

## BEA Depreciation Estimates<sup>1</sup>

In the perpetual inventory method, the pattern of depreciation charges for an asset of a given type is determined by its “depreciation profile”—that is, how the price of that type of asset declines as it ages in the absence of inflation. The profile for a given type of asset of a given vintage is assumed to be constant over time. However, the profile for one vintage of a given asset may differ from the profile of a different vintage of the same asset.

BEA bases its depreciation patterns on empirical evidence of used asset prices in resale markets wherever possible. For most asset types, geometric patterns are used because the available data suggest that they more closely approximate actual profiles of price declines than straight-line patterns.<sup>2</sup>

The geometric rates for specific types of assets are determined by dividing the appropriate declining-balance rate for each asset by the asset’s assumed service life. The declining-balance rates used by BEA are primarily derived by Fraumeni from estimates made by Hulten and Wykoff under the auspices of the U.S. Department of the Treasury and are shown in the accompanying table entitled, “BEA Rates of Depreciation, Service Lives, Declining-Balance Rates, and Hulten-Wykoff Categories.”<sup>3</sup> For the purposes of determining the appropriate rates, they divided assets into three major types. Type A assets are those for which extensive data were available for estimating geometric rates of depreciation: Tractors (farm and construction), construction machinery, metalworking machinery, general industrial equipment, trucks, commercial buildings, and manufacturing buildings. In 1977, these categories accounted for about 55 percent of investment expenditures on equipment and 42 percent of spending on nonresidential structures.

Type B assets are those for which the limited studies on depreciation or other relevant data did not support defensible estimates of the rate of declining balance. For these assets, Hulten and Wykoff used the results of empirical research by others, including the research of BEA, Dale Jorgenson, the Bureau of Labor Statistics, and Jack Faucett Associates, as well as their own judgement to determine the geometric rate of depreciation on a case by case basis.

No data were available for Type C assets. Hulten and Wykoff estimated the average declining-balance rates from information on the eight categories of type A assets combined with information on the average life of the type B assets. They determined

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<sup>1</sup> The following information is primarily extracted from 1) Barbara M. Fraumeni, “The Measurement of Depreciation in the U.S. National Income and Product Accounts, *Survey of Current Business* 77 (July 1997): 7–23; and 2) U.S. Department of Commerce. Bureau of Economic Analysis. *Fixed Assets and Consumer Durable Goods in the United States, 1925-97*. Washington, DC: U.S. Government Printing Office, September, 2003: M-29 – M-33.

<sup>2</sup> Except for missiles and nuclear fuel rods, where an explicit retirement pattern and distribution of service lives is used, the BEA depreciation profiles are for an entire cohort of assets of a given type. When different assets within a cohort have different service lives, the profile for the cohort as a whole will be more convex (accelerated) than the profile for a single asset. For further discussion of this point, see Frank C. Wykoff, “Economic Depreciation and the User Cost of Business-Leased Automobiles,” *Technology and Capital Formation* (Cambridge, MA: MIT Press, 1989): 262–265.

<sup>3</sup> The information on HultenWykoff methodology is taken from three sources: Hulten andWykoff (1981a and 1981b) and Wykoff and Hulten (1979).

that, on average, the declining-balance rate for equipment was 1.65 and that for private nonresidential structures was 0.91. These declining-balance rates serve as the rates for assets where no data are available.

At the time of the Hulten-Wyckoff studies, computer software was not treated as a capitalized asset in the National Income and Product Accounts (NIPAs). As there have been no subsequent studies of software depreciation, pre-packaged, custom, and own-account software are treated as type C assets.

The geometric depreciation rates and the underlying declining-balance rates and service lives used by BEA to derive the estimates of net stocks and depreciation are shown in the accompanying table. Separate depreciation rates and service lives are used for each type of asset at the level of detail for which annual data are available from the NIPAs. For some types of private fixed assets, different depreciation rates and service lives are also used in different industries. For missiles and nuclear fuel rods, depreciation is estimated using a straight-line pattern (to reflect the pattern of rotation and replacement of nuclear fuel) and a Winfrey retirement pattern.

### **Service lives**

As with depreciation patterns, service lives should reflect actual experience as closely as possible—separate lives should be used for each industry in which a particular type of asset is purchased, and service lives should be varied over time to account for changes in business conditions and technology. Because of data limitations, the service lives BEA uses fall short of this ideal in two ways. First, service lives can be computed only for those types of assets and industries shown in the table. Second, service lives can be varied over time only for those types of assets and industries shown in the table. All other service lives by type of asset and industry are held constant over time. Book value comparisons suggest that the use of constant service lives has not produced any systematic bias in the BEA estimates of private fixed assets for the period (1959–81).<sup>4</sup>

As indicated in the accompanying table, the service lives for some types of assets are varied over time while others are held constant depending upon the availability of data. With the exception of trucks, the lives used for durable goods owned by consumers are held constant over time because the information necessary to estimate changing lives over time was not available.

***Private equipment and software.*** BEA's service lives for private equipment and software are based on service lives obtained from industry studies conducted during the 1970s by the former Office of Industrial Economics (OIE) of the U.S. Department of the Treasury and from industry studies conducted during the 1980s and 1990s by the Office of Tax Analysis (OTA) of the U.S. Department of the Treasury, with the following exceptions: Computers and peripheral equipment; software; nuclear fuel; light trucks; autos; aircraft purchased by selected industries *after* 1959; and railroad equipment.<sup>5</sup> The

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<sup>4</sup> Book value data, which relate directly to capital stocks, can be used as checks on the validity of the information used to implement the perpetual inventory method. Examples of such checks on the BEA estimates are given in John A. Gorman, John C. Musgrave, Gerald Silverstein, and Kathy A. Comins, "Fixed Private Capital in the United States: Revised Estimates, 1925–81 and Estimates by Industry, 1947–81," *SURVEY* 65 (July 1985): 36–59.

<sup>5</sup> The results of the OIE studies are given in David W. Brazell, Lowell Dworin, and Michael Walsh, *A History of Federal Tax Depreciation Policy*, U.S. Department of the Treasury, OTA Paper 64 (Springfield,

OIE results are particularly useful for manufacturing industries because they provide separate industry estimates of service lives for production-type equipment—metalworking machinery; special industry machinery, not elsewhere classified; and general industrial machinery, including materials handling equipment. The depreciation rates for computers and peripheral equipment were taken from Oliner as described in the *Fixed Assets and Consumer Durable Goods* methodology. The service lives for software were set judgmentally by BEA during the 1999 comprehensive revision of the NIPAs. The information on the service life for nuclear fuel was obtained from Professor Madeline Feltus of the Pennsylvania State University. Beginning with 1992, “trucks, buses and truck trailers” are split into two categories: light trucks, and “other” trucks, buses, and truck trailers. Light trucks are assigned an expected service life of 17 years based on research conducted by BEA using data from Wards Automotive Yearbook and the National Automobile Dealers’ Association. “Other” trucks, buses, and truck trailers are assigned separate service lives for the following industries: transit and ground passenger transportation; trucking and other services; and all other industries. The derivation of stocks of autos does not require an explicit service-life assumption, as explained in the *Fixed Assets and Consumer Durable Goods* methodology. Research conducted by BEA during the 2003 comprehensive revision indicated that the expected service lives for private aircraft in the industries of air transportation; depository institutions; other credit intermediation; insurance agencies and brokers; offices of bank holding companies and of other holding companies; funds, trusts and other financial vehicles; and rental and leasing should be lengthened. Accordingly, the expected service lives for these aircraft for 1960 forward were extended from 20 to 25 years. The service life for railroad equipment is derived from information on service lives submitted by railroads to the Interstate Commerce Commission as part of the 1983 annual reports of individual railroads.

***Private nonresidential structures.*** For communication, electric light and power, gas, and petroleum pipelines structures, the service lives are derived by comparing book value data provided by regulatory agencies with various perpetual inventory estimates calculated using alternative service lives. The depreciation rate for wind and solar was calculated by BEA based on industry trade data. For railroad structures, service lives are derived from the same source as for railroad equipment (see above). For petroleum and natural gas exploration, shafts, and wells, the lives are based on data from the Census Bureau’s annual surveys of oil and gas for 1979–1982. For farm structures, the average service life is derived from USDA studies. For other types of nonfarm structures, service lives are based on published and unpublished data from studies conducted during the 1960s and 1970s by the U.S. Department of the Treasury.<sup>6</sup>

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VA: National Technical Information Service, May 1989): 33–58. The results of the OTA studies that are used in the BEA wealth calculations are given in U.S. Department of the Treasury, Report to the Congress on Depreciation of Scientific Instruments (Washington, D.C.: March 1990); U.S. Department of the Treasury, Report to the Congress on Depreciation of Business-Use Passenger Cars (Washington, D.C.: April 1991); and U.S. Department of the Treasury, Report to the Congress on Depreciation of Business-Use Light Trucks (Washington, D.C.: September 1991).

<sup>6</sup> See U.S. Department of the Treasury, Office of Industrial Economics, Business Building Statistics (Washington, D.C.: U.S. Government Printing Office, August 1975).

With the August 2010 release of the Fixed Assets Accounts, estimates for private nonresidential structures are prepared and presented by function-type rather than by structure-type. This change brings the classification of these estimates into harmonization with the NIPA estimates of nonresidential structures and it reflects the current Census Bureau classification of the value of construction put in place for nonresidential structures. Service lives and declining balance rates for the “new” nonresidential structures types are taken from existing corresponding categories. The table below shows the mapping of “old” to “new” types.

“Old” Types	“New” Types *
Office, including medical buildings	Office buildings Medical buildings
Other commercial buildings	Multimerchandise shopping Food and beverage establishments Other commercial buildings
Hospitals and special care	Hospitals Special care
Miscellaneous nonfarm buildings	Air transportation Other transportation Other land transportation (excluding railroads) Public safety
Other	Water supply Sewage and waste disposal Highway and conservation and development

\* Note: “New” type categories correspond to estimates published in the detailed fixed assets tables (<http://www.bea.gov/national/FA2004/Details/Index.html>).

**Residential structures.** The average service lives for most types of new residential structures are taken from a study by Goldsmith and Lipsey.<sup>7</sup> Improvements to residential structures are assigned the following lives: Additions and alterations are assumed to have lives one-half as long as those for new structures; and lives for residential major replacements are based on industry estimates for items replaced during the 1970s. Manufactured homes are assigned a life of 20 years, based on trade association data.

<sup>7</sup> See Raymond W. Goldsmith and Robert Lipsey, *Studies in the National Balance Sheet of the United States, Volume 1* (Princeton, NJ: Princeton University Press, for the National Bureau of Economic Research, 1963).

***Durable goods owned by consumers.*** For durable goods owned by consumers, the average service lives are based on unpublished trade association data, the assumptions of other researchers, several USDA studies, and the age distribution of the stock of various consumer durables reported in the 1960–61 and 1972–73 BLS surveys of consumer expenditures.<sup>8</sup>

During the 2009 comprehensive revision of the NIPAs, a new classification system for personal consumption expenditures (PCE) was introduced. The new system defines new categories of expenditures by type of product and by function to reflect changes that have occurred in consumer buying patterns since the 1940s (when the previous classifications were first developed) and to bring the classifications of expenditures closer to the recommendations of the SNA 2008.<sup>9</sup> The consumer durable goods statistics reflect the new classification system of expenditures by type of product. Service lives and declining balance rates for this new classification system are generally taken from the existing corresponding category. One exception is luggage, which was reclassified from nondurable goods to durable goods.<sup>10</sup> At the time of the Hulten-Wyckoff studies, luggage was not treated as a capitalized asset in the NIPAs. As there have been no subsequent studies of luggage depreciation, BEA treats luggage as a type C asset with the declining-balance rate for equipment of 1.65 and an average expected service life of 14 years based on the sources cited above.

***Government-owned fixed assets.*** Service lives for most government assets are derived from those used for corresponding assets owned by private business. For some Federal Government equipment (primarily military equipment), depreciation patterns are based on service lives estimated from U.S. Government administrative sources (primarily U.S. Department of Defense data). The service life for highways was shortened to 45 years from 60 years in the 1999 comprehensive revision of the NIPAs. The new service life is based on research conducted by BEA.<sup>11</sup>

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<sup>8</sup> See Lenore A. Epstein, *Consumers' Tangible Assets*, Studies in Income and Wealth, Volume 12 (Princeton, NJ: Princeton University Press, for the National Bureau of Economic Research, 1950, 410–460; Raymond W. Goldsmith, *The National Wealth of the United States in the Postwar Period* (Princeton, NJ: Princeton University Press, for the National Bureau of Economic Research, 1962); Marilyn Doss Ruffin and Katherine S. Tippett, “Service-Life Expectancy of Household Appliances: New Estimates from USDA,” *Home Economics Research Journal* 3 (March 1975): 159–170; and U.S. Bureau of Labor Statistics, “Survey of Consumer Expenditures, 1960–61, Expanding Ownership of Household Equipment,” BLS Report No. 238–7, November 1964, and “Consumer Expenditure Survey Series: Interview Survey, 1972–73, Inventories of Vehicles and Selected Household Equipment, 1973,” BLS Report No. 455–5, 1978.

<sup>9</sup> See Eugene P. Seskin and Shelly Smith, “Preview of the 2009 Comprehensive Revision of the NIPAs: Changes in Definitions and Presentations,” *SURVEY* 89 (March 2009): 18–19.

<sup>10</sup> See Eugene P. Seskin and Shelly Smith, “Improved Estimates of the National Income and Product Accounts: Results of the 2009 Comprehensive Revision,” *SURVEY* 89 (September 2009): 18.

<sup>11</sup> For information on the service life of highways, see Richard Beemiller, *Experimental Estimates of State and Local Government Highway Capital Stocks* (paper presented at the 1999 annual meeting of the Southern Regional Science Association, Richmond, VA, April 1999); and Barbara M. Fraumeni, *Productive Highway Capital Stock Measures*, a report prepared for the Federal Highway Administration, U.S. Department of Transportation, January 1999.

**BEA Rates of Depreciation, Service Lives, Declining-Balance Rates, and Hulten-Wyckoff Categories--Table Continues**

Type of Asset	Rate of depreciation	Service life	Declining balance rate	Hulten-Wyckoff category/1/
<b>Private nonresidential equipment</b>				
Computers and peripheral equipment /2/	.....	.....	.....	.....
Software:				
Prepackaged	0.5500	3	1.65	C
Custom	0.3300	5	1.65	C
Own-account	0.3300	5	1.65	C
Communications equipment:				
Rental and leasing and computer systems design and related services /3/	0.1500	11	1.65	C
Other industries /3/	0.1100	15	1.65	C
Nonmedical instruments/4/	0.1350	12	1.6203	C
Medical equipment and instruments:				
Medical instruments /4/	0.1350	12	1.6203	C
Electromedical equipment /5/	0.1834	9	1.65	C
Photocopy and related equipment /6/	0.1800	9	1.6203	C
Office and accounting equipment:				
Years before 1978	0.2729	8	2.1832	B
1978 and later years	0.3119	7	2.1832	B
Nuclear fuel /7/	.....	4	.....	.....
Other fabricated metal products /8/	0.0917	18	1.65	C
Steam engines and turbines /9/	0.0516	32	1.65	C
Internal combustion engines /9/	0.2063	8	1.65	C
Metalworking machinery:				
Nonmanufacturing industries	0.1225	16	1.96	A
Durable manufacturing:				
Wood products	0.1633	12	1.96	A
Nonmetallic mineral products	0.1032	19	1.96	A
Primary metals	0.0726	27	1.96	A
Fabricated metal products	0.0817	24	1.96	A
Machinery	0.0784	25	1.96	A
Computer and electronic products	0.1400	14	1.96	A
Electronic equipment, appliances, and components	0.1400	14	1.96	A
Motor vehicles, bodies and trailers, and parts	0.1400	14	1.96	A
Other transportation equipment	0.1153	17	1.96	A
Furniture and related products	0.1400	14	1.96	A
Miscellaneous manufacturing:				
Medical equipment and supplies	0.1400	14	1.96	A
Other	0.1153	17	1.96	A
Nondurable manufacturing:				
Food and beverage and tobacco products:				
Food	0.0980	20	1.96	A
Beverage and tobacco product	0.0933	21	1.96	A
Textile and textile product mills	0.1225	16	1.96	A
Apparel and leather and allied products	0.1307	15	1.96	A
Paper products	0.1225	16	1.96	A
Printing and related support activities	0.1307	15	1.96	A
Petroleum and coal products	0.0891	22	1.96	A
Chemical	0.1225	16	1.96	A
Plastics and rubber products	0.1400	14	1.96	A
Special industry machinery, nec:				
Nonmanufacturing industries	0.1031	16	1.65	C
Durable manufacturing:				
Wood products	0.1375	12	1.65	C
Nonmetallic mineral products	0.0868	19	1.65	C
Primary metals	0.0611	27	1.65	C
Fabricated metal products	0.0688	24	1.65	C
Machinery	0.0660	25	1.65	C
Computer and electronic products	0.1179	14	1.65	C
Electronic equipment, appliances, and components	0.1179	14	1.65	C
Motor vehicles, bodies and trailers, and parts	0.1179	14	1.65	C
Other transportation equipment	0.0971	17	1.65	C
Furniture and related products	0.1179	14	1.65	C
Miscellaneous manufacturing:				
Medical equipment and supplies	0.1179	14	1.65	C
Other	0.0971	17	1.65	C

**BEA Rates of Depreciation, Service Lives, Declining-Balance Rates, and Hulten-Wyckoff Categories--Table Continues**

Type of Asset	Rate of depreciation	Service life	Declining balance rate	Hulten-Wyckoff category/1/
Nondurable manufacturing				
Food and beverage and tobacco products:				
Food	0.0825	20	1.65	C
Beverage and tobacco product	0.0786	21	1.65	C
Textile and textile product mills	0.1031	16	1.65	C
Apparel and leather and allied products	0.1100	15	1.65	C
Paper products	0.1031	16	1.65	C
Printing and related support activities	0.1100	15	1.65	C
Petroleum and coal products	0.0750	22	1.65	C
Chemical	0.1031	16	1.65	C
Plastics and rubber products	0.1179	14	1.65	C
General industrial, including materials handling equipment:				
Nonmanufacturing industries	0.1072	16	1.715	A
Durable manufacturing:				
Wood products	0.1429	12	1.715	A
Nonmetallic mineral products	0.0903	19	1.715	A
Primary metals	0.0635	27	1.715	A
Fabricated metal products	0.0715	24	1.715	A
Machinery	0.0686	25	1.715	A
Computer and electronic products	0.1225	14	1.715	A
Electronic equipment, appliances, and components	0.1225	14	1.715	A
Motor vehicles, bodies and trailers, and parts	0.1225	14	1.715	A
Other transportation equipment	0.1009	17	1.715	A
Furniture and related products	0.1225	14	1.715	A
Miscellaneous manufacturing:				
Medical equipment and supplies	0.1225	14	1.715	A
Other	0.1009	17	1.715	A
Nondurable manufacturing:				
Food and beverage and tobacco products:				
Food	0.0858	20	1.715	A
Beverage and tobacco product	0.0817	21	1.715	A
Textile and textile product mills	0.1072	16	1.715	A
Apparel and leather and allied products	0.1143	15	1.715	A
Paper products	0.1072	16	1.715	A
Printing and related support activities	0.1143	15	1.715	A
Petroleum and coal products	0.0780	22	1.715	A
Chemical	0.1072	16	1.715	A
Plastics and rubber products	0.1225	14	1.715	A
Electrical transmission, distribution, and industrial apparatus	0.0500	33	1.65	C
Trucks, buses, and truck trailers:				
<i>Years before 1992:</i>				
Transit and ground passenger transportation /10/	0.1232	14	1.7252	A
Trucking and other services /10/	0.1725	10	1.7252	A
Other industries	0.1917	9	1.7252	A
<i>1992 and later years:</i>				
Light trucks /11/	0.1925	17	3.2725	.....
Other trucks, buses, and truck trailers:				
Transit and ground passenger transportation /10/	0.1232	14	1.7252	A
Trucking and other services /10/	0.1725	10	1.7252	A
Other industries	0.1917	9	1.7252	A
Autos /12/	.....	.....	.....	.....

**BEA Rates of Depreciation, Service Lives, Declining-Balance Rates, and Hulten-Wyckoff Categories--Table Continues**

Type of Asset	Rate of depreciation	Service life	Declining balance rate	Hulten-Wyckoff category/1/
Aircraft:				
<i>Years before 1960:</i>				
Air transportation, depository institutions, other credit intermediation, and rental and leasing	0.1031	16	1.65	C
Other industries	0.1375	12	1.65	C
<i>1960 and later years</i>				
Air transportation, depository institutions, other credit intermediations, insurance agencies and brokers, offices of bank holding companies and of other holding companies, funds, trusts and other financial vehicles, and rental and leasing /11/	0.0660	25	1.65	.....
Other industries	0.1100	15	1.65	C
Ships and boats	0.0611	27	1.65	B
Railroad equipment	0.0589	28	1.65	C
Household furniture and fixtures /13/	0.1375	12	1.65	C
Other furniture /13/	0.1179	14	1.65	C
Farm tractors /14/	0.1452	9	1.3064	A
Agricultural machinery, except tractors	0.1179	14	1.65	C
Construction tractors /14/	0.1633	8	1.3064	A
Construction machinery, except tractors	0.1550	10	1.55	A
Mining and oil field machinery	0.1500	11	1.65	C
Service industry machinery:				
Wholesale and retail trade /15/	0.1650	10	1.65	C
Other industries /15/	0.1500	11	1.65	C
Household appliances /16/	0.1650	10	1.65	C
Miscellaneous electrical equipment /5/	0.1834	9	1.65	C
Other /4/	0.1473	11	1.6203	C
<b>Private nonresidential structures</b>				
Office buildings /17/	0.0247	36	0.8892	A
Medical buildings /17/	0.0247	36	0.8892	A
Commercial warehouses /17/	0.0222	40	0.8892	A
Other commercial buildings /17/	0.0262	34	0.8992	A
Multimurchandise shopping /17/	0.0262	34	0.8992	A
Food and beverage establishments /17/	0.0262	34	0.8992	A
Mobile offices /17/	0.0556	16	0.8892	A
Hospitals	0.0188	48	0.9024	B
Special care	0.0188	48	0.9024	B
Manufacturing	0.0314	31	0.9747	A
Electric light and power /18/:				
<i>Years before 1946</i>	0.0237	40	0.948	C
<i>1946 and later years</i>	0.0211	45	0.948	C
Gas /18/	0.0237	40	0.948	C
Petroleum pipelines /18/	0.0237	40	0.948	C
Wind and solar /11/	0.0303	30	0.909	.....
Communication/18/	0.0237	40	0.948	C
Railroad replacement track/18/	0.0249	38	0.948	C
Other railroad structures /18/	0.0176	54	0.948	C
Mining exploration, shafts, and wells:				
Petroleum and natural gas /19/:				
<i>Years before 1973</i>	0.0563	16	0.9008	C
<i>1973 and later years</i>	0.0751	12	0.9008	C
Other /19/	0.0450	20	0.9008	C
Religious buildings	0.0188	48	0.9024	C
Educational buildings	0.0188	48	0.9024	C
Lodging /20/	0.0281	32	0.899	B
Amusement and recreational buildings /20/	0.0300	30	0.899	B
Farm /21/	0.0239	38	0.91	C
Local transit /22/	0.0237	38	0.899	C
Air transportation /22/	0.0237	38	0.899	C
Other transportation /22/	0.0237	38	0.899	C
Other land transportation /22/	0.0237	38	0.899	C
Water supply /22/	0.0225	40	0.899	C
Sewage and waste disposal /22/	0.0225	40	0.899	C
Public safety /22/	0.0237	38	0.899	C
Highway and conservation and development /22/	0.0225	40	0.899	C



**BEA Rates of Depreciation, Service Lives, Declining-Balance Rates, and Hulten-Wyckoff Categories--Table Continues**

Type of Asset	Rate of depreciation	Service life	Declining balance rate	Hulten-Wyckoff category/1/
<b>Residential capital (private and government)</b>				
1-to-4-unit structures-new /21/	0.0114	80	0.91	A
1-to-4-unit structures-additions and alterations /21/	0.0227	40	0.91	A
1-to-4-unit structures-major replacements /21/	0.0364	25	0.91	A
5-or-more-unit structures-new /21/	0.0140	65	0.91	A
5-or-more-unit structures-additions and alterations /21/	0.0284	32	0.91	A
5-or-more-unit structures-major replacements /21/	0.0455	20	0.91	A
Manufactured homes /21/	0.0455	20	0.91	A
Other structures /21/	0.0227	40	0.91	A
Equipment /16/	0.1500	11	1.65	C
<b>Durable goods owned by consumers /23/</b>				
Motor vehicles and parts				
Autos /12/	.....	.....	.....	.....
Trucks				
Years before 1992 /24/	0.2316	8	1.853	A
1992 and later years /11/	0.1925	17	3.2725	.....
Recreational vehicles /24/	0.2316	8	1.853	A
Tires, tubes, accessories, and other parts /24/	0.6177	3	1.853	A
Furniture, including mattresses and bedsprings	0.1179	14	1.65	B
Household appliances	0.1500	11	1.65	C
Glassware, tableware, and household utensils /25/	0.1650	10	1.65	C
Other durable household equipment /25/	0.1650	10	1.65	C
Video and audio products, including musical instruments /26/	0.1833	9	1.65	B
Personal computers and peripheral equipment /2/	.....	.....	.....	.....
Computer software and accessories	0.5500	3	1.65	C
Jewelry and watches /25/	0.1500	11	1.65	C
Therapeutic appliances and equipment /25/	0.2750	6	1.65	C
Books and maps /25/	0.1650	10	1.65	C
Sports equipment and vehicles and photographic equipment /27/	0.1650	10	1.65	C
Luggage	0.1179	14	1.65	C
<b>Government nonresidential equipment /28/</b>				
<b>Federal:</b>				
National defense:				
Aircraft:				
Airframes:				
Bombers	0.0660	25	1.65	C
F-14 type	0.0868	19	1.65	C
Attack, F-15 and F-16 types	0.0825	20	1.65	C
F-18 type	0.1100	15	1.65	C
Electronic warfare	0.0717	23	1.65	C
Cargo and trainers	0.0660	25	1.65	C
Helicopters	0.0825	20	1.65	C
Engines	0.2750	6	1.65	C
Other:				
Years before 1982	0.1179	14	1.65	C
1982 and later years	0.1650	10	1.65	C
Missiles: /29/				
Strategic	.....	20	.....	.....
Tactical	.....	15	.....	.....
Torpedoes	.....	15	.....	.....
Fire control equipment	.....	10	.....	.....
Space programs	.....	20	.....	.....

**BEA Rates of Depreciation, Service Lives, Declining-Balance Rates, and Hulten-Wyckoff Categories--Table Continues**

Type of Asset	Rate of depreciation	Service life	Declining balance rate	Hulten-Wyckoff category/1/
<b>Ships:</b>				
Surface ships	0.0550	30	1.65	C
Submarines	0.0660	25	1.65	C
<b>Government furnished equipment:</b>				
Electrical	0.1834	9	1.65	C
Propulsion	0.0825	20	1.65	C
Hull, mechanical	0.0660	25	1.65	C
Ordnance	0.1650	10	1.65	C
Other	0.1650	10	1.65	C
<b>Vehicles:</b>				
Tanks, armored personnel carriers, and other combat vehicles	0.0825	20	1.65	C
<b>Noncombat vehicles:</b>				
Trucks	0.2875	6	1.7252	C
Autos /30/				
Other	0.2465	7	1.7252	C
<b>Electronic equipment:</b>				
Computers and peripheral equipment /2/	.....	.....	.....	.....
Electronic countermeasures	0.2357	7	1.65	C
Other	0.1650	10	1.65	C
<b>Other equipment:</b>				
Medical	0.1834	9	1.65	C
Construction	0.1550	10	1.5498	C
Industrial	0.0917	18	1.65	C
Ammunition plant	0.0868	19	1.65	C
Atomic energy	0.1375	12	1.65	C
Weapons and fire control	0.1375	12	1.65	C
General	0.1650	10	1.65	C
Other	0.1375	12	1.65	C
<b>Nondefense:</b>				
<b>General government:</b>				
Computers and peripheral equipment /2/	.....	.....	.....	.....
Aerospace equipment	0.1100	15	1.65	C
Vehicles	0.4533	5	2.2664	C
Other	0.1650	10	1.65	C
<b>Enterprises:</b>				
<b>US Postal Service:</b>				
Computers and peripheral equipment /2/	.....	.....	.....	.....
Vehicles	0.3238	7	2.2664	C
Other	0.1100	15	1.65	C
Tennessee Valley Power Authority	0.0500	33	1.65	C
Bonneville Power Authority	0.0500	33	1.65	C
Other	0.0660	25	1.65	C
<b>State and local:</b>				
Power tools, lawn and garden equipment	0.1650	10	1.65	C
Miscellaneous metal products	0.0917	18	1.65	C
Agricultural machinery and equipment	0.1833	9	1.65	C
Construction machinery and equipment	0.1650	10	1.65	C
Metalworking machinery and equipment	0.1031	16	1.65	C
General purpose machinery and equipment	0.1500	11	1.65	C
Special industry machinery and equipment	0.1500	11	1.65	C
Integrating and measuring instruments	0.1375	12	1.65	C
Motors, generators, motor generator sets	0.0516	32	1.65	C
Switchgear and switchboard equipment	0.0500	33	1.65	C
Electronic components and accessories	0.1833	9	1.65	C
Miscellaneous electrical machinery	0.1375	12	1.65	C
Calculating and accounting machines	0.2357	7	1.65	C
Typewriters	0.2357	7	1.65	C
Computers and peripheral equipment /2/	.....	.....	.....	.....
Machine shop products	0.2063	8	1.65	C
Wood commercial furniture	0.1179	14	1.65	C
Metal commercial furniture	0.1179	14	1.65	C
Household appliances	0.1500	11	1.65	C
Home electronic equipment	0.1500	11	1.65	C

**BEA Rates of Depreciation, Service Lives, Declining-Balance Rates, and Hulten-Wyckoff Categories--Table Continues**

Type of Asset	Rate of depreciation	Service life	Declining balance rate	Hulten-Wyckoff category/1/
Motor vehicles	0.1650	10	1.65	C
Motorcycles	0.1650	10	1.65	C
Aircraft	0.1100	15	1.65	C
Railroad equipment	0.0590	28	1.65	C
Sporting and athletic goods	0.1650	10	1.65	C
Photographic and photocopying equipment	0.1650	10	1.65	C
Mobile classrooms, mobile offices, etc	0.1650	10	1.65	C
Musical instruments	0.1834	9	1.65	C
Other equipment	0.1375	12	1.65	C
<b>Government nonresidential structures /31/</b>				
Federal, State, and local:				
Buildings:				
Industrial	0.0285	32	0.91	C
Educational	0.0182	50	0.91	C
Hospital	0.0182	50	0.91	C
Other	0.0182	50	0.91	C
Nonbuildings:				
Highways and streets /32/	0.0202	45	0.91	.....
Conservation and development	0.0152	60	0.91	C
Sewer systems	0.0152	60	0.91	C
Water systems	0.0152	60	0.91	C
Military facilities	0.0182	50	0.91	C
Other	0.0152	60	0.91	C
Conservation and development	0.0152	60	0.91	C
Sewer systems	0.0152	60	0.91	C
Water systems	0.0152	60	0.91	C
Military facilities	0.0182	50	0.91	C
Other	0.0152	60	0.91	C

1. This column refers to Hulten-Wyckoff categories. Type A assets are types of assets for which Hulten-Wyckoff specifically estimated age-price profiles. Type B assets are those for which Hulten-Wyckoff used empirical research by others and their judgement to estimate the depreciation rate. Type C assets are types of assets for which Hulten-Wyckoff had no data. For these assets, Hulten-Wyckoff estimated an average declining-balance rate from data for all type A and B assets.
2. For computers and peripheral equipment, information on used asset prices is available and empirical profiles are used. See *Fixed Assets and Consumer Durable Goods* methodology: M29-M30 on [http://www.bea.gov/national/pdf/Fixed\\_Assets\\_1925\\_97.pdf](http://www.bea.gov/national/pdf/Fixed_Assets_1925_97.pdf).
3. The declining-balance rate is from the Hulten-Wyckoff communications equipment aggregate.
4. Medical and nonmedical Instruments and other private nonresidential equipment, called producer durable equipment by Hulten-Wyckoff, are classified by them to be of type C, but appear to be of type B as they were given a declining-balance rate of 5.
5. The declining-balance rate is from the Hulten-Wyckoff electrical equipment (not elsewhere classified) aggregate.
6. The declining-balance rate is from the Hulten-Wyckoff other producer durable equipment aggregate.
7. The depreciation rates for nuclear fuel are based on a straight-line rate and a Winfrey retirement pattern.
8. The declining-balance rate is from the Hulten-Wyckoff fabricated metal products aggregate.
9. The declining-balance rate is from the Hulten-Wyckoff engines and turbines aggregate.
10. The declining-balance rate is from the Hulten-Wyckoff trucks, buses and truck trailer aggregate.
11. The depreciation rate is derived by BEA.
12. Depreciation rates for autos are derived by BEA from data on new and used auto prices.
13. The declining-balance rate is from the Hulten-Wyckoff furniture and fixtures aggregate.
14. The declining-balance rate is from the Hulten-Wyckoff tractors aggregate.
15. The declining-balance rate is from the Hulten-Wyckoff service industry machinery aggregate.
16. The declining-balance rate is set to the Hulten-Wyckoff producer durable equipment default.
17. The declining-balance rate is from the Hulten-Wyckoff commercial aggregate.
18. The declining-balance rate is from the Hulten-Wyckoff public utilities aggregate.
19. The declining-balance rate is from the Hulten-Wyckoff mining exploration, shafts and wells aggregate.
20. The declining-balance rate is from the Hulten-Wyckoff other private nonresidential structures aggregate, which consists of buildings used primarily for social and recreational activities and buildings not elsewhere classified.
21. The declining-balance rate is set to the Hulten-Wyckoff private nonresidential structures default.
22. The declining-balance rate is from the Hulten-Wyckoff other private nonresidential structures aggregate, which consists of streets, dams and reservoirs, sewer and water facilities.
23. For all consumer durables except for motor vehicles and parts and computing equipment, the declining-balance rate is set to the Hulten-Wyckoff producer durable equipment default.
24. The declining-balance rate is from the Hulten-Wyckoff motor vehicles and parts aggregate. The declining-balance rate for this category is calculated under the assumption that the service life for consumer durables motor vehicles and parts is equal to the service life for producer durable equipment autos previously used by BEA.

#### **BEA Rates of Depreciation, Service Lives, Declining-Balance Rates, and Hulten-Wyckoff Categories--Table Ends**

25. The corresponding Hulten-Wyckoff consumer durables category is other. The category other durable household equipment includes clocks, lamps, lighting fixtures, and other decorative items; carpets and other floor coverings; window coverings; tools and equipment for house and garden; and telephone and facsimile equipment.

26. The corresponding Hulten-Wyckoff aggregate is radio and television receivers, recorders, and musical instruments. Radio and television receivers, recorders, and musical instruments are classified by Hulten-Wyckoff to be of type B, but are indistinguishable from type C as their declining-balance rate is 1.65.

27. The corresponding Hulten-Wyckoff consumer durables category is wheel goods, durable toys, sports equipment.

28. For most government nonresidential equipment, the declining-balance rate is set to the Hulten-Wyckoff producer durable equipment default. Where possible, the rate is set equal to the rate used for comparable equipment in the private sector.

29. Missiles are depreciated using straight-line patterns of depreciation and a Winfrey retirement pattern.

30. Depreciation rates for government-owned autos are derived from data on autos that are privately owned.

31. For all government nonresidential structures, the declining-balance rate is set to the Hulten-Wyckoff private nonresidential structures default.

32. The declining-balance rate comes from Hulten-Wyckoff (category C), however the service life was reduced from 60 years (Hulten-Wyckoff) to 45 years based on studies by Beemiller and Fraumeni. For information on the service life of highways, see Richard Beemiller, "Experimental Estimates of State and Local Government Highway Capital Stocks" (paper presented at the 1999 annual meeting of the Southern Regional Science Association, Richmond, VA, April 1999); and Barbara M. Fraumeni, Productive Highway Capital Stock Measures, a report prepared for the Federal Highway Administration, U.S. Department of Transportation, January 1999.