555.5	1,037.7	163.4	138.1	375.2	676.7
1970	272.5	246.7	572.4	1,091.6	175.8	154.2	385.3	715.3
1971	294.1	272.7	582.5	1,149.3	194.2	174.0	398.2	766.4
1972	317.2	306.2	597.0	1,220.4	212.3	197.9	410.2	820.4
1973	350.6	352.5	617.4	1,320.5	238.1	231.6	427.8	897.5
1974	374.3	386.4	626.8	1,387.5	253.5	251.3	433.8	938.6
1975	400.8	407.0	640.4	1,448.2	269.9	257.9	443.8	971.6
1976	418.5	445.5	651.0	1,515.0	274.1	278.2	450.4	1,002.7
1977	448.0	502.6	656.6	1,607.2	286.7	309.7	451.8	1,048.2
1978	496.7	569.2	665.8	1,731.7	318.2	354.0	456.5	1,128.7
1979	552.0	620.4	680.8	1,853.2	353.7	387.4	466.7	1,207.8
1980	590.7	663.1	693.9	1,947.7	372.7	406.4	474.6	1,253.7
1981	600.8	710.1	707.9	2,018.8	371.8	431.5	483.1	1,286.4
1982	599.5	730.0	720.1	2,049.6	357.9	431.6	489.5	1,279.0
1983	601.5	726.0	727.4	2,054.9	345.3	418.9	490.6	1,254.8
1984	603.2	731.4	731.6	2,066.2	334.0	406.7	488.3	1,229.0

(6). From about £70m in 1950, they grow to exceed £400m in the 1980s. Growth of net plant and machinery is also impressive, as per column (5). From some £100m around 1950, it increases to about £370m in 1980, but subsequently decreases towards £330m.

10.3: *(b) Finance and Business Services*

Average life values are again 10 years for vehicles and for computers, etc., 20 years for plant, etc., and 50 years for buildings, etc. Gross stock estimates are shown in columns (1) to (3) of Table 10.2. A very large growth of total gross fixed stock is apparent, from £206m at the end of 1950, to £1,551m at the end of 1984, as shown by column (3) results. Even during the 1950s the stock was growing, so as to reach £340m at the end of 1960. The growth is continuous, from £532m for 1970 through £1,082m for 1980, to £1,551m at the end of 1984.

Buildings and land grow fourfold, from £175m at the end of 1950 to £654m at the end of 1984, as per column (2). The largest rate of increase, however, pertains to plant, machinery and vehicles. This group item reaches £897m at the end of 1984, from a starting value estimated as £32m at the end of 1950. Two items not shown explicitly in the table may be mentioned. (a) Vehicles take only a minor share, being below £50m during the 1980s. (b) But the estimated gross stock of computers and office machines, etc., shows rapid growth. From less than £100m up to about 1975 this item reaches nearly £600m by the end of 1984.

Net Stock Estimates

Net Fixed stock estimates for the group are given in columns (4) to (6) of Table 10.2. These net estimates have been derived from the gross data in the usual way. Total net stock of Finance and Business Services increases from some £120m in 1950 to about £1,050m at the end of 1984, per column (6). As happened for Trade, the net stock of the present group is again some two-thirds of gross stock since the mid-1960s, but tending towards one-half of it during the earlier years.

The net stock of plant and machinery and vehicles and computers, in column (4), shows values below £50m during 1950-1966. Growth thereafter is huge, through some £100m in 1973 and about £350m in 1980, to reach £600m in 1984.

The net value of buildings and land also shows large growth. From about £100m in 1950 it reaches some £440m in 1984, through about £200m in 1965 and £300m in 1970.

Under conditions of such rapid growth of gross and net stocks, the starting stock estimates have little significance beyond the mid-1960s.

10.4: *(c) Public Administration and Defence*

Table 5.1 average life values of relevance are 10 years for vehicles and

Table 10.2: *Gross and Net Fixed Stock of Finance and Business Services at end of year, 1950-1984, at 1980 prices*

£ million

Year	GROSS FIXED			NET FIXED		
	Plant machinery and vehicles (1)	Buildings and land (2)	TOTAL GROSS (1) + (2) (3)	Plant, machinery and vehicles (4)	Buildings and land (5)	TOTAL NET (4) + (5) (6)
1950	31.7	174.5	206.2	20.6	97.2	117.8
1951	39.7	192.6	232.3	24.6	106.4	131.0
1952	43.5	201.7	245.2	28.8	116.4	145.2
1953	46.3	214.3	260.6	31.5	129.8	161.3
1954	50.7	230.1	280.8	35.7	145.9	181.6
1955	55.9	243.7	299.6	40.2	159.5	199.7
1956	62.0	256.3	318.3	45.0	171.7	216.7
1957	65.5	270.7	336.2	46.9	185.5	232.4
1958	65.7	271.2	336.9	45.0	185.1	230.1
1959	66.0	272.6	338.6	43.1	185.4	228.5
1960	65.7	273.9	339.6	41.6	185.3	226.9
1961	65.8	275.8	341.6	40.4	186.0	226.4
1962	66.7	280.4	347.1	40.1	189.3	229.4
1963	68.4	284.8	353.2	39.8	192.4	232.2
1964	69.8	290.1	359.9	40.3	196.1	236.4
1965	72.7	298.4	371.1	41.6	202.6	244.2
1966	77.6	309.2	386.8	44.7	211.5	256.2
1967	85.5	326.0	411.5	50.6	226.0	276.6
1968	98.1	355.0	453.1	59.9	252.5	312.4
1969	115.3	385.1	500.4	72.2	279.3	351.5
1970	126.3	405.9	532.2	81.2	296.2	377.4
1971	134.3	422.4	556.7	87.1	308.3	395.4
1972	144.5	443.8	588.3	95.3	325.0	420.3
1973	155.5	474.6	630.1	102.6	350.6	453.2
1974	168.1	492.1	660.2	110.9	362.2	473.1
1975	179.5	507.9	687.4	117.9	371.7	489.6
1976	232.8	519.7	752.5	166.2	376.8	543.0
1977	263.5	535.8	799.3	183.6	384.9	568.5
1978	323.9	549.7	873.6	227.7	392.6	620.3
1979	395.3	567.4	962.7	277.8	402.6	680.4
1980	493.6	588.4	1,082.0	349.0	415.5	764.5
1981	594.5	610.6	1,205.1	411.9	429.2	841.1
1982	685.6	630.5	1,316.1	479.7	440.0	919.7
1983	780.5	644.3	1,424.8	535.1	444.4	979.5
1984	897.0	654.4	1,551.4	606.0	444.7	1,050.7

computers, 20 years for plant, etc., and 80 for buildings. An 80-year life was chosen for buildings, in line with an 80-year average life used for dwellings. Because many buildings owned or rented by Government, including military barracks and police stations, are akin to dwellings, this choice applies. The United Nations' GFCF guidelines apply as to military equipment being excluded. The fixed stock estimates shown in Table 10.3 may therefore be regarded as mainly of Public Administration.

Gross stock estimates appear in columns (1) to (3) of the table. The column (3) gross total show a threefold growth, from £301m at the end of 1950 to £922m at the end of 1984. Very little growth appears before 1965. Some decline in the late 1950s (as occurs in other columns of Table 10.3) might be due to the treatment of scrapping of starting values, but certainly indicates no significant investment during this period. From the £314m at the end of 1965, the total gross stock increases to £587m by the end of 1975, and grows by about one half to the end of 1984.

The buildings, etc., gross values of column (2) also show a threefold growth, from £236m to £683m between 1950 and 1984. Stagnation is again evident between 1950 and 1964. By end-of-1974 an increase of about one half occurs, over the 1964 level. And between 1974 and 1984 a growth of 86 per cent is manifest.

Major growth between 1966 and 1984 also applies to the plant and vehicle gross figures of column (1). The value at the end of 1950 is estimated to be £65m. By the end of 1966 it is £66m. It grows continuously, to reach £238m, by the end of 1984. Background detail, not shown in the table, may be mentioned for the group of plant, etc., shown in column (1). Within this group, vehicles take a small share, being below £50m up to 1974, and staying below £100m through 1984. Computers, etc., are also estimated to be below £100m at all times.

Net Stock Estimates

Columns (4) to (6) of Table 10.3 show net fixed stock estimates for Public Administration and Defence. These net values have been obtained in the usual way from their gross counterparts.

Total net stock, in column (6), shows major growth. From some £150m in 1950, it passes £200m in 1966, and £400m in 1975, to reach almost £700m by the end of 1984.

Most of this growth is contained in the net estimates of buildings and land, shown in column (5). These increase from £120m in 1950, to reach some £560m in 1984. The plant and vehicle estimates, shown in column (4), are on a smaller scale. From about £35m in 1950, they grow to only some £130m in 1975, the level maintained throughout the period 1975-84.

Table 10.3: *Gross and Net Fixed Stock of Public Administration and Defence at the end of year, 1950-1984, at 1980 prices*

	GROSS FIXED			NET FIXED		£ million
Year	Plant machinery and vehicles (1)	Buildings and land (2)	TOTAL GROSS (1)+⅟(2) (3)	Plant, machinery and vehicles (4)	Buildings and land (5)	TOTAL NET (4) + (5) (6)
1950	64.6	236.2	300.8	34.5	119.9	154.4
1951	64.6	237.2	301.8	34.6	120.8	155.4
1952	62.9	237.2	300.1	35.0	122.6	157.6
1953	59.6	241.8	301.4	33.5	128.8	162.3
1954	58.0	242.8	300.8	33.7	131.4	165.1
1955	57.9	243.8	301.7	34.5	133.9	168.4
1956	56.1	242.0	298.1	33.4	133.5	166.9
1957	53.4	240.0	293.4	31.1	133.0	164.1
1958	51.4	238.9	290.3	29.7	133.3	163.0
1959	52.3	239.3	291.6	30.2	135.1	165.3
1960	52.8	240.5	293.3	31.5	137.6	169.1
1961	52.2	240.8	293.0	31.5	139.2	170.7
1962	53.2	242.2	295.4	32.8	141.8	174.6
1963	55.0	243.7	298.7	34.3	144.5	178.8
1964	56.6	246.0	302.6	36.3	147.9	184.2
1965	61.0	253.4	314.4	40.5	156.3	196.8
1966	65.7	258.5	324.2	43.8	162.3	206.1
1967	69.6	263.1	332.7	45.2	167.7	212.9
1968	79.4	270.9	350.3	52.3	176.2	228.5
1969	90.9	280.6	371.5	60.9	186.5	247.4
1970	103.6	292.7	396.3	71.4	198.9	270.3
1971	115.5	303.3	418.8	80.1	209.6	289.7
1972	131.8	321.4	453.2	93.2	227.8	321.0
1973	152.4	349.4	501.8	107.2	255.5	362.9
1974	173.2	367.9	541.1	122.1	273.4	395.5
1975	187.4	399.8	587.2	129.1	304.3	433.4
1976	197.5	420.7	618.2	127.4	323.8	451.2
1977	212.6	442.9	655.5	128.3	344.4	472.7
1978	228.0	466.6	694.6	132.4	366.0	498.4
1979	239.3	496.0	735.3	132.8	393.1	525.9
1980	248.4	531.5	779.9	131.5	425.8	557.3
1981	254.8	572.2	827.0	134.4	464.2	598.6
1982	253.7	619.3	873.0	133.4	507.6	641.0
1983	247.3	654.6	901.9	131.9	538.4	670.3
1984	238.1	683.4	921.5	129.5	562.3	691.8

PART 2: OTHER SERVICES

10.5 (d) *Transport and Communication* Introduction

The Transport and Communication group is described in Sections 10.5 to 10.7 of this Chapter, with fixed stock results appearing in Tables 10.4 and 10.5. The problem of estimating starting values may be considered first. Possible starting values appear in Appendix 4 Table A4.1. These are derived from UK gross stock per employee, weighted by numbers of Irish persons employed in each of 9 sub-sectors, about the year 1950. Further detail is given in Appendix 4. These starting values *have been used,* and scrapped in the way described in Appendix 4, because better data are not available. They appear to work satisfactorily, since they lead to 1980 end-of-year gross and net stock levels in good agreement with respective benchmark estimates to be described in Section 10.6 following.

The available data were not detailed enough to permit full use of the Average Life particulars set out in Table 5.1. Some compromise values were chosen as follows: plant and equipment 20 years; computers and office machines 10 years; motor vehicles (mechanically propelled land and road vehicles) 10 years; ships and railway rolling stock 25 years; aircraft 10 years; buildings and engineering structures 50 years. Particulars for aircraft and computers etc. were available only for 1971-1984 in the GFCF detail.

The CSO data do not show GFCF for transport as such separately from GFCF data for communication as such. The writer has not attempted to do so. Thus, separate capital stock estimates for these two sub-sectors are not available in the present report, although they would be of interest.

10.6: *Establishing a 1980 Benchmark Estimate*

In view of the lack of information and the absence of detailed GFCF data for sub-sectors, it is advisable to have some benchmark estimate available, against which the gross stock series may be compared. Such a benchmark gross and net estimate for the end of 1980 will now be described. It is obtained from published data, but is only a rough order of magnitude. This is because net amalgams of current-price data have to be scaled up by guesswork, to give notional gross and net figures.

The figures will all be brought together below. What now follows is a summary of the source of each component, its description, and how to use it to yield a gross and net stock estimate for the end of 1980. The chosen year is the price-base of the constant-price series. It is also near 1984, the last year of the series, and therefore caters for the larger values of the stock.

Regarding air transport, the Aer Lingus (1981) report for the year ending March 1981 shows, on page 37, some £274m for Aer Lingus/Aerlinte combined

as the "gross current replacement cost of fixed assets" (footnote 5, p. 38). So no adjustment is needed for this as a gross value. A net value of £166m, on the same basis, appears on page 39 of the report.

Regarding sea transport, Irish Shipping ships and premises had a written-down value of almost £33m for March 1981, per Table 300 (p.298) of *Statistical Abstract of Ireland 1981* (See Central Statistics Office, 1961). By using Vaughan's approach and by assuming net as 50 per cent of gross, a factor 4 could be applied to give £132m as the gross estimate at 1980 prices. A net estimate of £66m corresponds to this. From previous work with transport data, the writer ascertained that in 1980 the B & I Steampacket Co. had about 2,000 persons employed, as against 1,000 in Irish Shipping. On this basis, a gross stock estimate for B & I is £264m, with one half of this, £132m, as the corresponding net estimate.

It is to be noted that since 1986 sea transport has been affected by major changes, including the termination of Irish Shipping and reductions in B & I employment. These major changes, however, do not affect the capital stock estimates covering the period 1950-1984.

The land transport is dominated by Coras Iompair Eireann (CIE). Their 1980 Annual Report (Coras Iompair Eireann, 1984) shows on page 41 a "gross current replacement cost" of about £441m for all their fixed assets, including railway lines, rolling stock, buses and lorries. This figure needs no adjustment. The net value corresponding, also shown, is £264m. But for licensed hauliers, CIE had only one-seventh of the tonnage of 1980 (compare CIE, p. 52 and Table 299 of the same *Statistical Abstract*). It follows that non-CIE road freight vehicles could be worth £70m in gross stock values, against the £11.7m shown for CIE on p.41 of their 1980 Annual Report. Along similar lines, a rough gross estimate for non-CIE buses, and for all taxis, is some £20m. By taking 60 per cent of the gross as net, respective net estimates are £42m and £12m.

Regarding communications, the dominant public enterprise during 1980 was run directly by the Department of Posts and Telegraphs. In their *Commercial Accounts* for the year ended 31 December 1981, they show (p.21) some £577m as the value of all fixed assets at 31 December 1980, "Value at Prime Cost", meaning before depreciation, with "Depreciation" quoted at about £107m. For construction-type items (per Table 6.3) the price inflator of 1950, to bring it to 1980 prices, is 8 or 9. Thus for long-life assets an average inflator involving the value 8 or 9 for 1950 and 1 for 1980 would be 4 or 5. A grossing factor of about 4 is, therefore, reasonable, to correct for price — in view of the long-life expectancy of this kind of stock. Thus £2,308m is the estimate of gross stock at 1980 prices, at the end of 1980, with £1,880m the net estimate. Finally, the 1980 Annual Report of Radio Telefis Eireann (RTE) shows, in Schedule 4, a fixed asset value of £37m gross and £26m net at cost, in September 1980. These

figures could be multiplied by 4, to give £148m gross, and £104m net, respectively.

A summary list of the items mentioned above is as follows:

	Gross	Net
	£m	£m
Aer Lingus	274	166
Irish Shipping (33 x 4 gross)	132	66
B & I (132 x 2 gross)	264	132
Coras Iompair Eireann	441	264
Other road freight	70	42
Other buses, and taxis	20	12
Posts and Telegraphs (577 x 4 gross)	2,308	1,880
RTE (37 x 4 gross)	148	104
Total (at 1980 prices)	3,657	2,666

Thus, a rough order of magnitude of the stock at the end of 1980 is £3,700m gross and £2,700m net, before inclusion of airport and harbour developments. The writer has estimated £158m as the gross value, at 1980 prices, of cumulated airport development during 1953-1984, by repricing at 1980 prices the "Airport Development" values shown in Public Authorities' capital formation included in *National Income and Expenditure,* various issues. A corresponding net estimate of about £100m is feasible. For airport and harbour development also included, £3,815m gross and £2,766m net are therefore the aggregate all-inclusive benchmark 1980 estimates for the Transport and Communication group, according to the figures quoted and assembled above.

It turns out that the fixed stock estimation procedures described in Section 10.5 above yield estimates of £4,059m gross and £2,658m net for the end of 1980, as shown in column (5) of Tables 10.4 and 10.5, respectively. These estimates implicitly include airport and harbour development since 1950, as part of the GFCF data used to compile the gross stock. They are "reasonable" estimates, being about £250m gross greater and £100m net smaller than the benchmark values derived above including airport development during 1953-1984. The writer would not put their precision in a higher order than that of being reasonable.

10.7: *Transport and Communication Gross and Net Fixed Stock*

Table 10.4 details the relevant end-of-year gross stock. The total stock in column (5) shows a fourfold growth between 1950 and 1984, from £1,100m to

Table 10.4: *Gross Fixed Stock of Transport and Communication at end of year, 1950-1984, at 1980 prices*

					£ million
Year	Plant and equipment	Motor vehicles	Other transport equipment	Buildings, engineering constructions, and land	TOTAL GROSS (1)to(4)
	(1)	(2)	(3)	(4)	(5)
1950	61.5	24.6	186.9	827.4	1100.4
1951	65.5	25.9	198.3	853.7	1143.4
1952	66.5	26.0	197.2	875.5	1165.2
1953	67.6	26.7	199.7	902.7	1196.7
1954	69.1	27.4	205.3	929.8	1231.6
1955	69.4	30.1	210.0	956.9	1266.4
1956	73.7	34.7	226.4	984.2	1319.0
1957	75.1	38.1	239.4	1004.1	1356.7
1958	77.4	43.4	254.2	1023.4	1398.4
1959	80.6	48.1	265.6	1039.3	1433.6
1960	83.3	50.4	274.8	1057.5	1466.0
1961	88.1	54.0	289.7	1086.5	1518.3
1962	93.6	55.9	307.3	1118.5	1575.3
1963	100.0	57.1	328.4	1157.2	1642.7
1964	106.0	59.7	352.9	1203.5	1722.1
1965	114.3	64.5	384.6	1265.9	1829.3
1966	123.1	66.1	411.2	1321.9	1922.3
1967	134.0	66.0	434.6	1384.9	2019.5
1968	148.7	68.8	463.0	1426.3	2106.8
1969	167.3	82.6	539.0	1504.3	2293.2
1970	182.9	94.5	606.4	1577.8	2461.6
1971	202.9	106.8	692.2	1654.3	2656.2
1972	227.6	120.2	696.9	1741.2	2785.9
1973	252.5	138.1	760.3	1841.1	2992.0
1974	277.0	153.2	784.3	1929.8	3144.3
1975	344.6	160.3	785.5	1994.2	3284.6
1976	402.8	172.8	792.4	2036.1	3404.1
1977	462.4	196.2	799.4	2082.0	3540.0
1978	519.2	220.5	814.1	2128.7	3682.5
1979	585.0	237.6	874.4	2183.2	3880.2
1980	644.2	246.7	884.1	2284.2	4059.2
1981	728.1	262.3	827.9	2434.1	4252.4
1982	809.9	291.1	817.5	2550.2	4468.7
1983	885.5	304.3	803.9	2646.2	4639.9
1984	964.3	316.6	802.4	2722.2	4805.5

£4,806m. For 10-year intervals the growth is as follows: 1950-1960, 33 per cent; 1960-1970, 68 per cent; 1970-1980, 65 per cent. Between 1980 and 1984 the growth is 18 per cent. It appears therefore that major growth occurred during 1960-1980, with a lower growth rate before 1960 and after 1980.

Column (4) shows that buildings and engineering construction reduced their share of the gross total with the progress of time. At £827m for the end of 1950 they formed 75 per cent of the total. For 1960 their £1,058m share took 72 per cent of the total. For 1970, at £1,578m it formed 64 per cent. At the end of 1980 it was £2,284m and 56 per cent. For 1984 it was £2,722m. and 57 per cent of total stock.

Motor vehicles (of column (2)) and other transport equipment (of column (3)) are shown separately. However, their combined gross value is more reliable than either item individually. The other transport equipment includes railway rolling stock, ships, and aircraft. The motor vehicle estimate shows a thirteenfold growth, from £25m at the end of 1950 to £317m at the end of 1980. Some of this is due to road passenger and freight services by CIE and private firms. But part of it is due to the Post Office progressively providing more mechanised transport to postmen, and so on. The other transport equipment of column (3) shows a lesser, but still considerable, growth. From £187m gross at the end of 1950 it increases to £802m at the end of 1984. Perhaps it is well to recognise that large growth of stock has occurred, without treating as precise the quoted rates, which derive from 1950 starting stock estimated indirectly.

The plant and equipment gross estimates of column (1) show a sixteenfold growth, from £62m at the end of 1950, to £964m at the end of 1984. The major part of this growth occurred since 1970, at the end of which the stock was £183m. The major part of this is due to the Communications industry.

Net Stock Estimates

The net stock estimates are shown in Table 10.5. Total stock, in column (5), increases from £582m in 1950 to £3,183m at the end of 1984. The series is roughly two-thirds of corresponding gross values (Table 10.4) from about 1960 onwards, having increased its share from the typical one-half of gross about 1950.

Only a brief mention will suffice, for details in columns (1) to (4). The largest component of the stock is buildings and engineering constructions, etc., of column (4). This net stock grows from £428m in 1950 to £1,922m in 1984. Plant and equipment, shown in column (1), has a very high rate of increase: from £34m in 1950 it reaches a net £679m at the end of 1984. Motor vehicle net values appear in column (2). These show £15m in 1950 and £192m in 1984. The other transport equipment net values, in column (3), start at £105m in 1950, and show £389m at the end of 1984. But their largest values, some £470-500m, appear for 1971-75.

Table 10.5: *Net Fixed Stock of Transport and Communication at end of year, 1950-1984, at 1980 prices*

£ million

Year	Plant and equipment	Motor vehicles	Other transport equipment	Buildings, engineering constructions, and land	TOTAL GROSS (1)to(4)
	(1)	(2)	(3)	(4)	(5)
1950	33.8	14.7	105.4	428.1	582.0
1951	36.2	15.4	110.0	445.9	607.5
1952	38.4	17.0	113.6	473.1	642.1
1953	40.4	18.8	120.4	505.1	684.7
1954	42.7	20.1	129.7	536.1	728.6
1955	43.5	21.9	137.5	566.4	769.3
1956	48.2	25.2	156.4	596.1	825.9
1957	49.6	26.5	170.7	617.6	864.4
1958	51.7	29.3	185.9	637.8	904.7
1959	54.4	29.6	196.6	654.0	934.6
1960	56.3	29.5	204.2	671.9	961.9
1961	60.0	31.1	216.7	700.1	1,007.9
1962	64.1	31.8	230.8	730.3	1,057.0
1963	68.5	32.2	245.5	766.4	1,112.6
1964	72.1	33.9	262.4	809.1	1,177.5
1965	77.6	37.4	285.3	866.7	1,267.0
1966	82.2	39.2	301.3	916.5	1,339.2
1967	88.4	38.3	312.9	971.8	1,411.4
1968	97.8	41.9	328.3	1,004.1	1,472.1
1969	110.3	53.5	389.9	1,071.8	1,625.5
1970	121.7	61.8	435.7	1,132.3	1,751.5
1971	137.9	71.2	497.2	1,196.0	1,902.3
1972	157.3	80.0	470.1	1,267.3	1,974.7
1973	175.3	91.8	501.5	1,349.7	2,118.3
1974	191.4	100.5	490.1	1,418.6	2,200.6
1975	247.7	101.7	466.3	1,461.2	2,276.9
1976	293.9	106.4	446.7	1,479.8	2,326.8
1977	335.6	117.8	426.3	1,501.3	2,381.0
1978	372.4	132.7	416.6	1,522.4	2,444.1
1979	416.4	146.2	454.8	1,550.1	2,567.5
1980	449.9	148.2	436.9	1,623.0	2,658.0
1981	512.3	158.0	432.8	1,742.5	2,845.6
1982	571.4	180.1	408.1	1,825.0	2,984.6
1983	626.5	188.1	395.2	1,884.8	3,094.6
1984	678.9	192.4	389.3	1,922.4	3,183.0

10.8: *(e) Community, Social and Personal Services*

Introduction

This group of services is discussed in Sections 10.8 to 10.10 of the present chapter. Gross and net fixed stock estimates appear in Tables 10.6 to 10.8. The aggregate group is first considered, with stock figures in Table 10.6 for the usual period 1950-1984 discussed in Section 10.9. But further detail, for each of three sub-groups, is available for 1971-1984. This detail comprises GFCF particulars provided by the CSO. This information has been used to compile fixed stock partial estimates, gross and net. These are shown in Tables 10.7 and 10.8 and discussed briefly in Section 10.10 for Health and Education distinguished.

Starting values of the gross stock have been derived from UK data, as summarised in Appendix 4. This fact indicates that data resources are scarce. However, average life assumptions are those stated in Table 6.1 to the extent that the data permit. And the schedule of scrapping of the starting values is mentioned in Appendix 4. The usual procedure for net stock estimates has been used. This means linear depreciation of the GFCF categories over assumed average life, and one-half of the gross starting stock of each category taken throughout its schedule of scrapping as the net estimate.

A brief mention of the various kinds of services included in each of the three sub-groups is in order. The detail appears in Appendix 1, especially in Tables A1.2 and A1.3, where R44 (EUROSTAT) listing is used. The first sub-group is "Health" services. This may be taken as the equivalent of R44 items "77. market services of health" and "89. non-market services of health".

The second sub-group is "Education" services. This may be taken as equivalent to the R44 items "75. market services of education and research" and "85. non-market services of education and research".

The third sub-group is "Other community, social and personal services". This may be regarded as equivalent to the R44 items "79. recreational and cultural services, personal services, other market services n.e.c." and "93. domestic services and other non-market services n.e.c.".

The above groupings of R44 items by this writer assume that all of R44 item "81. general public services" is fully covered by the GFCF and fixed stock sector "Public Administration and Defence" addressed in Section 10.4 and Table 10.3 above. If not, then some of the GFCF and fixed stock of R44 item 81 is (by default) included in the third sub-group "Other community", etc., referred to in the previous paragraph.

10.9: *The Combined Aggregate of Community, Social and Personal Services*

The group aggregate is treated first, with results shown in Table 10.6. Gross stock estimates occupy columns (1) to (4) of this table, and net estimates columns

Table 10.6: *Gross and Net Fixed Stock of Community, Social and Personal Services at end of year 1950-1984, at 1980 prices*

								£ million
	GROSS FIXED				NET FIXED			
Year	Plant and machinery	Vehicles	Buildings and land	TOTAL GROSS (1) to (3)	Plant and machinery	Vehicles	Buildings and land	TOTAL NET (5) to (7)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1950	68.3	10.2	627.8	706.3	47.9	9.3	362.5	419.7
1951	92.3	16.3	719.2	827.8	59.2	11.6	409.0	479.8
1952	100.5	18.2	768.3	887.0	67.8	13.6	460.8	542.2
1953	108.4	20.1	821.8	950.3	75.3	15.2	515.9	606.4
1954	116.6	24.4	875.7	1,016.7	82.8	18.9	570.0	671.7
1955	122.9	27.7	922.0	1,072.6	87.7	20.4	615.3	723.4
1956	127.9	31.8	968.4	1,128.1	90.8	22.5	659.6	772.9
1957	131.6	34.8	997.0	1,163.4	92.3	22.9	684.9	800.1
1958	141.3	39.2	1,035.0	1,215.5	99.2	24.4	719.0	842.6
1959	149.9	42.9	1,068.4	1,261.2	104.6	24.1	747.5	876.2
1960	159.0	42.4	1,106.8	1,308.2	109.7	23.5	780.0	913.2
1961	171.3	44.9	1,154.6	1,370.8	117.5	25.4	821.1	964.0
1962	187.6	47.4	1,214.6	1,449.6	128.5	27.0	873.2	1,028.7
1963	203.5	48.8	1,291.6	1,543.9	138.0	27.3	940.9	1,106.2
1964	221.8	48.7	1,375.8	1,646.3	149.1	28.3	1,014.1	1,191.5
1965	242.7	54.5	1,468.1	1,765.3	161.6	33.3	1,093.5	1,288.4
1966	268.4	57.8	1,565.1	1,891.3	176.9	36.2	1,175.6	1,388.7
1967	298.7	61.1	1,664.1	2,023.9	195.4	37.5	1,257.5	1,490.4
1968	335.1	70.4	1,803.4	2,208.9	218.4	46.0	1,377.7	1,642.1
1969	373.4	83.6	1,932.9	2,389.9	241.4	55.8	1,484.9	1,782.1
1970	399.9	97.6	2,061.7	2,559.2	264.3	65.2	1,588.7	1,918.2
1971	436.1	109.4	2,190.7	2,736.2	295.5	73.3	1,690.0	2,058.8
1972	483.1	125.0	2,318.1	2,926.2	333.5	84.1	1,786.9	2,204.5
1973	521.7	147.2	2,467.0	3,135.9	359.7	98.8	1,902.6	2,361.1
1974	556.8	164.3	2,603.8	3,324.9	380.9	107.1	2,003.0	2,491.0
1975	613.0	179.4	2,703.9	3,496.3	419.0	115.6	2,063.7	2,598.3
1976	671.5	205.5	2,793.7	3,670.7	454.2	132.1	2,112.0	2,698.3
1977	728.6	238.3	2,889.8	3,856.7	483.8	151.4	2,164.6	2,799.8
1978	793.2	270.9	2,998.8	4,062.9	523.7	174.8	2,228.0	2,926.5
1979	847.1	298.9	3,135.3	4,281.3	548.8	192.6	2,316.5	3,057.9
1980	906.4	323.8	3,281.5	4,511.7	577.0	205.3	2,411.8	3,194.1
1981	1,027.1	355.0	3,437.8	4,819.9	670.1	222.1	2,514.1	3,406.3
1982	1,121.2	370.3	3,598.5	5,090.0	735.2	223.6	2,617.4	3,576.2
1983	1,200.4	374.6	3,746.1	5,321.1	780.1	218.0	2,704.4	3,702.5
1984	1,274.4	380.9	3,878.2	5,533.5	819.4	209.9	2,772.6	3,801.9

(5) to (8). The gross total results appearing in column (4) show an eightfold growth of aggregate stock, from £706m at the end of 1950 to £5,534m at the end of 1984. Growth appears to be continuous, with something like a doubling of the gross stock every decade, through £1,308m at the end of 1960, £2,559m for 1970, and £4,512m at the end of 1980. It is clear that in the circumstances of such large growth, the starting value of £706m, as estimated, has minor significance.

A major share of the gross stock comprises buildings and land, as per column (3) figures. At £628m for the end of 1950 this item comprises six-sevenths of the starting stock. By the end of 1984 it reaches £3,878m, some seven-tenths of the total. Plant and machinery take an increasingly larger share with time progressing, from about one-tenth (£68m) at the end of 1950, to about one-quarter (£1,274m) of the total at the end of 1984. Within this item, computers and office machines are estimated to be well below £100m, even in the 1980s.

Vehicle estimates are also shown, as rough orders of magnitude. From less than £50m during the 1950s they pass the £100m level in 1971, and reach £381m at the end of 1984.

Net Stock Estimates

Net stock estimates of the group aggregate may be considered briefly. The net total in column (8) shows increasing amounts, from £420m in 1950 to about £3,800m in 1984. The net share of gross stock is seen to increase from about four-sevenths in the early 1950s to about two-thirds for most of the period. Buildings and land again dominate the net stock totals, showing £363m in 1950 and increasing to £2,773m by the end of 1984.

The plant and machinery net estimates appear on a smaller scale, from £48m in 1950 to £819m in 1984. Their net value passes through £100m in 1959, £200m in 1968, and £400m in 1975. The vehicles' net estimate starts at about £10m in 1950, but reaches £210m by the end of 1984. It passes the £100m level in 1974, and the £200m level in 1980.

10.10: Gross and Net Investment during 1971-1984 for Three Sub-Groups

Partial stock estimates appear in Tables 10.7 and 10.8, for the three major sub-groups of services described in Section 10.9 above. These partial estimates comprise cumulated gross and net investment during the 14 years 1971-84. These investment figures are components of the gross and net *full* stock estimates shown in Table 10.6 above. These latter are "full" because they derive from the full 1950-1984 GFCF, with starting stock estimates of 1949 or 1950 also included.

The gross investment figures, in Table 10.7, may be considered first. Column (10) shows the aggregate investment for all three sub-groups combined. This new gross investment in 1971 was £208m, within the total gross stock of £2,736m

Table 10.7: *Cumulative gross investment during 1971-1984 in each of three service groups included in Community, Social and Personal Services, at 1980 prices*

£ million

Year	HEALTH			EDUCATION			OTHER SERVICES			TOTAL COMMUNITY etc.
	Plant, machinery and vehicles	Buildings and land	Total Health (1)+(2)	Plant, machinery and vehicles	Buildings and land	Total Educ. (4)+(5)	Plant machinery and vehicle	Buildings and land	Total Other (7)+(8)	GROSS (3)+(6)+(9)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1971	9.0	16.6	25.6	2.6	52.0	54.6	58.2	70.0	128.2	208.4
1972	20.1	37.6	57.7	5.2	110.1	115.3	126.7	127.9	254.6	427.6
1973	37.6	61.5	99.1	7.8	174.7	182.5	185.0	198.0	383.0	664.6
1974	48.1	82.5	130.6	10.7	232.2	242.9	243.2	265.7	508.9	882.4
1975	73.8	100.3	174.1	14.2	277.8	292.0	306.5	311.9	618.4	1084.5
1976	105.0	118.0	223.0	18.2	325.2	343.4	372.9	345.8	718.7	1285.1
1977	138.5	136.0	274.5	19.1	379.1	398.2	442.3	379.5	821.8	1494.5
1978	179.2	158.9	338.1	21.6	441.4	463.0	524.3	412.6	936.9	1738.0
1979	199.4	187.8	387.2	25.6	499.6	525.2	610.8	471.5	1082.3	1994.7
1980	219.5	220.3	439.8	31.7	558.0	589.7	699.2	536.1	1235.3	2264.8
1981	239.1	257.0	496.1	39.4	614.8	654.2	839.9	608.3	1448.2	2598.5
1982	245.1	293.2	538.3	44.3	674.9	719.2	958.1	682.2	1640.3	2897.8
1983	250.2	325.8	576.0	50.8	729.7	780.5	1043.3	751.9	1795.2	3151.7
1984	253.6	358.4	612.0	57.0	774.6	831.6	1132.0	815.9	1947.9	3391.5

at the end of 1971, shown in Table 10.6 column (4). But cumulation of annual investments shows that £3,392m is the gross stock component of the aggregate gross £5,534m at the end of 1984. In effect, some 60 per cent of this latter aggregate is due to GFCF in the combined sub-groups of services during 1971-1984. This GFCF cumulation, to yield gross stock, does take account of scrapping vehicles and computers when their ten-year average life has expired.

A breakdown of the cumulated aggregate figures of column (10) of Table 10.7 is shown in columns (1) to (9). The figures for 1981-1984 give crude indicators of gross stock shares, within the column (10) overall aggregate of the group. The estimate for Health Services is about £500-600m, one-fifth of the total. We see that more than one-half of the gross stock in Health comprises buildings and land, according to the data of columns (1) to (3).

The Education sub-group has gross estimates set out in columns (4) to (6). Again for 1981-1984, its aggregate shows some £650-850m, about one-quarter of the overall aggregate. Almost all of the stock appears to be in buildings and land, with less than one-tenth in the form of equipment and vehicles.

The "Other Services" gross residual appears in columns (7) to (9), and comprises 50-60 per cent of the column (10) aggregate. Less than half of the gross stock of Other Services consists of buildings and land, which implies that more than half comprises equipment and vehicles. This group is very heterogeneous, including such diverse items as churches, sanitary services, recreation, professional services not elsewhere included.

Net Investment Values for 1971-1984

Net investment 14-year cumulation appears in Table 10.8, corresponding to

Table 10.8: *Cumulative net investment during 1971-1984 in each of three service groups included in Community, Social and Personal Services, at 1980 prices*

										£ million
	HEALTH			EDUCATION			OTHER SERVICES			TOTAL COMMUNITY
Year	Plant, machinery and vehicles	Buildings and land	Total Health (1)+(2)	Plant, machinery and vehicles	Buildings and land	Total Educ. (4)+(5)	Plant machinery and vehicle	Buildings and land	Total Other (7)+(8)	etc. GROSS (3)+(6)+(9)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1971	9.0	16.6	25.6	2.6	52.0	54.6	58.2	70.0	128.2	208.4
1972	19.3	37.3	56.6	5.1	109.0	114.1	122.9	125.6	248.5	419.2
1973	35.2	60.4	95.6	7.4	171.5	178.9	173.1	191.4	364.5	639.0
1974	42.5	80.2	122.7	9.9	225.4	235.3	219.0	252.5	471.5	829.5
1975	64.3	96.4	160.7	12.9	266.5	279.4	265.8	289.9	555.7	995.8
1976	89.5	112.1	201.6	16.2	308.3	324.5	311.7	313.3	625.0	1151.1
1977	114.6	127.6	242.2	16.2	355.6	371.8	356.0	335.5	691.5	1305.5
1978	144.1	147.9	292.0	17.6	410.4	428.0	406.0	356.0	762.0	1482.0
1979	149.9	173.6	323.5	20.7	459.7	480.4	457.0	401.2	858.2	1662.1
1980	153.8	202.3	356.1	25.5	508.1	533.6	504.0	450.0	954.0	1843.7
1981	159.6	234.6	394.2	31.6	553.8	585.4	614.2	504.4	1118.6	2098.2
1982	151.5	265.6	417.1	34.5	601.6	636.1	697.2	557.9	1255.1	2308.3
1983	149.0	292.4	441.4	38.8	642.9	681.7	745.1	604.9	1350.0	2473.1
1984	140.9	318.5	459.4	42.4	673.2	715.6	790.0	643.8	1433.8	2608.8

the gross series of Table 10.7. Net values for the first year, 1971, are of course the same as gross values, but soon become smaller, through effects of depreciation.

The aggregate net total may be considered first. It appears in column (10) of Table 10.8 and may be compared with the "full" net aggregate shown in Table 10.6 column (8), in parallel with gross value comparisons. For 1971, the net investment is £208m, out of total net stock of £2,059m at the end of 1971, a fraction of some 10 per cent. But by the end of 1984, the 14-year net investment value is £2,609m, out of total net stock £3,802m, thus comprising 69 per cent of the latter.

For 1981-84, net estimates of the sub-groups, in columns (1) to (9), may be compared with the grand total of column (10). The Health aggregate of column (3) shows some £350-450m, one-fifth or more of the grand total. The Education aggregate is roughly £550-700m, and this takes one-quarter to one-third of the total. The residual "Other Services" make up about one-half of the total during 1981-84, and also during some earlier years.

To attempt to get concrete detailed data on services within this group would require major survey work. There is also the question of records of investment, and how far back towards 1950 these might be available. Until or unless such survey work is possible, the estimates given and described above seem to be the only kind possible.

Chapter 11

FIXED STOCK ESTIMATES FOR ROADS AND DWELLINGS

11.1: *Introduction*

This chapter presents fixed stock gross and net estimates of roads and dwellings for the usual period 1950-1984, at 1980 prices. Results appear in Tables 11.1 and 11.2, for the end of each year. Lack of data prevents a breakdown into much detail, although more detail would be of interest. Section 11.2 following considers the methodology used to estimate the gross stock of roads, taken to be the same as net stock because of conventional zero depreciation of road gross values. Section 11.3 presents and discusses the road stock estimates thus obtained.

Sections 11.4 to 11.6 have dwellings as their subject matter. Methodology and starting values are the theme of Section 11.4. Gross stock estimates are addressed in Section 11.5 and net estimates in 11.6. Farmhouses have been included as part of "land and buildings" of Agriculture in Chapter 7. But, as dwellings, they are relevant to the present chapter. They are included, but shown separately, in the dwellings' gross and net estimates of Table 11.2. Details of methodology and estimation of farmhouses appear in Chapter 7 and Appendix 3. These particulars will not be repeated in this present chapter.

11.2: *Roads: Methodology of Estimation*

Because depreciation of roads is assumed nil, gross and net stock are identical. A benchmark estimate for the end of 1984 was first obtained at current prices, and then revalued at 1980 prices. For roads the Average Life is taken to be indefinitely long, as mentioned in Chapter 5 Section 5.7. This implies that end-of-year stock estimates for roads are obtained by subtraction of cumulated GFCF (at 1980 prices) from the benchmark estimate for years earlier than 1984. The end-of-1984 benchmark estimate is £10,490m at 1980 prices, as will be explained below. With GFCF of £88m occurring during 1984 (at 1980 prices), it follows that the end-of-1983 estimate is £10,402m, and so on.

There are no nationally agreed figures for road values, so the author was confronted with the problem of trying to assess some reasonable basis. With the help of the Department of the Environment and Local Authorities,[2] an

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[2] The author gratefully acknowledges the expert advice of Messrs. Donal O'Sullivan, John Carrick, Seamus Malone, John S. O'Flynn, and Bernard Feeney. Mr Carrick's 1984 estimate is the benchmark value, including breakdown by components.

approach was decided on, to value what now exists on the ground, i.e., the present right of way, pavement, etc., as is. The estimate can be considered only as *notional*, and could not be improved without considerable research.

The notional estimate for the end of 1984 is about £14,900m at 1984 prices. This estimate covers the Irish Road System as well as County Borough and Urban roads. The figure is based on the estimated cost of putting the existing facility in place at 1984 prices. An approximate breakdown is as follows:

		£m
Land value	3½ per cent	500
Bridges	10 per cent	1,500
Pavement	33½ per cent	5,000
Drainage	20 per cent	3,000
Fencing	13 per cent	2,000
Earthworks formation, etc.	20 per cent	2,900

By means of the Roads' deflator 0.704 (column (2) of Table 6.3 above), the aggregate value at 1980 prices is therefore £10,490m, for this notional benchmark end-on-1984 value of £14,900m at 1984 prices.

11.3: *Roads: Gross Stock Estimates, Same as Net*

Notional values of the gross stock of all roads combined appear in Table 11.1, presented as being end-of-year. The value at 1980 prices increases each year, from £8,822m for 1950 to £10,490m for 1984.

Several qualifications of this notional set of values are required. The CSO uses the general construction deflator for roads also, as is clear from comparing the implicit deflator series of columns (2) and (3) of Table 6.3. A proper deflator for roads as such would make for improved constant-price estimates. In the late 1970s especially the price inflation of bituminous road materials has been excessive, by comparison with inflation of other construction inputs. It is possible, therefore, that the value 0 .704 used to deflate the 1984 benchmark £14,900m is inadequate. This implies that for truer 1980 road construction costs the benchmark value might be perhaps £9,000m, instead of the £10,490m. appearing in Table 11.1. This would suggest a step-decrease of perhaps £1,500m in the whole series.

A further qualification concerns the gross fixed capital formation values (at current prices) used by CSO for the Roads' series. It can be argued that as much as half of this is not real *new* or *additive* GFCF, but is in the nature of maintenance. The effect of this on the series shown Table 11.1 would be to increase its value

Table 11.1: *Gross Fixed Stock of Roads at end of year, 1950-1984, at 1980 prices*

							£ million
Year	Gross Stock	Year	Gross Stock	Year	Gross Stock	Year	Gross Stock
1950	8,822.3	1960	9,224.4	1970	9,703.2	1980	10,164.1
1951	8,864.9	1961	9,274.0	1971	9,750.6	1981	10,232.7
1952	8,909.3	1962	9,321.8	1972	9,792.4	1982	10,311.0
1953	8,954.6	1963	9,370.9	1973	9,837.7	1983	10,402.0
1954	8,999.9	1964	9,422.3	1974	9,886.8	1984	10,490.0
1955	9,044.3	1965	9,472.8	1975	9,927.3		
1956	9,081.6	1966	9,521.9	1976	9,957.7		
1957	9,114.4	1967	9,567.8	1977	9,999.5		
1958	9,149.0	1968	9,611.4	1978	10,050.5		
1959	9,185.4	1969	9,654.5	1979	10,106.9		

by as much as £800m for 1950. But progressive reduction of this extra amount would occur in the years towards 1984, so as to leave the end-of-1984 value £10,490m unchanged.

A brief comment may be made on the notional figures, such as they are, in Table 11.1. The estimate of £10,490m for the end of 1984 is only 19 per cent greater than the £8,822m for the end of 1950. This growth is quite small, by comparison with sixfold to ninefold growth shown by other sectors and commented on above in earlier chapters. However, the apparent relatively small growth of the fixed stock of roads is in full agreement with the view held by the experts of the Department. The following quotation covers the point at issue:

> I further estimate that a high portion of this value was in existence in 1950. For instance, I would estimate that 95 per cent of the value of our bridges was in place prior to 1950. I also consider that between 80 and 90 per cent of the value of the drainage and fencing was in place at that date. Also, perhaps 70-80 per cent of the pavement value was there at that time. The pavement, however, is the main element which would have benefited from the State's investment programme in the meantime (from a letter of Mr Carrick to writer, 18 July 1988).

The percentages just quoted, or mid-values of percentage ranges, can be applied to the components of the 1984 benchmark value, quoted in Section 11.2 above, with 80 per cent assumed for "land" and "earthworks". The result is an aggregate value of £12,145m at 1984 prices, which is 81.5 per cent of the benchmark value. At 1980 supposed prices, the corresponding estimate is £8,550m, representing an informed guess of the 1950 value, through this approach. This alternative estimate is satisfactorily close to the £8,822m appearing

for 1950 in Table 11.1. There is no strong reason, therefore, for presenting any alternative series, in addition to that of Table 11.1.

11.4: *Dwellings: Methodology and Starting Values*

"Dwellings" mean private dwellings, excluding hospitals, institutions, and so. No separate information on farmhouses as such is available to the writer, for either starting values in 1950 or GFCF during 1950-1984. Thus, it is not possible to compile directly the gross or net fixed stock of farmhouses, within total dwellings. However, the farmhouse gross and net estimates shown in Chapter 7 are again shown in Table 11.2 of the present chapter, as an implicit component of the stock of all dwellings. Further comment appears in Sections 11.5 and 11.6.

The methodology of estimating gross and net stocks of dwellings is consistent with that used for other sectors. All values are at 1980 prices. Starting values at the end of 1949 are required. These must be scrapped during 1950-1984 in accordance with stated assumptions. The annual GFCF accumulation is also included, according to the Average Life chosen. As stated in Chapter 5, the scrapping assumption for the starting stock of dwellings is 1 per cent per year, applied to the estimated starting value at the end of 1949. And the chosen Average Life value for dwellings built during 1950-1984 is 80 years. Net stock estimates are derived by linear depreciation of the annual GFCF over 80 years and by cumulating it. Also added in is half the gross starting stock throughout its schedule of scrapping.

The starting values chosen, and their system of scrapping, are debateable if not arbitrary. Their gross and net values are shown in columns (5) and (6) of Table 11.2, so that readers can change them if they wish to. All changes made to these values equally affect the estimates of total stock in columns (1) and (3), respectively. How the starting values were obtained can now be described.

Mr Michael Lucey of CSO kindly provided an estimate of £301.3m as a "lower limit" value of the gross stock of private dwellings not rented from Local Authorities, at the middle of 1950 and at 1950 prices. Central Statistics Office (1964) Census of Population 1961 data showed some 676,400 private dwellings in the State, of which some 124,600 were rented from Local Authorities. And Central Statistics Office (1961 and earlier issues) Statistical Abstract Section VII data revealed 1950-1960 new houses built numbering 107,930, of which 55,155 (about half) were built by Local Authorities. From these data, and some further items such as 662,654 private dwellings shown by the 1946 Census of Population, the writer estimated the housing stock at the middle of 1950. This is roughly 600,000 non-Local Authority dwellings (valued at £301.3m per Mr Lucey) and a further 69,400 dwellings rented from Local Authorities, and valued by the writer at £43.6m. This combined gross value of £344.9m was inflated by the factor 9.244 (Table 6.3 dwellings price inflator) to give £3,188.7m at

1980 prices as the gross starting stock at the end of 1949. A deduction of £31.9m (1 per cent) by way of scrapping has been made each year since 1950, to allow for old houses being demolished and so on. These results are taken to be end-of-year gross estimates of the starting stock throughout 1950-1984.

A check by means of UK data is in order. Table 68 of Central Statistical Office (1964) shows a stock of public and private dwellings valued at £22,500m at 1958 prices at the end of 1951. The writer estimated £19,035m as their value at 1951 prices. And Table 65 of Central Statistical Office (1960) showed a housing stock of 14,177 thousand UK dwellings at the end of 1951. One can thus derive a UK 1951 average value of £1,343 per dwelling, more than twice the Irish average 1950 value £515 derivable from the data of the previous paragraph.

Further data from the Statistical Abstracts of both countries, available for 1952, shows a UK £18 per capita on "housing" as against £5 per capita "gross rent" in Ireland, these ratios being derived from particulars of private (or household) expenditure during 1952 on goods and services. The same data reveal a UK £210 per capita total expenditure, compared with £120 in Ireland. It seems reasonable, therefore, to accept a 1950 Irish benchmark average value per dwelling less than half that of the UK.

11.5: *Dwellings: Gross Stock Estimates*

Gross stock estimates for all private dwellings, including farmhouses, appear in column (1) of Table 11.2. From a starting value of £3,327m at the end of 1950, the stock reaches £12,904m at the end of 1984, the latter value being almost four times that of 1950.

Growth over 10-year intervals may be considered. The 1960 value (end-of-year) of £4,296m is 29 per cent larger than that of 1950. The 1970 value of £6,120m is 42 per cent larger than that of 1960. And the 1980 value of £10,860m is 77 per cent larger than that of 1970.

Between 1980 and 1984 the growth is 19 per cent of the 1980 (end-of-year) value. A considerable increase in the growth rate is, therefore, apparent for the decade of the 1970s, coincident with Irish entry into the EEC. And a subsequent slow-down of growth during 1981-1984 is also apparent.

Farmhouse Gross Values

A brief comment on the notional farmhouse component, column (2), of the gross stock of dwellings is in order. These gross farmhouse values, as orders of magnitude, show some £1,000m in 1950, and increase generally, through about £1,400m in 1962, £1,900m in 1970 and £2,600m in 1980, so as to reach some £3,000m in 1984.

These tentative estimates suggest a threefold growth of farmhouses between 1950 and 1984, compared with the fourfold growth of all dwellings over the same

Table 11.2: *Gross and Net Fixed Stock of Dwellings including Farmhouses at end of year, 1950-1984, at 1980 prices*

£ million

Year	GROSS STOCK		NET STOCK		STARTING STOCK INCLUDED	
	All Dwellings including Farmhouses	Farmhouses	All Dwellings including Farmhouses	Farmhouses	Gross	Net
	(1)	(2)	(3)	(4)	(5)	(6)
1950	3,327.4	984.6	1,733.1	492.3	3,188.7	1,594.35
1951	3,437.9	1,029.0	1,857.8	547.5	3,156.8	1,578.40
1952	3,552.0	1,057.6	1,984.3	585.5	3,124.9	1,562.45
1953	3,670.8	1,102.2	2,113.7	638.5	3,093.0	1,546.50
1954	3,779.4	1,149.6	2,231.0	693.0	3,061.1	1,530.55
1955	3,893.5	1,190.5	2,352.1	739.7	3,029.2	1,514.60
1956	4,008.5	1,234.8	2,472.3	788.7	2,997.3	1,498.65
1957	4,073.6	1,262.0	2,540.7	819.1	2,965.4	1,482.70
1958	4,135.8	1,287.9	2,605.0	847.2	2,933.5	1,466.75
1959	4,209.3	1,327.1	2,679.4	887.9	2,901.6	1,450.80
1960	4,295.6	1,364.4	2,765.4	925.2	2,869.7	1,434.95
1961	4,386.4	1,386.7	2,854.2	946.6	2,837.8	1,418.90
1962	4,494.4	1,438.0	2,958.8	996.1	2,805.9	1,402.95
1963	4,620.4	1,488.2	3,079.7	1,043.3	2,774.0	1,387.00
1964	4,786.1	1,523.7	3,238.2	1,074.2	2,742.1	1,371.05
1965	4,990.6	1,559.3	3,433.1	1,103.7	2,710.2	1,355.10
1966	5,174.8	1,611.4	3,604.8	1,149.0	2,678.3	1,339.15
1967	5,395.6	1,677.3	3,810.3	1,206.1	2,646.4	1,323.20
1968	5,627.6	1,756.9	4,023.9	1,275.8	2,614.5	1,307.25
1969	5,873.2	1,793.7	4,247.8	1,300.3	2,582.6	1,291.30
1970	6,119.7	1,872.7	4,469.1	1,366.4	2,550.7	1,275.35
1971	6,421.1	1,928.6	4,741.8	1,406.9	2,518.8	1,259.40
1972	6,817.3	1,988.1	5,105.2	1,459.8	2,486.9	1,243.45
1973	7,270.8	2,066.4	5,520.5	1,509.1	2,455.0	1,227.50
1974	7,775.5	2,147.2	5,981.0	1,569.7	2,423.1	1,211.55
1975	8,208.0	2,212.4	6,362.5	1,612.6	2,391.2	1,195.60
1976	8,647.0	2,283.1	6,744.8	1,659.3	2,359.3	1,179.65
1977	9,121.8	2,365.6	7,156.9	1,715.8	2,327.4	1,163.70
1978	9,677.7	2,448.1	7,643.8	1,770.3	2,295.5	1,147.75
1979	10,314.3	2,542.1	8,204.1	1,824.1	2,263.6	1,131.80
1980	10,860.4	2,636.0	8,665.5	1,885.6	2,231.7	1,115.85
1981	11,412.5	2,731.4	9,125.7	1,947.1	2,199.8	1,099.90
1982	11,903.3	2,828.3	9,517.3	2,007.1	2,167.9	1,083.95
1983	12,435.9	2,924.6	9,944.2	2,064.1	2,136.0	1,068.00
1984	12,904.0	3,027.6	10,299.5	2,125.7	2,104.1	1,052.05

period. A direct comparison of the two series of estimates shows farmhouses about one-third of the gross stock of all dwellings at the end of 1950, and declining in share so as to be about one-quarter by the end of 1984.

A brief comment on the quality of the estimates is in order. The farmhouse estimates are notional, being based on assumptions about housing per agricultural holding, modified by allowance for assumed quality difference between housing conditions of people on farms and those of the rest of the population. The estimates for all dwellings, however, are probably more realistic. However, it is possible that these latter estimates are too small, because CSO 1950 data of starting values have not been grossed up, to allow for some depreciation inherent in them. They might be increased by 25 per cent, which would add some £800m to the 1950 end-of-year estimate. This £800m would be decreased linearly by 1 per cent throughout 1951-1984.

Gross Starting Stock

Column (5) shows the gross stock series used as part of the gross estimates of column (1) already discussed. The starting stock gross values are about £3,200m in 1950, and decrease linearly so as to reach about £2,100m in 1984.

These values are shown to enable readers to adjust them if they want to. For example, if the rate of scrapping were doubled, then some extra £1,100m would be removed by 1984. This would give a revised end-of-1984 starting-value residue of about £1,000m, and thus cause a revised column (1) gross estimate of about £11,800m. Consistent net stock should also be reduced. For an assumed 50 per cent of gross, the 1984 corresponding reduction of net values in columns (3) and (5) would be about £550m.

11.6: *Dwellings: Net Stock Estimates*

Corresponding to the gross stock estimates just discussed, net stock estimates are shown in columns (3) and (4) of Table 11.2. The net starting stock component is set out in column (6).

The net estimate for all dwellings including farmhouses comprises the figures of column (3). From £1,733m in 1950 the net value increases regularly so as to reach £10,300m by the end of 1984. In the early 1950s the net value is about half of the corresponding gross value. But the net share increases so as to represent three-quarters or more by the 1980s. The dominance of new GFCF over the scrapping of starting stock explains the growth of the proportion of gross covered by net, in the context of an 80-year average life.

Net farmhouse values appear in column (8). These also increase regularly, from £492m in 1950 to £2,126m in 1984. They cover about half of the gross stock in the early 1950s, but this ratio increases so as to be about two-thirds in the 1980s.

The net starting stock figures decrease gradually through scrapping, as shown by their values in column (6). From about £1,600m in 1950 they decline towards some £1,050m in 1984. These values can be modified to produce corresponding changes in column (3) figures. For example, a faster assumed rate of scrapping could reduce the 1984 starting stock by a further £1,000m. This reduction should accordingly be used to revise the column (3) estimate. This latter would thus show £9,300m as the revised net end-of-1984 stock estimate for all dwellings including farmhouses.

Chapter 12

NON-AGRICULTURAL INVENTORIES OF WORKING CAPITAL

12.1: *Introduction and Methodology*

Non-agricultural working capital comprises end-of-year inventories of raw materials and fuels, work in progress and finished goods, held throughout Industry and Utilities in general. There are also inventories held by Distribution, mainly in wholesale and retail trade. The working capital referred to so far is the subject matter of the present chapter. Other forms of working capital comprise agricultural livestock, discussed in Chapter 7, and standing timber in forests, referred to briefly in Appendix 5. Working stocks of agricultural crops (such as fodder and seeds) held on farms are not included anywhere in the present report.

Estimation of year-end values of inventories is detailed, rather than complicated. Appendix 6 shows the full details of such estimates, for industry, utilities, and distribution, and readers seeking such detail will find it in Appendix 6. The present chapter presents summary estimates and fills out gaps in some of the series.

The rest of this present Section 12.1 of the chapter looks at the methodology of estimation. Section 12.2 presents and discusses inventories of materials and fuels for the usual period, 1950-1984, at 1980 prices. Corresponding inventories of work in progress and finished goods and goods for resale are the theme of Section 12.3. Total inventories are the subject matter of Section 12.4, where estimates are presented to fill lacunae in the annual series of construction and trade.

Methodology of Estimation

The great simplifying element in estimating year-end inventories is the absence of cumulation, and the further absence of "net" or depreciated values. Each estimate is of a "once only" nature and has a gross value. Three stages of estimation can be envisaged:

(1) Comprehensive year-end inventories need to be compiled and assembled, at current prices, and in as much detail as possible; "current prices" is normally taken to mean "annual average".

(2) At the available level of detail, the value of each item at current prices

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is inflated (or deflated) so as to be valued at average prices of the base year; this implies using price per physical unit, where possible.

(3)   Results of (2) are aggregated and grouped as required.

Lack of data usually prevents the refined and detailed repricing just described from being applied in practice. Wholesale price inflators have to be applied to groups of inventories, without breakdown by types or commodities. One therefore has to choose the seemingly most relevant or appropriate inflator. A description of such Irish inflators for 1950-1984 occupies Part 3 of Appendix 6, of which Part 2 discussed the sources and nature of current-price data. The constant-price inventory results emerging from the estimation process are now considered below.

12.2: *Materials and Fuels, at 1980 Prices (Table 12.1)*

Materials and fuels are required by all sectors of industry and utilities. End-of-year stocks, at estimated 1980 prices, appear in Table 12.1 for the usual period 1950-1984. "End-of-year" may be taken as "end of the calendar year". Where a business year differs from the calendar year, no separate calendar-year estimates were available; in such cases the data of the establishment or enterprise were used as estimators of inventories at the end of the calendar year.

Four groups of activities are shown in the table, as well as combinations of these. The manufacturing group occupies column (1); 10 subsectors (e.g., food) appear in Appendix 6. Mining and Bord na Mona are covered in column (2). The utilities are the group of column (4), with separate particulars for each of electricity, gas, and water supply shown in Appendix 6. Construction occupies column (6), only as far as 1973; a subdivision between private firms and work by Local Authority (and Government Department) employees can be found in Appendix 6. All these detailed sub-sectors are perhaps better omitted in looking at the main features.

Regarding coverage, data for 1980-1984 are in principle complete. Non-respondents have been estimated for, and their particulars added to those of respondents, within mining, manufacturing and utilities. The basic data source of all these sectors is the annual Census of Industrial Production. For 1950-1979 data relate to respondents only; in view of no parameters available for non-respondents (other than number of establishments) this writer did not attempt to estimate their inventories. However, the observable adjustment for non-respondents during 1979-1984 would suggest an effect of only a few per cent, by way of increase of inventories of respondents. In view of the major price inflators being applied, this effect for non-respondents might be regarded as trivial.

Table 12.1: *Inventories of Materials and Fuels at 1980 prices held by Irish Industry and Utilities at End of Year, 1950-1984*

£ million

Year	Manufac- turing (1)	Mining (2)	Manuf. and Mining (1)+(2) (3)	Utilities (Elec., Gas Water) (4)	Manuf. Mining and Utilities (3)+(4) (5)	Construc- tion (6)	Total (5)+(6) (7)
1950	247	1	248	38	286	13	299
1951	270	2	272	47	319	15	334
1952	262	2	264	49	313	13	326
1953	252	2	254	46	300	12	312
1954	242	1	243	39	282	10	292
1955	254	1	255	41	296	10	306
1956	233	1	234	38	272	9	281
1957	228	1	229	30	259	15	274
1958	197	2	199	25	224	8	232
1959	220	2	222	23	245	8	253
1960	242	2	244	26	270	11	281
1961	251	2	253	32	285	10	295
1962	262	2	264	35	299	10	309
1963	279	2	281	36	317	13	330
1964	289	2	291	42	333	13	346
1965	289	3	292	47	339	18	357
1966	289	4	293	47	340	17	357
1967	295	5	300	41	341	22	363
1968	314	6	320	41	361	23	384
1969	355	7	362	46	408	25	433
1970	374	8	382	60	442	26	468
1971	368	8	376	60	436	20	456
1972	381	7	388	48	436	19	455
1973	446	7	453	80	533	18	551
1974	543	6	549	83	632		
1975	478	5	483	65	548		
1976	524	4	528	63	59i		
1977	524	7	531	62	593		
1978	565	6	571	82	653		
1979	649	14	663	108	771		
1980	658	15	673	109	782		
1981	643	14	657	65	722		
1982	623	12	635	59	694		
1983	649	12	661	43	704		
1984	688	11	699	40	739		

The writer does not know how adequate are the inventory estimates for construction. They supposedly relate to stocks held by respondents' establishments of 15 or more employees, in recent years, and stocks held by establishments of 5 or more employees in earlier years. The writer is prepared to suggest, in the light of other aspects of such respondents, that the *doubling* of the construction estimates shown in column (6) of Table 12.1 might be of the right order of magnitude to cover all establishments.

The estimated year-end values of the table may now be considered briefly. We find that manufacturing dominates all groups, and forms most of the aggregate, by comparing values of column (1) with those of column (5). The manufacturing aggregate itself (in column (1)) increases from some £250m in 1950 to almost £700m in 1984, but with no persistent growth apparent before 1962.

Mining inventories are negligible, being at most some £15m in 1980. The utilities are dominated by stocks held by the Electricity Supply Board (ESB), almost all of which comprise fuels for generating electric power. We see that the inventories of utilities pass £100m only in 1979-1980, due to ESB stock-building in the face of oil supply problems. In conditions of supplies being more certain, stocks are economised.

The combined year-end inventories of mining, manufacturing and utilities, as estimated, appear in column (5). From some £300m around 1950, they decrease at first, then again reach £300m in 1962. Fairly continuous growth appears thereafter, through £400m in 1969 and £600m in 1974, to reach some £740m at the end of 1984.

The inventories held by construction firms are negligible by comparison, showing £26m at most in 1970. Even if these estimates were doubled, they would still be only of the order of 10 per cent of the aggregate shown in column (5). Estimates for 1974-1984 (of such inventories of construction firms) will be introduced below in Table 12.3.

12.3: *Work-in-Progress, Finished Goods, Goods for Resale (Table 12.2)*

Any "work-in-progress" of the nature of construction is by definition Gross Fixed Capital Formation, and therefore in principle included in the GFCF and *fixed* capital stocks described in Chapters 6-11 above. Within Industry and Utilities, therefore, working capital of the type "work-in-progress" can occur only in manufacturing and mining. The same argument applies to "finished goods" including "goods for resale". The working stock of wholesale and retail trade is all "goods for resale" of one kind or another. All such end-of-year inventory values are combined, and their estimates at 1980 prices appear in Table 12.2.

The manufacturing and mining time-series are complete, showing estimates for each year within 1950-1984. Ten subsectors of manufacturing are again

Table 12.2: *Inventories of Work in Progress, Finished Goods, and Goods for Resale, at 1980 prices, held by Irish Manufacturing, Mining and Trade, at End of Year, 1950-1984*

£ million

Year	Manufac-turing (1)	Mining (2)	Manuf. and Mining (1)+(2) (3)	Wholesale and Agents (as avail.) (4)	Retail (as avail.) (5)	Wholesale and Retail (4)+(5) (6)	TOTAL (as available (3)+(6) (7)
1950	116	1	117				
1951	137	1	138	216	202	418	556
1952	128	0	128				
1953	163	6	169				
1954	164	6	170				
1955	165	7	172				
1956	164	9	173	185	197	382	555
1957	156	10	166				
1958	150	8	158				
1959	168	11	179				
1960	178	13	191				
1961	200	15	215				
1962	219	13	232				
1963	222	14	236				
1964	241	15	256				
1965	259	15	274				
1966	274	17	291	187	235	422	713
1967	292	28	320				
1968	319	35	354				
1969	374	33	407				
1970	388	35	423				
1971	406	36	442	250	269	519	961
1972	411	33	444				
1973	472	31	503				
1974	561	21	582				
1975	554	17	571				
1976	578	15	593				
1977	651	16	667	470	367	837	1,504
1978	693	14	707				
1979	753	25	778				
1980	792	26	818				
1981	789	30	819				
1982	790	29	819				
1983	774	29	803				
1984	767	33	800				

distinguished in Appendix 6. For wholesale and retail trade, however, particulars appear for only five years. Their details, from various Census of Distribution reports, are explained in Appendix 6, with data sources. Description-of-business breakdown is also shown in that Appendix, within each of the wholesale and retail aggregates. Inventory coverage is complete for retail trade, with likely negligible effects of non-coverage of non-respondents (in the earlier years) within wholesale (including manufacturers' agents) and retail trade.

It may be noted at this point that only negligible inventories were shown to be held by other Distribution activities, such as hotels, guesthouses, restaurants, in the earlier Census of Distribution reports (e.g., Central Statistics Office, 1962). In later reports such inventories tended to be omitted from the scope of the Census. For the Distribution activities referred to, this present report has omitted estimates of their inventories, as a possible but trivial amount of £1m-£10m, within aggregate amounts of £500m-£1,500m for wholesale plus retail trade.

The inventory values of Table 12.2 may now be considered. Manufacturing dominates manufacturing and mining, as is apparent from comparing columns (1) and (3). For manufacturing and mining combined, the growth is impressive, from some £120m in 1950 to some £800m in the early 1980s, through £400m in 1969.

The inventory estimates of wholesale and retail trade are shown in columns (4) to (6), for the five years in which they have been available. For wholesale and retail combined, about £420m appears for both 1957 and 1966, with a decrease to about £380m for 1956. Growth to about £520m is shown for 1971, and major growth to the £840m or so for the end of 1977. It also appears that the combined aggregate can be divided about equally into wholesale and retail stocks for four of the five years, with wholesale trade in 1977 taking more than half the aggregate.

It is clear that inventories of wholesale and retail trade exceed in value those of manufacturing and mining included in Table 12.2. To avoid a serious omission, these inventories should therefore be estimated for the other 30 years of the period 1950-1984; such estimation will be explained briefly in relation to Table 12.3 in the following section.

Column (7) of Table 12.2 is incomplete, but nevertheless suggests massive inventory growth of the kind being measured, from some £550m in the 1950s to some £1,500m in the late 1970s — a trebling of inventory levels.

12.4: *Total Inventories, at 1980 Prices (Table 12.3)*

Aggregate year-end inventories of industry, utilities and trade are set out in Table 12.3 valued at 1980 prices. These estimates are the result of combining the figures of Tables 12.1 and 12.2 in general, but with further estimates included

for missing data of construction and trade, as will be explained below. Brief comment on the results in each column of Table 12.3 is in order.

Manufacturing

In column (1) we see a fourfold growth of Manufacturing inventories, from £363 in 1950 to £1,455m in 1984. Steady growth seems to have started only about 1960, through some £400m then, and doubling to reach £800m about 1972. We see a plateau of some £1,400m-£1,500m during 1980-1984.

Mining

The Mining inventories are comparatively small, as shown in column (2). They include Bord na Mona inventories. Maximum values in the range £40m-£50m occur several times during the period 1968-1984. Again a plateau is evident for 1980-1984.

Utilities

These inventories, shown in column (3), are again small, by comparison with those of Manufacturing. They are confined to materials and fuels and are dominated by ESB supplies, as remarked in Section 12.1 above. Their largest values, of some £100m, occur in 1979-1980.

As background, inventories *at current prices* on current account held by the ESB may be quoted, for 31 March each year: 1979, £43.5m; 1980, £76.4m; 1981, £104.4m; 1982, £85.7m: 1983, £85.1m (see Electricity Supply Board, 1987). Fuel prices rose steeply throughout these years 1978-1982. Repriced at 1980 prices, these quoted ESB figures might help to explain the 1979-1980 maximum of column (3) of Table 12.3. Values before 1980 would be considerably enlarged, repriced at 1980 prices, whereas values after 1980 would be considerably smaller. Those of 1980 remain unchanged at 1980 prices.

Manufacturing, Mining, Utilities

The aggregate result of columns (1) to (3) appears in column (4). For industry (except construction) and utilities, year-end inventories were some £400-500m throughout 1950-1961. Then steady growth is manifest, to show £1,000m in 1973, and reach a plateau of £1,500-1,600m for 1979-1984.

Construction

This sector provides the rather small results shown in column (5); these are repeated from Table 12.1 for 1950-1973. They lie in the range £8-26m, and may underestimate the true situation by as much as half.

For 1974-1984, estimates are required. To obtain these estimates, a proportion

Table 12.3: *Total Inventories, at 1980 prices, held by Irish Industry, Utilities and Trade, at End of Year, 1950-1984*

								£ million
Year	Manufac-turing (1)	Mining (2)	Utilities (Elec., Gas, Water) (3)	Manuf., Mining, Utilities (1) to (3) (4)	Construc-tion (5)	Industry plus Util. (4)+(5) (6)	Trade, Whole. and Retail (7)	Industry Util., Trade (6)+(7) (8)
1950	363	2	38	403	13	416	418†	834
1951	407	3	47	457	15	472	418	890
1952	390	2	49	441	13	454	410†	864
1953	415	8	46	469	12	481	405†	886
1954	406	7	39	452	10	462	402	864
1955	419	8	41	468	10	478	410†	888
1956	397	10	38	445	9	454	382	836
1957	384	11	30	425	15	440	367†	807
1958	347	10	25	382	8	390	368†	758
1959	388	13	23	424	8	432	377†	809
1960	420	15	26	461	11	472	374†	846
1861	451	17	32	500	10	510	384†	894
1962	481	15	35	531	10	541	394†	935
1963	501	16	36	553	13	566	410†	976
1964	530	17	42	589	13	602	423†	1,025
1965	548	18	47	613	18	631	424†	1,055
1966	563	21	47	631	17	648	422	1,070
1967	587	33	41	661	22	683	437†	1,120
1968	633	41	41	715	23	738	474†	1,212
1969	729	40	46	815	25	840	499†	1,339
1970	762	43	60	865	26	891	506†	1,397
1971	774	44	60	878	20	898	519	1,417
1972	792	40	48	880	19	899	567†	1,466
1973	918	38	80	1,036	18	1,054	631†	1,685
1974	1,104	27	83	1,214	26*	1,240	669†	1,909
1975	1,032	22	65	1,119	23*	1,142	714†	1,856
1976	1,102	19	63	1,184	24*	1,208	758†	1,966
1977	1,175	23	62	1,260	24*	1,284	837	2,121
1978	1,258	20	82	1,360	29*	1,389	927†	2,316
1979	1,402	39	108	1,549	35*	1,584	977†	2,561
1980	1,450	41	109	1,600	33*	1,633	1,002†	2,635
1981	1,432	44	65	1,541	35*	1,576	1,025†	2,601
1982	1,413	41	59	1,513	33*	1,546	957†	2,503
1983	1,423	41	43	1,507	29*	1,536	945†	2,481
1984	1,455	44	40	1,539	25*	1,564	955†	2,519

† Estimated, as proportions of Personal Expenditure on Goods, at 1980 prices; see text.

* Estimated, on the basis of the value of Building and Construction GFCF at 1980 prices, except Roads, as 2.46% of that value.

of 2.46 per cent of the value of GFCF at 1980 prices by way of construction (except roads) has been used. This percentage has been derived from data for 1967-1973, as the aggregate construction inventories of Table 12.3 column (5) (£153m), divided by aggregated "dwellings" plus "other building and construction" GFCF values (£6,219m) for 1967-1973 at 1980 prices, the explicit or background data of Chapter 6.

Application of this rough estimator, 2.46 per cent, to the appropriate GFCF at 1980 prices yields the estimates for 1974-1984 appearing in column (5) and marked by an asterisk (*). The estimates lie in the range £23-35m. These again may be much smaller than reality, because they derive from data of 1967-1973, thought to be serious underestimates. In view of the small scale of such inventories, possible underestimation is not of major consequence.

Wholesale and Retail Trade

Estimates of wholesale plus retail year-end inventories appear in column (7) for all 35 years 1950-1984. The direct Census-based estimates for five years only are copied from Table 12.2 above. The other 30 estimates have been made indirectly, as will now be explained; these estimates are marked by a cross (+) in column (7).

Retail and wholesale inventories have been estimated separately. The retail inventories were estimated first, at 1980 prices, as between 8 and 9 per cent of Personal Expenditure on Goods, also at 1980 prices. Then wholesale inventories were derived, in relation to retail inventories. Following is a summary outline of the method used.

Personal expenditure on goods at 1980 prices for all years 1950-1984 has been derived from linked constant-price series given in *National Income and Expenditure* issues: 1961, 1977, 1983-1984, 1986 (see Central Statistics Office, 1986(b)). In general, eight series were used, comprising (a) food, (b) alcoholic beverages, (c) tobacco, (d) clothing, etc., (e) fuel and power (ex. motor spirit), (f) durable household goods, (g) transport equipment, (h) other goods. Each series was individually linked to the 1980 price system, by two or more values of a year of linkage providing price inflators for each sub-set of the 35-year full series. After individual deflation or repricing so as to be at 1980 prices, the eight series were added so as to give aggregate expenditure on goods at 1980 prices.

The Census of Distribution results for the five available years were now used; they showed retail year-end stocks some 8 to 9 per cent of aggregate personal expenditure on goods, as just described, for all data at 1980 prices. Minor trending was applied within the percentage range 8-9, and application of the percentage estimates (for the required 30 years) to the aggregate personal expenditure amounts yielded retail inventory estimates. These comprised some £200m in the 1950s, increasing to some £400m in the 1980s.

Wholesale inventories were derived from those of retail, as assumed proportions of the latter, within a range 80 to 134 per cent. Increasing percentages were assumed to apply, through 1966-1984, as suggested by benchmark Census results for 1966, 1971, and 1977. In all events, the derived wholesale inventory estimates are between £170m and £220m during 1951-1968; but then increase steadily to reach a plateau of some £500-600m for 1978-1984.

Combined wholesale plus retail inventory estimates appear in Table 12.3 column (7). They stay within the range £350-450m during 1951-1967. Then fairly continuous growth is apparent, up to the £1,025m maximum of 1981. Some minor reduction, towards £900m or so, appears for 1982-1984. These comments, however, may be too definite for such tentative estimates. One is more certain, however, for the Census years: some £400m for 1951, 1956 and 1966 is much more definite, as is the £520m for 1971 and roughly £850m for 1977.

Total Inventories of Industry, Utilities and Trade

Overall aggregate inventory estimates appear in Table 12.3 column (8), covering industry, utilities and trade. For 1950-1964 the estimate lies in the range £750-1,000m at 1980 prices. Continuous growth from 1965 onwards is manifest, through £2,000m about 1976, to pass £2,600m in 1980. One can see a plateau of £2,500-£2,600m during 1979-1984.

In spite of the estimation problems, these results may be taken seriously, as orders of magnitude. Each series, including that of trade, has some benchmark data derived from Census aggregates. The main unknown factor is the sensitivity of the estimates to the degree of detail of repricing in terms of 1980 prices. If all price inflators moved together to much the same extent, then such degree of detail would not matter greatly. Energy prices showed greatest increases between 1973 and 1984; these affect major inventories only for the electricity and gas components of Utilities, which have had such high inflation taken into account in their re-estimation at 1980 prices. Little further useful or relevant comment is possible on repricing aspects.

Chapter 13

CONSUMER DURABLES, GROSS AND NET

13.1: *Introduction and Methodology*

This chapter presents estimates of the gross and net year-end inventory values of consumer durables throughout the usual period 1950-1984. The present section of the chapter describes what kind of goods are covered by the term "consumer durables", and outlines the methodology used to obtain gross and net end-of-year inventories at 1980 prices. Section 13.2 sets out the data, which are the personal or household annual purchases equivalent to GFCF by businesses and government. Starting values and average life assumptions and data sources are explained. Section 13.3 presents the inventory estimates and discusses them.

Consumer Durables Described

These goods have a life of more than one year, but exclude clothing and footwear. Their purchase is part of "Expenditure of Personal Income" as detailed in *National Income and Expenditure* (see Central Statistics Office, 1986 (b)), and covered by the two items "durable household goods" and "personal transport equipment". For 1975 and more recent years an item "equipment and accessories" appears as part of the category "Recreation, Entertainment and Education"; but this item is not available for the period 1950-1974. The writer, therefore, confined the scope to the two groups mentioned above, and their particulars will appear separately in the numerical results below. These groups: (a) durable household goods, and (b) transport equipment, have consistent value series available throughout 1950-1984, in the National Accounts' published detail.

A descriptive paragraph from Goldsmith (1962) may be considered as to the United States' experience during 1946-1958. The paragraph described his coverage of consumer durables, besides discussing different growth rates for different categories of such inventories.

> This aggregate is a compound of one group of consumer durables — automobiles and household appliances, mostly electrical, including radio and television sets — the stock of which grew at the astonishing average rate of 14 per cent per year after adjustment for price changes; and of another group — consisting of furniture, house furnishings, jewelry, watches and books — which showed an average rate of growth of the net stock of only 4-5 per cent per year. The reasons for these differences are fairly

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> obvious. The extraordinary increase in the value of the net stock of passenger cars — at a rate of 15 per cent per year in 1947-49 prices — reflected primarily the replacement of a stock that had been run down far beyond customary standards as a result of unavailability of new cars during the war years, but was also influenced by a spread of car ownership, due to the general high level of income, and by an upgrading among types of cars, made possible by the same favorable income experience. The almost equally sharp rise in the stock of what may be called household machinery, averaging about 12.5 per cent a year, on the other hand, may be attributed primarily to the introduction of entirely new types of commodities (for example, television sets and air conditioning equipment) or the sharp decline in the relative price of others (such as radios, washing machines, and heaters). These are typically "new products", and their rapid growth is in sharp contrast to the much slower increase of furniture (5 per cent per year) and particularly house furnishings (only about 1.5 per cent per year). (p.58)

One may conclude that the Irish third group (to do with recreation, education, etc.) might well be included, even in part, to give more complete coverage, if data were available for 1950-1974. The values are not negligible, as they lie in a range of some £160-320m of annual purchases at 1980 prices during 1975-1984.

Methodology of Estimation

The methodology is essentially the same as that for fixed capital stock, already described in Chapters 2 and 5. A summary description will, therefore, suffice. But a specific methodology for scrapping of cars and motor cycles has been made possible, by data on numbers of registrations, as will be explained below.

One starts with annual gross purchases, at current prices, for as many items as the data permit. Next, purchases at 1980 prices have to be estimated. Each of the two Irish series being included has values available at current prices, and also at prices of some other year, such as 1980. By linking the sub-series at constant prices, it is, therefore, possible to obtain each series (throughout 1950-1984) at 1980 prices. Further description of this aspect appears in Chapter 12 above. In other words, an *explicit* price inflator series is not necessary in this instance. But the *implicit* price series is obtainable at the ratio of values at 1980 prices divided by corresponding values at current prices; this implicit series is not shown below as part of the data.

Starting values at the end of 1949 or 1950, at 1980 prices, are required. A scheme for scrapping the starting values must also be proposed. This directly involves the values chosen for average life. A value of 10 years has been chosen for vehicles, and 12 years for household durables, in the estimation process leading to the results shown in Section 13.3 below.

Gross stock is the cumulative outcome of annual purchases at 1980 prices being held at initial gross value during "average life", before 100 per cent scrapping, supplemented by gross starting stock, the latter also going through gradual scrapping.

Net stock is the cumulative outcome of annual purchases at 1980 prices undergoing linear depreciation to zero value, over the average life, supplemented by net (or depreciated) starting stock progressively depreciated to zero.

For transport equipment a methodology has been used for scrapping, derived from the apparent numbers of vehicles scrapped each year. Essentially, this method attempts to give more realistic scrapping than mechanical application of a 10-year average life. In various issues of the *Statistical Abstract of Ireland* (see Central Statistics Office, 1961) numbers of "private cars" and "motor cycles" licensed in August (more recently, in September) are given, as well as monthly numbers registered and licensed for the first time. These figures enable numbers apparently scrapped during each year to be estimated. On the basis of an assumption of three motor cycles equivalent to one car, a "per new car equivalent" personal transport cost each year (at 1980 prices) is given. It is the quotient of the purchase cost of "transport equipment" (that share of the Expenditure of Personal Income at 1980 prices) divided by "new car equivalent" numbers. The inherent assumption also included is that pedal cycles form a negligible share of purchase cost of transport equipment, i.e., the "new car equivalent" numbers may be used for trending the "per new car equivalent" annual cost.

By applying the "per new car equivalent" cost of 10 years earlier to the number of cars apparently scrapped in any year, a gross scrapping (at 1980 prices) is partly obtained. The residue of scrapping is given by applying one-third of the "per new car equivalent" cost to the apparent number of scrappings of motor cycles.

A more direct approach is not possible, because "private cars" as listed in vehicle registration statistics include those used by business, as well as the "farm share" of family cars owned by farmers. Details of these are used within CSO, but are not generally available. The "per new car equivalent" cost is in fact rather stable, in the range £2,100 to £3,100 at 1980 prices, and for most years in the range £2,500 to £3,100. A reasonable assumption is that this personal or household share of the full cost of all new cars was paid out some 10 years before the date of scrapping. And an assumption of one new motor cycle equivalent to one-third of the cost of a new car is also reasonable. This methodology could obviously be refined further given more data.

In getting the net stock estimates, a simple 10 per cent linear depreciation scheme has been applied. There are difficulties and complications in trying to project, into some 10 years past, the apparent scrapping value of any year, as explained in the previous paragraph.

13.2 *Data and Starting Values*

Some partial description of data and data sources has already appeared in Section 13.1, in clarifying the description of commodities and methodology of estimating inventory values. Data sources can be summarised at this point. The two Personal Expenditure series being used appear at current prices in various issues of *National Income and Expenditure,* for the period 1953-1984. They also appear as sub-series at constant prices, and from these latter a continuous series at 1980 prices can be estimated. These data are part of those used to estimate inventories of retail trade, as described in Chapter 12 above. The motor vehicle statistics of numbers licensed and numbers registered and licensed for the first time appear in various issues of the *Statistical Abstract of Ireland,* for all years.

Personal expenditure on transport equipment and on durable household goods is not available for 1950-1952, as the published National Accounts start with the year 1953. This writer estimated durable household goods as some £78m at 1980 prices for each year of 1950-51; this becomes some £14m at current prices, on the basis of the implicit 1953 price deflator. For transport equipment, the method of "per new car equivalent cost" was used, with vehicle numbers; the "equivalent cost" derived from 1953 data was £3,080 per new car at 1980 prices. Derived values (as shown in Table 13.1) were about £49m for 1950, £44m for 1951 and £37m for 1952; at current prices (through 1953 implicit deflation) they lie in the range £6-8m.

Purchase Data at Current and at 1980 Prices

The full series of Personal Expenditure on these consumer durables appear in Table 13.1, at current and at 1980 prices. Because of the effect of large price inflation, values at current prices are not of much use for purposes of analysis. However, these values may be mentioned.

The expenditure on durable household goods, in column (1), increases from £15m in the early 1950s to some £400m by 1984. Transport equipment shows similar growth, from £8m to £300m. The combined purchases increase from some £20m in 1953 to about £700m in 1984, per column (3).

At 1980 prices, there is still major growth in evidence. The durable household goods' values in column (4) increase from some £80m in 1953 to almost £350m in 1979, and then decrease towards some £270m in 1984. Transport equipment purchases are some £50m for 1950 and reach almost £310m in 1978, with reductions for 1978-79 and a similar peak in 1981, followed by decreases to about £170m in 1984. The combined purchases in column (6) are about £120m in the early 1950s; they exceed £600m during 1978-1981, then fall back to some £440m in 1983-1984. The economic stagnation of the early 1980s gives credence to these results, which show reduced purchasing of these durable goods in real terms.

Table 13.1: *Personal Expenditure on Durable Household Goods and on Transport Equipment, at current and at 1980 Prices, 1950-1984*

£ million

Year	At Current Prices			At 1980 Prices		
	Durab. H.H. Goods (1)	Transp. Equip. (2)	Combined Total (1)+(2) (3)	Durab. H.H. Goods (4)	Transp. Equip. (5)	Combined Total (4)+(5) (6)
1950	14.30*	7.64*	21.94*	77.6*	49.0*	126.6*
1951	14.30*	6.79*	21.09*	77.6*	43.5*	121.1*
1952	14.30*	5.72*	20.02*	77.6*	36.7*	114.3*
1953	14.7	7.5	22.2	79.7	48.1	127.8
1954	15.6	9.6	25.2	85.1	62.8	147.9
1955	17.2	10.7	27.9	93.8	69.2	163.0
1956	16.8	6.9	23.7	87.3	42.9	130.2
1957	16.1	7.4	23.5	81.3	42.9	124.2
1958	18.8	9.9	28.7	93.3	57.0	150.3
1959	21.1	10.6	31.7	103.6	59.6	163.2
1960	19.8	12.4	32.2	96.4	70.1	166.5
1961	23.0	12.9	35.9	110.0	72.5	182.5
1962	26.0	14.4	40.4	122.8	80.2	203.0
1963	29.7	16.9	46.6	138.5	92.8	231.3
1964	33.8	20.6	54.4	151.7	111.6	263.3
1965	34.7	20.8	55.5	150.7	108.8	259.5
1966	35.7	21.0	56.7	152.4	105.0	257.4
1967	38.5	22.8	61.3	158.1	107.1	265.2
1968	44.0	31.8	75.8	173.4	136.7	310.1
1969	50.5	37.3	87.8	185.6	144.4	330.0
1970	56.4	41.4	97.8	191.4	144.4	335.8
1971	64.8	44.9	109.7	203.9	139.6	343.5
1972	78.9	58.7	137.6	226.4	168.8	395.2
1973	95.0	82.5	177.5	245.2	216.5	461.7
1974	109.0	82.7	191.7	237.1	190.6	427.7
1975	139.4	81.0	220.4	261.3	154.5	415.8
1976	168.3	144.9	313.2	284.0	217.3	501.3
1977	204.6	205.0	409.6	298.4	262.3	560.7
1978	243.7	272.6	516.3	317.4	309.1	626.5
1979	294.7	274.4	569.1	349.4	271.0	620.4
1980	325.6	277.7	603.3	325.6	277.7	603.3
1981	350.3	357.5	707.8	299.3	307.4	606.7
1982	335.0	292.2	627.2	258.9	204.2	463.1
1983	385.0	266.7	651.7	275.7	161.4	437.1
1984	406.1	306.5	712.6	274.6	167.3	441.9

*Values for 1950-1952 are estimated in the way explained in the text.

Average Life

Goldsmith (1962) quotes average life values of various consumer durables in his Appendix B Table B-31 (p.252), as "expected useful life". A few quotations are of relevance, in years: passenger cars 15; furniture 15; household appliances 12; china, tableware, utensils, etc., 10; other durable household furnishings 10; radio and TV receivers, etc., 10; books and maps 6; jewellery and watches 15. In a footnote to the table he shows that the non-linear depreciation applied for passenger cars consumes 90 per cent of the new gross cost or value in the first 10 years.

The writer, therefore, considers that 10 years is reasonable for transport equipment. The vehicle numbers of "apparent scrapping" described above also agree broadly with a 10-year span from registration and licensing new. An average life of 12 years also seems appropriate for the amalgam of items included in the Irish "durable household goods" group. As further detail is not available, some average life must be chosen.

Starting Values

Gross and net starting values are required. The gross value for transport equipment at the end of 1949 is estimated to be £233.6m, derived from 74,000 cars at £3,080 and 5,500 motor cycles at £1,030. These prices are "per new car equivalent" cost derived from 1953 new car and motorcycle registrations versus personal expenditure on transport equipment, at 1980 prices, with again one motor cycle taken as one-third of one car. The net starting value for transport equipment is taken as half the gross value.

No direct information was available for durable household goods. In view of a chosen 12-year average life, the gross starting value was taken to be £1,041m (at 1980 prices), which is twice the aggregate amounts purchased during the six years 1953-1958. The net starting value was taken to be half this, i.e., £520.5m.

The scheme of scrapping of starting values needs some explanation. For durable household goods, both gross and net values are evenly scrapped over the 12-year average life period. The net value of transport equipment is similarly treated, over the average life of 10 years. But the gross starting value of transport equipment is disposed of by means of the "apparent scrapping" approach described above. This starting value goes directly into the cumulated value of gross purchases; it is not treated separately.

13.3 *Gross and Net Inventory Results for Consumer Durables*

Table 13.2 sets out the gross and net inventory results at 1980 prices. Gross estimates appear in columns (1) to (3), and net estimates in columns (4) to (6).

Total gross inventories may be considered first, as estimated by the combined

Table 13.2: *Gross and Net Inventories of Durable Household Goods and Transport Equipment, at 1980 prices, at End-of-Year, 1950-1984*

						£ million
	GROSS INVENTORIES			NET INVENTORIES		
Year	Durab. H.H. Goods (1)	Transp. Equip. (2)	Combined Total (1)+(2) (3)	Durab. H.H. Goods (4)	Transp. Equip. (5)	Combined Total (4)+(5) (6)
1950	1,041	271	1,312	598	154	752
1951	1,032	300	1,332	626	181	807
1952	1,023	320	1,343	647	197	844
1953	1,016	337	1,353	664	220	884
1954	1,014	366	1,380	680	254	934
1955	1,021	392	1,413	697	287	984
1956	1,022	407	1,429	700	287	987
1957	1,016	400	1,416	690	284	974
1958	1,023	424	1,447	685	289	974
1959	1,040	444	1,484	682	292	974
1960	1,049	477	1,526	664	311	975
1961	1,073	506	1,579	651	330	981
1962	1,109	547	1,656	642	354	996
1963	1,169	588	1,757	688	387	1,075
1964	1,244	651	1,895	742	433	1,175
1965	1,315	711	2,026	789	472	1,261
1966	1,382	740	2,122	832	503	1,335
1967	1,446	776	2,222	875	530	1,405
1968	1,532	832	2,364	928	581	1,509
1969	1,637	891	2,528	986	630	1,616
1970	1,735	990	2,725	1,041	672	1,713
1971	1,835	1,061	2,896	1,100	701	1,801
1972	1,965	1,146	3,111	1,174	763	1,937
1973	2,100	1,276	3,376	1,255	844	2,099
1974	2,214	1,330	3,544	1,317	896	2,213
1975	2,337	1,414	3,751	1,394	904	2,298
1976	2,470	1,564	4,034	1,483	971	2,454
1977	2,617	1,679	4,296	1,576	1,071	2,647
1978	2,782	1,846	4,628	1,675	1,204	2,879
1979	2,974	1,965	4,939	1,793	1,279	3,072
1980	3,126	2,131	5,257	1,871	1,349	3,220
1981	3,239	2,277	5,516	1,910	1,436	3,346
1982	3,307	2,097	5,404	1,898	1,407	3,305
1983	3,379	2,100	5,479	1,898	1,323	3,221
1984	3,427	2,073	5,500	1,891	1,255	3,146

total values appearing in column (3). From about £1,300m at the end of 1950, fairly continuous increase is evident until a maximum of about £5,500m is reached, for the end of 1981. A plateau effect (i.e., absence of continuing steady growth) is apparent for 1982-1984. Thus the early 1980s show some four times the volume estimated for the early 1950s, with a doubling of the latter appearing by about 1970.

The major component of gross inventories has been durable household goods throughout the period, as set out in column (1). These goods have comprised about two-thirds of the combined total for 1950-1970, and show some reduction of share in later years. Durable household goods increase from about £1,000m in the early 1950s to some £3,400m by the end of 1984 — an expansion to more than three times the volume of their 1950 base. A doubling of the latter occurs by about 1973, with little growth during 1950-1960.

The other component of gross inventories is transport equipment. This shows faster growth than the durable household goods, since transport equipment reaches a maximum value of some £2,300m in 1981, from a base volume of about £300m in the early 1950s. Thus an eightfold expansion is evident, between 1951 and 1981. Some decrease below 1981 maximum value occurs during 1982-1984 — or one might regard the 1980-1984 set of values as a plateau.

Total net inventories appear in column (6). Their value generally lies within a range of one-half to two-thirds of the corresponding (year-end) gross value of column (3). Thus the total net value is some £750m at the end of 1950, and by general increase reaches more than £3,300m at the end of 1981. In this case also an expansion of more than four times the 1950 base value is evident, to the plateau of the early 1980s.

The major share of the net total is again taken by durable household goods as shown in column (4). For this group some £600m is estimated as their net value at the end of 1950. General growth is evident, until a plateau of about £1,900m is found to occur for the early 1980s. A fairly steady level, however, appears for the period 1953-1963: this plateau is indicative of economic stagnation in general during that period. Thus, in summary, durable household goods' net value in the early 1980s is about three times that of the early 1950s.

Much more rapid expansion is apparent for the net transport equipment stock as given in column (5). From less than £200m for 1950-1952, it reaches some £1,400m for 1980-1982, showing an expansion of more than seven times the volume of the early 1950s. Continuous growth appears as the rule throughout 1950-1981, with some reduction during 1982-1984. There is certainly a cessation of growth after 1981, even if one minimises the significance of the apparent reductions occurring for 1982-1984.

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Appendix 1

RECONCILIATION OF UN AND EUROSTAT SERVICES' SECTOR LISTINGS

The objective of this Appendix and its four tables is to clarify the activity content of the services' sectors used above in the main-level Report. It is helpful to show service activities in terms of three major international classifications:

(a) The United Nations ISIC divisions used in the *UN Yearbook of National Accounts Statistics,* (United Nations, 1986);

(b) The EUROSTAT NACE-CLIO codes R44 and R25 and their groupings used for Gross Fixed Capital Formation (EUROSTAT, November 1978);

(c) The Singelmann classification of services (Singelmann, 1978; and NBST Research Team, September 1985).

Table A1.1 shows, on the left, the UN ISIC divisions used for subdividing GFCF by sector, within services. Irish data appear in the United Nations (1986) Table 2.11 in the form of 9 groupings of these service sectors; the groupings are separated by horizontal lines. On the right-hand side of Table 2.11 there appear the approximate matching list of Singelmann sectors; these are grouped by Singelmann as: III Distributive; IV Producer; V Social; VI Personal. His Group I Extractive covers agriculture, etc., and mining; his group II Transformation covers manufacturing, construction, electricity, gas, water. It is clear from Table A1.1 that the Singelmann groups do not match the ISIC major groups, numbering 6, namely 6 to 9, Private Non-Profit, etc., Producers of Government Services. Approximate matching is possible at the level of 9 groups as shown.

Table A1.2 shows, in its left-hand column, 9 sectors used in the EUROSTAT (1986) listing of services, for purposes of subdividing GFCF. The Irish data were supplied for 6 groupings of these 9 sectors, comprising 5 groups of Market Services and one group of Non-Market Services. The other two columns of Table A1.2 show matching lists, from NACE-CLIO R25 and R44.

Table A1.3 shows a list of 9 services' sectors or items selected by the writer as a useful objective for showing capital stock within services, if possible to reach. This selected list is on the left of the table, with approximate matching ISIC grouping in the second column, and approximate EUROSTAT NACE-CLIO groupings in the third, with R44 listing in the fourth column.

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Table A1.1: *Ireland, ISIC, Division and Groupings Used for Gross Fixed Capital Formation by Kind of Activity of Owner, in Services (United Nations, 1986), (Irish data appear for each of 9 groups, separated by horizontal lines)*

United Nations (1986) *Volume 1* *Table 2.11 list (14 items) +*	*Approximate matching by Singelmann** *classification of Sectors (26 items)*
6A Wholesale and retail trade	III DISTRIBUTIVE SERVICES (13) Wholesale trade (14) Retail trade (except eating and drinking places)
7A Transport and storage	III (11) Transportation and storage
7B Communication	III (12) Communication
8A Financial Institutions	IV PRODUCER SERVICES
8B Insurance	(15) Banking, credit and other financial services
8C (part) Business Services	(16) Insurance (21) Legal Services (18) Engineering and architectural services (19) Accounting and Book-keeping (20) Miscellaneous business services
8C (rest) Real estate (Irish list allocates all of 8C to "Dwellings")	IV (17) Real estate
	VI PERSONAL SERVICES
6B Restaurants and hotels 9A Sanitary and similar services 9C Recreational and cultural services 9D Personal and household services Private Non-Profit Institutions Serving Households	(31) Hotels and lodging places (32) Eating and drinking places (36) Entertainment and recreational services (30) Domestic services (33) Repair services (34) Laundry and dry cleaning (35) Barber and beauty shops (37) Miscellaneous personal services

Table A1.1: *(Continued)*

United Nations (1986) *Volume 1* *Table 2.11 list (14 items) +*	*Approximate matching by Singelmann** *classification of Sectors (26 items)*
	V SOCIAL SERVICES
9B (part) Social and related community services: Educational services	(24) Education
9B (rest) Social and related community services: Medical, dental Other health and veterinary services	V (22) Medical and Health Services V (23) Hospitals V (25) Welfare and religious services V (26) Non-profit organisations V (29) Miscellaneous professional and social services
Producers of Government Services (Irish list includes here public administration and defence only, per Table 2.11 footnote (c))	V (27) Government

† *Footnote:* The six major ISIC services headings are:
6. Wholesale and retail trade, *restaurants and hotels;*
7. *Transport, storage and* communication;
8. Finance, insurance, real estate and business services;
9. Community, social and personal services;
Producers of Govt. Services;
Private Non-Profit Institutions Serving Households.

* *Footnote:* See Table 3 of Steering Committee and NBST Research Team (September 1985), *Study on Ways of Accelerating the Application of Information Technology in the Services Sector,* Parts 1 and 2. Report to the Sectoral Development Committee.

Table A1.2: *Ireland, NACE CLIO Codes and Groupings Used for Gross Fixed Capital Formation by Ownership Branch, in Services (EUROSTAT, 1986) (Irish data appear for each of 6 groups, separated by horizontal lines)*

EUROSTAT (1986) Table 7 list (9 items) Market Services		Corresponding R25 list (9 items) Market Services	Corresponding* R44 list (17 items) Market Services
5. (a)	56.	Recovery and repair services, wholesale and retail trade	55. Recovery and repair services
			57. Wholesale and retail trade
5. (c)	61.	Inland transport services	61. Inland transport services
(d)	63.	Maritime and air transport services	63. Maritime and air transport services
(e)	65.	Auxiliary transport services	65. Auxiliary transport services
5. (f)	67.	Communication services	67. Communication services
5. (g)	69A.	Services of credit and insurance institutions	69A Services of credit and insurance institutions
5. (b)	59.	Lodging and catering services	59. Lodging and catering services
(h)	74.	Other market services	71. Business services provided to enterprises
			73. Services of renting of immovable goods
			75. Market services of education and research
			77. Market services of health
			79. Recreational and cultural services, personal services, other market services n.e.c.
Non-Market Services 6.	86.	Non-market services	*Non-Market Services*
			81. General public services
			85. Non-market services of education and research
			89. Non-market services of health
			93. Domestic services and other non-market services n.e.c.

* See EUROSTAT (November 1978) *European System of Integrated Economic Accounts ESA* (Second Edition) "2. Classification and Coding of Branches and Products."

Table A1.3: *Selected 9-sector list, and concordance with ISIC (Table A1.1) and NACE-CLIO (Table A1.2) lists*

Selected 9-sector list, with short title	ISIC, Table A1.1	NACE-CLIO, Table A1.2	NACE-CLIO R44 List
(1) Trade	6A. Wholesale etc.	5. (a) Recovery etc.	55,57
(2) Transport*	7A. Transport etc.	5. (c), (d), (e), Inland etc.	61,63,65
(3) Communication	7B. Communication	5. (f) Communication etc.	67
(4) Finance and business	8A to 8C (part), Financial etc.	5. (g) Services of Credit etc.	69A
(5) Dwellings	8C (rest) Real Estate 6B. Restaurant etc.	5. (b) Lodging etc.	59,71,73
(6) Personal services	9A. Sanitary etc. 9C. Recreational etc. 9D. Personal etc. Private Non-Profit etc.	5. (h) Other market services	75,77,79
(7) Education	9B. (part) Educational services	6. Non-market services	81,85
(8) Medical	9B. (rest) Social etc. services		89,93
(9) Government	Producer of Govt. Services		

* Transport has been divided between (a) roads, (b) other capital stock, for capital stock and investment results of main report.R

Table A1.4 provides numerical verification of the Table A1.3 matchings of UN and EUROSTAT sectors, by means of Irish GFCF data for each of the three years 1970, 1975, 1980. Two groupings of UN sectors are required, to match EUROSTAT figures of which there are also required two groupings.

For capital stock derived from GFCF at 1980 prices in the main Report above, the following 7 service sectors emerge, using Table A1.3 9-sector list as base:

1 : (1) Trade
2 : (2) Transport (Part); Roads
3 : (2) Transport (Rest) and (3) Communication
4 : (4) Finance and Business
5 : (5) Dwellings
6 : (9) Government, confined to "Public Administration and Defence"
7 : (6) Personal services and (7) Education and (8) Medical denoted "Community, Social and Personal Services".

Table A1.4: *Numerical verification of Table A1.3 harmonisation of service sectors, by means of Irish GFCF data for years 1970, 1975, 1980 (£ million at current prices)*

Selected 9-sector list	U.N. (1986) data			EUROSTAT (1986) sector codes and data			
	1970	1975	1980	Sector	1970	1975	1980
(1) Trade	22.9	51.5	146.9	5.(a)	22.8	51.8	149.3
(2) Transport	47.3	58.6	207.8	5.(c)+(d)+(e)	47.2	56.5	159.6
(3) Communication	10.6	51.7	127.5	5.(f)	10.5	51.7	127.5
(4) Finance	5.7	18.5	98.4	5.(g)	5.7	18.6	127.1
(5) Dwellings	61.7	209.7	578.0				
(6) Personal	28.6	53.3	145.4				
((5) + (6))	(90.3)	(263.0)	(723.4)	5.(b)+(h)	90.2	264.1	731.0
(7) Education	12.5	23.6	63.1				
(8) Medical	6.0	21.7	51.9				
(9) Government	8.1	27.7	56.9				
((7)+(8)+(9))	(26.6)	(73.0)	(171.9)6.		26.5	73.0	174.0
Total Services	203.4	516.3	1,475.9	Total Services	202.9	515.7	1,468.5

Appendix 2

NOTE ON VAUGHAN (1980) TREATMENT OF NEW PURCHASES, SECOND-HAND PURCHASES, SALES OF FIXED ASSETS, STARTING STOCK

1. The scope of the estimation is confined to Manufacturing. The basic data are from respondents to the Census of Industrial Production (CIP). *All Sales* are assumed second-hand; thus second-hand purchases usually have asset sales deducted in the *computer* program treatment. But there is no second-hand category for land purchases, or for purchases of "other fixed assets".

2. *New Purchases*
    These are deflated, so as to be valued at 1958 (base-year) prices. They are scaled up by the UN Yearbook scaling factors (the same for all five categories of fixed assets) to cover such purchases by non-respondents to the CIP. They are depreciated linearly over the average life read in by the program. Undepreciated values are "gross"; depreciated values are "net". The gross values are entered in as stock during the average life of the asset, without any reduction in initial value.

3. *Second-Hand Purchases (Net of Sales)*
    These are deflated, so as to be valued at base-year prices. They are scaled up by the UN Yearbook scaling factors. They are further scaled up by factors 1/ALT to value them at *equivalent-new* values for treatment as *gross* stock. ALT assumes the purchase cost is directly proportional to remaining "useful life". ALT has value .75 for ¼ of second-hand, .50 for ½ of them, .25 for ¼ of them. The corresponding "useful life" is .75 of read-in average life with wgt. .25 (of full value deflated and scales), and .50 of life with wgt. .50, and .25 of life with wgt. .25, respectively.

    Equivalent-new and value unscaled by 1/ALT are treated separately; the equivalent-new is undepreciated and added to gross new stock, with the three wgts, and three useful life-spans just described. The unscaled and depreciated values, which are *net*, are added to net new stock, with the same assumed "useful life" and wgts. as described above for the gross equivalent-new. Depreciation is linear over each assumed useful life.

    For 1968-1973, second-hand purchases and sales were estimated, because CIP for those years did not distinguish second-hand.

4. *Starting Stock*

This is assumed to be given initially as written-down book values. These are deflated, so as to be valued at base-year prices. They are NOT scaled up by the UN Yearbook scaling factors. But they are scaled up by an "inflation corrector" ALC (plant, vehicles, other f.a.) or BLC (buildings) of value about 2. This parameter is computed by the program; it attempts to take account of price inflation of asset purchases during 8 years 1938-1945 for starting year 1945, or during 13 years 1938-1950 for starting year 1950. Gross starting stock is taken to be about twice the value of net starting stock.

A "new life" is estimated by the program via the Revenue Commissioners' approach, which depreciates the initial gross value of an asset by 90 per cent over a period of half the life read in. (See Vaughan formula (3.1 p. 30.) This "new life" is further extended to exclude effects of the (short) life of vehicles included with plant in written-down balance-sheet data of the 1938-1950 period (Vaughan form. (3.5) p. 33). The gross starting stock is reduced by CVFAC over the "new life" period just described, for plant and other fixed assets; the read-in life (80 years) is used for buildings and a 10-year life is used for vehicles. The net starting stock is reduced similarly by CFAC. These consumption factors CVFAC and CFAC are described in Vaughan (1980, p. 25).

5. *General Background and Refined Theory to Benchmark and Starting Values*

In order to construct capital stock indices, summation of capital stock purchases is required; given insufficient length of such a series, assumptions regarding a benchmark capital stock value is required. Such a benchmark may either be at the start of the series, as in Vaughan (1980), or at any intermediate or end point of the series, as employed in a few cases in the current paper. From the point of view of consistency of estimation, the date of the benchmark is not important. What is important however is the nature of the capital benchmark. In many cases the benchmark relates to accounting estimates of the capital stock, which usually correspond to historic cost written down values. In the absence of inflation, such would correspond to the PI definition of net capital stock; in the presence of inflation or deflation it would not however so correspond. Two adjustments are therefore necessary to estimate the current value of the gross capital stock from such data:

(i) Transformation from historic cost to current estimates of net capital

(ii) Transformation from net capital stock to gross capital at current values.

After estimation of the current value of the gross capital stock, the usual price deflators may then be used to transfer to the baseline value chosen for the series.

Regarding the particular values chosen for (i) and (ii), theory underlying the choice of these factors may be found in Vaughan (1980). *Ex post* the factors were shown to be about 2 in both cases, indicating a blow-up of about 4, to get from written down Historic cost to Current value gross stock. The present author uses this blow-up factor for periods other than 1945 and 1950. In Vaughan (1980) an explicit factor of 4 was not used; in each case the blow up was estimated from the formula on pp. 18-23. The case in (ii) is simplest to specify; for an asset of lifetime $(T - L)$, the net stock under linear depreciation is:

$$NS(T) = \int_{t=T-(T-L)}^{t=T} I(t) \frac{(t-T)}{(T-L)} \, dt \tag{1}$$

which under the assumption of zero growth in investment is given by,

$$NS(T) = \tfrac{1}{2} \dot{I} \, (T-L) \tag{2}$$

where $\dot{I}$ is the average and constant gross investment per year during period $(T-L)$. Gross stock is defined by,

$$GS(T) = \int_{t=T-(T-L)}^{t=T} I(t)dt = \dot{I}(T-L) \tag{3}$$

again under zero growth of investment, so we have the immediate identification of

$$GS(T) = 2NS(T) \tag{4}$$

indicating gross stock as being twice net stock, at time T. However, in the presence of growth at rate g, we have,

$$GS(T) = I_L \{e^{g(T-L)} - 1\}/g \tag{5}$$

While

$$NS(T) = I_L \{e^{g(T-L)}(g(T-L) - 1) + 1) +)\}/(T-L) \, g^2 \tag{6}$$

Thus,

$$\frac{GS(T)}{NS(T)} = \{e^{g(T-L)} - 1\} \{T-L\} \, g/[e^{g(T-L)} (g(T-L)-1) + 1] \tag{7}$$

In the presence of growth, the ratio of gross stock to net stock is less than

two; for example, for g = .03 and (T−L) = 20, ratio (7) has the value 1.82.

Now consider the factor (i), the ratio of net capital stock at current cost to the net capital stock at historic cost. In general we have:

$$\frac{NSC}{NSH} = \frac{(g+\pi)}{g} \quad \frac{e^{(g+\pi)(T-L)} \left[(T-L) - (1/g)\right] + (1/g^2) e^{\pi(T-L)}}{e^{(g+\pi)(T-L)} \left\{(T-L) - (1/g+\pi))\right\} + (1/(g+\pi)^2)} \tag{8}$$

while for the particular case of zero growth

$$NSC = \pi^2 (T - L)^2/2\{\pi(T-L) - 1 + \exp(-\pi(T-L)\} \tag{9}$$

where inflation occurs at the constant rate π throughout the preceding period. (The more complicated estimates in Vaughan (1980) was an attempt to model the inflation/deflation of experience in the 1920-40s in Ireland.)

The important point to note is that the choice of blow up factor is crucially dependent on π, g, and the lifetime of assets. Although *ex post*, the combined effects of (i) and (ii) amounted to a factor of around 4 in 1950, in general this factor would not remain the same for other periods. As an example, for $\pi = 0.06$, g = 0.03, and a lifetime (T-L) of 20 years the factors are:

For blow up from Historic to current cost   1.39;
For blow up from Net Stock to Gross Stock   1.82;
Combined effect   2.52.

Appendix 3

METHODOLOGY OF ESTIMATING THE VALUE OF IRISH AGRICULTURAL HOLDINGS (INCLUDING FARM BUILDINGS AND FARMHOUSES) AT 1980 PRICES

PART 1: HOLDINGS (INCLUDING FARMHOUSES)

The following brief description covers the eight main aspects of the methods used to value agricultural holdings at 1980 prices. One table (A3.1) below shows the 1980 land prices used; a second table (A3.2) shows the 1980 estimated land-area of various size-groups.

(1) Only land on farms was valued. Farms include holdings of 1 acre and upwards. Thus the chosen area omits non-agricultural land (parks, commonages, etc.) used for grazing. For 1980 the total area to be valued was about 12.5 million acres, comprising 11.6 million acres of crops and pasture, and 900,000 acres of other land.

(2) The area of land on farms is not available for separate size-groups for most years of the period 1950-1984, and must accordingly be estimated from the published numbers of holdings by size-group. The numbers of holdings must themselves be estimated by interpolation, for years not having numbers of holdings available, typically 4 years out of every 5 years.

(3) To estimate the area by size-group, it was necessary to calculate the average size of farm in each of the published size-groups. These averages are not the medians of the size-group ranges. The medians are in general 7.6 per cent too high; they were therefore reduced by this percentage, and these reduced acreages applied to the published or estimated number of holdings in each size-group for each year.

(4) The set of 1980 farm values was obtained by multiplying the areas in the different size-groups by the estimated size-group price obtained from the Valuation Office. (Data kindly provided by Dr Paul Kelly of An Foras Talúntais were not detailed enough for the 1980 valuation experiment on hand.)

Within each of 10 size-groups *across counties*, it was therefore possible to get a 1980 national average per-acre price for each of 10 size-groups. For all other years these 10 per-acre prices were applied to the estimated national acreage in each of the 10 size-groups, to give a *preliminary* value estimate for all years except 1980. The adjustment for quality of land, under point (5) following, was applied to these preliminary estimates.

(5)   It was assumed that the quality of the holding is not the same each year. Land quality is improved by the depreciated value of the land rehabilitation project. The quality of the holding is further improved by the depreciated value of farmhouses and farm buildings being added annually. Hence, to get the 1979 value at 1980 prices, a preliminary estimate is first obtained as the product of 1979 land by 1980 prices (in each of 10 national size-groups). From this estimate one deducts the value of 1979 land rehabilitation and new farmhouses and new farm buildings at 1980 prices. A similar method is applied for other years, taking into account the cumulative value of land rehabilitation plus farmhouses and farm buildings constructed in the years before (or after) 1980, reduced by depreciation.

(6)   *Main data sources:* Among the background data sources an important report is that of Gilmore (September 1959) which includes a 1958 valuation of land and buildings and farm machinery. Various issues of the *Statistical Abstract of Ireland* show detailed acreages of crops and pasture, etc., as well as numbers of agricultural holdings in different size-groups of acreage. In recent years the *Irish Statistical Bulletin* carries similar size-group data, with acreage as well as number of holdings, per size-group. Some information of this kind was also obtained by the author directly from the Central Statistics Office, whose kind co-operation is appreciated. The specially detailed 1980 sample data on farm sales were provided by the Valuation Office.

(7)   Table A3.1 shows the 1980 per-acre average sales prices used to value the 1980 estimated areas in each size-group within each county. These are derived from Valuation Office data which related to 20 counties. Judgements were made as to which price-per-acre was appropriate for counties and size-groups not covered by satisfactory sample estimates. A perusal of Table A3.1 entries will show that price-per-acre varies considerably between counties, and across size-groups within counties. It is also apparent that the price-per-acre for 50-100 acre holdings was generally used for holdings of larger size. The per-acre price of small holdings was relatively large, because of the effects of the value of farmhouses and buildings.

Table A3.1: *Average per-acre 1980 sales — prices used for holdings in each size — group, within counties, to value Irish agricultural holdings*

										£
Province, County, or Sub-County	1 to 5 acres	5 to 10 acres	10 to 15 acres	15 to 30 acres	30 to 50 acres	50 to 100 acres	100 to 150 acres	150 to 200 acres	200 to 300 acres	300 acres and upwards
LEINSTER										
Meath	3,984	3,781	2,761	3,271	2,294	1,873	2,966	1,873	1,873	1,873
Kildare	2,056	2,400	3,887	3,476	2,549	2,984	2,984	2,984	2,984	2,984
Louth	3,519	3,719	1,983	4,432	4,441	3,425	3,425	3,425	3,425	3,425
Wicklow	4,384	3,582	2,360	3,602	3,610	1,095	1,280	1,095	1,095	1,095
Wexford	3,742	1,719	1,849	1,959	1,481	1,244	1,244	1,244	1,244	1,244
Carlow	3,352	2,739	1,804	2,128	1,617	1,893	1,893	1,893	1,893	1,893
Kilkenny	3,000	3,215	2,118	1,402	1,961	1,520	1,520	1,520	1,520	1,520
Dublin	4,384	4,830	3,887	4,432	4,441	3,425	3,425	3,425	3,425	3,425
Laois	2,887	2,359	1,554	1,421	1,183	1,304	1,304	1,304	1,304	1,304
Offaly	3,062	2,502	2,635	1,592	1,671	1,600	1,600	1,600	1,600	1,600
Westmeath	3,500	1,881	1,185	1,528	1,531	1,792	1,792	1,792	1,792	1,792
Longford	2,575	2,240	1,476	1,124	1,126	1,318	1,318	1,318	1,318	1,318
MUNSTER										
Cork	2,706	4,830	2,226	2,183	2,130	2,131	2,131	2,131	2,131	2,131
Limerick	4,000	1,841	1,766	2,446	2,147	1,603	1,603	1,603	1,603	1,603
Tipperary	4,148	2,999	2,051	1,522	1,777	2,134	2,036	2,036	2,036	2,036
Waterford	2,875	2,621	1,589	758	789	924	1,138	924	924	924
Kerry	3,287	1,918	1,667	1,592	1,491	1,217	1,217	1,217	1,217	1,217
Clare	2,573	1,987	1,571	738	834	830	830	830	830	830
ULSTER										
Cavan	3,087	1,071	1,402	957	624	730	730	730	730	730
Monaghan	2,519	2,342	1,356	1,250	1,225	1,434	1,434	1,434	1,434	1,434
Donegal	1,427	1,127	1,196	680	638	760	760	760	760	760
CONNAUGHT										
Galway East	3,942	2,207	1,137	1,072	1,019	1,386	1,386	1,386	1,386	1,386
Sligo	5,370	4,388	1,346	800	770	968	968	968	968	968
Roscommon	2,211	1,577	1,562	932	1,112	1,009	1,009	1,009	1,009	1,009
Leitrim	2,934	2,397	1,579	545	555	650	650	650	650	650
Galway West (Clifden & Oughterard)	2,062	1,685	1,110	652	653	198	198	198	198	198
Mayo	2,573	1,987	1,571	738	834	830	830	830	830	830

(8)   Table A3.2 shows a breakdown of the 12.5 million acres of 1980 farm-land between size-groups within counties. Readers are asked to note that the detailed areas are estimates, *not to be regarded as precise or accurate measures*. They are derived from assumptions about the adjusted median acreage

Table A3.2: *Estimated 1980 Land-Area in Irish Agricultural Holdings of Various Size-Groups Within Counties*

thousand acres

Province, County, or Sub-County	1 to 5 acres	5 to 10 acres	10 to 15 acres	15 to 30 acres	30 to 50 acres	50 to 100 acres	100 to 150 acres	150 to 200 acres	200 to 300 acres	300 acres and upwards	Total
LEINSTER											
Meath	2.10	5.74	5.37	39.28	66.40	116.32	69.51	54.96	69.28	75.04	504.00
Kildare	2.49	3.71	3.82	17.31	33.33	68.59	53.12	40.58	50.58	55.80	329.33
Louth	1.82	4.09	4.92	18.58	21.99	43.58	22.05	16.00	16.40	16.93	166.36
Wicklow	1.64	2.47	2.73	11.89	24.61	77.87	56.58	36.05	28.41	41.95	284.20
Wexford	2.71	4.01	4.65	19.35	46.67	152.63	109.58	66.12	54.96	34.25	494.93
Carlow	.87	1.40	1.73	8.23	17.55	57.09	38.45	23.92	23.33	11.54	184.11
Kilkenny	1.63	2.29	2.83	14.69	41.57	133.16	95.38	59.17	54.96	34.63	440.31
Dublin	2.10	3.08	2.97	10.70	13.86	29.86	18.36	13.90	18.01	24.24	137.08
Laois	1.42	2.64	3.23	16.57	37.13	103.58	62.01	43.65	35.79	22.71	328.73
Offaly	1.37	2.72	3.48	18.44	48.04	108.98	63.62	35.73	33.49	31.17	347.04
Westmeath	1.58	2.89	3.93	25.15	54.32	105.72	51.61	35.24	38.10	35.78	354.32
Longford	.68	2.49	4.99	29.76	46.11	66.58	25.17	11.32	9.70	6.54	203.34
MUNSTER											
Cork	5.94	8.97	12.32	68.09	175.36	497.02	341.09	160.85	114.54	72.34	1,456.52
Limerick	2.77	4.97	5.88	33.52	87.02	223.08	116.28	50.28	35.10	19.24	578.14
Tipperary	3.34	5.28	6.30	36.56	93.78	277.68	173.55	99.58	93.30	60.41	849.78
Waterford	1.68	2.05	2.41	10.41	24.68	87.50	76.90	45.10	46.19	37.71	334.63
Kerry	4.79	9.12	12.55	64.97	132.87	287.86	119.16	53.35	51.96	78.51	815.14
Clare	1.80	4.06	6.03	50.98	110.66	225.58	94.68	47.04	39.49	47.34	627.66
ULSTER											
Cavan	1.20	4.84	10.97	62.77	96.99	133.09	39.37	12.77	7.62	6.93	376.55
Monaghan	1.30	5.55	10.65	51.28	71.09	99.14	24.94	6.95	4.62	4.24	279.76
Donegal	8.33	20.28	24.09	85.34	103.02	183.73	93.88	57.87	57.73	72.34	706.61
CONNAUGHT											
Galway East	2.03	7.05	10.69	104.05	231.27	287.24	75.05	30.39	25.87	24.24	797.88
Sligo	1.20	4.15	9.34	63.10	79.04	104.75	28.06	10.67	9.93	12.70	322.94
Roscommon	1.03	4.71	10.84	82.18	135.38	165.44	42.38	16.17	9.47	5.78	473.38
Leitrim	.62	3.17	8.40	58.07	78.30	94.98	20.55	6.14	4.16	4.61	279.00
Galway West (Clifden and Oughterard)	1.14	7.25	9.43	22.51	17.66	15.94	4.39	3.07	3.70	25.78	110.87
Mayo	4.68	15.71	30.06	178.99	187.74	186.99	41.92	15.03	16.40	29.63	707.15
Total	62.26	144.69	214.61	1,202.77	2,076.44	3,933.98	1,957.64	1,062.90	953.09	892.38	12,489.76

of each size-group. They are not based on any actual sample-average farm-size results within size-groups within counties.

Within size-groups for the State as a whole, however, it is clear that farms of 50-100 acres take some 4 million acres of the 12.5 million total, with

those of 30-50 acres and 100-150 acres each taking some 2 million acres. Of four other size-groups, of 15 acres and upwards, each takes roughly 1 million acres. Holdings of less than 15 acres have a negligible share, comprising less than half-a-million acres in aggregate.

PART 2: FARMHOUSES AS SUCH

The first section of this present Part 2 compares Census of Population counts of numbers of farmhouses (or their equivalents) with the total number of dwellings, over the period 1946-1981. It is also shown that CSO official counts of numbers of agricultural holdings of 1 acre and upwards for 1946-1970, at five-year intervals, approximate closely the numbers of farmhouses as per Census of Population.

The second section shows how to estimate a gross value for farmhouses, as a share of the gross value of total dwellings, allowing for improvement in the "quality" of farmhouses, between 1950 and 1984.

1: *Numbers of Farmhouses and Agricultural Holdings*

Table A3.3 shows Census of Population numbers of "private" dwellings (as distinct from hospitals, institutions, etc.) for each of five years of the period 1946-1981, the only years for which these data are available. These numbers increase steadily, from some 663,000 for 1946 to 896,000 for 1981. The second item shown for each of the five years is the Census equivalent of "farmhouses" and shows decreasing numbers, from some 308,000 for 1946 to 253,000 for 1971. The 1981 figure of 150,000 "farm households" is clearly an anomaly and not part of the previous series; the textual comment reveals that it is a new definition not previously used.

Various issues of the *Statistical Abstract of Ireland* give numbers of agricultural holdings, from which the numbers of 1 acre and larger can be found. The numbers are counted at roughly five-year intervals, and those of 1 acre and upwards, for 1946 and later years, are as follows:

1946	321,192;	1950	317,619;	1955	313,287;
1960	290,308;	1965	283,456;		
1970	279,450;	1975	269,827;		
1980	263,558;	1984	an estimate of 261,000.		

Comparison with respective "farmhouse" equivalent numbers of Table A3.3 for nearest year shows good agreement for each of 1946, 1960, 1965, 1970, with

Table A3.3: *Census of Population Counts of Dwellings and Farmhouses, 1946-1981*

Year	Number	Description	Source
1946	662,654	Private dwellings	Table 167 (p.181) Census of Population of Ireland 1946 and 1951: General Report
1946	307,723	Farm dwellings	Table 182 (p.196) of same.
1961	676,402	Private dwellings	Table 14 (p.79) Census of Population of Ireland 1961, Volume VI.
1961	301,774	Farm dwellings	Table 32 (p.160) of same.
1966	687,304	Private dwellings (same as private households)	Table 1 (p.11) Census of Population of Ireland 1966, Volume VI.
1966	267,547	Private households with agricultural land	Table 21 (p.129) of same.
1971	726,363	Private households	Table 2 (p.2) Census of Population of Ireland 1971, Volume VI.
1971	252,986	Permanent housing units with agricultural land	Table 20A (p.168) of same.
1981	896,054	Private households	Table 2 (p.3) Census of Population of Ireland 1981, Volume 8.
1981	150,372	Farm households	Table 21A (p.168) of same.

"holdings" exceeding "farmhouses" in three years out of four. It is likely that some 250,000 "farmhouses" is a better estimate of the matched series for 1980-1981 than the 150,000 "farm households" shown in Table A3.3 as resulting from the new definition used in the Census. The 1984 estimate of 261,000 holdings is made by the writer, based on the trend derived from a *new* CSO series of "farms" in hectares, started since 1980.

In conclusion, it seems reasonable to use the above counts of "holdings" as a projector of the trend in the numbers of farmhouses, towards estimating their value, in the second section following.

2. *Estimating a Gross Value for Farmhouses*

The basic objective is to estimate a rough trend in the farmhouse gross value per agricultural holding. This trend value can then be applied to the numbers of holdings listed above, to yield farmhouse gross values at five-year intervals, in general.

The "quality" of the farmhouse dwellings needs to be taken into account. Perusal

of the Census volumes listed in Table A3.3 reveals that rural dwellings have lacked major amenities of urban dwellings, such as piped water, sewerage, and electricity. This lack was much more apparent in the earlier years than in recent years, i.e., an improvement in quality with the passage of time is apparent. However, this effect can be included (in a very "rough and ready" way) into the relative valuation of farm houses, as a scaling factor of 0.5 for 1950, increasing by 1 per cent per year linear, i.e., from 50 per cent of non-farmhouses for 1950 to 80 per cent for 1980.

The trend-value per agricultural holding has to be derived from the data for the five years 1950, 1961, 1966, 1971, 1981. A 1950 estimate of a total of 669,400 houses (as stated in Section 10.4 of Chapter 10 above) is reasonable, as is 306,000 farmhouses.

Table A3.4 shows the details of estimating the trend-value. The numbers of holdings of 1 acre and upwards, for these years, have been estimated by interpolation of published data.

The workings in the table are explained in the column headings. The farmhouse trend-value to emerge per holding, shown in column (11), increases from £3,104 for 1950 to £10,371 for 1981, at 1980 prices. These five values have been fitted to a parabolic graphical curve, to show the estimates set out in Table A3.5. In that table there also appear the numbers of holdings already quoted above for 8 selected years, and the derived estimated values of farmhouses. These

Table A3.4: *Estimation of Farmhouse Trend-Value per Agricultural Holding, at 1980 Prices*

Year	Total No. of private dwellings (1) 000	No. of non-farm dwellings (2) 000	No. of farm-houses (3) 000	Quality factor (4)	(3)x(4) No. of farm-houses adjusted (5) 000	Adjusted No. of dwellings (2)+(5) (6) 000	Value of all dwellings at 1980 prices (7) £m	Value per adjusted dwelling at 1980 prices (7)/(6) (8) £	Farm-house Value at 1980 prices (8)x(5) (9) £m	No. of ag. holdings 1 acre+ upwards (10) (10) 000	Trend value of farmhouse per holding at 1980 prices (9)/(10) (11) £
1950	669.4	363.4	306.0	0.50	153.0	516.4	3.327	6,443	985.8	317.6	3,104
1961	676.4	374.6	301.8	0.61	184.1	558.7	4,386	7,850	1,445.2	288.9	5,002
1966	678.3	410.8	267.5	0.66	176.6	587.4	5,175	8,810	1,555.8	282.7	5,503
1971	726.4	473.4	253.0	0.71	179.6	653.0	6,421	9,833	1,766.0	277.5	6,364
1981	896.1	646.1	250.0	0.81	202.5	848.6	11,413	13,449	2,723.4	262.6	10,371

are in harmony with the figures of Table A3.4 column (9), which show increasing gross value, from some £1,000m for 1950 to £2,700m for 1981.

Table A3.5: *Estimation of Farmhouse Gross Values at 1980 prices*

Year	Estimated No. of holdings of 1 acre and upwards 000 (1)	Estimated farmhouse gross value per holding at 1980 prices £000 (2)	Estimated farmhouse gross value at 1980 prices (1)x(2) £ million (3)
1950	317.6	3.1	984.6
1955	313.3	3.8	1,190.5
1960	290.3	4.7	1,364.4
1965	283.5	5.5	1,559.3
1970	279.5	6.7	1,872.7
1975	269.8	8.2	2,212.4
1980	263.6	10.0	2,636.0
1984	261.0	11.6	3,027.6

Appendix 4

POSSIBLE GROSS FIXED STARTING VALUES FOR THE FIVE GROUPS OF SERVICES, DERIVED FROM UK DATA, WITH SCRAPPING RATES

There is close similarity of method and data sources across the five groups of Services treated in Chapter 10 above, in deriving possible Irish end-of-1950 gross starting values from UK data. For this reason, all five groups are treated together in the present Appendix, rather than being treated separately in different parts of Chapter 10. The word "possible" is used to indicate that the gross starting values discussed here and shown in Table A4.1 are not necessarily used without modification, to obtain the fixed capital stock of Chapter 10 above. The discussion in that chapter explains how Table A4.1 estimates are in fact used.

A summary outline of procedures used to obtain these gross starting value estimates will suffice. UK data were available, to give 1950 end-of-year gross fixed stock per employee in various activities. An Irish level of *about half of these UK gross capital stock/employee values* was judged appropriate, in view of the 1951

Table A4.1: *Estimated Gross Starting Stock at End of 1950 in Irish Service Sectors, with 1951 Employment*

Sector	Employment (000)	Buildings	Motor Vehicles	Other Transport Equipment	Other Machinery and Equipment	Total
				£ million at 1980 prices		
Trade (wholesale and retail)	137.76	406.5	117.7	—	176.3	700.5
Transport and communication	56.75	827.4	24.6	186.9	61.5	1,100.4
Finance and business	32.79	174.5	3.4	.	28.3	206.2
Community, social, personal	166.60	627.8	10.2	.	68.3	706.3
Public Administration and Defence	40.53	236.2	14.3	.	50.3	300.8
Total	434.43	2,272.4	170.2	186.9	384.7	3,014.2

dwellings' comparisons of Chapter 11 above. Irish GFCF data for 1950-1960 were used to estimate the 1950 share, within each major sector, of the starting stock to be allocated to (a) buildings, (b) motor vehicles, (c) other transport equipment, (d) other machinery and equipment. Table 6.3 price inflators were used to re-value 1950 stock at 1980 prices.

The basic UK data appear in Tables 61, 62, 68 of Central Statistical Office (1964) and in Table 135 of Central Statistical Office (1960). Irish 1951 employment data are taken from Tables 1 and 2 of Central Statistics Office (1954).

The discussion of dwellings in Section 11.4 of Chapter 11 above shows that CSO Irish data for 1950 comprise the core of the 1950 Irish benchmark estimate, and that UK per capita data show about twice the Irish level. For the five service groups the latter approach is used, i.e., an Irish level of about half the UK stock per employee has been used. This has been done for 1950, not for 1984, which means in effect that all capital stock investment since 1950 will reduce the significance of starting-stock errors, as will the scrapping effects of the starting stock. The writer has strong reservations about making Irish 1950 per-employee gross capital stock the same as that of the UK, because of the strong urban content of UK services, including Greater London, as well as a UK per capita 1952 expenditure about twice that of Ireland (also mentioned in Chapter 11, Section 11.4).

To reach the Irish end-of-1950 gross starting stock estimates, Irish numbers employed were multiplied by half the UK relevant capital stock per employee. Nine sub-sectors were estimated individually within "transport and communication", 8 sub-sectors within "finance and business", 3 sub-sectors within "community, social, personal" services. For gross capital stock estimation of the latter sector, 53,000 domestic servants were omitted from the "personal services" sub-sector because the capital stock used by them comprises dwellings and domestic consumer durables.

Table A4.1 summarises the gross starting stock estimates amounting to some £3,000m at 1980 prices. After the omission of 53,000 domestic servants, the remaining 381,000 employees required some £7,900 of capital stock each, on average, according to those estimates.

The following scheme of *scrapping* is proposed: *Buildings:* take off 1.5 per cent linear per year. *Motor vehicles:* take off one-sixth over each year 1951-1954, one-twelfth over the next 4 years. *Other transport equipment:* take off 6 per cent over each year 1951-1962, 4 per cent over the following 7 years. *Other machinery and equipment:* take of 5 per cent over each year 1951-1965, 2.5 per cent over the following 10 years.

These rates of scrapping allow for partly used assets among the gross starting stock, by reducing the stock at a relatively fast rate during the earlier years.

Appendix 5

FORESTRY DEVELOPMENT

1: *General Introduction, Sources and Coverage*

Introduction

The first part of this Appendix provides a general introduction to gross and net fixed stock estimates of forestry development, as well as its data sources and coverage. The second part discusses methodology of estimation and how to provide starting values. The third presents and discusses gross and net fixed stock estimates, for the usual period 1950-1984 and at 1980 prices. The fourth part offers a 1977 benchmark estimate of the value of standing timber and refers to a market valuation of the State Forestry estate proffered by an expert.

The treatment of forestry has given rise to several problems of data and estimation. Some of the problems are due to the fact that the Department of Forestry did not find it possible to co-operate fully with the writer in the present study. As a result, the value of standing timber is not included as working stocks in the capital asset time-series. These are confined to the value of forestry development, including the value of the land, mainly in State Forestry but also including some allowance for private forestry. Both gross and net estimates have been made.

However, in Part 4 of this Appendix a more comprehensive measure of valuation will be referred to. An expert's evaluation of State Forestry at the end of 1983, in terms of its market value for purposes of sale or purchase, will be considered. This value implicitly includes standing timber as well as development costs, and is confined to the single year 1983.

Sources

In general, regarding forestry development the GFCF annual control totals (at current prices) are to be found in tables such as Table A21 (pp. 40-41) of *National Income and Expenditure 1983 and 1984* which shows Public Authorities' Gross Physical Capital Formation on "Forest Development (including acquisition of land)". These GFCF data include small amounts of grants to private forestry, but almost completely relate to State Forestry. Other main data sources comprise three:

(1)   the Department of Finance annual *Estimates for the Public Services* which has a Vote for Forestry giving GFCF detail as required;

(2)   the Department of Fisheries and Forestry (1982) Report of the Minister on the Forest and Wildlife Service, and other issues;

(3)   The Convery (1979) report *Irish Forestry Policy.*

Coverage and Scope

For the period 1950-1984, nine components of forestry development, as outlined above, have been included in the fixed capital stock estimation. They are not listed, with average life used for the stock estimation:

(a)   land held for forestry and further acquisition of land: indefinitely long,

(b)   grants for private forestry: indefinitely long,

(c)   nurseries: 50 years,

(d)   establishment of plantations: 50 years,

(e)   new roads and buildings: 25 years,

(f)   amenity development: 40 years,

(g)   J.F. Kennedy Park: 40 years,

(h)   other items: 25 years,

(i)   plant, machinery, vehicles: 20 years.

.   The allocation of a 50-year life to (c) and (d) assumes that the land will not be fully cleared for about 50 years; this is a reasonable "expected value" proposed by the writer, on the basis of Convery (1979) data.

In attempting to find suitable price inflators for items (a) to (i) above, the Table 6.3 inflator "transport equipment" was applied to (i); "other buildings", etc., was applied to (e), (f), (g); "total GFCF" was applied to the rest.

2: *Starting Values and Methodology of Stock Estimation*
   Starting Values and Clearfelling as Scrapping

Table 50 (p. 61) of the *Statistical Abstract of Ireland 1953* shows 288,799 acres of "woods and plantations" existing in 1949. This area of 116,876 hectares is used for end-of-1949 stock purposes. During 1980, the State purchased 4,282 hectares of land for forestry purposes, costing £1,081,000 per data source (2) of Part 1 above. This gives an average 1980 cost of £252.45 per hectare, to be applied to the 116,876 hectares of 1949. Thus a starting stock value of £29.506m is estimated for the land component of forestry development at the end of 1949, at 1980 prices.

The value of £252 per hectare of land purchases during 1980 for Forestry

development is equivalent to £100 per acre. By reference to Table A3.1, it is clear that the price of £100 per acre is very low by comparison with prices shown for agricultural holdings, even in Donegal, Leitrim and Galway West. The 1980 State purchases for Forestry were unsuitable for agriculture, as indicated by the price.

It is impossible to say how much of the full 117,000 hectares of 1949 land under forestry would be suitable for agriculture of a profitable nature. But perhaps the £100 per acre price might be regarded as minimal. Even a trebling of the 1950 initial land stock of £30m (at £100 per acre) would add only some £60m to the figures of Table A5.1 column (4), thus increasing (say) the 1960 value of some £200m by only 30 per cent.

On the basis of data for 1950-1959 under headings (c) nurseries, (d) plantations and (e) construction of Part 1 above, related to 66,201 hectares planted by Stated Forestry during the same decade (Appendix Table 5, pp. 210-211 of Convery, 1979), the following average cost per hectare (at 1980 prices) emerges: nurseries £147.84; establishing plantations £240.48; new roads, etc., £451.20. By application of these to the 1949 forestry acreage, the starting values to result are as follows: nurseries £17.279m; establishing plantations £28.106m; new roads, etc., £52.735m. Thus, with inclusion of the land value £29.506m the estimate of the Forestry starting stock (end-of-1949) is £127.626m at 1980 prices. This includes private forestry and State forestry. A possible stock of machinery and vehicles is ignored, because of problems of estimation; as no data on machinery appear for years before 1959 in the published sources quoted above.

The question arises as to how these starting values should be scrapped over the period 1950-1984. *Scrapping may be identified with clearfelling,* according to the following statement on UK methodology of Forestry stock estimation, taken from the Central Statistical Office (1985): "For forestry, gross and net capital stock are calculated as the product of the area of forestry plantation and the cost of replacement per hectare. Gross and net capital stock are the same, since a forest is not 'consumed' until it is felled. Capital consumption is the plantations felled valued at their replacement cost per hectare" (p. 201).

Thus, given annual data for clearfelling, the scrapping of the Irish starting stock could be estimated,. The per hectare data above give a cost of £839.52 at 1980 prices, *including land,* for forestry establishment (£147.84 + £240.48 + £451.20).

Mr Michael Brophy of the Forest Service (Department of Energy) has kindly provided the writer with clearfell hectare estimates for each year of the period 1966-1984. On the basis of these estimates, an annual 400 hectares of clearfelling can be postulated as a reasonable estimate for each year of the period 1950-1965. Thus cumulated scrapping, by way of clearfelling, can be deducted from the starting value of £127.6m quoted above for the end of 1949, at 1980 prices.

Table A5.1: *Fixed Stock of Forestry Development at End of Year, 1950-1984, at 1980 prices*

£ million

	GROSS STOCK				NET STOCK			
Year	Land and grants for private forestry (1)	Nursery and plantation establish. (2)	Roads construction, all other items (3)	TOTAL GROSS (4)	Land and grants for private forestry (5)	Nursery and plantation establish. (6)	Roads, construction, all other items (7)	TOTAL NET (8)
1950	30.0	46.6	53.5	130.1	30.0	46.6	53.5	130.1
1951	30.6	49.0	57.1	136.7	30.6	49.0	57.1	136.7
1952	31.5	51.0	58.5	141.0	31.5	51.0	58.2	140.7
1953	32.7	52.9	60.5	146.1	32.7	52.9	60.1	145.7
1954	33.7	54.7	62.8	151.2	33.7	54.7	61.9	150.3
1955	34.3	56.2	66.3	156.8	34.3	56.2	65.0	155.5
1956	35.1	58.4	70.4	163.9	35.1	58.4	68.6	162.1
1957	35.8	61.1	75.5	172.4	35.8	61.1	72.9	169.8
1958	36.9	64.8	78.2	179.9	36.9	64.8	74.6	176.3
1959	38.1	68.5	81.2	187.8	38.1	68.5	76.6	183.2
1960	39.4	72.6	84.7	196.7	39.4	72.6	79.7	191.7
1961	40.4	76.7	88.6	205.7	40.4	76.7	82.3	199.4
1962	41.3	81.1	92.1	214.5	41.3	81.1	84.2	206.6
1963	43.3	86.0	95.6	224.9	43.3	86.0	86.1	215.4
1964	44.0	90.6	99.9	234.5	44.0	90.6	88.7	223.3
1965	44.9	95.7	103.1	243.7	44.9	95.7	89.6	230.2
1966	45.7	100.9	106.2	252.8	45.7	100.9	90.5	237.1
1967	46.5	106.9	109.5	262.9	46.5	106.9	91.5	244.9
1968	47.4	112.5	113.4	273.3	47.4	112.5	92.9	252.8
1969	48.3	118.5	117.5	284.3	48.3	118.5	94.4	261.2
1970	50.1	123.5	123.0	296.6	50.1	123.5	97.1	270.7
1971	51.9	129.2	126.5	307.6	51.9	129.2	97.6	278.7
1972	53.3	135.4	129.7	318.4	53.3	135.4	97.6	286.3
1973	54.3	141.0	133.0	328.3	54.3	141.0	97.6	292.9
1974	55.1	144.8	135.4	335.3	55.1	144.8	96.6	296.5
1975	55.9	150.1	141.5	347.5	55.9	150.1	97.1	303.1
1976	56.6	155.4	140.6	352.6	56.6	155.4	96.5	308.5
1977	57.4	159.4	143.0	359.8	57.4	159.4	96.6	313.4
1978	58.5	162.9	145.6	367.0	58.5	162.9	97.6	319.0
1979	59.1	166.1	147.4	372.6	59.1	166.1	98.4	323.6
1980	60.2	169.5	148.7	378.4	60.2	169.5	99.9	329.6
1981	63.1	172.7	150.5	386.3	63.1	172.7	102.5	338.3
1982	66.0	175.9	151.4	393.3	66.0	175.9	104.9	346.8
1983	68.4	179.4	154.1	401.9	68.4	179.4	107.9	355.7
1984	71.0	182.7	156.8	410.5	71.0	182.7	108.6	362.3

As the scrapping excludes land as such, the land clearfelled remains as part of the fixed stock of State Forestry, and is available for replanting

Methodology of Stock Estimation

A summary description of methodology should suffice, in view of coverage in Chapters 2 and 5 above. The gross fixed stock of forestry development may first be considered. The starting stock is carried forward from the end of 1949 by depleting or scrapping it each year at £839.52 per hectare clearfelled.

The other components of the year-end gross fixed stock are obtained by cumulating items of the nine components (a) to (i) listed above under "Coverage and Scope" in Part 1 of this Appendix, valued at 1980 prices. The average life values quoted there are used to determine how long each annual entry is kept before scrapping.

In estimating the net stock, there is the same value series for the starting stock as is estimated for gross stock purposes. The quotation given above from the Central Statistical Office (1985, p. 201) covers the point at issue. Five of the nine components (a) to (i) are depreciated linearly over their average lives as quoted. Zero depreciation applies to components (a) and (b) which are land acquisition or its equivalent, and likewise for (c) and (d) which are scrapped after 50 years of average life. These nursery and plantation components are taken to have identical gross and net values.

3:Gross and Net Fixed Stock Estimates of Forestry Development

The fixed stock outcome of the data and methods described in Parts 1 and 2 above appears in Table A5.1. The gross aggregate for the end of each year is given in column (4), with three components shown in columns (1) to (3). Corresponding net estimates occupy columns (5) to (8), the aggregate net value series appearing in column (8).

The land-type items (a) and (b) of Part 1 above occupy column (1). For identical gross and net values, the same figures appear also in column (5). The component for grants towards private forestry is generally negligible. Included is a starting value of some £30m for all land under forestry in 1949. We see that the value increases steadily over the years so as to be £71m at the end of 1984, thus showing an increase of about £41m. An alternative estimate of this increase is available, showing some £70m as the value of the 280,000 hectares purchased for State Forestry during 1950-1984 (per Appendix 8 of the 1984 Report of the Minister), valued at the 1980 average price £252.45 per hectare used above in Part 2 for the starting value. This alternative estimate would indicate that the column (1) trend of values from £30m to about £70m could be replaced by a trend from £30m to about £100m.

Column (2) shows the estimated value of nursery costs and plantation

establishment, at 1980 prices, items (c) and (d) of Part 1 above. Corresponding identical net values appear in column (6). These values also increase steadily, from £47m for 1950 to £183m for 1984. The starting stock value included throughout decreases from £45m at the start of 1950 to about £38m at the end of 1984, through clearfelling effects explained above.

All other items (e) to (i) of Part 1 above are combined to shows column (3) gross results. These start at about £54m for end of 1950, then increase to reach £157m for the end of 1984. Included in this is a fairly negligible plant and machinery component, ranging from zero for 1958 to some £19m for 1984. The "amenity development" plus "J.F.K. Park" combined are also quite small, reaching only some £14m at the end of 1984, from zero in 1964. It follows that the roads, etc., and "other items" are the dominant component in this group.

The combined gross estimate for all components of forestry development including land values appears as the total figure of column (4). It increases from £130m for 1950 to £411m for the end of 1984. A further £30m could be added to this latter value, for an alternative estimate of the land value, as has been mentioned above. Its increase, in either case, is of the order of some £300m during 1950-1984, at 1980 prices. This figure should be regarded as an order of magnitude rather than precise. The inflation to values at 1980 prices has made use of Table 3.3 price inflators which may not be fully appropriate for the forestry items in question. This inflation problem, more than any other factor, reduces the precision of the capital stock estimates.

The net stock estimates of column (5) to (8) require little comment, since values of columns (5) and (6) are the same as those of columns (1) and (2), respectively. Some depreciation, however, shows progressive reduction of column (7) net values by comparison with those of column (3). By the end of 1984 the net value in column (7) is £109m, which is £48m smaller than the gross value £157m appearing in column (3).

The aggregate net stock series shows continuous growth, from £130m at the end of 1950 to £362m at the end of 1984. A doubling of the 1950 value is apparent by about 1969. For an extra £30m land value included in the net stock, its end-of-1984 value would be some £390m, which is three times the value of £130m.

4: *A Word on Timber and on a Market Valuation of State Forestry*

Standing timber is the working capital or inventories of forestry, corresponding in many ways to livestock in agriculture. An estimate of the value of the "Standing Volume" of forest timber in Ireland at the end of 1977 can be calculated. Convery (1979, p. 37) shows a total of 18,005 thousand cubic metres of "industrial timber" in State and private forests combined, as well as a further 4,428 thousand units of "firewood". An overall average 1980 price of £12.49 per cubic metre of State Forest sales is obtainable from the data on page 4 of the 1980 Report of the Minister, which also shows sales of 529,326 cubic metres for £6,610.176.

Application of this price to the combined total end-of-1977 volume of 22,433 thousand cubic metres gives £280m as the estimated value of all standing timber at the end of 1977, at 1980 prices.

This estimate assumes that the mix of different grades and kinds of timber included in the 1980 State Forest sales (used for the average price per cubic metre) approximates the mix of the standing timber at the end of 1977. The value of £280m is, therefore, to be regarded only as an order of magnitude of a more precise estimate.

End-of-year estimated volumes of standing timber are not published in the Report of the Minister, as a rule. Neither do they appear in the Forestry Vote detail in *Estimates for the Public Services*. If the Department of Forestry could provide such data for several years, in at least the detail used above for 1977, then their valuation at 1980 prices would present no problem. Because of the complex and detailed nature of the year-by-year forestry operations, the writer did not attempt to estimate such volumes of standing timber.

There is, however, a question as to whether an acceptable time-series valuation of forestry can be obtained through the two approaches used above, namely the capital gross or net valuation of forestry development combined in one way or another with a valuation of the standing volume of timber. These approaches were not used by the Review Group on Forestry (November 1985) in their Report to the Minister for Fisheries and Forestry.

Regarding valuation of the State Forestry of 1983, considered as a forest estate, the Review Group argued as follows (pp. 25-28). Forestry is an investment where payments and receipts are spread over periods of up to 50 years or more. There is no definitive method of valuing a forest estate. Expenditure on a forest crop is highly concentrated in the early years and the greater part of the income comes towards the end of the rotation. Discounted cash flow methods were, therefore, used to appraise the investment. The market value of the estate for sale (or purchase) purposes was considered. The discounted cash flow exercise suggested a range of values from £600m to £1,100m (at 3 per cent and 2 per cent discount rate respectively and based on an annual increase of 0.5 per cent in timber price and 0.5 per cent in productivity). A chosen value of £810m within the stated range was proposed by Dr F.C. Hummel, an international forestry expert and a member of the Review Group.

For a Table 6.3 GFCF general deflator of 0.75, this 1983 value of £810m would be about £600m at 1980 prices. By combining the Table A5.1 end-of-1977 net capital stock estimate of £313m forestry development with the £280m estimate of standing timber (also end-of-1977) a joint value of £593m is obtained. One may, therefore, surmise that a net or depreciated market valuation of some £600m for the State Forestry in the early 1980s is in harmony with the two approaches used above, values being expressed in supposed 1980 prices.

Appendix 6

END-OF-YEAR INVENTORIES OF IRISH INDUSTRY, UTILITIES AND DISTRIBUTION

1. *Introduction and Methodology*

This Appendix provides the detailed background to Chapter 12 above, by presenting inventory estimates of working capital, at 1980 prices, for Irish industry, utilities and distribution. The detailed current-price data, and their price inflators, are also presented. Inventories are in principle for the end of the calendar year.

Industry covers mining, manufacturing and construction. Utilities are production and distribution of electricity, townsgas and water. Distribution is mainly wholesale and retail trade, including manufacturers' agents; hotels and restaurants carry negligible inventories, according to the available data, but should in principle be included also, as sub-sectors of Distribution.

For manufacturing and mining, two major groupings of inventories of working capital are possible: (a) raw materials and fuels; (b) stocks of work-in-progress, finished goods, and similar goods for resale without processing. For construction, inventories by way of working capital are confined to materials and fuels, because work-in-progress and finished goods are by definition Gross Fixed Capital Formation, and should therefore in principle be included with all other GFCF of the building trades. Materials and fuels also comprise the inventories of the utilities, because of the "instantaneous" nature of their outputs. In the case of wholesale and retail trade, end-of-year stocks cover items traded, including materials for work on, or repair of, goods supplied by customers.

The rest of this first part of the Appendix briefly describes the methodology of estimating constant-price inventories. Parts 2 to 4 present and discuss: current-price data for industry and utilities; the price inflators to be applied; the constant-price inventory estimates for industry and utilities. The final Part 5 treats the limited data available for wholesale and retail trade. In view of Chapter 12 discussion above, treatment below is descriptive, rather than critical or reflective.

Methodology of Estimation

By comparison with fixed-stock estimation, the methodology required for year-end inventory valuation at constant prices is simple and straightforward. It is like a volume-index computation, in three steps: (a) get comprehensive year-

end inventories at current prices in as much commodity detail as possible; (b) inflate (or deflate) each item at the detailed level by the most relevant and appropriate price inflator (based on annual average prices), using price per physical volume where possible; (c) aggregate and group these detailed results as required.

Data limitations require modification of the refined and detailed method just described, as will appear below.

2. *Current-Price Inventories for Industry and Utilities*

The main data source of this information is the annual Census of Industrial Production, which extends back through 1950. Most of the Census results have appeared in the *Irish Statistical Bulletin* (see Central Statistics Office, March 1974). But for 1979-1984, individual annual reports have been issued, such as that of Central Statistics Office (October 1987).

For all years, the data are collected generally for establishments rather than enterprises. But the Census questionnaire does obtain enterprise-type information for mining and utilities, covering building and construction activity as well as production of peat, electricity, gas, and water. It may be assumed, therefore, that the electricity year-end stocks (all being of the Electricity Supply Board) of materials and fuels quoted by the Census include building supplies of relevance. The same applied to Bord na Mona, a peat producing enterprise included in mining.

The business year covered by the Census is not necessarily that of the calendar year. Stocks at the end of the business year are assumed to be legitimate estimators of stocks at the end of the calendar year: where the latter are not available in any event. Thus the "end-of-year" inventories of Chapter 12 above and the Tables A6.1 to A6.7 of the present Appendix are derived from the Census data which do not necessarily relate to the end of December.

The comprehensiveness of the Census coverage is more complete for 1980-1984 than for earlier years; this is due to estimation for non-respondents as well as for respondents in these later years. This writer has not attempted to estimate for non-respondents of the period 1950-1979. But on the basis of 1980-1984 published gross output of non-respondents, one may surmise that their aggregate activity is of the order of a few per cent of that of respondents. In effect, therefore, their inventories are of negligible consequence in aggregate.

Commodity detail is not available, at the Census industry or establishment level. The year end stocks typically cover four classes: (a) raw materials and fuels, (b) work in progress, (c) finished goods made by the establishment, (d) goods for resale without processing. As already mentioned above, all four classes are relevant only for manufacturing and mining; class (a) only applies for construction and utilities. For manufacturing and mining the data are grouped

into two types: (i) raw materials and fuels; (ii) work in progress, finished goods, goods for resale. These time-series data are now considered.

Current-Price Inventory Time Series (Tables A6.1 and A6.2)

Table A6.1 gives the time series of raw materials and fuels, relevant to all sectors of the group; Table A6.2 shows the inventories of work in progress and finished goods, etc., as relevant for manufacturing and mining. Ten groups or sectors are distinguished within manufacturing; there is one mining sector, three utility sectors, and two construction sectors.

Table A6.1 shows three successive levels of aggregation, so far as the data permit. The two construction time-series stop at 1973 and 1978, due to changes in Census coverage. Within manufacturing, major importance applies to four groups, namely food, drink and tobacco, chemicals, metals and engineering, especially in later years.

The manufacturing aggregate of materials and fuels shows enormous growth, from £36m for end-of-1950 to £1,010m for end-of-1984. Most of this growth is due to price inflation, since at 1980 prices (Table A6.4) the corresponding aggregates are £247m and £688m respectively. This comparison is parallel to that made for fixed capital in Chapter 6 above. It again suggests that values at current prices are not a useful time-series to work with, which implies that even rough or faulty price inflators (deflators) are still necessary, to correct for such severe price inflation.

The mining and utility inventories are quite small by comparison with those of aggregate manufacturing. In the early 1980s some £100m is the aggregate stock for mining and utilities, the major share of which relates to the Electricity Supply Board.

The building and construction inventories (up to about 1973) are quite small, reaching at most £3m or £4m for each of the two sectors, one being private contractors and the other being Local Authority enterprises. Within the scale of aggregate stock, it therefore appears that either inclusion or omission of their inventories is of little consequence.

The year-end inventories for work in progress and finished goods (including goods for resale) appear in Table A6.2, relating to manufacturing and mining. Total manufacturing shows colossal growth, from £17m in 1950 to £1,122m in 1984, again mainly due to price inflation. The mining and peat inventories are quite small by comparison, being only about £40m in the 1980s.

The combined inventory results of Tables A6.1 and A6.2 show the considerable magnitude of inventories held by Irish industry and utilities during the early 1980s. Some £2,000m (or £2 billion) is the estimate resulting from the work described so far, at current prices.

Table A6.1: *End-of-Year Inventories of Materials and Fuels held by Irish Industry and Utilities, 1950-1984, at Current Prices*

£ million

Year	Food	Drink and Tobacco	Textiles includ. hosiery	Clothing, footwear, tanning, leather	Timber and furniture	Paper and printing	Non-metallic minerals	Chemicals includ. man-made fibres	Metals and engineering	Other Manufact. including petrol refining, rubber, plastics	Total Manufact. (1) to (10)	Mining and Peat	Electricity	Gas	Water Supply	Total Manufact. Mixing + Utilities (11) to (15)	Building and Construc. by private firms	Building and Construc. by L.A.s and Govt. Depts.	Total Industry + Utilities (16) to (18)	Year
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	
1950	7.01	8.85	4.21	4.12	1.67	2.03	0.84	2.15	3.97	1.30	36.15	0.13	3.57	0.39	0.03	40.27	0.94	0.43	41.64	1950
1951	9.34	9.66	4.86	5.26	3.24	3.07	1.15	2.65	5.43	1.84	46.50	0.24	5.29	0.54	0.03	52.60	1.17	0.57	54.34	1951
1952	8.58	14.63	3.47	3.34	3.07	2.81	1.24	2.28	5.02	1.31	45.75	0.24	6.12	0.52	0.05	52.68	1.04	0.57	54.29	1952
1953	8.82	14.68	3.79	3.28	2.20	2.28	1.16	1.54	5.13	0.70	43.58	0.18	5.29	0.40	0.04	49.49	0.89	0.50	50.88	1953
1954	7.24	13.36	3.86	3.03	2.18	2.45	1.33	1.64	5.44	0.76	41.29	0.11	4.34	0.37	0.14	46.25	0.79	0.48	47.52	1954
1955	8.89	12.94	4.66	3.24	2.42	2.88	1.64	1.84	6.17	0.95	45.63	0.11	4.55	0.49	0.14	50.92	0.83	0.46	52.21	1955
1956	7.90	12.73	5.06	3.04	2.33	2.86	1.58	1.83	6.43	0.75	44.51	0.15	4.18	0.57	0.15	49.56	0.74	0.52	50.82	1956
1957	10.03	11.89	5.43	3.06	2.20	2.71	1.62	1.76	6.73	0.82	46.25	0.18	3.29	0.55	0.11	50.38	1.78	0.46	52.62	1957
1958	7.14	10.79	4.48	3.09	1.83	2.38	1.55	1.57	6.34	0.82	39.99	0.24	2.70	0.51	0.11	43.55	0.63	0.49	44.67	1958
1959	9.03	11.21	4.79	3.41	1.52	2.44	1.56	1.78	7.17	1.42	44.33	0.23	2.58	0.38	0.09	47.61	0.50	0.47	48.58	1959
1960	8.82	11.75	5.48	3.56	1.58	2.84	1.69	2.03	9.69	1.47	48.91	0.21	3.01	0.37	0.09	52.59	0.69	0.59	53.87	1960
1961	8.34	12.54	5.65	3.70	1.60	3.21	1.71	2.16	10.61	2.15	51.67	0.24	3.79	0.44	0.10	56.24	0.62	0.58	57.44	1961
1962	10.71	12.98	5.55	4.17	1.67	2.91	1.81	2.19	11.56	1.62	55.17	0.27	4.28	0.42	0.09	60.23	0.67	0.59	61.49	1962
1963	10.69	13.16	6.39	4.47	1.80	3.01	1.97	2.32	13.43	2.08	59.32	0.27	4.48	0.48	0.07	64.62	0.80	0.94	66.36	1963
1964	11.47	13.08	7.14	4.76	2.32	3.47	2.10	3.01	14.72	2.36	64.43	0.27	5.67	0.49	0.10	70.96	0.97	0.93	72.00	1964
1965	12.15	12.21	6.57	4.63	2.29	3.46	2.33	3.10	16.66	2.39	65.79	0.40	6.61	0.53	0.10	73.43	1.62	1.06	76.11	1965
1966	13.28	11.82	6.72	4.82	2.18	3.74	2.53	3.34	16.69	2.60	67.72	0.51	6.64	0.63	0.11	75.61	1.49	1.00	78.10	1966
1967	12.70	12.37	6.43	4.99	2.37	3.67	2.98	3.54	16.99	3.77	69.81	0.73	6.18	0.55	0.10	77.37	2.21	1.02	80.60	1967
1968	16.10	12.13	8.01	5.62	2.78	4.13	2.78	3.70	19.01	4.06	78.32	0.82	6.27	0.57	0.10	86.08	2.36	1.01	89.45	1968
1969	18.32	14.94	8.68	6.56	3.08	4.95	3.11	4.87	23.77	5.69	93.97	1.10	7.41	0.61	0.11	103.20	2.85	1.06	107.11	1969
1970	18.25	14.23	9.64	6.83	3.34	5.89	3.26	5.86	28.93	7.01	103.24	1.29	9.56	1.00	0.12	115.21	3.18	1.22	119.61	1970

Table A6.1. *Continued*

£ million

Year	Food	Drink and Tobacco	Textiles includ. hosiery	Clothing, footwear, tanning, leather	Timber and furniture	Paper and printing	Non-metallic minerals	Chemicals includ. man-made fibres	Metals and engineering	Other Manufact. including petrol refining, rubber, plastics	Total Manufact. (1) to (10)	Mining and Peat	Electricity	Gas	Water Supply	Total Manufact. Mining+ Utilities (11) to (15)	Building and Construc. by private firms	Building and Construc. by L.A.s and Govt. and Govt. Depts.	Total Industry + Utilities (16) to (18)	Year
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	
1971	19.42	14.37	8.51	6.62	3.71	4.69	3.81	6.72	30.24	7.82	105.91	1.60	10.32	0.82	0.11	118.76	2.46	1.34	122.56	1971
1972	21.97	13.73	9.73	8.04	4.27	5.16	4.01	7.91	35.94	8.54	119.30	1.62	8.81	0.73	0.14	130.60	2.92	1.32	134.84	1972
1973	29.33	19.67	15.51	10.21	5.99	6.99	5.11	11.70	47.44	12.79	164.74	1.87	15.72	1.68	0.22	184.23	3.27	1.45	188.95	1973
1974	43.75	25.96	17.50	12.53	11.58	15.59	10.06	22.32	72.93	10.83	243.05	2.49	20.09	1.64	0.23	267.50		1.48		1974
1975	45.58	32.31	15.02	12.72	8.88	13.60	12.49	24.84	77.92	13.13	256.49	2.21	20.76	2.11	0.30	281.87		1.95		1975
1976	67.98	35.76	21.94	15.22	10.69	15.76	13.72	25.15	98.87	18.56	323.65	2.29	26.19	2.47	0.36	354.96		2.63		1976
1977	86.59	42.70	24.00	16.47	10.80	15.32	15.16	32.28	119.93	17.49	380.74	4.33	33.28	2.83	0.38	421.56		3.91		1977
1978	91.22	43.30	26.68	18.77	11.43	17.04	19.99	42.15	154.45	21.64	446.67	4.16	41.30	5.12	0.49	497.74		2.88		1978
1979	107.59	46.92	33.02	25.48	17.30	20.82	27.82	61.95	193.36	33.50	567.76	11.77	73.72	5.18	0.42	658.85				1979
1980	126.02	54.32	37.97	25.12	20.08	23.22	30.83	71.43	226.67	42.23	657.89	14.93	102.00	6.18	0.79	781.79				1980
1981	133.93	65.50	35.23	28.15	23.71	27.54	38.27	88.93	263.23	38.75	743.24	16.11	83.85	5.81	1.06	850.07				1981
1982	134.96	73.91	32.01	29.03	24.18	26.49	43.32	96.26	292.26	54.35	806.77	14.13	82.38	4.84	1.14	909.26				1982
1983	148.12	78.65	33.89	28.76	24.27	26.99	40.48	125.28	338.47	50.15	895.06	15.69	67.43	3.26	1.32	982.76				1983
1984	149.17	90.60	41.24	28.35	26.20	32.24	50.85	131.40	411.64	47.97	1,009.66	14.90	65.83	4.32	1.85	1,096.56				1984

Table A6.2: *End-of-Year Inventories of Work in Progress and Finished Goods held by Irish Manufacturing and Mining, 1950-1984, at Current Prices*

£ million

Year	Food (1)	Drink and Tobacco (2)	Textiles includ. Hosiery (3)	Clothing, Footwear, Tanning, Leather (4)	Timber and Furnit. (5)	Paper and Print. (6)	Non-Metallic Minerals (7)	Chemicals inc. man-made fibres (8)	Metals and Engineering (9)	Other Manuf. petrol refin. rubber and plastics (10)	incl. Manufacturing (1)to(10) (11)	Total Mining and Peat (12)
1950	5.32	3.55	1.78	1.77	.56	.40	.21	.59	1.54	1.06	16.78	.05
1951	8.51	3.42	2.93	2.18	.33	.53	.28	.85	2.26	2.28	23.57	.07
1952	6.84	4.34	2.52	2.16	.60	.67	.45	.83	2.01	2.34	22.76	.05
1953	10.77	5.15	3.76	2.57	.89	.54	.53	.76	2.81	.88	28.66	.74
1954	9.29	5.08	4.24	2.89	.85	.61	.48	.92	3.25	1.01	28.62	.72
1955	10.23	4.79	3.14	2.76	.97	.73	.57	1.16	3.93	1.10	29.38	.84
1956	9.54	5.19	3.51	2.80	.72	.79	.77	1.19	3.72	1.08	29.31	1.24
1957	9.30	5.35	4.05	2.70	.60	.81	.86	1.27	3.59	.90	29.43	1.59
1958	8.35	5.19	4.15	2.69	.73	.82	.83	1.26	3.96	.96	28.94	1.06
1959	10.23	5.12	4.12	2.93	.68	.90	.71	1.34	4.73	2.02	32.78	1.35
1960	9.69	5.49	4.99	2.90	.80	1.07	.79	1.47	5.69	1.80	34.69	1.56
1961	10.39	5.67	5.34	2.94	1.08	1.20	.78	1.86	7.78	2.10	39.14	1.80
1962	10.76	6.64	5.57	3.13	1.12	1.44	.90	2.43	9.21	2.57	43.77	1.69
1963	11.15	6.24	5.97	3.28	1.26	1.17	1.15	2.35	9.50	3.20	45.27	1.90
1964	13.21	7.49	7.10	3.82	1.45	1.35	1.42	2.50	9.17	4.03	51.54	2.12
1965	14.04	8.25	7.44	3.96	1.59	1.62	1.63	3.08	10.71	4.61	56.93	2.18
1966	15.04	9.56	7.85	4.17	1.65	1.74	1.89	2.72	11.78	4.87	61.27	2.46
1967	16.60	10.45	8.21	4.56	1.64	1.79	2.02	4.38	12.08	5.33	67.06	4.06
1968	18.91	11.94	8.56	4.77	1.69	2.54	2.23	5.59	12.94	7.37	76.54	5.22
1969	21.27	12.51	10.31	6.18	2.05	3.81	2.35	7.63	20.01	9.16	95.28	5.23
1970	22.22	13.29	11.57	7.03	2.15	4.44	3.11	6.91	21.76	10.96	103.44	5.98
1971	26.07	13.23	12.36	7.61	1.75	4.85	4.23	8.25	25.17	11.25	114.77	6.86
1972	34.00	14.49	11.85	8.36	2.43	5.20	4.80	8.33	27.42	10.74	127.62	7.20
1973	46.17	17.57	17.56	10.71	4.24	3.96	6.11	11.21	39.33	14.20	171.07	7.84
1974	65.03	21.10	18.62	13.71	7.11	7.19	9.94	20.40	61.14	14.29	238.53	8.10
1975	73.96	27.32	17.62	14.39	8.03	7.65	12.89	37.54	76.39	14.99	290.78	7.91
1976	78.48	34.41	22.68	17.28	8.73	9.34	26.20	34.79	107.59	19.64	359.14	8.27
1977	124.71	45.78	32.67	18.86	8.98	10.21	31.90	55.83	126.06	23.28	478.28	10.28
1978	136.20	46.35	38.68	20.02	9.28	11.50	39.38	62.33	170.14	25.83	559.71	10.24
1979	150.97	51.75	44.46	26.43	14.26	14.93	47.78	83.52	203.93	34.85	672.88	20.52
1980	152.16	68.48	45.37	26.22	14.06	15.97	62.86	116.97	248.70	41.43	792.22	25.81
1981	161.60	59.84	48.01	29.86	17.16	17.47	78.15	134.96	305.58	53.38	906.01	33.93
1982	175.60	70.78	47.75	30.02	15.76	18.81	92.38	141.97	361.31	63.30	1,017.68	35.57
1983	183.84	76.95	40.43	29.71	15.15	14.11	104.50	130.74	407.26	64.70	1,067.39	37.70
1984	203.09	77.36	49.16	32.81	17.13	17.44	111.53	144.95	411.87	56.16	1,121.50	43.83

3. *Available Price Inflators*

The *Irish Statistical Bulletin* (see Central Statistics Office, March 1974) has relevant wholesale price indices of five different series, spanning the period 1950-1984. These are used, to bring the data of Tables A6.1 and A6.2 to estimated values at 1980 prices, because commodity detail of these current-value inventories does not exist. But the selected price indices must first be reworked, to provide price inflators based on unity for 1980.

The derived price inflators appear as the five parts of Table A6.3. All need to be based on unity for the year 1980. The logical beginning of 1980-based series comprises the Parts 3 to 5 of Table A6.3. These three series cover the period 1975-1985, and were derived directly from the published series based on unity for 1980 by rescaling the latter to show unit value for 1980, and then inverting the rescaled series.

The series of inflators comprising Part 2 of Table A6.3 cover the period 1953-1975. For the year 1975, linkages must be made with 1975 values of Parts 3 to 5, in the most relevant way possible, e.g., 1.852 for Textiles is transferred from Part 3 to Part 2. Once reasonable 1975 values, based on unity for 1980, have been applied to the year 1975 of the Part 2 series, the values of each component back to 1953 emerge in a similar way to that described for Parts 3 to 5, by rescaling and inverting. The year 1953 likewise provides the linkages between the Part 2 and Part 1 series, the latter covering 1950-1953.

A brief comment on the nature of the series is in order. Part 1 shows 1950-1953 price changes for 9 wholesale commodity groups and for three kinds of major use, as well as the general index. The hides, etc., series is not usable, because of problems of linkage; the series is not of great significance at all events. Part 2 shows a set of wholesale price changes of 1953-1975 covering 15 commodity groups, except for the "wood manufacturers" series which stopped at 1960. The period 1975-1985 shows three sets of price-change series of a wholesale nature. Manufacturing outputs (excluding VAT) show one series, covering 16 commodity groups, and comprising Part 3. Materials for building and construction, covering 11 groups and an aggregate, comprise Part 4. Data on wholesale prices of petroleum fuels of 5 kinds makes up Part 5. There is therefore a considerable volume and variety of price inflators available for multiplication by current-price values of Tables A6.1 and A6.2.

Some comparison of inflator values of Table 6.3 above (related to GFCF) is advisable. For 1970, the Table A6.3 Part 2 "Total" inflator value is 3.675, with low values such as 2.824 for clothing and high values such as 5.826 for non-metallic mineral products. Similar 1970 Table 6.3 values are 4.079 for total GFCF and 3.820 for PCE, with 4.591 for other building and construction. For 1950, the Table A6.3 Part 1 "General Index" inflator is 7.414, with low values such as 4.609 for textiles and apparel, and high values such as 9.569 for mine

Table A6.3: *Series of Price Inflators to base 1.0 for 1980, derived from different Wholesale Price Indices, and used to inflate End-of-Year Inventories of Industry and Distribution*

PART 1: *Inflators derived from Index to Base 100 for October 1938*

| Year | By Community Groups | | | | | | | | By Use | | | | GENERAL INDEX |
	Food, Drink and tobacco	Mineral quarry products and turf	Metals and Manufact.	Wood and timber Manufact.	Textiles and Apparel	Hides Skin and Manufact.	Rubber and Manufact.	Paper and Cardboard	Chemicals	Materials for food etc. industries	Food	Other Goods ready for consm.	
1950	8.027	9.569	8.321	6.783	4.609	No	7.001	6.645	5.475	7.507	7.281	7.504	7.414
1951	7.349	8.350	7.335	5.329	3.415	link	4.132	4.906	4.574	6.610	6.773	6.319	6.404
1952	6.688	7.841	6.642	4.646	3.875	to	4.810	4.401	4.188	6.179	6.050	6.259	6.063
1953	6.400	8.313	7.000	5.052	4.000	1980	5.607	5.052	4.537	5.837	5.837	6.400	6.053

Table A6.3: *(continued)*

PART 2: Inflators derived from Index to Base 100 for Year 1953

Year	Food includ. live animals	Drink	Tobacco	Non-metallic mine and quarry products	Metal Manufact.	Machinery + electrical goods	Vehicles	Wood Manufact.	Textiles	Clothing	Rubber	Paper + Cardboard	Oils, fats etc.	Chemicals	TOTAL
1953	5.837	7.146	6.380	8.313	7.427	4.832	6.456	series	3.911	4.153	5.607	5.052	7.139	4.537	6.053
1954	5.956	7.262	6.380	8.198	7.360	4.852	6.535	stops	3.991	4.129	5.756	4.973	7.307	4.610	6.139
1955	5.683	7.329	6.349	7.850	6.655	4.710	6.508	at	3.955	4.092	4.871	4.440	7.344	4.592	5.958
1956	5.914	7.232	5.602	6.974	5.789	4.474	6.137	1960	3.877	3.967	4.657	4.576	6.665	4.461	5.871
1957	5.470	6.884	5.137	6.566	5.461	4.292	5.880		3.687	3.886	4.346	4.597	5.630	4.337	5.508
1958	5.133	6.574	4.931	7.523	5.614	4.250	5.770		3.971	3.811	4.482	4.648	5.693	4.292	5.333
1959	5.120	6.502	4.912	8.223	5.704	4.228	5.713		3.959	3.797	4.665	4.593	5.706	4.252	5.333
1960	5.239	6.496	4.830	8.231	5.661	4.209	5.703		3.827	3.712	4.573	4.674	5.734	4.204	5.362
1961	5.184	6.484	4.634	8.055	5.530	4.113	5.644		3.783	3.657	4.503	4.695	5.794	4.189	5.278
1962	5.115	5.985	4.297	7.769	5.421	4.010	5.566		3.750	3.541	4.661	4.665	5.832	4.135	5.117
1963	5.093	5.772	4.184	7.599	5.437	3.967	5.481		3.659	3.470	4.570	4.606	5.905	4.058	5.053
1964	4.741	5.526	3.965	6.910	5.249	3.854	5.380		3.524	3.331	4.446	4.556	5.720	3.901	4.774
1965	4.567	5.119	3.697	6.865	5.076	3.784	5.228		3.639	3.273	4.323	4.367	5.466	3.691	4.600
1966	4.651	4.643	3.390	6.853	4.785	3.697	5.032		3.645	3.220	4.267	4.436	5.085	3.603	4.511
1967	4.574	4.452	3.222	6.781	4.697	3.622	4.797		3.722	3.152	4.340	4.221	4.927	3.447	4.396
1968	4.199	4.256	3.075	6.693	4.366	3.519	4.672		3.608	3.061	4.316	4.114	4.728	3.403	4.149
1969	3.984	3.763	2.802	6.307	4.014	3.321	4.324		3.440	2.950	4.099	4.214	4.582	3.250	3.871
1970	3.785	3.629	2.735	5.826	3.760	3.148	4.066		3.416	2.824	3.859	3.889	4.518	3.184	3.675
1971	3.601	3.434	2.734	5.251	3.562	2.994	3.619		3.329	2.704	3.716	3.718	4.332	3.016	3.487
1972	3.110	3.245	2.709	4.588	3.288	2.811	3.314		2.990	2.593	3.511	3.566	4.285	2.841	3.158
1973	2.561	2.912	2.424	3.892	2.806	2.591	2.924		2.312	2.195	3.188	3.088	3.882	2.579	2.686
1974	2.426	2.665	2.284	2.570	2.212	2.196	2.451		1.923	1.840	2.646	2.055	2.574	2.141	2.366
1975	1.860	2.070	1.824	2.137	1.836	1.881	1.957		1.852	1.647	2.174	1.784	1.860	1.759	1.900

Table A6.3 *(continued)*

PART 3: Inflators derived from Output Price Indices (excluding VAT) Manufacturing Industries to base 100 for 1975

Year	Food	Drink	Tobacco	Textiles	Leather and footwear	Clothing	Timber and wood furniture	Paper and Products	Rubber process	Plastics	Non-metallic miner	Chemicals	Metal prods.	Mechan. engineer.	Electrical engineer	Motor vehicle parts + access.	Year
1975	1.860	2.070	1.824	1.852	1.666	1.647	1.810	1.784	2.174	1.847	2.137	1.759	1.836	1.881	1.763	1.957	1975
1976	1.553	1.583	1.626	1.550	1.334	1.450	1.602	1.593	1.849	1.663	1.850	1.604	1.619	1.557	1.523	1.598	1976
1977	1.262	1.501	1.552	1.306	1.126	1.285	1.336	1.357	1.535	1.421	1.549	1.424	1.369	1.379	1.335	1.328	1977
1978	1.134	1.407	1.473	1.221	1.064	1.175	1.268	1.330	1.404	1.383	1.392	1.307	1.241	1.231	1.250	1.192	1978
1979	1.027	1.240	1.249	1.110	0.915	1.098	1.130	1.189	1.249	1.178	1.220	1.195	1.143	1.100	1.138	1.078	1979
1980	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1980
1981	0.860	0.805	0.774	0.895	0.894	0.874	0.873	0.850	0.880	0.974	0.881	0.847	0.884	0.879	0.913	0.893	1981
1982	0.769	0.699	0.642	0.811	0.796	0.805	0.798	0.767	0.780	0.943	0.813	0.766	0.790	0.797	0.863	0.780	1982
1983	0.735	0.640	0.564	0.763	0.729	0.746	0.734	0.730	0.739	0.890	0.774	0.730	0.739	0.745	0.809	0.715	1983
1984	0.692	0.614	0.498	0.712	0.612	0.692	0.682	0.674	0.722	0.815	0.759	0.691	0.696	0.675	0.767	0.662	1984
1985	0.672	0.607	0.450	0.664	0.607	0.655	0.646	0.640	0.690	0.806	0.735	0.673	0.664	0.650	0.752	0.623	1985

Table A6.3 *(continued)*

PART 4: Inflators derived from Wholesale Price Indices of Building and Construction Materials

Year	Sand and gravel	Cement	Ready-mix morter + concrete	Concrete bricks and blocks	Asbestos and other concrete prods.	Struct. Steel etc.	Rough timber	Other timber	Tarmac etc.	Electr. fittings	All other materials	ALL MATERIALS	Year
1975	1.953	2.285	2.083	2.337	2.437	1.837	1.819	1.717	2.139	2.319	2.166	2.095	1975
1976	1.497	1.950	1.922	1.847	1.967	1.633	1.596	1.588	1.790	1.869	1.802	1.771	1976
1977	1.549	1.619	1.605	1.580	1.652	1.473	1.276	1.332	1.666	1.571	1.511	1.503	1977
1978	1.361	1.558	1.451	1.480	1.463	1.349	1.359	1.260	1.534	1.455	1.410	1.403	1978
1979	1.238	1.367	1.236	1.263	1.285	1.142	1.210	1.176	1.316	1.208	1.190	1.219	1979
1980	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1980
1981	0.889	0.841	0.909	0.909	0.865	0.910	0.808	0.828	0.789	0.845	0.854	0.859	1981
1982	0.807	0.769	0.871	0.876	0.776	0.769	0.806	0.788	0.727	0.765	0.776	0.795	1982
1983	0.744	0.749	0.839	0.877	0.723	0.743	0.742	0.722	0.700	0.706	0.723	0.749	1983
1984	0.714	0.740	0.838	0.876	0.665	0.712	0.654	0.635	0.640	0.664	0.677	0.705	1984
1985	0.657	0.722	0.760	0.788	0.620	0.681	0.633	0.613	0.572	0.665	0.651	0.671	1985

Table A6.3 *(continued)*

PART 5: *Inflators derived from Wholesale Price Index (excluding VAT) for Petroleum Fuels*

Year	Petrol	Auto-diesel	Gas oil other than auto diesel	Fuel oil	Petroleum fuels purchased by Manufact.
1975	2.045	2.391	3.101	2.804	2.719
1976	1.716	2.105	2.342	2.154	2.128
1977	1.588	1.839	1.917	1.690	1.704
1978	1.641	1.878	1.992	1.716	1.734
1979	1.386	1.502	1.445	1.357	1.373
1980	1.000	1.000	1.000	1.000	1.000
1981	0.750	0.723	0.769	0.745	0.716
1982	0.665	0.637	0.690	0.659	0.658
1983	0.598	0.560	0.631	0.605	0.601
1984	0.579	0.524	0.598	0.547	0.548
1985	0.556	0.492	0.576	0.530	0.529

and quarry products. Whereas 1950 Table 6.3 values are 7.323 for total GFCF and 7.108 for PCE, with 9.004 for other building and construction. The outcome of this comparison is satisfactory, and adds credibility to the values shown in Table A6.3.

4. *Inventories at 1980 Prices for Industry and Utilities*

Values of end-of-year inventories estimated at 1980 prices appear in Tables A6.4 and A6.5, the exact counterparts of Tables A6.1 and A6.2, respectively. The most relevant price inflator of Table A6.3 was applied to each entry of Tables A6.1 and A6.2, as a multiplier, to estimate values at 1980 prices. There is some subjective judgement in selecting these multipliers.

The inventories of materials and fuels, in Table A6.4, may now be considered. At 1980 prices, total manufacturing shows a general increase, from some £247m in 1950 to £688m in 1984. The inclusion of mining makes little difference. The value series for mining, manufacturing and utilities increases generally, from £287m in 1950 to £739m in 1984. Higher values of some £780m occur in 1979 and 1980, partly due to electricity fuel stocks. The construction inventories show values of £20-25m in the early 1970s; they are therefore unlikely to be of major significance for more recent years in which their estimates are not available.

The inventories of work in progress and finished goods for mining and manufacturing, at 1980 prices, appear in Table A6.5. For total manufacturing, a great increase is apparent, from some £116m in 1950 to £767m in 1984, with slightly higher values in the early 1980s. The mining and peat inventories show

Table A6.4: *End of Year Inventories of Materials and Fuels held by Irish Industry, and Utilities, 1950-1984, at 1980 Prices*

£ million

Year	Food	Drink and Tobacco	Textiles includ. hosiery	Clothing, footwear, tanning, leather	Timber and furniture	Paper and printing	Non-metallic minerals	Chemicals includ. man-made fibres	Metals and engineer-ing	Other Manufact. including petrol refining, rubber, plastics	Total Manufact. (1) to (10)	Mining and Peat	Electricity	Gas	Water Supply	Total Manufact. Mining + Utilities (11) to (15)	Building and Construc. by private firms	Building and Construc. by L.A.s and Cent. Depts.	Total Industry + Utilities (16) to (18)	Year
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	
1950	51.1	71.1	19.4	19.0	11.4	13.5	8.0	11.7	33.1	9.1	247.4	1.3	34.4	3.7	0.1	286.9	9.0	4.1	300.0	1950
1951	63.2	71.0	16.6	17.9	17.2	15.1	9.6	12.1	39.8	7.6	270.1	2.0	42.6	4.3	0.1	319.1	9.8	4.7	333.6	1951
1952	51.9	97.8	13.4	12.9	14.2	12.4	9.7	9.5	33.4	6.3	261.5	1.9	45.1	3.8	0.2	312.5	8.2	4.5	325.2	1952
1953	51.5	93.6	14.8	12.8	11.1	11.5	9.7	7.0	35.9	3.9	251.8	1.5	42.3	3.2	0.2	299.0	7.4	4.2	310.6	1953
1954	43.4	85.2	15.4	12.1	10.8	12.2	10.9	7.6	40.0	4.4	242.0	0.9	35.2	3.0	0.6	281.7	6.5	3.9	292.1	1954
1955	50.5	82.2	18.4	12.8	10.7	12.8	12.9	8.4	41.1	4.6	254.4	0.9	36.8	3.9	0.6	296.6	6.5	3.6	306.7	1955
1956	46.7	71.3	19.6	11.8	10.7	13.1	11.0	8.2	37.2	3.5	233.1	1.0	32.9	4.5	0.7	272.2	5.2	3.6	281.0	1956
1957	54.8	61.1	20.0	11.3	10.1	12.5	10.6	7.6	36.7	3.5	228.2	1.2	25.2	4.2	0.5	259.3	11.7	3.0	274.0	1957
1958	36.6	53.2	17.8	12.3	8.5	11.0	11.7	6.8	35.6	3.7	197.2	1.8	20.4	3.8	0.5	223.7	4.7	3.7	232.1	1958
1959	46.2	55.1	19.0	13.5	7.0	11.2	12.8	7.6	40.9	6.6	219.9	1.8	19.3	2.8	0.4	244.2	4.1	3.9	252.2	1959
1960	46.2	56.7	21.0	13.6	7.4	13.3	13.9	8.5	54.8	6.7	242.1	1.7	22.3	2.8	0.4	269.3	5.7	4.8	279.8	1960
1961	43.5	58.1	21.4	14.0	7.5	15.0	13.8	9.0	58.6	9.7	250.6	1.9	27.9	3.2	0.4	284.0	5.0	4.7	293.7	1961
1962	54.8	55.8	20.8	15.6	7.8	13.6	14.1	9.0	62.7	7.5	261.7	2.1	31.2	3.1	0.4	298.5	5.2	4.6	308.3	1962
1963	54.5	55.1	23.4	16.4	8.3	13.9	15.0	9.4	73.0	9.5	278.5	2.1	32.0	3.4	0.3	316.3	6.1	7.2	329.6	1963
1964	54.4	51.9	25.2	16.8	10.5	15.8	14.5	11.7	77.2	10.5	288.5	1.9	38.4	3.3	0.4	332.5	6.7	6.4	345.6	1964
1965	55.5	45.1	23.9	16.8	10.0	15.1	16.0	11.5	84.6	10.3	288.8	2.7	43.0	3.4	0.4	338.3	11.1	7.3	356.7	1965
1966	61.8	38.2	24.5	17.6	9.6	16.6	17.4	12.0	79.8	11.1	288.6	3.5	42.1	4.0	0.4	338.6	10.2	6.8	355.6	1966
1967	58.1	39.9	23.9	18.6	10.0	15.5	20.2	12.2	79.8	16.3	294.5	5.0	37.5	3.3	0.4	340.7	15.0	6.9	362.6	1969
1968	67.6	37.3	28.9	20.3	11.4	17.0	18.6	12.6	83.0	17.5	314.2	5.5	37.6	3.4	0.3	361.0	16.3	7.0	384.3	1968
1969	73.0	41.9	29.8	22.6	13.0	20.9	19.6	15.8	95.4	23.3	355.3	6.9	42.4	3.5	0.4	408.5	18.0	6.7	433.2	1969

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Table A6.4: *Continued*

£ million

Year	Food	Drink and Tobacco	Textiles includ. hosiery	Clothing, footwear, tanning, leather	Timber and furniture	Paper and printing	Non-metallic minerals	Chemicals includ. man-made fibres	Metals and engineering	Other Manufact. including petrol refining, rubber, plastics	Total Manufact. (1)to(10)	Mining and Peat	Electricity	Gas	Water Supply	Total Manufact. Mining + Utilities (11)to(15)	Building and Construc. by private firms	Building and Construc. by L.A.s and Govt. Depts.	Total Industry + Utilities (16)to(18)	Year
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	
1970	69.1	38.9	32.9	23.3	13.0	22.9	19.0	18.6	108.8	27.1	373.6	7.5	53.6	5.6	0.4	440.7	18.5	7.1	466.3	1970
1971	69.9	39.3	28.3	22.0	13.8	17.5	20.0	20.3	107.7	29.0	367.8	8.4	54.8	4.4	0.3	435.7	12.9	7.1	455.7	1971
1972	68.3	37.2	29.1	24.0	15.2	18.4	18.4	22.5	118.2	30.0	381.3	7.4	44.1	3.7	0.4	436.9	13.4	6.0	456.3	1972
1973	75.1	47.7	35.8	23.6	18.5	21.6	19.9	30.2	133.1	40.8	446.3	7.3	71.4	7.6	0.6	533.2	12.7	5.6	551.5	1973
1974	106.1	59.3	33.7	24.1	23.8	32.0	25.8	47.8	161.3	28.7	542.6	6.4	75.8	6.2	0.5	631.5		3.8		1974
1975	84.8	58.9	27.8	23.6	16.1	24.3	26.7	43.7	143.1	28.5	477.5	4.7	58.2	6.5	0.5	547.4		4.1		1975
1976	105.6	58.1	34.0	23.6	17.1	25.1	25.4	40.3	160.1	34.3	523.6	4.2	56.4	5.8	0.6	590.6		4.7		1976
1977	109.3	66.3	31.3	21.5	14.4	20.8	23.5	46.0	164.2	26.8	524.1	6.7	56.2	5.4	0.5	592.9		5.9		1977
1978	103.4	63.8	32.6	22.9	14.5	22.7	27.8	55.1	191.7	30.4	564.9	5.8	70.8	10.2	0.6	652.3		4.0		1978
1979	110.5	58.5	36.6	28.3	19.5	24.8	33.9	74.0	221.0	41.8	648.9	14.4	100.0	7.5	0.5	771.3				1979
1980	126.0	54.3	38.0	25.1	20.1	23.2	30.8	71.4	226.7	42.2	657.8	14.9	102.0	6.2	0.8	781.7				1980
1981	115.2	50.7	31.5	25.2	20.7	23.4	33.7	75.3	232.7	34.1	642.5	14.2	59.7	4.5	0.9	721.8				1981
1982	103.8	47.5	26.0	23.5	19.3	20.3	35.2	73.7	230.9	42.4	622.6	11.5	54.3	3.3	0.9	692.6				1982
1983	108.9	44.4	25.9	21.9	17.8	19.7	31.3	91.5	250.1	37.1	648.6	12.1	40.8	2.1	1.0	704.6				1983
1984	103.2	45.1	29.4	20.2	17.9	21.7	38.6	90.8	286.5	34.6	688.0	11.3	36.0	2.6	1.3	739.2				1984

Table A6.5: *End of Year Inventories of Work in Progress and Finished Goods held by Irish Manufacturing and Mining, 1950-1984 at 1980 Prices*

£ million

Year	Food (1)	Drink and Tobacco (2)	Textiles includ. Hosiery (3)	Clothing, Footwear, Tanning, Leather (4)	Timber and Furnit. (5)	Paper and Print. (6)	Non-Metallic Minerals (7)	Chemicals inc. man-made fibres (8)	Metals and Engineering (9)	Other Manuf. petrol refin. rubber and plastics (10)	incl. Manufacturing (1)to(10) (11)	Total Mining and Peat (12)
1950	38.8	28.5	8.2	8.2	3.8	2.7	2.0	3.2	12.8	7.4	115.6	.5
1951	57.6	25.1	10.0	7.5	1.8	2.6	2.3	3.9	16.6	9.4	136.8	.6
1952	41.4	31.0	9.8	8.4	2.8	2.9	3.5	3.5	13.3	11.2	127.8	.4
1953	62.9	36.8	14.7	10.7	4.5	2.7	4.4	3.4	18.2	5.0	163.3	6.1
1954	55.7	36.9	16.9	11.9	4.2	3.0	3.9	4.2	21.2	5.8	163.7	5.9
1955	58.2	35.1	12.4	11.3	4.3	3.2	4.5	5.3	25.6	5.4	165.3	6.6
1956	56.4	37.5	13.6	11.1	3.3	3.6	5.4	5.3	22.8	5.0	164.0	8.6
1957	50.8	36.8	14.9	10.5	2.8	3.7	5.7	5.5	21.1	3.9	155.7	10.4
1958	42.8	34.1	16.5	10.3	3.4	3.8	6.2	5.4	22.8	4.3	149.6	8.0
1959	52.4	33.3	16.3	11.1	3.1	4.1	5.9	5.7	27.0	9.4	168.3	11.1
1960	50.8	35.6	19.1	10.8	3.7	5.0	6.5	6.2	32.5	8.2	178.4	12.9
1961	53.8	36.8	20.2	10.7	5.1	5.6	6.3	7.8	43.9	9.5	199.7	14.5
1962	55.0	39.7	20.9	11.1	5.2	6.7	7.0	10.1	51.3	12.0	219.0	13.1
1963	56.8	36.0	21.9	11.4	5.8	5.4	8.7	9.5	52.1	14.6	222.2	14.4
1964	62.6	41.4	25.0	12.7	6.6	6.1	9.8	9.8	49.3	17.9	241.2	14.6
1965	64.1	42.2	27.1	13.0	7.0	7.1	11.2	11.4	56.0	19.9	259.0	15.0
1966	70.0	44.4	28.6	13.4	7.3	7.7	13.0	9.8	59.3	20.8	274.3	16.8
1967	75.9	46.5	30.6	14.4	6.9	7.5	13.7	15.1	57.9	23.1	291.6	27.5
1968	79.4	50.8	30.9	14.6	6.9	10.4	14.9	19.0	60.5	31.8	319.2	34.9
1969	84.8	47.1	35.5	18.2	8.6	16.0	14.8	24.8	86.5	37.5	373.8	33.0
1970	84.1	48.2	39.5	19.9	8.4	17.3	18.1	22.0	88.5	42.3	388.3	34.9
1971	93.9	45.4	41.1	20.6	6.5	18.0	22.2	24.9	91.1	41.8	405.5	36.0
1972	105.7	47.0	35.4	21.7	8.7	18.5	22.0	23.7	90.9	37.7	411.3	33.0
1973	118.2	51.2	40.6	23.5	13.1	12.2	23.8	28.9	115.0	45.3	471.8	30.5
1974	157.8	56.2	35.8	25.2	14.6	14.8	25.5	43.7	149.9	37.8	561.3	20.8
1975	137.6	56.5	32.6	23.7	14.5	13.7	27.5	66.0	149.5	32.6	554.2	16.9
1976	121.9	54.5	35.2	25.1	14.0	14.9	48.5	55.8	171.9	36.3	578.1	15.3
1977	157.4	68.7	42.7	24.2	12.0	13.9	49.4	79.5	167.4	35.7	650.9	15.9
1978	154.5	65.2	47.2	23.5	11.8	15.3	54.8	81.4	202.8	36.3	692.8	14.3
1979	155.0	64.2	49.4	29.0	16.1	17.7	58.3	99.8	219.8	43.5	752.8	25.0
1980	152.2	68.5	45.4	26.2	14.1	16.0	62.9	117.0	248.7	41.4	792.4	25.8
1981	139.0	48.2	43.0	26.1	15.0	14.8	68.9	114.3	272.9	47.0	789.2	29.9
1982	135.0	49.5	38.7	24.2	12.6	14.4	75.1	108.8	281.8	49.4	789.5	28.9
1983	135.1	49.2	30.8	22.2	11.1	10.3	80.9	95.4	291.2	47.8	774.0	29.2
1984	140.5	47.5	35.0	22.7	11.7	11.8	84.6	100.2	272.7	40.5	767.2	33.3

some £30m for the 1980s, with considerable fluctuations in earlier years.

It appears therefore that for the early 1950s the combined total inventories of industry and utilities (covered by Tables A6.4 and A6.5) at 1980 prices lay in the range of £400-450m. Around 1960 their value was some £500m. Around 1970 it was some £850m. In 1980 it was some £1,600m. And around 1984 it was again some £1,600m. Major growth is apparent, between 1960 and 1970, and again between 1970 and 1980.

5. *Inventories of Wholesale and Retail Trade*

Data for wholesale and retail trade are sparse, being confined to five years: 1951, 1956, 1966, 1971, and 1977. However, for these five years data are adequate, since end-of-year inventories were part of the Census of Distribution questionnaires. The data sources comprise the official reports compiled by the CSO (see Central Statistics Office, 1956, 1962, September 1970, December 1971, January 1977, June 1977, November 1982).

For the years 1951, 1956 and 1961, inventory published results were given only for Census respondents. This writer grossed them up for retail trade, in proportion to retail sales estimates covering both respondents and non-respondents. No attempt has been made to cover wholesale non-respondents, because no estimates appeared in the CSO reports for sales of such non-respondents; their omission is likely to be of small significance. Published results for inventories of 1971 and 1977 included estimates for non-respondents of both wholesale and retail trades.

End-of-year inventories at current prices appear in Table A6.6, for each of the five years referred to above. They may be regarded as estimates of levels at the end of the calendar year, and as fully comprehensive by covering both Census respondents and non-respondents.

The top portion of the table shows nine descriptions of business for wholesale traders and manufacturers' agents. The "other non-food goods" description includes solid fuels such as coal and peat. Aggregate inventory value increases from £32m in 1951 to £41m in 1966, through a slight 1956 decrease to £30m. A major growth appears in the £70m of 1971, and again the £323m of 1977; but price inflation is largely accountable for these current-price increases.

The lower portion of Table A6.6 shows five descriptions of business for the retail trade. The "other non-food" group again includes solid fuels, as well as consumer durables such as furniture. The aggregate retail inventories showed a value of some £35m for both 1951 and 1956; successive increases were shown by the £58m of 1966, the £84m of 1971, and the £263m for end-of-1977. Price inflation played a large part in this apparent growth.

Thus, the combined wholesale and retail year-end inventories at current prices grew from £67m in 1951 through £155m in 1971 to £586m in 1977. For both

Table A6.6: *End-of-year Inventories of Irish Wholesale and Retail Trade at Current Prices, for five years covered by the Census of Distribution*

					£ million
Description of Business	1951	1956	1966	1971	1977
Wholesale (including Agents):					
Food and drink	10.62	10.41	9.21	13.31	53.71
Clothing and textiles	4.92	3.18	3.81	4.60	12.62
Grain and forage	3.82	2.36	6.00	10.77	54.90
Builders' materials	3.11	4.02	5.82	9.49	35.78
Hardware and electrical goods	2.27	1.94	2.34	3.98	21.21
Paper, stationery, books	0.43	0.57	0.49	0.95	2.70
Chemists' ware etc.	0.70	1.06	1.59	1.76	13.99
Petroleum products	1.80	2.05	1.85	3.84	27.09
Other non-food goods	4.48	4.47	9.96	21.65	100.62
Total Wholesale	32.15	30.06	41.07	70.35	322.62
Retail:					
Food, drink and tobacco	11.72	12.65	18.48	25.64	72.38
Drapery, clothing, footwear	11.01	10.45	11.68	17.22	42.54
Motor vehicles, garages, cycles	2.17	2.57	6.75	11.23	50.63
Filling stations	0.25	0.26	0.35	1.52	4.69
Other non-food	9.48	10.37	20.37	28.55	93.16
Total Retail	34.63	36.30	57.63	84.16	263.40
Total Wholesale and Retail	66.78	66.36	98.70	154.51	586.02

wholesale and retail, the "other non-food" group could be broken down into several further descriptions. Between 1951 and 1977 this group has increased its share of the total, in both wholesale and retail trade. Perhaps some four to six subsectors of "other non-food" in both wholesale and retail trades might be useful further information, especially for 1971 and 1977.

The inventory values at current prices were multiplied by selected inflators of Table A6.3, so as to provide estimates at 1980 prices. The most appropriate price inflators were applied, according to the judgement of the author. Parts 1 and 2 of Table A6.3 do not offer a wide choice of inflators, in the "description of business" context of the trade inventories being inflated. At all events the estimate at 1980 prices appear in Table A6.7.

For aggregate wholesale trade, little growth is apparent during 1951-1971: from £216m in 1951 the values decline somewhat before reaching £250m in 1971. But major growth is apparent by 1977, for which the end-year estimate is £470m; and large corresponding growth appears also among most descriptions of business.

For aggregate retail trade, a similar pattern is apparent, but with some growth in 1966 and again in 1971. From £202m in 1951, the inventory value reaches £269m in 1971, with a major growth to £367m in 1977. This latter growth is reflected in most descriptions of business.

For combined wholesale and retail trade, the inventory values at 1980 prices show little change between 1951 and 1966, being some £420m in both years, with a decrease to about £380m for 1956. (There was a major economic recession around 1956.) Between 1966 and 1971 some growth is apparent for £520m inventory value at the end of 1971. Major growth then occurred, to give some £840m for end-of-1977.

Table A6.7: *End-of-Year Inventories of Irish Wholesale and Retail Trade at 1980 Prices, for five years covered by the Census of Distribution*

					£ million
Description of Business	1951	1956	1966	1971	1977
Wholesale (including Agents):					
Food and drink	78.1	75.3	42.7	45.7	80.6
Clothing and textiles	16.9	12.6	11.5	12.5	16.2
Grain and forage	28.1	17.0	27.9	37.0	82.4
Builders' materials	26.0	28.0	39.9	49.8	53.8
Hardware and electrical goods	16.6	8.7	8.7	11.9	28.3
Paper, stationery,					
books	2.7	2.5	1.8	2.8	3.7
Chemists' ware, etc.	4.4	4.8	5.9	5.3	19.9
Petroleum products	14.5	16.1	11.7	20.4	45.8
Other non-food goods	28.3	20.0	36.8	64.8	138.8
Total Wholesale	215.6	185.0	186.9	250.2	469.5
Retail:					
Food, drink and tobacco	86.1	91.5	85.8	88.0	108.6
Drapery, clothing, footwear	37.6	41.5	37.6	46.6	54.7
Motor vehicles, garages, cycles	15.9	15.8	33.9	40.6	67.3
Filling stations	2.0	2.0	2.2	8.1	7.9
Other non-food	59.9	46.4	75.3	85.5	128.5
Total Retail	201.5	197.2	234.8	268.8	367.0
Total Wholesale and Retail	417.1	382.2	421.7	519.0	836.5

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