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Chapter 8

Consumption of Consumers' Capital

THE second part of this volume has been devoted to business capital, excluding, however, residences whether occupied by the owner or rented. For many purposes rented houses should be included with other business capital goods. There are reasons for including also houses owned by their occupants. When the gross national income is to include imputed rent, for example, depreciation on all houses must be deducted. Other durable consumers' goods also may well be included.

This chapter presents accounting estimates of consumption of the capital represented by houses and automobiles. Owing to the unsatisfactory character of the data no attempt was made to estimate depreciation on furniture or other durable goods. The series for houses and automobiles were derived without reference, of course, to any consumer estimates. It is highly doubtful that consumers estimate depreciation. If they think of capital consumption at all it is probably in terms of replacements, supplemented by the idea of staggering large expenditures. In making these estimates, therefore, it was necessary to assume that current business methods of calculating depreciation were applied.

One objection to this assumption requires some mention. The life of consumers' goods seems to be a function of the level of consumer income. When income declines, even shabby furniture may be retained. Its use may be stretched further than it would be at a higher level of income. That the average

life of consumers' goods may increase to some extent in a severe depression is indicated by the changes in the number of automobiles registered. No attempt was made to adjust the estimates for this possibility.

Since the estimates in this chapter are accounting measures, the usual qualifications apply to them.

DEPRECIATION OF DWELLINGS

Non-farm dwellings

The method of estimation is based on the application of depreciation rates to cumulated building construction.

Residential construction was estimated as follows:

1919–35, David L. Wickens' estimates of residential construction (excluding repairs and additions), non-farm, private; plus estimates of additions, alterations, and repairs important enough to require building permits.
1914–19, B.L.S. permits, per capita, 130 cities, multiplied by non-farm population.
1869–1914, J. R. Riggleman (*Journal of the American Statistical Association,* June 1933), building permits per capita, 20–65 cities, multiplied by non-farm population.

The depreciation rates were taken from those collected by the Bureau of Internal Revenue. These include:

TYPE	RATE *(per cent per annum)*
One family dwellings	
Frame (wood)	3
Brick or masonry	2
Multiple dwellings	
Frame (wood)	3.33
Brick	2.25, 2.86 (average taken equal to 2.5)
Other (masonry chiefly)	2.5, 3, 3.33, 4 (average taken equal to 3)

These were weighted as follows:
1) At the end of 1933 the following number of dwelling units, by types of structure (*Real Property Inventory,* 64 cities), were in existence:

	(thousands)
One family dwellings	
Wood	1,284
Brick	134
Other (masonry chiefly)	119
Multiple dwellings	
Wood	834
Brick	201
Other	61
	2,633

2) Distributing these by life groups (reciprocals of B.I.R. depreciation rates) we have:

LIFE GROUP *(years)*	NUMBER OF DWELLING UNITS *(thousands)*
30	834
33	1,345
40	201
50	253
	2,633

These represent the relative proportions of houses in existence in 1933, not the relative proportions of average annual construction of each life group. Another adjustment is needed.

3) The appropriate weight for each life group was obtained as follows:

30 year group:

$$\text{weight} = \left(\frac{\Sigma C\ {}^{1933}_{1904}}{\Sigma C\ {}^{1933}_{1904}}\right) \times 834 = \frac{69{,}267}{69{,}267} \times 834 = \quad 834 \quad 33.92\%$$

33 year group:

$$\text{weight} = \left(\frac{\Sigma C\ {}^{1933}_{1904}}{\Sigma C\ {}^{1933}_{1901}}\right) \times 1{,}345 = \frac{69{,}267}{73{,}441} \times 1{,}345 = \quad 1{,}269 \quad 51.61$$

40 year group:

$$\text{weight} = \left(\frac{\Sigma C\ {}^{1933}_{1904}}{\Sigma C\ {}^{1933}_{1894}}\right) \times 201 = \frac{69{,}267}{81{,}734} \times 201 = \quad 170 \quad 6.91$$

50 year group:

$$\text{weight} = \left(\frac{\Sigma C\ {}^{1933}_{1904}}{\Sigma C\ {}^{1933}_{1884}}\right) \times 253 = \frac{69{,}267}{94{,}131} \times 253 = \quad 186 \quad 7.56$$

2,459 100.00%

where C = deflated value of residential construction.
These were reduced to percentages of the total sum of the weights.[1]

The annual amount of construction of houses in each life group known, the next step was to distribute the value of construction of a given year over the succeeding years. The value of 30–year houses built in 1900 had to be divided into 30 equal portions, each representing the annual depreciation on this particular group of houses. Since we assume the average date of construction to be as of the middle of the year, one-half year's depreciation had to be charged to 1900 itself, and one-half year's to 1930, the years 1901–29 each being charged with a full year's depreciation. The easiest way of carrying out this series of computations was by means of moving averages of the original annual construction values, the weights derived above being applied after computation of the moving averages. That is, moving averages of appropriate length (30, 33, 40, and 50 years) were taken of the construction estimates (in current prices) and were centered on the year following the span covered (31st year, etc.). Then a two-year moving average of each series was taken, centered on the first of the two years. The resulting four series were weighted by the weights derived above and summated. The result is the estimate (on an accounting basis) of the depreciation of non-farm houses (Table 25).

Houses were divided into those rented and owned. The trend from rented to owned non-farm dwellings was taken into account by using decennial Census data.

The above estimates may be checked for 1929. Gross rent paid on rented non-farm dwellings, as estimated from the Census of Population, was about 5,200 million dollars. If we

[1] It is necessary to assume that the fraction of a year's construction consisting of houses in a given life group is constant and equal for all years. Knowing the number of houses in each group in existence in a given year (in this case, 1933) and the volume of construction in every year (C) we can determine these fractions, as we have done above. The fractions obtained do not depend on the year for which we have the inventory—if our initial assumption is correct.

apply to this figure the 1929 ratio of depreciation to rents received by realty corporations, 0.1445, we obtain about 750

Table 25

Depreciation Charges, Non-Farm Dwellings, 1919–1935

Straight Line Basis

	TOTAL ($1,000,000)	RATIO OF OWNED HOUSES TO TOTAL HOUSES [1]	OWNED HOUSES ($1,000,000)	RENTED HOUSES ($1,000,000)
1919	673.8	.466	314.0	359.8
1920	701.3	.472	331.0	370.3
1921	737.8	.478	352.7	385.1
1922	804.8	.483	388.7	416.1
1923	904.6	.489	442.3	462.3
1924	1,023.2	.495	506.5	516.7
1925	1,153.3	.501	577.8	575.5
1926	1,284.5	.507	651.2	633.3
1927	1,406.9	.512	720.3	686.6
1928	1,521.3	.518	788.0	733.3
1929	1,612.6	.524	845.0	767.6
1930	1,667.8	.524	873.9	793.9
1931	1,697.7	.524	889.6	808.1
1932	1,707.3	.524	894.6	812.7
1933	1,704.0	.524	892.9	811.1
1934	1,698.8	.524	890.2	808.6
1935	1,697.9	.524	889.7	808.2

[1] The figures derived for checking purposes (see below) provide us with the ratio for 1929:

	DEPRECIATION	
	$1,000,000	Per cent
Rented houses	750	47.6
Owned houses	830	52.4
	1,580	100.0

The ratios for other years are based on the ratios of the number of owned non-farm dwellings to the total, as reported in the decennial Censuses of Population:

1909	*1919*	*1929*
.3836	.4087	.4595

These were interpolated on a straight line basis and the ratios for 1930–35 were assumed to be equal to those for 1929.

million dollars as depreciation on rented non-farm dwellings. The estimate above is 770 million dollars.

For owned non-farm houses, the checking process was more complicated. According to the Census of Population, the value of owner-occupied non-farm dwellings early in 1930 was about 66,000 million dollars.[2] Assuming a ratio of gross rental to value of houses of 0.10 we have 6,600 million as estimated gross rental. This must be corrected for houses partly occupied by their owners and partly rented, e.g., two-family houses. Averaging the results of various assumptions,[3] we have 5,800 million dollars. If we apply to this gross rental value the ratio 0.1482 (depreciation to gross rentals, realty corporations, 1930), the estimate of depreciation is about 860 million dollars.[4] This also happens to be extremely close to that used above, 870 million dollars.

Despite the similarity of the two sets of estimates the check is, of course, only rough. A slightly different rent-value ratio or depreciation-rent ratio, just as acceptable on the basis of our present knowledge as the ratios we did use, might result in a larger discrepancy between the two estimates.

Farm dwellings

Department of Agriculture estimates for buildings and fence used in production constituted the basic data in the estimation of depreciation on farm dwellings.

The ratio of depreciation on producers' buildings and fence (339 million dollars) to their value (6,220 million) in 1930 (5.46 per cent) was reduced two-fifths. This last reduction is needed because depreciation on dwellings is at a slower rate

[2] *Abstract of the 15th Census, 1930,* p. 408. Open-end classes are estimated.

[3] We may assume that occupant-owners own one-family houses only (a maximum estimate); or that they own all multi-family houses plus a sufficient number of one-family houses to make up the proper number (a minimum estimate). The average of these two estimates is close to an estimate based on the assumption that occupant-owners own the same proportionate number of each size of house.

[4] The figure used in Table 25, footnote, 830 million dollars, refers to 1929.

than on other farm buildings. The resulting ratio (3.27 per cent) was applied to the value of dwellings (6,730 million) to get the 1930 depreciation charge (220 million). The latter was extrapolated back to 1919 and forward to 1933 by use of the depreciation charges on producers' buildings and fence. (The

Table 26

Depreciation Charges, Farm Dwellings, 1919–1935

(*Unit: $1,000,000*)

	TOTAL	OWNED HOUSES	RENTED HOUSES
1919	254	187	67
1920	276	203	73
1921	210	155	55
1922	214	157	57
1923	215	158	57
1924	214	157	57
1925	220	162	58
1926	222	163	59
1927	224	165	59
1928	222	163	59
1929	225	166	59
1930	220	162	58
1931	197	145	52
1932	183	135	48
1933	183	135	48
1934 [1]	189	139	50
1935 [1]	187	138	49

[1] Preliminary estimates.

ratio of the value of dwellings to the value of buildings and fence used in production remained constant during 1920–30.) [5] The resulting series was broken down into depreciation on owned and rented dwellings by applying the ratio of the value of owned dwellings to the value of all dwellings in 1930 (73.6 per cent).[6]

[5] *Crops and Markets*, April 1933, p. 146, Table 7.
[6] *15th Census, Agriculture, IV*, p. 158.

Comparison with an estimate of depreciation for the total for 1930 derived in another manner was made as follows:

1) Value of dwellings not used in production (million dollars)	6,730
2) Assumed ratio of gross rentals to value of house	.10
3) Gross rental value (million dollars), (1) x (2)	673
4) Ratio of depreciation to rents received, realty corporations (Treasury Department), 1930	.1482
5) Estimated depreciation (million dollars), (4) x (3)	100

This estimate differs widely from the one derived above. The Department of Agriculture estimate of depreciation may be high because it includes some maintenance.[7] Another reason may be that the two-fifths reduction applied above is too small. Or it is possible that the rent-value ratio of .10 and the depreciation-rent ratio of .1482 are too low. In the absence of further information we must accept the estimates presented in Table 26, but with considerable reservation.

The figures for farm and urban dwellings are brought together in Table 27.

DEPRECIATION OF PASSENGER AUTOMOBILES

Depreciation of automobiles used by consumers was estimated in the same general manner as depreciation of urban houses. Two formulas were used: (1) declining-percentage-of-cost method; (2) straight line method (Table 28).

The depreciation charges (declining-percentage-of-cost method) were calculated on the following assumptions:

1) Zero scrap value
2) Life of eight years [8]
3) Purchase centered at middle of first year

[7] The peculiarity of the 1919 census value of buildings may also be relevant. If this value was too high (because it was based on current prices) the derived depreciation would also be too high.

[8] See *Automobile Facts and Figures*. The available data indicate only that the average age of *scrapped* cars is about 8 years. Only about half of all cars produced have been scrapped, chiefly those cars produced before 1926. No distinction between types of cars is possible.

Table 27

Depreciation Charges, Farm and Non-Farm Dwellings, 1919–1935

Accounting Basis (*Unit: $1,000,000*)

	OWNED HOUSES	RENTED HOUSES	ALL HOUSES
1919	501.0	426.8	927.8
1920	534.0	443.3	977.3
1921	507.7	440.1	947.8
1922	545.7	473.1	1,018.8
1923	600.3	519.3	1,119.6
1924	663.5	573.7	1,237.2
1925	739.8	633.5	1,373.3
1926	814.2	692.3	1,506.5
1927	885.3	745.6	1,630.9
1928	951.0	792.3	1,743.3
1929	1,011.0	826.6	1,837.6
1930	1,035.9	851.9	1,887.8
1931	1,034.6	860.1	1,894.7
1932	1,029.6	860.7	1,890.3
1933	1,027.9	859.1	1,887.0
1934	1,029.2	858.6	1,887.8
1935	1,027.7	857.2	1,884.9

4) Succeeding sums of depreciation charges are 75 per cent of one another

The depreciation charges thus determined are the following fractions of original cost: [9]

YEAR	FISCAL YEAR	CALENDAR YEAR
1	.278	.139
2	.208	.243
3	.156	.182
4	.118	.137
5	.088	.103
6	.066	.077
7	.049	.058
8	.037	.043
9	...	.018
	1.000	1.000

[9] The sources of data on original cost are as follows: The data in the *Census of Manufactures* were interpolated by sales reported by the Automobile Manu-

Table 28

Depreciation Charges, Passenger Automobiles, 1919–1935

(Unit: $1,000,000)

	METHOD OF COMPUTATION	
	Declining percentage of cost	Straight line
1919	864.6	690.7
1920	1100.8	860.6
1921	1249.5	1007.3
1922	1340.1	1139.1
1923	1575.1	1335.8
1924	1802.5	1527.0
1925	1990.4	1699.6
1926	2226.0	1923.3
1927	2340.8	2099.7
1928	2383.0	2195.5
1929	2512.0	2345.1
1930	2488.4	2449.2
1931	2219.3	2371.6
1932	1864.3	2200.7
1933	1539.4	1994.3
1934	1360.4	1779.8
1935	1371.0	1653.1

Justification for the fourth assumption is found in data on values of used cars of different ages.[10]

While the above figures are probably more suitable than are depreciation charges computed on a straight line basis, the

facturers' Association (*Facts and Figures, 1934,* pp. 4 and 6). The 1919–35 figures exclude public conveyances, while those for 1909–14 include public conveyances. The value of exports (*Statistical Abstract,* 1934, p. 477, etc.) was subtracted from production, imports being ignored as unimportant. The wholesale value reported exported was reduced 15 per cent to the manufacturers' value (see Simon Kuznets, *Commodity Flow and Capital Formation*). The manufacturers' value of cars intended for domestic consumption was then raised to the retail value. The margin was assumed to be equal to 25 per cent of retail value (see W. H. Lough, *High Level Consumption* [McGraw-Hill, 1935], p. 256). Of total domestic consumption 85 per cent was allocated to consumers (see Lough, *loc. cit.*).

[10] See *Automobile Facts and Figures, 1934,* p. 27.

latter estimates also are given for comparison. In the computation of the straight line estimates we again assumed an eight year life, with purchases centered at the middle of the first year.

It seems curious, at first sight, that depreciation on motor cars should exceed depreciation on houses in many of the years covered. But we must remember the high rate of depreciation on cars. The rapid decline in depreciation on motor cars that began in 1929 is also a consequence of their short life.[11]

[11] No separate estimate of losses on houses or automobiles on account of fire is offered. It is felt that the depreciation rates used are sufficiently high to take care of these losses. A rough estimate, published in National Bureau *Bulletin 60,* suggested an average annual loss on houses of about 100 million dollars. This is only about 4 or 5 per cent of the average annual depreciation charge on houses.

A separate estimate of fire losses logically requires correction of the estimated depreciation charges, the depreciation base (gross value of houses or autos in existence) being reduced by the fire loss. This would involve assumptions as to the age distribution of houses or cars destroyed by fire, as to any discrepancy between original cost and current loss reported, etc. In view of the nature of the available data no such refinement is advisable.