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CHAPTER THIRTEEN

Consumer Durables

13.1. Introduction

Gallman believed that while his capital stock estimates provided a valuable picture of American wealth, they were incomplete. Among the important gaps were the exclusion of financial assets and that diverse body of skills and talents subsumed under the title "human capital."[1] His study focused on tangible capital, and largely excluded intangibles such as intellectual property rights and goodwill. Gallman considered measuring the stocks and flows of all these forms of capital beyond the scope of his study. This chapter presents information on the one step that Gallman did take to fill in the picture by introducing his estimates of the stocks of consumer durables.

Gallman argued that because the value of residential structures was already included in the capital stock, it was sensible to add up the value of long-lasting goods that heated, furnished, and decorated these buildings. Following Simon Kuznets (1938, 6), he defined durables as goods "that without marked change and retaining their essential physical identity, are ordinarily employed in their ultimate use over a long period," conventionally a period of three years or more. Such goods are valued principally for the flow of services they provided. By way of contrast, perishable goods such as food and fuel were consumed in less than six months, and semi-durable goods such as clothing were consumed over a period between six months and three years. Consumer durables differed from producer durables primarily on the basis of ownership—by the household, as

Gallman drafted the core sections, 13.4 and 13.5. Rhode wrote the introductory sections, 13.1, 13.2, and 13.3; and the concluding sections, 13.6 and 13.7.

opposed to the business firm—and on the scale of operations involved. Many pieces of capital equipment, such as sewing machines, initially were producer durables used in shops and factories. Once these durables could be made smaller and less expensive, they were sold to consumers and used within the household.

The chapter has the following form. Section 13.2 uses Gallman's flow data to document the rising share of consumer durables in expenditure over time, and to raise questions about when consumer durables became important in the American economy. Section 13.3 calls attention to Gallman's favorite example of a nineteenth-century consumer durable, the cast-iron stove. Section 13.4 provides Gallman's detailed description of his estimating procedures. Section 13.5 compares Gallman's estimates of the aggregate stock of consumer durables over the 1774–1900 period with his numbers for the aggregate capital stock. Section 13.6 concludes the chapter.

13.2. The Secular Rise of Consumer Durables Spending

A commonplace in economic history is to associate the rise of spending on long-lasting consumer products with the "consumer durables revolution" of the early twentieth century.[2] Automobiles and electric appliances are given pride of place. Based on his annual flow data, Gallman tended to view the rise of durables spending as part of a longer-term process, as one involving more continuity than change. Gallman's view differed from the scholars who focused on the 1920s and 1930s primarily because he was taking a much longer perspective.

Gallman and Howle (1971, 33) wrote, "The pre–Civil War durables may have differed from those in use today, but they did perform essentially the same kinds of functions." They reported that the share of durables in consumption (measured either in current or constant price terms) doubled from 5 percent in the 1839–58 period to 10 percent in the 1919–38 period. It then remained constant through the 1939–53 period.

Indeed, Gallman's annual product data indicate that the rise in the durables' share of GNP over the 1840–90 period exceeded what occurred later.[3] Figure 13.1, panel A, graphs the annual series on the share of consumer durables in consumption and GNP, all measured by constant price series, from the 1830s to the 1950s using Gallman's and Kuznets's data. The Gallman series are from chapter 5; the Kuznets (1961b) data are his constant (1929) price variant III series from his T-Tables. (Using Kuznets's variant I series would create no significant differences.) The

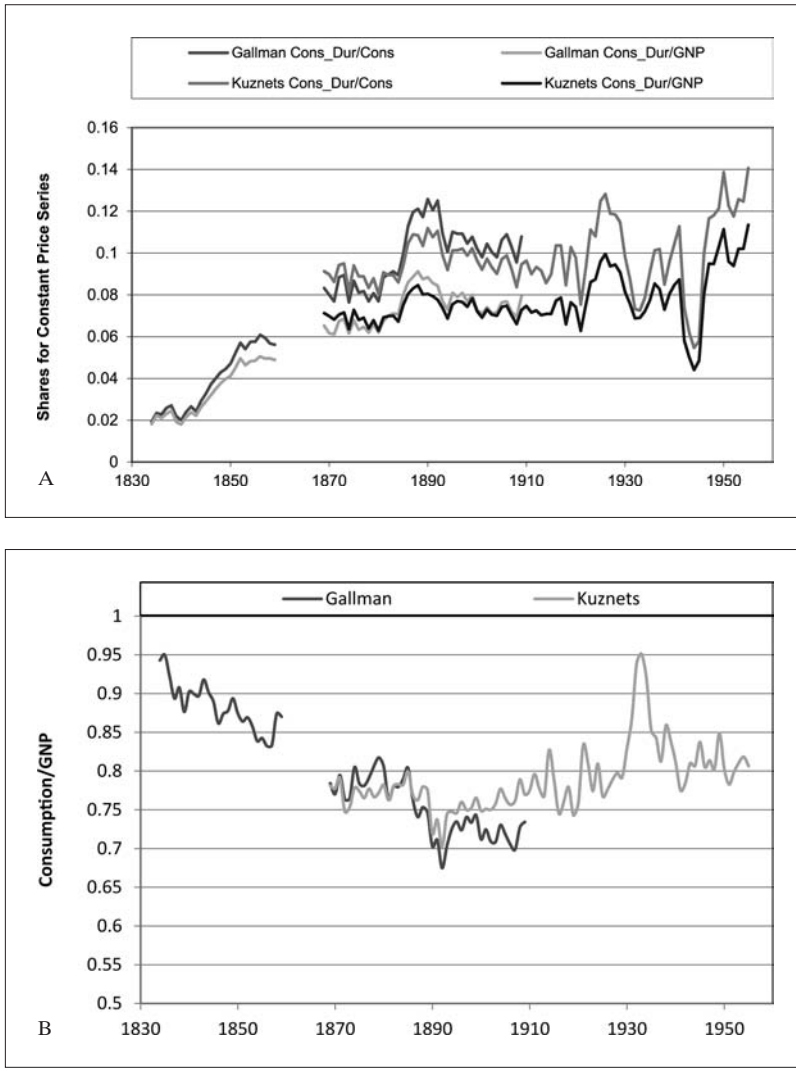

FIGURE 13.1 (a) Consumer durables share of consumption and annual product; (b) consumption as a share of annual product. Sources: See text.

series in figure 13.1, panel A, display sharp increases in the 1840s and 1850s and again in the late 1880s and early 1890s.[4] Notably, the volatility of the consumer durables shares over the 1920–50 period appears much greater than in Gallman's estimates. The importance of this category of spending for business cycle fluctuations might have changed.

The changes in the shares appear somewhat less pronounced when Gallman's current price series are used. This reflects the decline in the prices of consumer durables relative to the aggregate price level. This decline presumably resulted from the sector's relatively more rapid productivity growth. Gallman did not produce an annual current price series before 1860, but the same basic pattern of a steadily rising share for consumer durables appears in the current value data reported for the benchmark years 1839, 1844, 1849, 1854, and 1859 in table 5 of Gallman (1966). Gallman's share-based approach embraced the interaction of both demand-side shifts and supply-side shifts, including innovations that reduced the price, improved the quality, or increased the variety of goods available to consumers. Gallman (1972, 58) noted that "technical change has been especially fruitful in the development of new durable goods," which (together with an income elasticity of demand above unitary) led to the rising share of durables in expenditures.

Figure 13.1, panel B, graphs related series that are useful to introduce in this context. The panel shows the ratio of total consumption to GNP for the constant-price Gallman and Kuznets data. One can think of these series as the ratios of the series in panel A. The Gallman series shows that consumption accounted for a steadily declining share of national product over the 1839–1909 period. The Kuznets series indicates the share was roughly constant, perhaps declining in the late nineteenth century and recovering over the mid-twentieth century. The nineteenth century is sometimes treated as "the age of the producer" and the twentieth century as "the era of the consumer," with the consumer durable revolution associated with the spread of automobiles and electric appliances as the hinge in the transformation. These data serve to make the simple point that consumption was a larger share of output in the early period than it was anytime thereafter, except in the throes of the Great Contraction of the early 1930s.[5] In figures that Gallman provides, the mid-nineteenth century appears to be a period of rapid growth in the stocks of consumer durables. What was happening during this crucial period?

13.3. Exemplar of Nineteenth-Century Consumer Durables: Cast-Iron Stoves

Gallman's favorite example of a mid-nineteenth-century consumer durable was the cast-iron stove. He believed that the innovation deserved

far wider notice than it has received. In his *Cambridge Economic History of the United States*, volume 2, chapter 1, Gallman (2000, 33) wrote, "In the antebellum years the production and sale of stoves increased dramatically. Stoves vastly improved the quality of heating of homes and cooking." Stoves were not the most important consumer durable; timepieces and furniture dwarfed stoves in total volume. Nor were they the fastest-growing; timepieces and musical instruments outpaced stoves. And if price declines indicate innovation in production, stoves did not experience the most rapid advance in the period where data are available (see Nordhaus 1996 for the phenomenal declines in the price of lighting).

Yet when he was teaching and writing about nineteenth-century America, Gallman often highlighted the cast-iron stove. This was in part due to his interest in its effects on architecture and construction. As Virginia and Lee McAlester (1984, 28) argue, the cast-iron stoves and their venting systems "were far easier to install than massive fireplaces and thus permitted the wider use of larger—and less regular—house plans. Compound plans, in particular, now became more common."

Several other scholars have shared Gallman's appreciation of the cast-iron stove. Ruth Schwartz Cowan (1997, 197) called the cast-iron stove "the first do-it-yourself consumer durable, the first mass-produced appliance intended for use in people's homes."[6] Kathleen Smallzried (1956, 93–94) stated (italics in the original): "It can be said without exaggeration that *the cast-iron range created the first major revolution in cooking since the discovery of fire*." Sigfried Giedion (1948, 528) opined that in the nineteenth century, "the cast-iron stove and range were identified with America much as the automobile was later."

The first stoves developed in Europe dated to the end of the fifteenth century. The first model invented and used in North America is typically credited to Benjamin Franklin. In 1744, Franklin built his famous free-standing stove, but it proved to be inefficient, smoky, and of limited popularity. Predating Franklin's efforts, several Pennsylvanians produced jamb (five-plate) stoves of German design that were set against the wall in front of the fireplace. Six-plate stoves, which were essentially cubic metal boxes with plates on each side, appeared on the market in the late eighteenth century and were much cheaper than Franklin's model. Ten-plate stoves represented an enlargement of the six-plate model; some contained internal ovens, making them the prototypes of the cook stove. The early nineteenth century stove remained "a fire hazard and, besides, the plates had to be replaced frequently" (Brady 1964, 176–77).

Only after stove makers began in the 1830s to use cast iron instead of sheet iron plates did households adopt stoves in place of the traditional fireplaces (McAlester 1984, 52). Over the antebellum period, American stove makers solved a number of technical problems—how to design fireboxes and grates to sustain fires with less care; how to ease disposal of ash and clinkers (unburned coal or charcoal); how to allow for a steady draft of air and prevent smoke from being released indoors; how to spread heat evenly, especially around the oven; and how to capture heat for hot water, vent coal gas, and make the coal feed itself automatically into the fire. They learned how to create better, more evenly heated ovens and ranges for cooking. And they developed better materials and casting techniques to reduce production costs and increase product durability.

Stoves evolved from simple utilitarian fireboxes designed to provide heat for general use into a diverse range of specialized and often highly ornate household appliances. Dorothy Brady (1964, 148) observed, "The Victorian preferences for ornamentation found their outlet mainly in goods manufactured for the use of the consumer. Factory production began with simple and mainly functional models, but decoration and variety were introduced fairly quickly wherever ornament did not appear to interfere with use. By 1850, a large proportion of the patent applications for stoves (48 out of 54 in 1849) pertained to ornamental moldings, carvings, forms and figures; and by 1890, the Aldrich Committee found no way to give a simple functional description of a cook stove."

The initial takeoff in the diffusion process for stoves is typically dated to the 1830s. Production rose from 25,000 in 1830, 100,000 in 1840, and 375,000 in 1850 to one million in 1860 and 2.1 million in 1870 (Dwyer, 1968, 361). Based on these figures, Stanley Lebergott (1984, 71) conjectured that less than 1 percent of American families had cast-iron stoves in the period before 1830, whereas two-thirds did by 1860. Gallman's figures of the stocks of "stoves, ranges, and fireless cookers" in table 13.3 rise in rough parallel with these data on production flows, although Gallman's numbers show a decline between 1870 and 1880.

Perhaps the greatest importance of the stoves was to economize on fuel. According to a detailed study reported in the 1830 *Transactions of the American Philosophical Society*, stoves could save between 50 and 90 percent of the firewood that a fireplace required to heat a room to a given temperature (Bull 1830). Stoves could be placed so as to warm a space more evenly; and with the proper layout of stovepipes, far less of the heat went "up in smoke." The commonly-cited statistic is that 80 percent

of the heat generated in a fireplace escaped up the chimney (Reynolds and Pierson 1942, 3).

One factor slowing the adoption of stoves was the purported love of Americans for large open fires. In his classic *The Great Forest*, Richard G. Lillard (1947, 85) proclaimed, "All cabin dwellers gloried in the warmth of their fireplaces, exploiting their world of surplus trees where a poor man, even a plantation slave, could burn bigger fires than most noblemen in Europe. . . ." He added: "If the fire was too hot, he left the doors open, but fire he would have, if only to brighten up the dark end of the house." In the areas of the new nation where "trees were weeds," Americans could indulge in their love of open fires at low cost.

Another offsetting factor was that the wood used in stoves typically had to be split and "bucked up" into smaller pieces. Fireplaces could hold logs of two feet or more, whereas most stoves required lengths of sixteen inches or less. It took roughly twice the labor to cut the standard four-foot logs to stove lengths as was needed to produce fuel for fireplaces.[7] In *Energy in the American Economy*, Sam Schurr and Bruce Netschert (1960, 50) attribute the relatively slow transition from the fireplace to the country stove in the United States to "the simple fact that to chop fuel wood small enough for use in stoves would have required a substantial amount of human labor. Energy in the form of fuel wood was abundant, but manpower was scarce. It made no sense to waste man-hours in order to economize in the use of a seeming unlimited natural resource. Man's labor was the most valuable resource of all."[8] But by their own numbers, "the same quantity of wood, burned in a well-constructed wood stove, would supply about four times as much heat as when used in an open fireplace." Even with the need for bucking and splitting, it did not require four times as much labor to produce wood that fit into the stove rather than the fireplace.

The use of the cast-iron stoves facilitated the use of coal in heating homes. In the early 1800s, innovators developed grates allowing the combustion of coal without the forced draft that was used in furnaces and forges. Coal had several advantages over wood in urban settings. It had more fuel value per unit of weight and volume. Hence, coal required less space to store, was easier to transport, and was generally cheaper per BTU than wood in cities. Among the coals, anthracite was preferred for domestic uses. It produced less smoke and ash than either bituminous coal or wood. The map on fuel use in the 1880 census clearly indicates that the use of coal as a domestic fuel was concentrated in urban areas,

and that wood burning predominated throughout rural America (Sargent 1884, 489). Lebergott (1976, 276) estimated that in 1880, 98 percent of farm households heated with wood, whereas 16 percent of urban households did. In total, 65 percent of US households burned wood in that year, whereas 35 percent burned coal.[9] Coal could be burned in fireplaces, as was relatively common in Europe. But the mineral fuel gave off dangerous and corrosive gases during combustion. In the Victorian era, many households used equipment similar to iron stoves built into the fireplace to control these gases.

These features of stoves had important consequences of industrializing and urbanizing America. Lebergott (1984, 71) observed, "As cities grew and the trees around them were cut down for firewood, the price of wood rose steadily." He argues that this created "irresistible" cost incentives to adopt the cast-iron stoves. Brady (1972, 71) noted, "Fuel was a costly element in the city workers' budget, especially when inefficient fireplaces were the only means for heating and cooking. The search for more efficient cooking and heating equipment suitable for the dwellings in the growing cities of the eighteenth and nineteenth centuries led to many innovations in the design of stoves. . . . The diffusion of stoves made its contribution to low-cost housing simply by eliminating the masonry in the fireplace."[10] The adoption of the cast-iron stove occurred just when America was moving into the Great Lakes region—what became known in the twentieth century as the "Snow Belt."

Gallman (1966, 64) was acutely aware of the role of firewood production in the early American economy. One of his three main improvements to Kuznets's annual national product was to include the value of firewood production (see chapter 5). According to Gallman's constant 1860 price series, firewood accounted for roughly 6.5 percent of all goods and services consumed circa 1839, several times the share spent on durables. By 1869 the firewood share in consumption had fallen to 3.0 percent, and by 1909 to only about 0.4 percent. The spread of cast-iron stoves thus had indirect effects on the allocation of consumer spending. Firewood was a perishable good, and hence by economizing on its use, the cast-iron stoves increased the share of consumer spending that could be devoted to nonperishables, including consumer durables.

In his draft outline for the *Cambridge* chapter, Gallman set the issues broadly: "Stress the importance of other elements than nutrition to human health and well-being—Elements promoted by growth (e.g. stoves—importance for quality of cooking and quality of home heating and for

economy of both)—Talk about the innovation and diffusion of stoves, Talk about the innovation and diffusion of the balloon frame—effect on cost and quality of housing, etc."[11] Given his interest in architecture and construction, it is easy to see why Gallman was intrigued by the potential complementarity of cast-iron stoves and balloon-frame housing. (For the importance of balloon-frame construction of housing, see the discussion of structures in chapter 4). The cast-iron stove was only one example of the increasing importance of consumer durables during the "long" nineteenth century. Far greater detail on a comprehensive set of durables—including pianos, sewing machines, timepieces, furniture, and tombstones—may be found below. Gallman's estimates of household capital goods will now be presented in his own words.

13.4. Decadal Estimates of Consumer Durables, 1840–1900

This section details the estimation of consumer durables on a decadal basis from 1840 to 1900. The estimates for 1850, 1860, 1890, and 1900 were made by cumulating annual flows of the output of consumers' durables, expressed in 1860 prices and appropriately adjusted for capital consumption. These cumulations were then inflated to produce current price figures; see table 13.1.

The annual output series do not extend uninterruptedly for enough years to permit estimates of the stock of consumer durables for 1840, 1870, and 1880 to be made on the basis of cumulations of output flows alone. The cumulations for the years available (1834–39 for 1840; 1855–59, 1869, and half of 1870, taken together, for 1870; 1869–79 for 1880) were assembled, and the patterns of accumulation embodied in the estimates for the other benchmark years (1850, 1860, 1890, 1900) were used as means for blowing up the partial cumulations to achieve comprehensive estimates for 1840, 1870, and 1880 (see the notes to table 13.1).

The antebellum annual output flows refer to census years; for example, the estimate for 1839 refers to the flow across the period 1 June 1839 through 31 May 1840. These data were employed without adjustment. The postbellum series is a calendar-year series; it was converted into a form more suitable for present purposes by the calculation of two-year moving averages.

The system of capital consumption employed was straight-line. The reciprocal of the average life expectation of consumers' durables was computed (see below), and the value of each annual investment flow was reduced

TABLE 13.1 **Value of consumers' durables, measured in current and 1860 prices, 1840–1900, in millions of dollars**

Panel A: 1840–70

Census years	Value of output 1860 prices	Remaining in 1840	1850	1860	1870
1834	25.5	17.9	2.6		
1835	30.7	23.3	4.9		
1836	28.8	23.6	6.3		
1837	34.4	30.3	9.6		
1838	36.7	34.5	12.5		
1839	31.1	31.1	12.4		
1840	29.0		13.3		
1841	36.2		18.8		
1842	40.0		23.2		
1843	41.8		26.8	1.7	
1844	51.9		36.3	5.2	
1845	60.2		45.8	9.6	
1846	68.4		56.1	15.0	
1847	82.9		73.0	23.2	
1848	90.3		84.9	30.7	
1849	96.6		96.6	38.6	
1850	108.5			49.9	
1851	127.8			56.2	
1852	156.6			79.9	
1853	162.0			94.0	
1854	162.3			105.5	
1855	177.0			127.4	3.5
1856	187.0			147.7	16.8
1857	184.2			158.4	29.5
1858	197.5			183.7	45.4
1859	200.4			200.4	60.1
1869 (calendar)	349				338.5
1870 (1/2 calendar year output)	165				165
1. Totals, six most recent years		160.7	392.7	923.1	
2. Total value of consumers' durables at 1860 prices		(231)	524.1	1,327.10	(2190.8)
3. Ratio of lines 2 to 1		(1.4377)	1.3346	1.4377	
4. Price index		115.6	113.3	100	114.2
5. Total value of consumers' durables at current prices (Line 2 × line 4 ÷ 100)		267	593.8	1,327.10	2,501.90

TABLE 13.1 (*continued*)

Panel A: 1840–70

Census years	Value of output, 1860 prices	Remaining in			
		1840	1850	1860	1870
6. Total of first 5 years & last 1-1/2			157.6	338.6	658.8
7. Ratio of lines 2 and 6		3.3255	3.9194	(3.3255)	

Panel B: 1870–1900

	Value of output, 1860 prices		Remaining in		
	Calendar years	Census years	1880	1890	1900
1869	349	339.5	101.9		
1870	330	227.5	121.2		
1871	325	375.0	16.05		
1872	425	433.5	221.1		
1873	442	415.5	241.0		
1874	389	419.5	272.7		
1875	450	448.5	322.9	9.0	
1876	447	466.5	368.5	42.0	
1877	486	480.0	412.8	76.8	
1884	474	512.0	476.2	117.8	
1879	550	572.5	572.5	171.8	
1880	595	634.0		234.6	
1881	673	705.0		310.2	
1882	737	744.5		379.7	
1883	752	755.0		437.9	
1884	758	812.5		528.1	
1885	867	932.5		671.4	18.7
1886	998	1,037.5		819.6	93.4
1887	1,077	1,084.5		932.7	173.5
1888	1,092	1,090.0		1,013.7	250.7
1889	1,088	1,125.0		1,125.0	337.5
1890	1,162	1,172.5			433.8
1891	1,183	1,218.0			535.9
1892	1,253	1,183.5			603.6
1893	1,114	1,051.0			609.6
1894	988	1,097.0			713.1
1895	1,206	1,196.5			861.5
1896	1,187	1,228.5			970.5
1897	1,270	1,250.0			1,075.0
1898	1,230	1,316.5			1,224.3
1899	1,403	1,369.0			1,369.0
1900	1,335				

continues

TABLE 13.1 (*continued*)

Panel B: 1870–1900

	Value of output, 1860 prices		Remaining in		
	Calendar years	Census years	1880	1890	1900
1. Totals, 11 most recent years			3,275.8	6,624.7	8,733.8
2. Total value of consumers' durables at 1860 prices			(3439.6)	(6870.3)	(9270.1)
3. Ratio of lines 2 and 1			(1.05)	1.0371	1.0614
4. Price index			87.3	68.2	62.5
5. Total value of consumers' durables at current prices (line 2 × line 4 ÷ 100)			3,002.8	4,685.5	5,793.8

Sources:
Panels A and B, column 1: The estimation of this series is described in Gallman (1966). Panel B, column 2: Two-year moving averages of data in column 1, dated to the earlier of the two years (i.e., the mean of 1869 and 1870 is dated to 1869 and stands for census year 1869). Panel A, columns 2–5, and panel B, columns 3–5: These columns contain the depreciated flows of column 1 (panel A) and 2 (panel B). For example, the average life expectation of durables produced in census year 1834 was probably about 16.7 years (see table 13.2, 1840). The reciprocal of 16.7 is .06; i.e., the appropriate depreciation rate is 6 percent. By June 1 of 1840, goods produced in census year 1834 (i.e., between June 1, 1834, and May 31, 1835) were five years old, and had therefore lost 30 per cent of their original value. Thirty percent of $25.5 million (panel A, column 1) is $7.65 million, leaving $17.85 million (rounded to 17.9) left on June 1 of 1840, the figure appearing in the column headed "1840." For the years 1834 through 1850, a depreciation rate of 6 percent was employed; thereafter, a rate of 7 percent (see table 13.2).
Lines 1–3 in panels A and B and lines 6 and 7 in panel A are devoted to the estimation of the value of consumers' durables, in 1860 prices, at census dates, 1840–1900. For the years 1850, 1860, 1890, and 1900, the estimates were made simply by summing up the depreciated annual flows. For the years 1840, 1870, and 1880, it was necessary to blow up incomplete flows. The blow-up ratios (rows 3 and 7) were taken from evidence for years for which complete information was available. The estimate for 1840 was based on evidence for 1860 (i.e., the bracketed ratio in row 3 for 1840 was taken from 1860), rather than an average of the experience reflected in the 1860 and 1850 data, because the circumstances of the period during which the stock was being accumulated are more nearly similar for 1840 and 1860 than is the case for 1840 and 1850. Like reasoning led to the application to the 1870 data of a blow-up ratio drawn from the 1850 data. The blow-up ratio for 1880 is a rough average of experience in 1860 (1.043), 1890 (1.037), and 1900 (1.061). Clearly, hard data figure more importantly in the estimate for 1880 (95 percent) than in the estimates for 1840 (70 percent) and 1870 (30 percent). The figure for 1880 seems quite secure; the figures for the other two years seem much less so. Line 4 in each panel contains price index numbers, derived in table 13.3. Line 5 lists the current price estimates, calculated by multiplying the constant price estimates by the price index numbers, divided by 100.

by this fraction for each year following the investment. Thus, if consumers' durables lasted, on average, 16.7 years, the depreciation rate would be 6 percent. An investment of $100 in year t would become a capital stock of $94 in year t + 1 ($100 minus $6), and $88 ($94 minus $6), in year t + 2, and so forth.[12]

TABLE 13.2 **Mean life expectancy of new consumers' durables, 1850–90**

	Life expectancy				
	20 years	**12 years**	**10 years**	**Totals**	
Real value of output, in millions of dollars					
1840	13.6	1.4	5.8	20.8	
1850	27.7	5.3	20.4	53.4	
1860	50.3	17.2	47.9	115.4	
1870	93.1	23.7	75.5	192.3	
1880	148.0	27.0	166.2	341.2	
1890	259.1	57.5	339.7	656.3	
1900	324.1	97.9	464.4	886.4	
Shares in output					
1840	0.654	0.067	0.279	1.000	
1850	0.519	0.099	0.382	1.000	
1860	0.436	0.149	0.415	1.000	
1870	0.484	0.123	0.393	1.000	
1880	0.433	0.079	0.487	1.000	
1890	0.395	0.088	0.517	1.000	
1900	0.366	0.11	0.524	1.000	
Life expectancies × shares				**Mean life expectancy**	**Depreciation rate**
1840	13.08	0.80	2.79	16.67	6.0
1850	10.38	1.19	3.82	15.39	6.5
1860	8.72	1.79	4.15	14.66	6.8
1870	9.68	1.48	3.93	15.09	6.6
1880	8.66	0.95	4.87	14.48	6.9
1890	7.90	1.06	5.17	14.13	7.1
1900	7.32	1.32	5.24	13.88	7.1

Sources:
The data in the first panel, which distributes outputs among classes of goods having different degrees of durability, are drawn from table 13.3. Specifically, the first column is (table 13.3, line A.4.b. + A.5.x.) ÷ A.5.z.; the second column is table 13.3, line B.6.y.; the third column is (table 13.3, line C.14.b., + C.15.x.) ÷ line C.15.y. The second panel was computed from data in the first panel by dividing the total for each year through the entries recorded for the three classes of goods. The third panel was calculated by multiplying the share of each class of goods in total output for each year (taken from the second panel) by the life expectancy of new goods of this type (table heading). The sum across each row in the panel yields the average life expectancy of goods produced in that year. The depreciation rates are the reciprocals of the life expectancy estimates.

Table 13.2 presents estimates of the mean life expectations of new consumer durables and the associated depreciation rate. The life expectations of different classes of new durables were taken from Goldsmith, except for carriages. (Goldsmith does not treat carriages; here they are given a life expectation of twenty years, the same as furniture.) The classes were combined to produce average life expectations for durables of all types in the following way. Production of the various types of durables for benchmark years was drawn from the work of Shaw and Gallman, which

is based on the census. These output flows were then deflated by means of Dorothy Brady's price index numbers, and used to compute the average expectation of life of the durables produced at each census date. These figures are consistent with depreciation rates of about 7 per cent after 1850, and about 6 per cent for 1850 and earlier years.

Brady's weighted index numbers were used to inflate the constant price benchmark stock estimates. The price index weights were established in the following way. The fraction of total constant price output accounted for by each class of property—classes being defined in terms of durability—was established by deflating the benchmark output estimates. Given the flow of real output of each type of property, together with the durability of each type of property, it was then possible to estimate the structure of the stock of durables (i.e., the distribution of the stock among classes defined in terms of life expectation) in each benchmark year. Table 13.3 presents, in detail, the consumer durable price estimates for the 1840–1900 period.

TABLE 13.3 **Consumers' durables price indexes, 1840–1900**

		1840	1850	1860	1870	1880	1890	1900
A.	**Consumers' durables with 20-year lives**							
1a	New furniture							
1b	Household furniture Value, at current prices (mil. $)	6.5	16.6	22	58.4	66.3	95.2	106.7
1c	Price index: furniture: tables, chairs and bedsteads	—	111	100	108	79	70	—
1d	Value, at 1860 prices (mil. $)	—	15	22	54.1	83.9	136	—
2a	Carriages and wagons							
2b	Value, at current prices (mil. $)	6.1	8.1	19.6	36.1	36	56	55.6
2c	Price index: Carriages, buggies, and wagons	—	91	100	148	89	76	77
2d	Value, at 1860 prices (mil. $)	—	8.9	19.6	24.4	40.4	73.7	72.2
3a	Musical instruments							
3b	Value, at current prices (mil. $)	0.7	1.9	5.1	10.1	14.1	26.9	34.2
3c	Price index: pianos and reed organs	—	96	99	112	95	92	82
3d	Value, at 1860 prices (mil. $)	—	2	5.2	9	14.8	29.2	41.7
4a	Tombstones							
4b	Value, at current prices (mil. $)	0.8	1.8	3.5	6.6	7.5	15.2	20.3
4c	Price index (none)							

TABLE 13.3 ***(continued)***

		1840	1850	1860	1870	1880	1890	1900
5x	Total value, at current prices (mil $), rows 1b, 2b and 3b	13.3	26.6	46.7	104.6	116.4	178.1	196.5
5y	Total value, at 1860 prices (mil. $)	12.8	25.9	46.8	87.5	139.1	238.9	293.7
5z	Price index (103.6)	—	102.7	100	119.5	83.7	74.6	66.9
B.	**Consumers' durables with 12-year lives**							
1a	Household appliances							
1b	Refrigerators Value, at current prices (mil. $)	—	—	0.2	0.6	1.7	4.5	5.3
1c	Price index: refrigerators	—	—	100	105	73	65	—
1d	Value, at 1860 prices (mil. $)	—	—	0.2	0.6	2.3	6.9	—
2a	Stoves, ranges, and fireless cookers							
2b	Value, at current prices (mil. $)	1.6	6.1	14.1	15.3	11.5	24.2	39.2
2c	Price index: stoves	117	116	100	146	114	71	68
2d	Value, at 1860 prices (mil. $)	1.4	5.3	14.1	10.5	10.1	34.1	57.6
3a	Sewing machines, household							
3b	Value, at current prices (mil. $)	—	—	2.8	9.2	8.7	8.1	11.5
3c	Price index: sewing machines	—	—	100	83	66	62	53
3d	Value, at 1860 prices (mil. $)	—	—	2.8	11.1	13.2	13.1	21.7
4a	Washing machines and clothes dryers							
4b	Value, at current prices (mil. $)	—	—	0.1	1.4	1.2	2.5	3.7
4c	Price index: washing machines	—	—	100	92	83	73	—
4d	Value, at 1860 prices (mil. $)	—	—	0.1	1.5	1.4	3.4	—
5a	Elect. household appliances and supplies							
5b	Value, at current prices (mil. $)	—	—	—	—	—	—	1.9
6x	Total value,, at current prices (mil. $), rows 1b,2b,3b,4b	1.6	6.1	17.2	26.5	23.1	39.3	59.7
6y	Total value, at 1860 prices (mil. $)	1.4	5.3	17.2	23.7	27	57.5	97.9
6z	Price index	117	116	100	111.8	85.6	68.3	61

continues

TABLE 13.3 (*continued*)

		1840	1850	1860	1870	1880	1890	1900
C.	**Consumers' durables with 10-year lives**							
1a	House furnishings							
1b	Floor coverings Value, at current prices (mil. $)	1.6	5.5	9.7	22.1	30.3	44	47
1c	Price index: rugs	241	139	100	189	91	78	71
1d	Value, at 1860 prices (mil. $)	0.7	4	9.7	11.7	33.3	56.4	66.2
2a	Blankets: all-wool woven, cotton warp woven, and cotton mixed woven							
2b	Value, at current prices (mil. $)	0.6	0.7	1.3	5.1	5.5	7.2	5.2
2c	Price index: blankets	145	111	106	95	71	59	62
2d	Value, at 1860 prices (mil. $)	0.4	0.6	1.2	5.4	7.7	12.2	8.4
3a	Lamps and chimneys							
3b	Value, at current prices (mil. $)	—	0.6	1.2	2.4	4.3	6	10.9
3c	Price index: lamps	—	154	96	88	50	65	50
3d	Value, at 1860 prices (mil. $)	—	0.4	1.3	2.7	8.6	9.2	21.8
4a	Mattresses and string beds NES.							
4b	Value, at current prices (mil. $)	—	—	0.4	—	5	15	17.6
4c	Price index: mattresses and springs	—	—	100	—	65	43	53
4d	Value, at 1860 prices (mil. $)	—	—	0.4	—	7.7	34.9	33.2
5a	Mirrors, framed and unframed							
5b	Value, at current prices (mil. $)	—	—	—	0.3	0.2	3.4	4.6
5c	Price index: looking glasses	—	—	—	120	133	100	(77)
5d	Value, at 1860 prices (mil. $)	—	—	—	0.3	0.2	3.4	6.0
6a	Feather pillows and beds; other misc.							
6b	Value, at current prices (mil. $)	—	0.8	2.1	6.5	10.4	19.7	22.9
7q	Total value, at current prices (mil. $), rows 1b,2b,3b,4b,5b	2.2	6.8	12.6	29.9	45.3	75.6	85.3
7r	Total value, at 1860 prices (mil. $)	1.1	5	12.6	20.1	57.1	116.1	135.6
7w	Price index	200	136	100	148.8	79.3	65.1	62.9
8a	China, tableware							

TABLE 13.3 ***(continued)***

		1840	1850	1860	1870	1880	1890	1900
8b	Razors and table cutlery Value, at current prices (mil. $)	1	1.6	1.9	4.3	4.5	4.3	5.8
8c	Price index: cutlery	—	—	100	115	116	71	66
8d	Value, at 1860 prices (mil. $)	—	—	1.9	3.7	3.8	6.1	8.8
9a	China, earthenware, etc.							
9b	Value, at current prices (mil. $)	0.7	1	1.9	4	4.6	9.9	14.1
9c	Price index: china, earthenware	140	—	100	112	89	70	—
9d	Value, at 1860 prices (mil. $)	0.5	—	1.9	3.6	5.2	14.1	—
10a	Wooden Goods NES							
10b	Value, at current prices (mil. $)	0.8	1.1	2.2	5.5	5.6	3.8	3.8
10c	Price index: woodenware	—	132	108	129	86	76	72
10d	Value, at 1860 prices (mil. $)	—	0.8	2	4.3	6.5	5	5.3
11a	Blown tumblers, etc.							
11b	Value, at current prices (mil. $)	0.6	1	3.8	3.7	4.7	9.1	13.6
11c	Price index: glassware	147	—	100	84	47	37	
11d	Value, at 1860 prices (mil. $)	0.4	—	3.8	4.4	10	24.6	
12a	All other utensils							
12b	Value, at current prices (mil. $)	—	0.1	0.2	1	0.9	1.4	6.4
13q	Total value, at current prices (mil. $) rows 8b,9b,10b,11b	3.1	4.7	9.8	17.5	19.4	27.1	37.3
13r	Total value, at 1860 prices (mil. $)	2.1	3.8	9.6	16	25.6	49.8	73.6
13w	Price index	−147.4	102.1	109.4	75.8	54.4	50.7	124.8
14a	Jewelry, etc.							
14b	Clocks; watches and watch movements; other jewelry; books; luggage; motor vehicles; motorcycles and bicycles; pleasure craft Value, at current prices (mil. $)	4.3	15.2	25.9	51.7	65.3	107.6	168.3
15x	Total value, at current prices (mil. $) rows 7a,13a	5.3	11.5	22.4	47.4	64.7	102.7	122.6
15y	Total value, at 1860 prices (mil. $)	3.2	8.8	22.2	36.1	82.7	165.9	209.2
15z	Price index	165.6	130.7	100.9	131.3	78.2	61.9	58.6

continues

TABLE 13.3 (*continued*)

		1840	1850	1860	1870	1880	1890	1900
D.	**Consumers' durables with 5-year lives**							
1a	Ophthalamic and orthopedic products; eyeglasses; artificial limbs							
1b	Value, at current prices (mil. $)			0.1	0.4	0.7	2.3	4.8
E.	**Weighted average price indexes of consumers' durables stocks**							
1	Weights							
a	20-year life	0.702	0.572	0.515	0.544	0.501	0.456	0.433
b	12-year life	0.058	0.089	0.128	0.109	0.07	0.079	0.093
c	10-year life	0.24	0.339	0.357	0.347	0.429	0.465	0.474
2	Indexes × weights							
a	20-year life	72.7	58.7	51.5	65	42	34	29
b	12-year life	6.8	10.3	12.8	12.2	6	5.4	5.7
c	10-year life	39.7	44.3	36	45.6	33.6	28.8	27.8
d	Totals: weighted indexes, unadjusted	119.2	113.3	100.3	122.8	81.6	68.2	62.5
e	Adjusted to the dates of the consumers' durables stock estimates	115.6	113.3	100	114.2	87.3	68.2	62.5

Note:
(mil. $) = in millions of dollars
Sources:
Sections A through D: Lines whose enumerations end in "a" describe the consumers' durables that fall within each durability class, according to Goldsmith (1951, 23). In lines whose enumerations end in "b," the descriptive material and the estimates are from Shaw and Gallman. The Shaw data cover the years 1870–1900 (census years 1869–99), and the Gallman data cover the years 1840–60 (census years 1839–1859). The Gallman data are from worksheets underlying Gallman's numbers in Gallman 1966; the Shaw data come from Shaw 1947, 118–24. Shaw's estimates have been slightly modified to enhance the comparability of the antebellum and postbellum estimates. In lines whose enumerations end in "c," the descriptive material and estimates are from Brady 1966. Lines whose enumerations end in "q" or "x" contain sums of the lines specified.
Lines whose enumerations end in "r" or "y" contain sums of constant price data, comparable with the sums in lines ending in "q" or "x," with the following exceptions. Line A.5.y., 1840 and 1900, were calculated by deflating line A.5.x., 1840 and 1900, by indexes in Line A.5.z. Lines B.6.y., 1900, C.13.w., 1840 and 1850, were computed in a like manner. Lines whose enumerations end in "w" or "z" contain the indexes implicit in the appropriate lines "q" and "r" or "x" and "y", with the exceptions of line A.5.z., 1840 and 1900 (extrapolated on line B.6.z.); line B.6.z., 1900 (extrapolated from 1890 on a weighted index of lines C.2.c. and 3.c.); and line C.13.z., 1840 and 1850 (extrapolated in a like manner).

Section E: (1.) Based chiefly on table 13.2. For the years 1850–1900, the price index numbers of the three durability classes were weighted in the following way. The price index for property that had life expectancies of ten or twelve years when new received the weight given in the first panel of table 13.2, while the index for the property with a life expectancy of twenty years received a weight equal to the sum of the entry in table 13.2 for the given year, and half of the entry for the preceding census year. For example, the weights accorded the three types of durables in 1850 were as follows: ten-year life, $20.4 million; twelve-year life, $5.3 million; twenty-year life, $27.7 million plus ($13.6 million/2), or $34.5 million. For 1840 the same scheme was followed, except that in the absence of a figure for census 1830, the price index number for property with an expected life of twenty years was given a weight equal to one and one-quarter times the 1840 real value of output of goods with an expected life of twenty years. The weighting scheme is intended to take into account the fact that durable goods stay in the stock longer than those of lesser durability. (2.a.–c.) The weights of E.1. multiplied by the indexes in lines A.5.z., B.6.z., and C.15.z. (2.d.) The sums of Lines E.2.a.–c., which compose the weighted price indexes. (2.e.) The indexes in line E.2.d. do not correspond exactly with the dates of the consumers' durables estimates. Line E.2.e. contains indexes adjusted to the proper year. The adjustment device is described in the notes to table 8.9, above.

13.5. Estimates for Years before 1840

The section details the estimates of consumer durables before 1840.

1774. According to Jones (1980, 90), the stock of consumers' durables, other than apparel, ("equipment, furniture, other," in Jones's words) was worth 6,370,000 pounds in 1774. Jones's concept appears to be identical with the one underlying the consumers' durables estimates for 1840–1900, to be discussed below. Shifting from pounds to dollars by means of Jones's exchange rate ($4.15, p. 10) yields a dollar estimate of $26,435,500 for consumers' durables in 1774.

Table 13.4 presents a price index for 1809, assembled from the work of Dorothy Brady (1966, 107) and Anne Bezanson (US Bureau of the Census 1960, series E-76, E-78, and E-82), appropriately weighted. The value of consumers' durables in 1774, expressed in prices of 1860, then, is $26,435,500 divided by 1.39, or $19,018,345.

TABLE 13.4 **Price index for 1809**

Panel A			**Price**	**Base**	**Weight**
1	a	Furniture (tables, chairs, bedsteads)	289	1860	0.57
1	b	Carriages, buggies, wagons	234	1860	0.35
1	c	Pianos, reed organs	153	1860	0.08
1	d	Weighted average, 1a–1c	258	1860	[0.70]
2		Stoves	154	1860	[0.06]
3	a	Rugs	301	1860	0.36
3	b	Blankets	197	1860	0.04
3	c	Lamps	180	1860	0.04
3	d	Cutlery	250	1860	0.07
3	e	China, earthware	172	1860	0.07
3	d	Woodenware	194	1860	0.07
3	g	Glassware	256	1860	0.14
3	h	Clocks	517	1860	0.04
3	i	Books	267	1860	0.16
3	j	Weighted average, 3a–3i	266	1860	[0.24]
4		Weighted average, 1d, 2, 3j.	254	1860	
Panel B					
5		Lumber products	79.4	1809	
6		Industrial consumption goods	61.3	1809	
7		Weighted average	74	1809	
Panel C					
8		Bezanson's 1774 index shifted to 1784	73.9		
9		Line 7 × line 8 ÷ 100	54.7		
10		Line 4 × line 9 ÷ 100			
		1774 consumers' durables price	139	1860	

Source: See text.

The original Jones estimate of the value of consumers' durables, in prices of 1774, has all the strength of Jones's figures, in general, which is considerable strength. The deflator for 1809 rests on good evidence that relates to the important components of the stock of consumers' durables, and the weighting system is at least relevant to mid-nineteenth century circumstances. There is no strong reason to believe that it misrepresents the conditions of 1809. It will be obvious to the reader that the extension of the index number to 1784 is less secure, while the further extension to 1774 is even less so. Nonetheless, the deflator is not without merit and the ultimate results seem plausible, as will appear.

1799, 1805, 1815. There are no strong bases for estimating the value of the stocks of consumers' durables in 1799, 1805, or 1815, and to accept weak estimates just for the sake of completeness does not seem very sensible. Goldsmith has figures for 1805, derived from Blodget, but they are very heavily processed, involving some important guesses, and the final results place the relative importance of consumers' durables (i.e., their importance relative to the rest of the capital stock) so far out of line with the figures for 1774 and for 1840 through 1900 that they seem clearly unacceptable. This gap, then, is left unfilled.

13.6. Gallman's Estimates of the Stock of Consumer Durables

Table 13.5 displays Gallman's estimates of the aggregate *stock* of consumer durables from 1774 to 1900 (lines 1 and 2). To provide context, the table also included his estimated figures for the domestic capital stock, excluding consumer durables (lines 4 and 5).[13] Finally, the table has relevant price indexes for consumer durables (line 3) and domestic capital (line 6). Their ratio, displayed in line 9, shows that the price of consumer durables fell much faster than the price of domestic capital over most of this period. As the data displayed in line 8 reveal, the ratio of the stock of consumer durables to domestic capital in constant 1860 prices rose almost continuously over the 1774–1900 period. The ratio quadrupled from 4 percent in 1774, just before American independence, to nearly 16 percent at the beginning of the twentieth century. Given the discussion in the preceding section, it should not be surprising that most of this increase occurred between 1840 and 1870.

The ratio of consumer durable to domestic capital, measured in current prices, fluctuated more widely. This ratio fell from 1774 to 1840,

TABLE 13.5 **Value of the stocks of consumers' durables, 1774–1900, in millions of dollars**

		1774	1840	1850	1860	1870	1880	1890	1900
Consumer durables									
1	Value, at current prices	26	267	594	1,327	2,502	3,003	4,686	5,794
2	Value, at 1860 prices	19	231	524	1,327	2,191	3,440	6,870	9,270
3	Price index	139	116	113	100	114	87	68	63
Domestic capital									
4	Value, at current prices	284	4,069	6,334	12,394	18,831	24,752	40,715	53,784
5	Value, at 1860 prices	481	4,828	7,091	12,395	15,204	22,907	42,349	59,313
6	Price index	59	84.3	89.3	100	123.9	108.1	96.1	90.7
Ratio of consumers' durables to domestic capital									
7	Value, at current prices	0.092	0.066	0.094	0.107	0.133	0.121	0.115	0.108
8	Value, at 1860 prices	0.04	0.048	0.074	0.107	0.144	0.15	0.162	0.156
9	Relative price (line 3 ÷ line 6)	235.4	137.6	126.5	100	92	80.5	70.7	69.5

Note: Domestic capital excludes consumers' durables.
Source: See text.

rebounded and rose until 1870, and then again declined. It is possible that the 1840 current price figure is too low.[14] By Gallman's estimate, consumer durable prices fell between 1774 and 1840 during a period when other prices (capital and the CPI) were rising.

13.7 Conclusion

This chapter has opened a window into Gallman's stock data on consumer durables. It has offered his arguments regarding the quantitative and qualitative importance of these goods in the "long" nineteenth century, before the "consumer durables revolution" of the early twentieth century.