What Was the Value of the Consumer Bundle Then? A Data Study

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The Bureau of Labor Statistics of the U.S. Department of Labor has surveyed consumers for over a century. Its annual consumer-expenditure survey—termed the "current survey," in existence since 1980—provides much data on consumer behavior. What is of interest here are three aggregate-type series: average expenditures, number of consumer units, and average size of the consumer unit. Bureau of Labor Statistics (BLS) data for these variables exist for a few scattered years until 1980, annually since 1980, and on a consistent basis only since 1984.

It may be noted that, although the 1980-1983 consumer-expenditure surveys are not fully compatible with the 1984-onward surveys, they are methodologically so. The only reason that they are not fully compatible is budget cuts, which curtailed the survey operationally. Therefore it is with reason that the consumer-expenditure survey (CES) from 1980 onward, not just from 1984 onward, is termed the "current survey" (and by the BLS itself).

The objective of this study is to provide continuous, consistent (as much as possible), annual series of the three variables—average expenditures, number of consumer units, average size of the consumer unit—from 1900 to the present. This objective can be met only by use of both BLS data and data from other sources, governmental and private. Lack of data prevents generation of the series early than 1900. The current survey from 1984 onward is taken as the basis, and the series for 1900-1983 are constructed consistently with the 1984-onward segment. To the best of the present-author's knowledge, there has been no previous work that generates or simulates annual BLS CES series continuously—except, of course, that done by the BLS itself from 1980 onward.

The three variables of interest are defined precisely, as follows:

VCB = value of the consumer bundle, dollars
CU = number of consumer units, thousands
SZ = average size of consumer unit, number of persons

BLS nomenclature for VCB is "average annual expenditures." Officer and Williamson (2006) use the terms "value of the household bundle" (abbreviated VHB) and "cost of the (average) household bundle." The idea behind their terminology is that consumer spending units purchase a bundle of commodities and goodwill, via their purchases of goods and services and the gifts and contributions that they make. This bundle is expressed in dollar terms, without adjustment for inflation or deflation. The Officer-Williamson term, "value of the *household* bundle" (VHB), is here replaced by "value of the *consumer bundle*" (VCB), because the consumer spending unit underlying the CES is the "consumer unit," which is not identical to the "household" (see section II.B.1).

The BLS expression "number of consumer units" is retained, although the abbreviation CU for this purpose is original here. It should be noted that CU is the number of units in the consumer universe, not merely in the consumer sample.

The expression "average size of consumer unit" and the abbreviation SZ are also adopted here. The BLS term is generally "average number of persons in consumer unit" or "size of consumer unit;" and expressions such as "average size of consumer unit" or "consumer-unit size" (perhaps in the form "average size of family" or "family size") are common in the literature. It should be stated that the "consumer unit," already described as not identical to the "household," is also not identical to the "family."

In the process of developing the series, various data sources for this purpose are described, considered, and assessed. These fall into three groups. First, there are consumer-expenditure surveys, which could emanate from the BLS, other government agencies, or private parties. Second, there are series of aggregate consumption expenditures. Third, there are household and related series. The second and third categories again can be publicly or privately produced. In this study, not only the data used but also the data rejected are explained and justified, as are the techniques used to generate the three series.

The study is organized as follows. Section I presents the selection of benchmark years, emanating from the BLS consumer-expenditure surveys themselves. Section II discusses the concept of "consumer unit," and the related concepts of "household" and "group quarters." In section III, the benchmark data for the three series are assembled. Section IV makes use of non-CES information to construct a "synthetic consumer unit" series, and uses it to complete the CU series itself from 1900 onward. Sections V and VI do the same for the VCB and SZ series. The three series having been generated for 1900-2004, their behavior and quality are assessed in section VII.

I. Sources of Benchmark Data

A. Attributes of Current Survey

It is important to exposit properties of the current, 1984-onward, CES, because other benchmark data are to be selected to be consistent with that survey. Two properties are of vital importance. (1) The current survey pertains to all geographic areas—divided into urban and rural, with some earlier surveys separating rural into farm and nonfarm. Therefore the benchmark data must have that geographic coverage, although some data with narrower coverage might be extendible to all geographic areas and therefore acceptable. (2) The entity coverage (termed the "consumer-unit universe") of the current series is essentially the noninstitutional civilian population, though there are exceptions of inclusion and exclusion (see section II.B.2). Benchmark data should share this characteristic as well.

B. Potential Sources for Benchmark Data

1. Geographic coverage: all areas

Potential benchmark-data sources with all-area geographic coverage are summarized in Table 1. The first column of the table lists the data source—whether print study, website,

or other source. The second column provides the survey year or years. If there are multiple years, a survey invariably annualizes expenditures for a one-year period. Alternatively, data may be collected for a varying twelve-month period over two or three years. The proposition "to" between two years (the last entry, "1984 to 2004") indicates multiple (annual) surveys, running from beginning year (1984) to present ending year (2004). In general, studies and surveys are identified by means of the survey year or years.

Table 1 Consumer-Expenditure Surveys Geographic Coverage: All Areas			
Study	Survey Year(s)	Responsible Entity or Entities	Remarks on Method
Warburton (1934)	1929	Brookings Institution	ad hoc use and integration of heterogeneous expenditure surveys over 1918-1933 together with aggregate expenditure estimates
National Resources Committee (1939)	1935-36	BLS and four other agencies[a]	"the first expenditure survey to use imputation, weighting, and matching, though in a crude way"[b]
Bureau of Labor Statistics (1945)	1941[c]	BLS and Bureau of Human Nutrition and Home Economics (Dept. of Agriculture)	area sampling, random sample of spending units
Bureau of Labor Statistics (1965, 1966)	1960-61	BLS and Dept. of Agriculture	annual recall; weighting procedure less elaborate than in 1935-36
Bureau of Labor Statistics (1978)	1972-73	BLS	integrated data from diary and (quarterly-recall) interview surveys
BLS, unpublished[d]	1980	BLS	interview survey
BLS website	1984 to 2004 (annual)	BLS	integrated data from diary and (quarterly-recall) interview surveys, enhanced efficiency

[a]Bureau of Home Economics (Department of Agriculture), National Resources Committee, Works Progress Administration, Central Statistical Board.
[b]Jacobs and Shipp (1993, p. 62).
[c]Also, data for first quarter of 1942 provided separately.
[d]Data kindly furnished by John M. Rogers, of BLS.
BLS = Bureau of Labor Statistics

Other Sources: Lamale (1959), Jacobs and Shipp (1993), Branch (1994), Bureau of Labor Statistics (1997 updated, 2005b)

The third column names the entity or entities responsible for the survey. What the table does not show is the reason why the responsible party undertook the survey. These reasons are discussed here. The 1929 survey was part of a study of consumption expenditures and savings in the aggregate and also disaggregated by area (urban families and rural families, with unattached individuals separate) and income class. Average expenditures per consumer unit (the term is not used) are not provided as such, but readily computable as the ratio of aggregate expenditures to the sum of number of families and number of unattached individuals.

The purpose of the 1935-36 survey was to provide data on consumption expenditures, against which to evaluate proposals for economic recovery and expansion—a reasonable objective, given that the 1930s were years of the Great Depression. Similarly, the purpose of the 1941 survey was to provide expenditure and savings information on which to base decisions for the civilian economy during wartime (Lamale, 1959, p. 226).

The primary purpose of both the 1960-61 and 1972-73 surveys was to collect data for revising the weights for the consumer price index. This is also a purpose of the ongoing, current, survey, another objective of which is to obtain information on the spending patterns of consumers (Bureau of Labor Statistics, 1997 updated, p. 1; 2005b, p. 4).

The fourth column, "remarks on method," will be discussed in section C.2.

2. Geographic coverage: limited area

Potential benchmark-data sources for limited geographic areas are assembled in Table 2. This table differs from Table 1 in inclusion of a triple-column presentation of restrictions of the consumer-unit universe (columns 3-5).

Table 2 Consumer-Expenditure Surveys Geographic Coverage: Limited-Area					
Study/Responsible Entity[a]	Survey Year(s)	Restrictions of Consumer-Unit Universe			Remarks on Method
		Area	Unit	Occupation[b]	

Study/Responsible Entity[a]	Survey Year(s)	Restrictions of Consumer-Unit Universe			Remarks on Method
		Area	Unit	Occupation[b]	
Massachusetts Bureau of Statistics of Labor (1875)	1874-75	MA, urban	families of two or more persons	wage-earner	simple average of responses
Commissioner of Labor (1891, 1892)/Bureau of Labor	1888-90	urban	families of two or more persons[c,d]	wage-earner, nine industries[e]	"
Commissioner of Labor (1904)/ Bureau of Labor	1901	urban	families of two or more persons[c,f]	wage-earner or salaried worker[g]	"
Bureau of Labor Statistics (1924)	1917-19	urban	white families,[h] with husband and wife[c,i]	wage-earner or salaried worker	simple average of responses, 92 cities or localities[j]
Kirkpatrick (1926)/Department of Agriculture	1922-24	rural farm, 11 states[k]	white families, with adult man operating farm and adult woman homemaker[l]	farm owner, tenant, hired-man	simple average of responses, selected localities in which "average" farming conditions prevailed, families selected randomly
Williams and Hanson (1941)/ BLS	1934-36	urban, cities having population over 50,000	families of two or more persons[m]	wage-earner or clerical worker[n]	population weights by region[o]
Brady (1946)/BLS	1944	urban	_____	_____	area-sampling to select survey families
Lamale (1959)/	1950	urban	_____	_____	area-

Table 2
Consumer-Expenditure Surveys
Geographic Coverage: Limited-Area

Study/Responsible Entity[a]	Survey Year(s)	Restrictions of Consumer-Unit Universe			Remarks on Method
		Area	Unit	Occupation[b]	
BLS					sampling to select survey families[p]
Department of Agriculture (1958)/ Dept. of Agriculture and Bureau of the Census	1955	rural farm	_____	farm-operator	sampling survey enhanced by use of 1954 Census of Agriculture
BLS[q]	1981 to 1983	urban	_____	_____	interview survey

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Table 2
Consumer-Expenditure Surveys
Geographic Coverage: Limited-Area

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[a]If different from authorship of study.

[b]Of family-head or chief-earner.

[c] "All families" include dependents, boarders, lodgers, and servants. "Normal families" limited to husband-and-wife families with not more than five children (none over 14 years of age), no other household members, and does not own its dwelling place. Tabulations for both "all families" and "normal families."

[d]Also, "normal families" have expenditures for rent, fuel, lighting, clothing, and food.

[e]Pig iron, bar iron, steel, bituminous coal, coke, iron ore, cotton, wool, glass.

[f]Also, "normal families" occupy a rented house and have expenditures for food, clothing, fuel, lighting, and sundries.

[g]Salaried worker must earn no more than $1200 annually.

[h]Separate survey of black families, summarized in Bureau of Labor Statistics (1919, p. 119).

[i]Also, at least one child not a boarder or lodger, no boarders, no more than three lodgers. Also, no "slum or charity families," no non-English-speaking families who have been in the United States less than five years. Further, the family must have kept house in the locality for the entire year covered, and at least 75 percent of the family income must come from the principal earner or others who contribute all earnings to the family fund.

[j]Families taken to "represent proportionally the wage-earners and the low or medium salaried families of the locality" (Bureau of Labor Statistics, 1924, p. 2).

[k]New Hampshire, Vermont, Massachusetts, Connecticut, Kentucky, South Carolina, Alabama, Missouri, Kansas, Iowa, Ohio.

[l]Non-English-speaking families excluded.

[m]Excluded families: families who received direct relief or work relief; families with annual income below $500; families which received more than one-fourth income from interest, dividends, royalties, speculative gains, or rents (not including net receipts from boarders and lodgers); families which received income from an owned business equal to more than half the chief-earner's earnings; families which received gifts or income-in-

kind of value equal to one-fourth its total money income; families which received rent in payment for services; families which received three months or more free rent; families which resided in the area of investigation less than three months; families whose homemaker worked away from home both day and night for more than 78 days in the year; families boarding for more than one month; families with more than the equivalent of two boarders and/or lodgers (more than 104 boarder/lodger weeks); families having guests for more than the equivalent of 26 guest-weeks; families having another family or two unrelated dependent persons over 21 years of age living with it and completely dependent on it (unless dependents are parents of homemaker, husband, or chief-earner).
[n]Wage-earner or clerical worker must be employed. Chief-earner must have earned at least $300 during the year. Chief-earner classified as clerical worker must have earned less than $2000 over the schedule year and less than $200 during any month.
[o]Reduced to take account of population on relief and adjusted to take account of race.
[p]This is "the first BLS survey in which the entire sample population was chosen using scientific sampling methods"—Jacobs and Shipp (1990, p. 24).
[q]Data kindly furnished by John M. Rogers, of BLS.
BLS = Bureau of Labor Statistics
Other Sources: Kirkpatrick (1929), Lamale (1959), Bureau of the Census (1975), Jacobs and Shipp (1990).

With columns 1-2 of the table self-explanatory, consider the reasons for the surveys. The purpose of the 1874-75 survey was to investigate the standard of living of worker families and the relationship between expenditures on specific consumption categories and the level of income (Department of Labor, 1959, pp. 34, 218). The 1888-90 survey was undertaken to determine the cost of living and expenditure patterns of wage-earner families in conjunction with production costs (Department of Labor, 1959, p. 219; Lamale, 1959, p. 175). The 1901 survey had a dual purpose: to obtain data on the cost of living of industrial workers and to gather expenditure data required to construct a retail-price food index (a predecessor of the consumer price index). The 1917-19 survey had similar objectives: to investigate the cost of living in industrial centers and to assemble weights to construct a consumer price index. This information on the above surveys is in Department of Labor (1959, pp. 34, 218-19) and Lamale (1959, pp. 175, 179, 189).

The 1922-24 study is "the first concerted attempt to define the prevailing standard of living among farmers" (Kirkpatrick, 1929, p. 49). With a similar dual objective to that of the 1901 and 1917-19 surveys, the 1934-36 survey was conducted to obtain both expenditure patterns to revise the consumer price index and data to analyze consumption patterns. The purpose of the 1944 survey was to compare price changes reported by city consumers with price changes indicated in urban store reports; expenditure and related data were obtained as a by-product of this objective. Like several of its predecessors, the 1950 survey had the purpose of assembling data on expenditures in order to revise weights in the consumer price index. Again, Department of Labor (1959, p. 220) and Lamale (1959, pp. 208, 231, 234) are useful sources of information on purposes of these surveys.

The 1955 survey was conducted to provide comprehensive information on farmer expenditures. As for the 1980-to-1983 surveys, their purposes were the same as the 1984-onward component of the current survey: primarily to obtain data to revise the weighting pattern of the consumer price index, and to generate information on spending patterns.

The interesting feature of the reasons for the surveys listed in both Tables 1 and 2 is that obtaining data for the variables of this study (VCB, CU, SZ) is usually not the primary reason for the survey. Indeed, the variables of interest here are aggregate or aggregate-averages in nature; whereas the surveys are typically of interest for their disaggregate information, for example, expenditures by category of consumption and by income class.

As mentioned above, columns 3-5 of Table 2 describe, for each survey, three types of restrictions of the consumer-unit universe: geography (area), spending unit (consumer unit or predecessor, the entity of interest), and occupation of the spending-unit head (in practice, the family-head or chief-earner). By virtue of construction of the table, each survey has at least the restrictive-area entry. In contrast, the surveys in Table 1 have no restriction in any of the three categories. Of course, this property makes that group of surveys a better source of benchmark data; but, before turning to the task of assembling the benchmark data, consider compilations of surveys performed by previous researchers.

 C. Selection of Surveys for Benchmark Data

1. Compilations of surveys

[This section is presented for historical completeness, and may be skipped by readers interested exclusively in series generation as such.]

A review of existing compilations of expenditure surveys is performed for three reasons. First, a chronological listing of these compilations traces the history of the assembling of consumer expenditure surveys from a medium-term or long-term standpoint. Second, the compilations prove helpful in generating groups of surveys, as in Tables 1 and 2. Third, existing compilations might assist directly in generating benchmark data or in interpreting or extending these data. It happens that the third use is only potential; the existing compilations were of no direct use in developing benchmark data. Nevertheless, the first two uses remain.

Table 3 lists previous compilations of surveys in the literature (including websites), whatever the present author could find. Column 1 is the study (or location) of the compilation, column 3 lists the surveys in the compilation, while column 2 documents restrictions of the consumer-unit universe that are common to the compiled surveys. Surveys involving minimal geographic coverage—only one locality or several localities

within a state or states, such as in Kirkpatrick (1929, pp. 50-73)—are excluded. This means that the only compilations of surveys included are in Tables 1-2.

Table 3 Compilations of Consumer-Expenditure Surveys		
Study	Common Restrictions of Consumer-Unit Universe	Surveys[a] in Compilation
Winslow (1925, pp. 129-142, 267-277)	urban, wage-earner (alone, for 1888-90) or salaried worker, families of two or more persons[b]	1888-90[c], 1901[c], 1917-19
Kirkpatrick (1929, pp. 73-77)	families of two or more persons, white families (1917-19, 1922-24)[b]	1901[d], 1917-19, 1922-24
Department of Labor (1959, pp. 33-52), Bureau of the Census (1975, pp. 308-309, 320-22)	urban, wage-earner (alone, for 1874-75 and 1888-90) or salaried/clerical worker familes[b]	1874-75, 1888-90[d], 1901[d], 1917-19, 1934-36, 1950[e]
Department of Labor (1959, pp. 37-38, 49)[f]	urban, wage-earner (alone, for 1888-90) or salaried/clerical worker families[b]	1888-90[d], 1901[d], 1917-19, 1934-36, 1950[e]
Bureau of the Census (1975, pp. 309, 322)[f]	”	1888-90[d], 1901[d], 1917-19, 1934-36, 1950[e], 1960-61[e]
Bureau of the Census (1975, pp. 311-12, 325-26)	farm families of two or more persons	1922-24, 1929, 1935-36, 1941, 1955, 1961[g]
Bureau of the Census (1975, pp. 312-13, 327)	_____	1929, 1935-36, 1941, 1960-61
Jacobs and Shipp (1990, p. 21)	_____	1960-61, 1972-73, 1986-87
Jacobs and Shipp (1990, p. 22)	urban, wage-earners of salaried/clerical consumer units[h,i]	1901[j], 1917-19, 1934-36, 1950, 1960-61, 1972-73, 1986-87
Brown (1994); reprinted in Carter, Gartner, Haines, Olmstead, Sutch, and Wright (2006, vol. 3, pp. 280-86), series contributed by Lee A. Craig	urban, families of two or more persons[h]	1917-19[k], 1934-36, 1950, 1972-73, 1988
Carter, Gartner, Haines, Olmstead, Sutch, and Wright (2006, vol. 3, pp. 276-83), series contributed by Lee A. Craig	urban, families of two or more persons[h]	1874-75, 1901, 1917-19, 1934-36, 1950

Table 3		
Compilations of Consumer-Expenditure Surveys		
Study	Common Restrictions of Consumer-Unit Universe	Surveys[a] in Compilation
Carter, Gartner, Haines, Olmstead, Sutch, and Wright (2006, vol. 3, pp. 273-74, 284), series contributed by Lee A. Craig	_____	1972-73, 1984 to 1998
BLS[l]; Carter, Gartner, Haines, Olmstead, Sutch, and Wright (2006, vol. 3, pp. 273-74)[m], series contributed by Lee A. Craig	urban	1980 to 1983
BLS website	_____	1984 to 2004

[a]Surveys identified by "Survey Year(s)" column in Tables 1-2.
[b]See Table 2 for further survey-specific restrictions.
[c]Tabulations for both "all families" and "normal families."
[d] "Normal families."
[e]Wage-earner and clerical-worker families.
[f]Expenditures expressed in constant (1950) dollars.
[g]Rural farm component of 1960-61 survey pertains exclusively to year 1961.
[h]See Table 2 for survey-specific restrictions.
[i]Families of two or more persons: 1901, 1917-19, 1934-36; inclusive of single persons,1950, 1960-61, 1972-73, 1986-87.
[j]"All families."
[k]Incorporates separate survey of black families.
[l]Data kindly furnished by John M. Rogers, of BLS.
[m]Incorrect expenditures figure for 1981.
BLS = Bureau of Labor Statistics

2. Selection of surveys

The task, then, is to consider the surveys in Table 1 and 2—and decide, for each survey, whether or not the survey is to be a source of benchmark data. To be included as a source, a survey must pass two tests. The first test is that the consumer-unit universe either be not restricted or, if restricted, be extendible via removal of the restriction in a satisfactory way. The second test is that the survey method be scientific, for coverage of the consumer-unit universe. In particular, mere unweighted averaging of data provided by respondents is unacceptable.

The surveys in Table 1, all of which are without restriction of the consumer-unit universe, are easy to evaluate. Only the 1929 survey is rejected. Warburton (1934) is not a true survey but rather is a combination of aggregate-expenditure estimates and diverse surveys over time, not just for the year 1929. As stated in Bureau of the Census (1975, p.

313), "Warburton…based his figures on sample surveys of expenditures of nonfarm families for 1918-1930, of farm families for 1924-1930…and of single persons for 1918-1933 from a variety of sources. In addition, he used the results of a questionnaire concerning incomes, expenditures, and savings in 1929 circulated by The Brookings Institution to families of business and professional men." It is with reason that this work is not included as a source of benchmark data; for the methodology is incompatible with that of the other surveys in Table 1, and the results are unreliable.

The remaining surveys in Table 1 involve the BLS and are readily adopted as benchmark-data sources. The 1935-36 survey is impressive for its time, for the careful sampling procedure and estimation methodology. Communities are distinguished by area type: cities, villages, farm counties. Population weights for various income levels are employed. While the primary expenditure survey was limited to white, native-born, husband-wife, non-relief families, the "survey made great efforts to obtain data from which to make estimates for the omitted segments of the population....Weights were derived using several characteristics, including family size, size of community, region, income and race. These weights were used to calculate weighted consumption estimates" (Jacobs and Shipp, 1993, pp. 61, 62).

The 1941 survey has a sample size of under 3100—1300 families and single individuals in cities, 1000 in rural nonfarm areas, and 760 on farms; yet these numbers are sufficient for satisfactory estimates at the total-U.S. level as well as the three area aggregates (Lamale, 1959, p. 226). The 1960-61 survey was "more elaborate than any of its predecessors" (Jacobs and Shipp, 1990, p. 24). Expenditures information was obtained used annual recall.

Several innovations were made in the 1972-73 survey and retained in the current survey: (1) two separate surveys: interview and diary, (2) integrated data from these surveys, (3) quarterly rather than annual recall, in the interview survey, (4) daily recordkeeping of expenditures, in the diary survey. Due to budget limitations, the 1980 survey is based on the interview survey alone. The surveys from 1984 onward again integrate the interview and diary surveys.

Turning to Table 2, it is easy to reject the first five entries, namely, surveys for 1874-75, 1888-90, 1901, 1917-19, and 1922-24. On method alone, these surveys lack a scientific sampling basis, with the simple average of responses taken. Therefore the surveys fail the second test, stipulated above. In addition, these surveys have too restrictive a consumer-unit universe. The 1874-75 survey is too restrictive geographically. The survey covers only one state, Massachusetts. Using data compiled by Weiss (1999, pp. 25-26), one computes that Massachusetts "gainful workers" aged 16 and over constitute less than five percent of total-U.S. gainful workers in both 1870 and 1880. (A "gainful worker" denotes a person who reports an occupation, whether or not that person is employed.)

In contrast to 1874-75, the 1888-90 survey is too limited in terms of sector coverage. Employment in the nine industries covered by the survey is only four percent of total U.S. civilian employment in the census year 1890. [Employment in the nine industries of

the survey is represented by total employment in the bituminous-coal, wool, cotton, glass, coke, and iron-and-steel industries—data in Census Office (1892, p. 347; 1895, pp. 11, 165, 311, 343, 383). Total U.S. civilian employment is taken from Weir (1992, p. 337).]

The 1901 survey is confined to urban wage-earners and salaried workers. Such workers constituted only 49 percent of persons reporting occupations in census-year 1900. [Computed from data in Sobek (2001, p. 72). Counted as urban wage-earners and salaried workers are clerical workers, sales workers, craft workers, operatives, service workers, and nonfarm laborers. Excluded occupational groups are professionals, farmers, proprietors, managers and officials, domestic workers, and farm laborers.] Single-person nonfamily units, also excluded from the universe, composed six percent of all households in census-year1900 [computed from data in Carter, Gartner, Haines, Olmstead, Sutch, and Wright (2006, vol. 1, p. 660), contribution of Susan Brower and Steven Ruggles].

The 1917-19 survey has two serious restrictions of the consumer-unit universe. In terms of family structure, the survey is limited to white married-couple households. This group constituted 72 percent of all households in census year 1920 [computed from data in Carter, Gartner, Haines, Olmstead, Sutch, and Wright (2006, vol. 1, p. 660), contribution of Susan Brower and Steven Ruggles]. Given that the survey families must also have at least one child, the 72-percent figure is an upper limit to household coverage. In terms of occupations, the survey is restricted to wage-earners and salaried workers. In census-year 1920, this group constituted 59 percent of persons reporting occupations [computed from data in (Sobek, 2001, p. 72)].

Turning to the 1922-24 sample, it is confined to the rural farm area—and farm households composed only (27, 25, 24) percent of all households in (1922, 1923, 1924) [computed from data in Carter, Gartner, Haines, Olmstead, Sutch, and Wright (2006, vol. 1, p. 667), contribution of Susan Brower, Steven Ruggles, and Richard Sutch]. Exclusion of nonwhite farmers and single individuals reduces the coverage further. Also, later studies indicated that expenditures were overestimated (Bureau of the Census, 1975, p. 306).

Although its sampling methodology is sound, the other rural farm survey in Table 2, that for 1955, is also excluded. The reason is that farm households continued to shrink relative to nonfarm households, so that in 1955 farm households constituted only 12 percent of all households [Carter, Gartner, Haines, Olmstead, Sutch, and Wright (2006, vol. 1, p. 667), contribution of Susan Brower, Steven Ruggles, and Richard Sutch]. The 1934-36 survey also passes the method test; but its coverage of the consumer-unit universe is restricted (and in all three manifestations), in contrast to the universal coverage of the 1935-36 survey (in Table 1). Therefore the 1934-36 survey is excluded, as superseded by the 1935-36 survey.

The remaining surveys in Table 2 are included as benchmark-data sources. These surveys—1944, 1950, and 1981 to 1983—are distinguished by their geographic, urban-area restriction, but with no other limitation of consumer-unit-universe coverage.

Just as the surveys adopted from Table 1, these surveys all have the BLS as responsible entity (or as one of such entities).

The 1944 sample involves only 1700 families and single persons and 48 metropolitan districts or cities, but all cities with a population of 2500 or more (as distinct from 50,000 or more for the 1934-36 survey) are included in the universe. The sampling method is scientific, and the "study was planned as a representative cross section of all families and single consumers in cities of 2,500 or more in the United States" (Lamale, 1959, p. 231). Therefore at the total-U.S. level, for urban areas, the survey is acceptable as a benchmark-data source.

The 1950 survey is more impressive than that of 1944, with 12,489 consumer units in the sample and 91 survey cities, as well as a superior sampling method (Lamale, 1959, p. 234; Jacobs and Shipp, 1990, p. 24). As for the 1981-to-1983 surveys, they are part of the current survey, though deficient in their limitation to only one of the surveys rather than presenting integrated data from the two (diary and interview) component surveys.

Of course, for use as benchmark data, information from the 1944, 1950, and 1981-to-1983 surveys must be extended from urban-area to all-areas geographic coverage, to be performed in sections III.A and III.B. Such extension makes sense only if the urban coverage is a substantial proportion (certainly, at least a majority) of the all-area consumer-unit universe. This proportion cannot be computed directly, because of the restriction of the surveys to urban areas. However, urban/total area proportions in adjacent consumer surveys (listed in Table 1) can be computed, as done in Table 4. The urban share of consumer units, 62 percent in 1941, no doubt increasing steadily over time, reaches 83 percent in 1984.

Table 4 Number of Consumer Units in Universe Percentage Share—by Geographic Area				
Area	Survey			
	1941	1960-61	1980	1984
Urban	62	73	81	83
rural nonfarm	22	21	19	17
rural farm	16	6		

Source: 1941—Bureau of Labor Statistics (1945, p. 33). 1960-61—Bureau of Labor Statistics (1965, p. 2). 1980—Data kindly furnished by John M. Rogers, of BLS. 1984—BLS website. Percentages computed by present author.

To summarize, the surveys to provide benchmark data are: 1935-36, 1941, 1944, 1950, 1960-61, 1972-73, and annually from 1980 onward. This list identifies both the "benchmark surveys" and the "benchmark years."

II. "Consumer Unit" and Related Concepts

A. Definitions Pertinent to "Consumer Unit"

1. Household

Economists often describe the fundamental consuming unit or spending unit as the "household;" but that has never been the terminology of the BLS current expenditure survey. In fact, it is rare even to find an explicit definition of "household" in a BLS CES publication! Lamale (1959, pp. 219) describes the Commissioner of Labor (1891 or 1892) delineation of "household" as follows: "By family…is meant the family in totality…the husband, wife, children, boarders, everybody that goes to make up the household for which facts were given." "Thus," she observes, "no definitional distinction is made between 'household' and 'family.'" Lamale (1959, pp. 181, 191, 219, 227, 232) also presents definitions of "household" that she (presumably) implicitly derives from text and tabulations in publications of the 1901, 1917-19, 1935-36, 1941, and 1944 surveys.

In the 1934-36 survey, the definition of "household" is explicit: "the members of the economic family living together in one dwelling, plus roomers and guests sleeping in the family dwelling, plus boarders and guests eating with the family" (Williams and Hanson, 1941, p. 383—a BLS publication). Lamale (1959, p. 237—not a BLS publication) states that, for the 1950 survey, "the household consists of all persons residing in the sample living quarters. In addition to family members, a household may contain boarders, roomers, guests, or paid help." If one follows Lamale, this seems to have been the operational definition since the 1917-19 survey. It is not that BLS ignores the term "household;" for the term is used in the definition of "consumer unit" (see section 3 below). However, the term "household" is defined neither in the BLS *Handbook of Methods* (BLS, 1997 updated) nor in its several Glossaries: the Glossary in the annual consumer-expenditure report (such as Bureau of Labor Statistics, 2005b, p. 7), the Glossary in the Consumer Expenditure Survey *Anthology* (Bureau of Labor Statistics, 2005a), or the Glossary in the BLS website.

Nevertheless, there are places in which BLS does provide an explicit definition of household. In *Employment and Earnings* (for example, February 2006, p. 184), it is stated: "A household consists of all persons—related family members and all unrelated persons—who occupy a housing unit and have no other usual address. A house, an apartment, a group of rooms, or a single room is regarded as a housing unit when occupied or intended for occupancy as separate living quarters."

Similarly, the Annual Demographic Survey (a joint project of BLS and the Bureau of the Census) website, Glossary of Subject Concepts, states: "A household consists of all the persons who occupy a house, an apartment, or other group of rooms, or a room, which constitutes a housing unit. A group of rooms or a single room is regarded as a housing unit when it is occupied as separate living quarters…."

The Census definition of household is consistent with the above: "A household includes all the people who occupy a housing unit as their usual place of residence….Housing

unit: A house, an apartment, a mobile home or trailer, a group of rooms, or a single room occupied as separate living quarters, or if vacant, intended for occupancy as separate living quarters….”—Bureau of the Census, American FactFinder Help website, Glossary.

Thus a household is defined physically, the set of people residing in separate living quarters. Therefore a household is different from a family, although most households are family households. The matter deserves precise treatment, which follows.

As Ruggles and Brower (2003, p. 78) state: “Most households in all census years are composed of a group of persons related to one another who reside together in a separate physical dwelling and who share common eating and cooking facilities.” Thus the typical household is indeed the “family,” or “family household”—and the typical “family household” is the “married-couple household.” While most households are family households, the latter is by no means the only household type.

The various types of households are distinguished by Susan Brower and Steven Ruggles in Carter, Gartner, Haines, Olmstead, Sutch, and Wright (2006, vol. 1, pp. 660-61). Households are divided into “family” households and “nonfamily” households. “Family households…are households that include one or more persons related by birth, marriage, or adoption to the householder or household head.” The Bureau of the Census defines a householder as “the person, or one of the people, in whose name the home is owned, being bought, or rented. If there is no such person present, any household member 15 years old and over can serve as the householder for the purposes of the census” (American FactFinder Help website, Glossary).

Family households are “married-couple” households or “householder, no spouse present” households. “Married-couple family households have a married-spouse-present household head or householder” [Carter, Gartner, Haines, Olmstead, Sutch, and Wright (2006, vol. 1, p. 661), contribution of Susan Brower and Steven Ruggles]. “Householder, no spouse present” means a “householder residing with a child or other relatives, but no spouse;” so that household group includes single-parent households as a component.

As for nonfamily households, they may be composed of a single person or a group of unrelated persons.

In sum, as stated by Brower and Ruggles, “a household may consist of a single family, one person living alone, two or more families living together, or any other group of related or unrelated persons who share living arrangements.”

2. Group quarters

By definition, at least according to the Bureau of the Census, a person not living in a household is a member of the group-quarters population, a group-quarters resident: “The Census Bureau classifies all people not living in households as living in group quarters” (American Factfinder Help website, Glossary). Group quarters are of two types:

institutional and noninstitutional. Examples of institutional group quarters are correctional facilities (jails, penitentiaries, juvenile detention centers), nursing homes, and mental hospitals. Examples of noninstitutional group quarters are military barracks or housing, group homes, college dormitories, college fraternity and sorority housing, workers' dormitories, hotels, and lodging houses (such as single-room-occupancy dwellings).

3. Consumer unit

It is interesting that, although "consumer unit" has been the definitive BLS term for the entity making expenditure decisions only since the 1972-73 survey, the term was used as early as the 1935-36 survey. Synonyms, used prior to 1980, are "income-spending unit," "spending unit," "consumer," and "economic family." Terminology used in the various benchmark surveys are shown in Table 5. The table also specifies the consumer-unit universe for each survey, quoted from surveys or survey commentaries themselves. As stated explicitly from the 1941 survey onward (except for 1960-61), the consumer-unit universe of the benchmark surveys is the "civilian noninstitutional population." As shown below (section B.2), that is a convenient simplification.

Table 5			
Terminology of "Consumer Unit" and Specification of "Consumer-Unit Universe"			
Year(s)	Consumer-Unit Terminology	Consumer-Unit Universe	Source
1935-36	"income-spending units," "consumer unit"	"families of two or more persons, and…'single' individuals living alone or as lodgers	National Resources Committee (1939, pp. 1, 98)
1941	"spending unit"	"the civilian population exclusive of institutional and quasi-institutional groups"	Bureau of Labor Statistics (1945, pp. v, 31)
1944	"consumers,," "economic family"	"families and single persons living as civilians," "civilian noninstitutional population"	Brady (1946, p. 1, n. 2), Lamale (1959, p. 232)
1950	"consumer unit"	"civilian noninstitutional population"	Lamale (1950, pp. 231, 236-37)
1960-61	"family, or consumer unit"	"families and single consumers"	Bureau of Labor Statistics (1965, pp. 1, 5)
1972-73	"consumer unit"	"civilian	Bureau of Labor

Year(s)	Consumer-Unit Terminology	Consumer-Unit Universe	Source
title			
		noninstitutional population"	Statistics (1978, p. 126)
1980-	"consumer unit"	"civilian noninstitutional population"	Bureau of Labor Statistics (1997 updated, pp. 2, 5)

Table 5
Terminology of "Consumer Unit" and Specification of "Consumer-Unit Universe"

Operationally, the consumer-unit universe is the sum of (i) households (the count of households themselves, *not* the population in households) and (ii) noninstitutional group-quarters residents (the population of group quarters, *not* the count of group quarters). This result, invaluable in constructing the synthetic CU and VCB series, follows from the definitions of "consumer unit" (or predecessor term) in the benchmark surveys. The definitions, survey-by-survey, follow. They should be read in conjunction with the corresponding entries in Table 5.

1935-36: "main types of consumer units…the family, the single individual….The *family*…consists of two or more persons living together as one economic unit, having a common or pooled income and living under a common roof….they may be unrelated persons maintaining a joint home, provided they share a joint income....Single individuals…include all persons maintaining independent living quarters, or living as lodgers or servants in private homes, or as roomers in lodging houses and hotels." (National Resources Committee, 1939, pp. 98-99)

1941: "The spending units…[are] called the family and the single consumer. The family is a group of persons dependent on a common or pooled income for the major items of expense and usually living in the same household. The single person is a person who lives as an independent spending unit either in a separate household or as a roomer in a private home, lodging house, or hotel." (Bureau of Labor Statistics, 1945, p. 11)

1944: "'economic family'…1) a group of persons, usually related, who live together…contributing to the family income and/or receiving part of their support from the total income; 2) an individual who lives independently, apart from relatives, as a one-person economic family." (Lamale, 1959, p. 232)

1950: "consumer unit"…1) a *family* of two or more persons dependent on a common or pooled income for their major items of expense and usually living in the same household, or 2) a *single consumer*—a person who is financially independent of any family group, living alone or in a household with others." (Lamale, 1959, pp. 236-37)

1960-61: "family, or consumer unit refers (1) to a group of people usually living together who pooled their income and drew from a common fund for their major items of expense,

or (2) to a person living alone or in a household with others but who was financially independent." (Bureau of Labor Statistics, 1965, p. 5)

1972-73: "consumer unit…(1) a group of two persons or more, usually living together, who pool their income and draw from a common fund for their major items of expense, or (2) a person living alone or sharing a household with others, or as a roomer in a private home, lodging house, or hotel, but who is financially independent—that is, the person's income and expenditures were not pooled with other residents." (Bureau of Labor Statistics, 1978, p. 126)

1980-: "consumer unit…either (1) all members of a particular household who are related by blood, marriage, adoption, or other legal arrangements; (2) a person living alone or sharing a household with others or living as a roomer in a private home or lodging house or in permanent living quarters in a hotel or motel, but who is financially independent; or (3) two or more persons living together who pool their income to make joint expenditure decisions. Financial independence is determined by the three major expense categories: housing, food, and other living expenses. To be considered financially independent, a respondent must provide at least two of the three major expense categories." (BLS Glossary, BLS website). Similar definitions appear elsewhere, for example, Bureau of Labor Statistics (1997 updated, p. 2; 2005b, p. 7)

It is clear that the definitions are consistent in treating the household and financially independent single person as each constituting one consumer unit, whence the above statement that the consumer-unit universe is the sum of (i) households and (ii) noninstitutional group-quarters residents. The reason is that the subject of consumer-expenditure surveys is the decision-making unit for expenditures. That, of course, is the household (group of financially interdependent or financially dependent individuals) or the independent single individual. As Jacobs and Shipp (1993, p. 64) state, "The consumer unit definition was constructed [in the 1950 survey], because it is more closely related to the decision-making processes for spending." They also observe, correctly, that "earlier consumer expenditure surveys used the definition of consumer unit as the basis for the collection of expenditure and income information."

It may be noted that the sum of (i) the household *population* (number of persons in households) and (ii) group-quarters residents (that is, the group-quarters population, number of persons living in group quarters) is also a legitimate variable, and will be used in constructing the synthetic VCB series. However, the sum of group-quarters count (*not* residents, population) and either households-count or household-population is devoid of use.

B. Relation of Consumer Unit to Other Concepts

1. Household

Recall the description of the household given by Brower and Ruggles, in section A.1 above: "a household may consist of a single family, one person living alone, two or more

families living together, or any other group of related or unrelated persons who share living arrangements." At first glance, it would appear that the consumer unit is coincident with the household. However, that conclusion is false.

The relationship between the consumer unit and the household is stated succinctly by Jacobs and Shipp (1993, p. 64): "There may be more than one consumer unit in a household." The current survey provides a precise criterion: a consumer unit (whether a group of persons or a single person) within a household has responsibility (shared responsibility, if two or more persons) for at least two of the three major types of expenditures [housing, food, other living expenses]. For example, one can imagine a household composed only of individuals who jointly share that responsibility, in which case the household constitutes a single consumer unit. Also, one can conceive of a household of which the individual members retain their independence for at least two of the three major types of expenditures. In that situation, the household is composed of multiple consumer units.

Earlier surveys possessed a similar methodology, though the precise criterion had not been developed. The 1935-36 survey noted that "sons and daughters living with their parents but paying for board and lodging and not pooling their incomes in the common family fund are classified as single individuals" (National Resources Committee, 1939, p. 98). The 1941 survey mentions several pertinent situations:

> …related persons living in one household were considered as forming two or more spending units only when the separation of finances appeared to be clearly defined…earning sons and daughters who lived with their parents were not considered separate spending units unless their status in the household could be strictly construed as that of a roomer…persons related to the family that formed the nucleus of the household were considered as members of that family except where there was a clear separation of income and expenditures, in which case they were treated as single consumers…Two families or single consumers that lived in one dwelling and shared household expenses but did not pool incomes were considered separate spending units. (Bureau of Labor Statistics, 1945, p. 12)

The present author agrees with BLS that the "consumer unit" is the fundamental expenditure-decision-making entity, and that this consumer unit is distinct from the household.

2. Group-quarters residents

All consumer-expenditure surveys exclude institutional residents (that is, residents of institutional group quarters) from the consumer-unit universe (although the 1939 survey considers such residents separately, with the "institutional group" itself a distinct consumer unit). The surveys have also been consistent in the treatment of military personnel, excluding such personnel living on-post (on-base), but including personnel

living off-post (off-base). The exclusion of on-post military personnel is stated explicitly in National Resources Committee (1939, p. 99), Lamale (1959, p. 116), and Bureau of Labor Statistics (1965, p. 9; 1978, p. 126). By inference (and explicitly in Bureau of Labor Statistics, 1978, p. 126), military personnel residing outside military posts or bases in the United States are included in the consumer-unit universe. This is one exception, albeit a minor one, to the "*civilian* noninstitutional population" description of the consumer-unit universe. Of course, *overseas* military personnel, whether living on or off post, are excluded from the universe.

Consistent with the description of the consumer-unit universe, civilian residents of noninstitutional quarters situated on a military installation are *included* in the universe. These are civilian nurses and interns living in dormitories in military hospitals, civilian temporary residents in transient quarters on military bases, and civilian resident staff of military disciplinary barracks. I am indebted to John M. Rogers, of BLS, for this information and for the other information regarding the current survey in this section below.

Another amendment to the consumer-universe description is the *exclusion* of residents of certain noninstitutional group quarters. The 1935-36 survey mentions persons in Civilian Conservation Corps and labor camps, as well as crews on vessels (National Resources Committee, 1939, p. 99). The current survey explicitly puts the following group quarters outside the survey: military ships, shelters for abused women, soup kitchens, regularly scheduled mobile food vans, targeted nonsheltered outdoor locations, crews of maritime vessels, and group quarters for victims of natural disasters.

Certain noninstitutional group-quarters residents *included* in consumer-expenditure surveys are specified in some surveys: "roomers in lodging houses and hotels" (National Resources Committee, 1939, p. 99), "a roomer…in a lodging house, or hotel" (Bureau of Labor Statistics, 1945, p. 11), "population living in rooming or boarding houses or in doctors' and nurses' quarters of general hospitals" (Bureau of Labor Statistics, 1978, p. 126). The current survey includes the following group quarters: hotels and motels used entirely or partially for persons without a usual home, shelters for the homeless with sleeping facilities, religious group-quarters, hostels, YMCA, YWCA, dormitories for nurses and interns in general hospitals, job corps and vocational training facilities, dormitories for agricultural and other workers, group homes for the handicapped, communes, maternity homes for unwed mothers, and non-correctional halfway houses.

The treatment of students living away from home, predominantly college students, is probably the most-serious inconsistency among the surveys. There is a distinct break, with the current survey. From the 1935-36 to the 1972-73 surveys, college students away from home were generally included as a member of their parents' consumer unit. The 1935-36 survey states: "sons and daughters away at school or for other reasons living away from home for all or part of the year, but dependent on the family income for at least three-quarters of their support, are classified as members of the family." (National Resources Committee, 1939, p. 98). The 1972-73 survey specifies: "excluded from the address sample were college dormitories, fraternity or sorority houses" (Bureau of Labor

Statistics, 1978, p. 126). However, "students living in college- or university-regulated housing…in the current survey they constitute a separate sampling segment and report their own expenditures" (Jacobs and Shipp, 1993, p. 69). Again, "students living in university-sponsored housing are…included in the sample as separate consumer units" (Bureau of Labor Statistics, 2005a, p. 71).

Therefore, in not counting college students away from home as separate consumer units, the surveys from 1935-36 to 1972-73 understate CU (number of consumer units in the universe), relative to the current (1980-) survey—recall that it is the current survey that serves as the basis of generating the variables of interest: VCB, CU, and SZ. Unfortunately, information is lacking to correct the time inconsistency in the benchmark data.

However, one can make some statements about the resultant inconsistencies in the three series. Consider CU first. Enrollment in higher-education as a percentage of the population 18-to-24 years old, around benchmark years, is exhibited in Table 6.

Table 6 Higher-Education Enrollment (Percentage of Population 18-to-24 Years Old)	
Year	Percent
1935	7.6
1941	8.4
1943	6.8
1950	14.3
1961	23.6
1972	35.8
1980	40.2

Source: Carter, Gartner, Haines, Olmstead, Sutch, and Wright (2006, vol. 2, pp. 441-42), series contributed by Claudia Goldin.

There is a trend increase in higher-education enrollment, although interrupted in wartime (Korean War as well as World War II) and also in the late 1970s—as shown in the original table. It is reasonable to assume that the percentage of college students living away from home exhibits a similar behavior. Then the absolute and percentage undercount of CU is greatest in 1972, compared to 1980, and generally falls as one moves backward in time (except probably for the survey year 1944, given the figure for 1943 in the table).

A very rough idea of the inconsistency, for the year 1950, may be obtained as follows. In thousands, the value of CU for 1950 is 47,247; and total college enrollment in four-year institutions was 2064 (source for Table 6). (Enrollment in two-year institutions is excluded, as a high proportion of such students would live at home.) According to Steven Ruggles [in Carter, Gartner, Haines, Olmstead, Sutch, and Wright (2006, vol. 1, p. 655)],

in 1950, when the census first enumerated college students at their college location rather than at their family residence, "45.5 percent of college students were unrelated to the household head." Taking 45.5 percent of 2064 as the numerator and 47,247 as the denominator, the undercount of CU is slightly below two percent.

The two-percent figure is an upper limit, for two reasons. First, some students away from home were financially independent and therefore eligible to be counted as separate consumer units in any event. For example, in 1935-36, a student who received more than one-quarter of his/her income from other than family sources (in the form of scholarships, loans, earnings, etc.) was counted as a separate consumer unit. Second, part-time students are included with full-time students in the 2064 figure, and part-time students are more likely to attend a college in their area (and therefore live at home). In 1963, the first year for which the part-time/full-time split is available, part-time students constituted about one-third of total college enrollment (source for Table 6). One may guess that these two elements reduce the overstatement of CU to approximately one percent.

The break in the treatment of college students also affects the SZ series in a predictable way. The pre-current surveys, 1935-36 to 1972-73, classify a set of single individuals (college students away from home) as members of family households, instead of as separate consumer units. Therefore the average size of the consumer unit (SZ) is overestimated (relative to the current survey), with decreasing magnitude as one goes back in time.

Turning to VCB, the series of greatest interest, the discontinuity in the treatment of college students living away from home again has a predictable directional effect. In overstating the size of the consumer unit (SZ), the pre-current surveys also increase average annual expenditures of consumer units (VCB). The magnitude of the effect is uncertain—the present author does not dare to attempt even an approximate calculation—but again the magnitude is smaller, the earlier the survey.

The BLS changed treatment of college students (from members of their parents' consumer unit to autonomous consumer units) is at variance with the observation that—given the increase in both the cost and perceived importance of higher education—the typical college student is, both economically and sociologically, more dependent on his/her family today than prior to the early 1970s. So it is arguable that the BLS, with its changed treatment of college students, has overstated the number of consumer units. The present author is indebted to Lee Craig for this perceptive comment.

This study accepts the definitions and methodology of the BLS current expenditure survey, and generates long-run series of CU, VCB, and SZ, that cover gaps in the BLS series and extend the BLS series back in time. A broader project would be open to modification of the BLS approach. It is interesting that the BLS consumer expenditure survey as such has not received critiques at anywhere near the breadth and intensity of outside criticisms of the BLS consumer price index. The present study carries the BLS CES to a logical outcome: construction of long-run historical series.

III. Benchmark Data

A. Number of Consumer Units (CU)

Sources and method-of-construction of benchmark data for the number of consumer units in the all-areas universe (CU) are presented in Table 7. All-areas CU exists for 1935-36, 1941, 1960-61, 1972-73, 1980, and 1984 to 2004 (part I of the table) and urban-areas CU for 1950 and 1981 to 1983 (part II.A). The 1950 and 1981-to-1983 CU is extended from urban-areas to all-areas coverage via interpolation of CU for adjacent survey-years. The general interpolation technique, which will be adopted in later sections as well, is as follows:

1. Construct the (desired-variable/available-variable) ratio for the adjacent years.
2. Linearly interpolate this ratio for the desired year.
3. Compute the product of the desired-year interpolated ratio and the desired-year available variable.

This procedure is described in the context of the desired 1950 and 1980-to-1983 CU, in part II.B of the table. The technique makes sense, because (1) the majority—even the vast majority of consumer units are urban (see Table 4, above), and (2) Given the demographic nature of the variable, there is no reason for a sudden large movement in CU to have occurred between adjacent years. Note that the changed treatment of college students away from home, with the current survey, has no effect on the interpolations.

The outcome is that benchmark years for CU are: 1935-36, 1941, 1950, 1960-61, 1972-1973, and 1980 to 2004. CU is expressed in thousands of consumer units.

Table 7 Benchmark Data: Number of Consumer Units in Universe		
Year(s)	Source	Computation
I. Original Geographic Coverage: All Areas		
1935-36	National Resources Committee (1939, p. 77)	_____
1941	Bureau of Labor Statistics (1945, pp. 33, 69)	_____
1960-61	Bureau of Labor Statistics (1966, pp. 2, 114)	_____
1972-73	Bureau of Labor Statistics (1978, p. 24)	_____
1980	BLS, unpublished[a]	_____
1984 to 2004	BLS website	_____
II. Original Geographic Coverage: Urban Areas A. Urban Coverage		
1941[b]	Bureau of Labor Statistics (1945, p. 33)	_____

	Table 7	
Benchmark Data: Number of Consumer Units in Universe		
Year(s)	Source	Computation
1950	Lamale (1959, p. 119)	_____
1960-61[b]	Bureau of Labor Statistics (1965, p. 2)	_____
1980[b], 1981 to 1983	BLS[c]	_____
1984[b]	BLS website	_____
B. Extension to All Areas		
		Compute ratio R1 = (all-areas/urban) "number of consumer units," for 1941, 1960, 1980, 1984. Linearly interpolate R1 for (1950; 1981 to 1983) from R1 for (1941, 1960; 1980, 1984).
1950, 1981 to 1983		product of R1 and urban "number of consumer units"

[a]Figure kindly furnished by John M. Rogers, of BLS.
[b]Required for interpolation, in section II.B. of table.
[c]Data kindly furnished by John M. Rogers, of BLS.
BLS = Bureau of Labor Statistics

B. Value of Consumer Bundle (VCB)

The value of the consumer bundle (VCB) is termed "average annual expenditures" in the current survey. Table 8 presents the sources and method-of-construction of the benchmark data for VCB. The current survey (1980 onward) has a total-expenditures concept of expenditures, whereas the earlier surveys (1935-36 to 1972-73) have a "current-consumption" concept. Total-expenditures is the more-inclusive concept, as it includes—whereas current-consumption excludes—"expenditures for gifts and contributions, and payments for pensions and personal insurance" (Bureau of Labor Statistics, 2005b, p. 7). Therefore these two items must be added to current expenditures, in order to obtain total expenditures, as shown in the third column of the table.

	Table 8	
Benchmark Data: Value of Consumer Bundle (Average Annual Expenditures)		
Year(s)	Source	Terminology and Computation
I. Original Geographic Coverage: All Areas		
1935-36	National Resources Committee (1939, pp. 80, 83-84)	"current consumption" + estimated "gifts"[a] + estimated "premium payments for life insurance and annuities"[b]

Table 8
Benchmark Data: Value of Consumer Bundle (Average Annual Expenditures)

Year(s)	Source	Terminology and Computation
1941	Bureau of Labor Statistics (1945, pp. 73, 88)	"money expenditures for current consumption" + "gifts and contributions" + "premium payments for life insurance and annuities"
1960-61	Bureau of Labor Statistics (1966, pp. 2, 12, 114, 124)	"expenditures for current consumption" + "personal insurance, total" + "gifts and contributions"
1972-73	Bureau of Labor Statistics (1978, pp. 26, 32)	"current consumption expenses, total" + "personal insurance, retirement, and pensions, total" + "gifts and contributions"
1980	BLS, unpublished[c]	"average annual expenditures"
1984 to 2004	BLS website	"
II. Original Geographic Coverage: Urban Areas A. Urban Coverage		
1941[d]	Bureau of Labor Statistics (1945, pp. 73, 88)	"money expenditures for current consumption" + "gifts and contributions" + "premium payments for life insurance and annuities"
1944	Brady (1946, p. 2)	For each income class, "expenditures for current consumption" + "gifts and contributions" + "life and annuity insurance premiums" = "average annual expenditures". Weighted average of "average annual expenditures", with weights percent of families in each class.
1950	Lamale (1959, p. 115)	"expenditures for current consumption" + "gifts and contributions" +"expenditures for current consumption" + "gifts and contributions" + "personal insurance"— "adjusted data"
1960-61[d]	Bureau of Labor Statistics (1965, p. 2)	"expenditures for current consumption" + "gifts and contributions" + "personal insurance"[e]
1980[d], 1981 to 1983	BLS[f]	"average annual expenditures"
1984[d]	BLS website	"
B. Extension to All Areas		
		Compute ratio R2 = (all-areas/urban) "average annual expenditures," for 1941, 1960, 1980, 1984. Linearly interpolate R2 for (1944 and 1950; 1981 to 1983) from R2 for (1941, 1960; 1980, 1984).
1944, 1950,		product of R2 and urban "average annual

Table 8		
Benchmark Data: Value of Consumer Bundle (Average Annual Expenditures)		
Year(s)	Source	Terminology and Computation
1981 to 1983		expenditures"

[a] "Gifts" estimated as ratio of product of (i) ratio ("total gifts"/"all personal taxes and gifts") for "families", and (ii) "all personal taxes and gifts" for "families and single individuals".
[b] "Premium payments for life insurance and annuities" estimated as product of (i) 1941 ratio ("premium payments for life insurance and annuities")/("current consumption") for "families and single consumers", and (ii) 1935-36 "current consumption" for "families and single individuals". Source of (i) is Bureau of Labor Statistics (1945, pp. 73, 88).
[c] Figure kindly furnished by John M. Rogers, of BLS.
[d] Required for interpolation, in section II.B. of table.
[e] $7 added to "expenditures for current consumption," to incorporate "other real estate." See Bureau of Labor Statistics (1966, pp. 2, 114, 157).
[f] Data kindly furnished by John M. Rogers, of BLS.
BLS = Bureau of Labor Statistics

There is also the issue of converting urban-areas data to the all-areas basis, the latter being a characteristics of the current survey. As section I of Table 8 shows, not only the current survey (1980-) but also the 1935-36, 1941, 1960-61, and 1972-73 surveys are on an all-areas basis—as also reflected in section I of Table 7. Five surveys (1944, 1950, and 1981 to 1983) provide VCB only for urban areas (section II.A of Table 8). Using the same interpolation-and-estimation technique as for CU, these surveys are converted to an all-areas basis (section II.B of Table 8). The technique is appropriate, for the same two reasons given for CU, in section A above.

Thus benchmark years for VCB are 1935-36, 1941, 1944, 1950, 1960-61, 1972-73, and 1980 to 2004. VCB is expressed in dollars.

C. Average Size of Consumer Unit (SZ)

Surveys serving as sources for benchmark data on SZ, average size of the consumer unit, are listed in Table 9. Consumer-unit size has always been computed as the number of year-equivalent persons, with a person in the consumer unit for x percent of the survey year counted as $x/100^{th}$ of a person. For example, a person in the consumer unit for 26 out of the 52 weeks would count as 0.5 person. This treatment is stated explicitly for all the pre-current surveys in the table—see Lamale (1959, pp. 221, 229) and Bureau of Labor Statistics (1965, p. 5; 1978, p. 127).

Table 9	
Benchmark Data: Average Size of Consumer Unit	
Geographic Coverage: All Areas	
Year(s)	Source

Year(s)	Source
1935-36	Jacobs and Shipp (1993, p. 76)[a]
1941	Bureau of Labor Statistics (1945, p. 70)
1960-61	Bureau of Labor Statistics (1966, pp. 2, 114)
1972-73	Bureau of Labor Statistics (1978, p. 24)
1980	BLS, unpublished[b]
1984-2004	BLS website

Table 9
Benchmark Data: Average Size of Consumer Unit
Geographic Coverage: All Areas

[a]Figure checked as follows. Let F = number of families, PF = number of persons in families, S = number of single individuals, FS = number of families and single individuals. Using data in National Resources Committee (1939, p. 77) and National Resources Planning Board (1941, p. 120), F and PF are each computed as sum of number in farm families, number in rural nonfarm families, and number in urban families. S obtained as FS minus F. Average size of consumer unit estimated as (PF + S)/FS. Result identical (to one decimal place) to Jacobs-Shipp figure.
[b]Figure kindly furnished by John M. Rogers, of BLS.
BLS = Bureau of Labor Statistics

It may be observed that Table 9 does not include the 1944 and 1950 urban surveys as sources of benchmark data. For average size of the consumer unit, the interpolation-and-estimation technique to convert urban-areas to all-areas data is deemed inferior to following obvious patterns of the all-areas benchmark data (see section VI).

IV. Completion of CU Series

A. Strategy

The strategy for completing the CU series (and indeed the VCB and SZ series, as well) is to generate a synthetic equivalent series and use it for interpolation and estimation of the desired series. Recall that CU is the number of consumer-units in the universe. While there are no direct data on CU outside consumer-expenditure studies, there do exist related series, in particular, the *number of households* and the *number of residents of noninstitutional group quarters*. The sum of these two series is used to approximate CU, in particular, to develop a synthetic CU series. Of course, this synthetic CU series would be only an approximation to "true" CU, for reasons both conceptual (see section II.B, above) and statistical (different data-collection and data-processing techniques). Because benchmark data for CU exist annually 1980-2004, the synthetic series need not go beyond 1980.

B. Potential Data sources for Synthetic CU Series

1. Decennial Census

Figures on the number of households published decennially by the Bureau of the Census are assembled by Ruggles and Brower (2003, p. 76) [reprinted in Carter, Gartner, Haines, Olmstead, Sutch, and Wright (2006, vol. 1, p. 654), contribution by Steven Ruggles]. For the purpose of the present study, the segment 1900, 1910,…, 1980 is pertinent. The series (meaning always the 1900-1980 component) contains several breaks and inconsistencies, which it is instructive to review. These breaks are associated with the various criteria used to delineate households.

a. first criterion: number of unrelated persons

There are various criteria used to delineate households. One criterion is based on the number of unrelated persons in a housing unit. Given a number of persons, some or all of whom are unrelated, living together in a housing unit, does this unit constitute a "household"? The criterion counts the number of persons unrelated to the householder (see section II.A.1). If this number is at or beyond a lower limit, then the unit *must* be classified as group quarters (for example, a boarding house, lodging house, or apartment hotel), and is therefore excluded from the count of households. In Table 10, this criterion is reversed, so that it states the maximum number of unrelated persons for the unit to be classified as a household.

Table 10 Maximum Number of Persons Unrelated to Householder For Census Classification as Household[a], 1900-1980	
Year	Number
1900	unspecified[b]
1910-1920	_____[c]
1930-1940	10
1950-1970	4
1980	9

[a]If number exceeded, dwelling unit classified as group quarters.
[b]See text.
[c]Entire group quarters counted as one household.
Source: Ruggles and Brower (2003, pp. 75; 96-97, n. 4); Carter, Gartner, Haines, Olmstead, Sutch, and Wright (2006, vol. 1, pp. 653-54, contribution of Steven Ruggles.

Examples of the application of the criterion are as follows. In 1930 and 1940, a householder could have from zero to ten lodgers—and the dwelling group would count as one household. If more than ten, the entity would be classified as group quarters rather than a household. In 1950 to 1970, up to five unrelated young professionals (one being classified as the householder) could live together in an apartment unit, with the group counted as one household. More than five, and the dwelling unit becomes group quarters.

Consider the entries in Table 10 individually. The 1900 census was ahead of its time, in distinguishing "private families" (what would later be termed "households") from other

types of families (what came to be known as group quarters and their components). Thus families classified "other than 'private'" (that is, as group quarters) are stated to incorporate, among other entities: hotels, boarding houses, and "miscellaneous groups of persons lodging together but having no family relationship" (Census Office, 1902, p. clviii). The quotation suggests that as few as two unrelated persons could be classified as group quarters—implying that "one" might be the entry for 1900 in Table 10, but applicable only to non-family (all-persons-unrelated) groups.

In contrast, the 1910 and 1920 censuses did not distinguish a group quarters from a household. Each adds to the count of households. As these censuses state:

> One person living alone is counted as a family [that is, a household], while on the other hand the occupants of a hotel or institution, however numerous, are also treated as forming a family.—Bureau of the Census (1913, p. 1285)

> One person living alone is counted as a family, and, on the other hand, all the occupants and employees or a hotel, boarding house, or lodging house, if that is their usual place of abode, and all the inmates of an institution, however numerous, are treated as constituting a single family. Thus the census family [that is, household or group quarters] may be either a private family [household] or an "economic family" [group quarters]. The economic family, of course, is likely to be much larger than the private family.—Bureau of the Census (1921, p. 1265)

Beginning with census-year 1930, there is a definite number of unrelated persons above which a group of persons does not constitute a household; but this number changes twice over the 1930-1980 period. In summary, there are four distinct breaks in the census number-of-households series, emanating from changing application of the unrelated-persons criterion alone.

b. second criterion: physical and functional characteristics

A second set of criteria is required to classify multiple-family dwellings either as "boarding houses or apartment hotels, and thus enumerated as a single unit [group quarters]" or "apartment buildings containing multiple separate households" (Ruggles and Brower, 2003, p. 78). These criteria were especially required in the 1910 and 1920 censuses (see criterion a and Table 10), but in effect apply to every year as a *second* test that a dwelling unit must past in order to constitute a separate household. These criteria are physical and/or functional in nature, and are listed in Table 11.

Table 11 Separate Households in Multi-Unit Dwellings Census Physical and Functional Criteria, 1900-1980		
Year	Criterion	Application of

	Physical	Functional	
1900	_____	separate eating table	"usually, though not always"
1910-1930	separate portion of dwelling	separate housekeeping	both together
1940	"	separate cooking *or* separate housekeeping facilities	"
1950	two or more rooms *and* direct access to common hallway	separate cooking facilities	either
1960	direct access to common hallway *or* cooking equipment	live and eat separately	both together
1970	direct access to common hallway *or* complete kitchen facilities	"	both together[a]
1980	direct access to common hallway	"	"

[a]Ruggles and Brower observe that "the rules were not strictly enforced."
Source: Ruggles and Brower (2003, pp. 79-80).

Ruggles and Brower (2003, p. 78) observe that the criteria in Table 11 appear "reasonably compatible" through 1940. In 1950 both the physical and functional criteria for a separate household were made more difficult to pass. On the other hand, the criteria were liberalized by requiring only one or the other to be fulfilled. Therefore the net effect on the household count is uncertain. However, the 1960 rules, with the institution of "direct access to a common hallway" as a criterion, constitute a definite liberalization, which carries over into 1970 and 1980. "The common hallway criterion meant that hundreds of thousands of single-room-occupancy units that had previously been regarded as hotels or boarding houses were reclassified in 1960 as independent households" (Ruggles and Brower, 2003, p. 80).

To repeat, the classification of individuals living in single rooms in single-room-occupancy housing or in apartment hotels changed drastically in 1960, as shown in Table 12. In 1900-1950, such individuals were not counted as separate households; in 1960-1980 they were so counted. While the discontinuity is sharp, the consequent increase in the number of households was only 0.62 of one percent of households in 1960, and an even lower percentage in 1970 and 1980 (Ruggles and Brower, 2003, pp. 80-81).

From 1900 to 1940, college students living in dormitories were considered as part of their parental-family household. From 1950 onward, such students were enumerated at their

college location (Ruggles and Brower, 2003, p. 82). This meant that the criteria in Table 11 now would apply to such college students away from home. As a result, the number of households in 1950 would be larger than otherwise, and the number of households in 1960 larger still. The computations of Ruggles and Brower (2003, pp. 80-81) capture only the latter change, that from 1950 to 1960.

Table 12		
Census Classification of Single-Room Occupants of Multi-Unit Dwellings		
Year	Single-Room Occupant	
	Classification	Reason for Classification
1900	not a separate household	census instructions
1910-1920	”	”
1930-1940	”	”
1950	”	lacks two or more rooms
1960-1980	separate household	direct access to common hallway

Source: Ruggles and Brower (2003, pp. 80-81); Carter, Gartner, Haines, Olmstead, Sutch, and Wright (2006, vol. 1, pp. 654-55), contribution of Steven Ruggles.

c. third criterion: mailing address

Over time, from 1900 to 1960, with improvement in training and supervision of census enumerators, it is likely that census instructions were more closely followed. However, in 1970 and 1980, the use of mail-in forms rather than enumerator home visits suggests a deterioration in the reliability of responses (Ruggles and Brower, 2003, p. 94). What this changing reliability of responses means for the household count is unknown. However, the directional effect of the switch to mail-in forms as such on the household count is clear: the number of units classified as households increased. "The censuses of 1970 and 1980 include many households that do not meet the formal requirements of classification as a separate household. In practice, we suspect that separate mailing addresses have often led to designation of separate households, even where the units do not qualify as independent households under the formal definition" (Ruggles and Brower, 2003, p. 94).

Just as for the BLS treatment of college students (see section II.B.2 above), the Bureau of the Census changing criteria for delineation of separate households warrant critical examination. Again, the task is left for future study. In the interim, and fortunately, Ruggles and Brower have developed series with enhanced consistency over time.

2. Ruggles and Brower

Ruggles and Brower (2003, p. 66) [reprinted in Carter, Gartner, Haines, Olmstead, Sutch, and Wright (2006, vol. 1, p. 654), contribution of Steven Ruggles] provide two series, consistent with one another: number of households, and number of noninstitutional-group-quarters residents. As is the (unfortunately, unstated) practice of Ruggles and Brower, the adjective "noninstitutional" will be dropped here, except when there could be

an ambiguity as to the coverage of "group quarters." So "group quarters," standing alone, means "noninstitutional group quarters."

Actually, Ruggles and Brower generate two, alternative, sets of (number of households, number of group-quarters residents) series: one based on the 1950-1970 criterion for households shown in Table 10, the other based on the 1980 criterion. In generating these and related series, they make use of the Integrated Public Use Microdata Series (IPUMS) database. The series based on the 1950-1970 criterion are selected here, because the series exist for all census years: 1900, 1910,…, 1980. (Actually, figures for 1930 are not available, but, by interpolating the group-quarters-residents series and using other information, Ruggles and Brower complete the number-of-households series. Strangely, although they present the resulting number-of-households figure, they do not exhibit the interpolated group-quarters-residents figure. It is reasonable to assume that they employed straightforward linear interpolation, so the latter figure is readily obtained.)

The series based on the 1980 criterion lack data for 1950, 1960, 1970 (as well as 1930), for both series, and also 1940 for group-quarters residents. Therefore the series based on the 1950-1970 criterion are adopted not only here (as the fundamental source data for the synthetic CU series), but also by Ruggles and Brower for their further series development and analysis [Ruggles and Brower (2003); Carter, Gartner, Haines, Olmstead, Sutch, and Wright (2006, vol. 1, pp. 653-670), contributions of Brower, Ruggles, and Sutch].

To what extent is the Ruggles-Brower number-of-households series devoid of the inconsistencies associated with the census series? The first criterion—maximum number of persons unrelated to the head, for classification as a household—no longer gives rise to an inconsistency over time, because the 1950-1970 entry in Table 10 is applied to all years (1900, 1910,…, 1980). The second criterion—physical and functional characteristics--varies over censuses, as does the first criterion. Unlike the first criterion, the second criterion is not directly addressed in the Ruggles-Brower series. However, in making the first criterion uniform over time, Ruggles and Brower indirectly reduce the inconsistencies associated with Table 11; for they "apply the 1950-1970 group-quarters definition to any census year by simply classifying any unit with five or more persons unrelated to the head as group quarters" (Ruggles and Brower, 2003, p. 96).

Further, for the purpose of the present study, it is only the *sum* of the number of households and the number of group-quarters residents that is relevant, not the individual figures. The Ruggles-Brower series of number of households and number of group-quarters residents are consistent with respect to each other. Therefore a discontinuity that alters both series symmetrically, though in the opposite direction, does not affect the *sum* series. In particular, the changing classification of individuals living in single rooms in multi-unit dwellings in 1960 is irrelevant to the sum series. For the sum series, it does not matter whether a single person is counted as a household or as a group-quarters resident—as long as that person is counted in one or the other series, which Ruggles and Brower take care to do.

On the other hand, the Ruggles-Brower series do not correct the inconsistency due to the changed treatment of college students in 1950. However, they argue that "the consequences [of the change in the treatment of college students] for the population as a whole were small, because the number of students was still small in 1950" (Ruggles and Brower, 2003, p. 83). Stated differently: "Because the college population was small in 1940, the overall effects of the change are modest [Carter, Gartner, Haines, Olmstead, Sutch, and Wright (2006, vol. 1, p. 655), contribution of Steven Ruggles].

Therefore, the Brower-Ruggles series—number of households and number of group-quarters residents—based on the 1950-1970 criterion, are selected here as the fundamental data for construction of the synthetic CU series. A limitation of these series is that they exist only for census years: 1900, 1910,…, 1980.

3. Current Population Survey and Bureau of Census

Fortunately, there does exist an annual series of the number of households (though not of the number of group-quarters residents), from 1900 onward. This series, based on the Current Population Survey and also a special estimation by the Bureau of the Census, is assembled by Susan Brower, Steven Ruggles, and Richard Sutch [in Carter, Gartner, Haines, Olmstead, Sutch, and Wright (2006, vol. 1. pp. 662-63, 667)]. Only the 1900-1980 segment of the series is relevant for the present study. This series is less consistent than the Ruggles-Brower series for number of households, in section 2. One reason is the absence of correction of a shift in the number-of-related-persons definition of a household. From 1947 to 1950, a housing unit with a maximum of ten persons unrelated to the head was classified as a household. In 1951-1980, the maximum was four persons.

The 1900-1946 segment of the series was estimated by the Census Bureau using a demographic technique. Therefore the number-of-related-persons criterion is irrelevant for that time period. Because boarding and lodging became less important after the 1940 census year (Ruggles and Brower, 2003, p. 77), the inconsistency emanating from the changed criterion in 1951 is of reduced importance. On the other hand, the series may be subject to significant statistical error, according to Brower, Ruggles, and Sutch [in Carter, Gartner, Haines, Olmstead, Sutch, and Wright (2006, vol. 1, p. 667)].

On balance, it is reasonable to use this series judiciously to interpolate the Ruggles-Brower number-of-households series.

C. Construction of Synthetic CU Series

To summarize the outcome of section B, the following three series, with their sources and available years, are used to construct the synthetic CU series:

H = number of households, 1950-1970 criterion, thousands

GQ = number of group-quarters residents (population of noninstitutional group quarters), 1950-1970 criterion, thousands of persons
Source: Ruggles and Brower (2003, p. 76); reprinted in Carter, Gartner, Haines, Olmstead, Sutch, and Wright (2006, vol. 1, p. 654), contribution of Steven Ruggles.
Available years: 1900, 1910, .., 1980
For 1930, GQ figure obtained via interpolation, H figure via subsequent estimation (see section B.2 above).

HI = number of households, Current Population Survey series conjoined with Bureau of Census series [I for "interpolative series"], thousands
Available years: 1900-1980
Source: Carter, Gartner, Haines, Olmstead, Sutch, and Wright (2006, vol. 1; p. 667 for 1900-1946, p. 662 for 1947-1980), contribution of Brower, Ruggles, and Sutch.

The synthetic series, desired annually 1900-1980, is:

SCU = synthetic CU series, thousands of "consumer units"

The plan is to compute SCU = H + GQ. However, H and GQ exist only for decennial years (1900, 1910,…, 1980). Therefore SCU is obtained via the following steps:

Step 1: For the decennial years, construct SCU = H + GQ.

Step 2: For the decennial years, also compute the ratio R3 = H/HI.

Step 3: Linearly interpolate R3 between adjacent decennial years—(1900, 1910), (1910, 1920),… (1970-1980)—thus obtaining R3 annually for 1900-1980.

Step 4: Estimate H for the intervening years—1901-1909, 1911-1920,…, 1971-1979—as H = R3 · HI (the product of R3 and HI). Clearly, this estimation technique is superior to pure interpolation, because use is made of the HI series. H now exists annually 1900-1980.

The fact that HI exists only from the year 1900 is a reason why the series of this study (CU, VCB, SZ) are generated only from that year.

Step 5: Linearly interpolate GQ for the intervening years. Unlike for H, no annual series exists for a superior interpolation. However, it is less important to have a sophisticated interpolation of GQ than of H; because GQ is by far the smaller component of SCU, ranging from 4 to 15 percent of SCU and (except that the maximum is for 1910 rather than 1900) decreasing as one goes forward in time. GQ now exists annually 1900-1980.

Step 6: For all non-decennial years in 1900-1980, construct SCU = H + GQ.

Therefore SCU now is constructed annually for 1900-1980.

D. Use of SCU Series to Complete CU Series

Recall that the series to be completed is:

CU = number of consumer units, thousands

The steps to complete the CU series are as follows:

Step 1: Benchmark data for CU exist for 1935, 1936, 1941, 1950, 1960, 1961, 1972, 1973, and 1980 (see section III.A). (Of course, the 1935 and 1936 figures are identical, as are the 1960 and 1961 figures, and the 1972 and 1973 figures—for the pertinent consumer-expenditure surveys encompassed the respective yearly pairs.)

Step 2: For the benchmark years, compute the ratio R4 = CU/SCU.

Step 3: Linearly interpolate R4 for intervening years; thus 1937-1940 from (1936, 1941), 1942-1949 from (1941, 1950),…, 1974-1979 from (1973, 1980).

Step 4: For the intervening years (1937-1940, 1942-1949,…, 1974-1979), construct CU = R4 · SCU. CU now exists annually for 1935-2004.

The rationale for this estimation technique—as distinct from pure interpolation of intervening values of CU—is the same as that for estimating intervening values of H via the identical procedure.

Step 5: There exists no pre-1935 estimate of CU comparable to the BLS CES. So one must have resort to "ratio-linking" of 1900-1935 SCU to 1935-2004 CU via the overlap for the year 1935. Let $R4_{1935}$ denote the value of R4 for 1935; $R4_{1935} = 1.14$. Then CU for 1900-1934 is constructed as CU = $R4_{1935}$ · SCU.

How reliable is step 5? $R4_{1936}$ is 1.12, close to $R4_{1935}$; but then CU is identical for the two years. R4 is only 1.02 in 1941 and 1.01 in 1950. The ratio increases as one proceeds into the past. So the 1935 ratio might increasingly underestimate the true ratio, as one proceeds from 1934 to 1900. On the other hand, R4 in the order of 1.14 might be applicable to the full period 1900-1934. There is no way of knowing, one way or the other.

The CU series is now complete, annually 1900-2004.

V. Completion of VCB Series

A. Strategy

Just as for the CU series, completion of the VCB series involves generating a synthetic VCB series and using it for interpolating and estimating missing values. The synthetic VCB series, however, is constructed fundamentally differently from the "true" VCB

figures. The latter, the benchmark data for VCB, emanate from consumer-expenditure studies and are essentially weighted sample averages of individual-consumer-unit expenditures. Synthetic VCB, in contrast, is obtained as the ratio of aggregate expenditures of all consumer units to the number of consumer units. The denominator of this ratio is straightforward, of course; it is the completed CU series. It is the numerator that requires attention at this point.

As benchmark data for VCB (just as for CU) exist from 1980 onward, only the period up to 1980 is pertinent here.

B. Personal Consumption Expenditures as Numerator of Synthetic VCB

1. Aggregate-expenditures series

The obvious candidate for aggregate expenditures of consumer units is the "personal consumption expenditures" (PCE) series in the national accounts, generated by the Bureau of Economic Analysis (BEA). The PCE series will be used for construction of synthetic VCB, and the pertinent segment of the PCE series is described as follows.

PCE = personal consumption expenditures, BEA, million of dollars
Source: BEA website, Tables 1.1.5 or 2.4.5.
Available years: 1929 onward

The issue to be explored is the extent to which PCE is a good representation of aggregate expenditures of consumer units (CU · VCB). Recall that CU and VCB, in principle for the entire series and in actuality for the benchmark figures, emanate from the consumer-expenditure survey (CES) of the Bureau of Labor Statistics (BLS).

2. Comparisons of the series

Comparisons of PCE and (CU · VCB) logically fall into three categories: (a) consumption concept, (b) entity universe, and (c) method of data collection. Useful for the comparisons are the BLS publications listed in Tables 1-2, and also Department of Labor (1959, pp. 228-31), Lamale (1959, pp. 121, n. 1; 155-72), Branch (1994), Bureau of Labor Statistics (1997 updated, 2005a, 2005b), Triplett (1997, pp. 12-16), McCully, Parker, and Tice (1990, pp. 1-13), Schultze and Mackie (2002, pp. 253-56), and Mead, McCully, and Reinsdorf (2003).

a. consumption concept

In some respects, the PCE and CES figures of consumption are compatible. For example: both include sales and excise taxes; both exclude purchases of homes; and both exclude business items. Also, there are some expenditures that both BEA and BLS estimate via imputed purchases: food, clothing, and housing paid in kind. However, there are also many conceptual inconsistencies between PCE and CES. These inconsistencies

fall into two groups. Some inconsistencies are either of small importance or of magnitude difficult to gauge. Others are of definite importance.

i. inconsistencies of small or uncertain importance

One group of PCE-CES differences involves inconsistencies either of small importance or the magnitude of which is difficult to gauge. Some inconsistencies in this category are listed as follows.

1. PCE includes consumption expenditures of nonprofit institutions. The reason is that the personal sector of the national-income accounts consists of not only "individuals" ("households," in BEA terminology) but also "the nonprofit institutions serving them" (McCully, Parker, and Tice, 1990, p. 1). To repeat: "In the national income and product accounts…the personal sector comprises households and nonprofit institutions serving households" (Mead, McCully, and Reinsdorf, 2003, p. 13). Therefore the following identity holds:

Personal Consumption Expenditures = Household Consumption Expenditures + Final Consumption Expenditures of Nonprofit Institutions

The CES, and therefore the VCB series, incorporates expenditures only of "consumer units" (corresponding to "households" in the above identity). Therefore, ideally, the BEA series for aggregate expenditures in synthetic VCB should be not PCE but rather "household consumption expenditures" (HCE). Unfortunately, to date, the breakdown of PCE into its two components is available only from 1992 onward (in Table 2.9 of the BEA website). Fortunately, for the years available (1992-2004), the ratio HCE/PCE is not only high but also stable, ranging from .9779 to .9807. It follows that PCE is a good proxy for HCE.

2. Certain payments to government are excluded from PCE, though included in VCB. Examples are "consumer payments for medical care to county hospitals and for tuition [but not room and board] to State universities" (McCully, Parker, and Tice, 1990, p. 5).

3. VCB values expenditures on vehicles as net of any trade-in allowance, whereas PCE records the gross purchase price.

4. VCB expenditures include finance charges associated with purchases, whereas PCE excludes such charges.

5. PCE includes imputed payments for services of financial intermediaries that are not charged explicitly, such as brokerage fees and investment advice, but rather are implicit in buy-sell spreads or lower interest or dividend returns. VCB does not account for such implicit payments.

6. The cost of employer-paid life-insurance and health-insurance is included in PCE (via imputation), but excluded from VCB.

7. VCB records the (employee-paid) premiums of life insurance and private pension plans, whereas PCE imputes fees for service provided.

8. PCE records health and casualty insurance premiums net of benefits paid, whereas VCB takes the gross premiums. This is the opposite treatment of trade-in allowances (point 3).

9. A purchase that one consumer unit makes from another is part of VCB, whereas such transactions net out in PCE. The quantitative importance of this element is surely small.

ii. inconsistencies of definite importance

1. VCB records actual expenditures (taxes, insurance, mortgage interest, repairs, and replacement) for the upkeep of owner-occupied housing. PCE, instead, imputes a rental value to the housing. This is a fundamental conceptual difference. It moves one author to conclude: "Thus the basic definition of housing expenditures in the two sets of data is so different that it provides no basis for the comparison of the aggregate [housing-expenditures] estimates" (Lamale, 1959, p. 121, n. 1). Interestingly, the 1935-36 CES (and only that survey) did use the imputation approach. Home-ownership, of course, was much less in 1935-36 than it became subsequently.

2. PCE incorporates all expenditures for health care—whether these expenditures are made by government, business (employers), or consumers themselves. In contrast, VCB includes only the expenditures made by consumers. As Lee A. Craig observes, "for…medical expenditures, the difference [between household-expenditure data and aggregate consumer-expenditure data] is enormous" [Carter, Gartner, Haines, Olmstead, Sutch, and Wright (2006, vol. 3, p. 228)].

b. entity universe

The CES consumer universe, that underlies VCB, is discussed in sections II.A.3 and II.B.2 above. Essentially, this universe consists of the civilian household and noninstitutional-group-quarters population plus off-post military personnel, all physically resident in the United States. The entity universe underlying PCE is much broader. It includes the entire personal sector, which incorporates not only the CES universe but also (i) institutional-group-quarters residents, (ii) military personnel on-post domestically (iii) military personnel stationed abroad, and (iv) U.S.-government personnel abroad.

The difference in entity universe could have measurable quantitative impact. Fortunately, this is the one VCB-PCE difference for which a correction is made in the synthetic VCB series (see section E, below).

c. method of data collection

Consumer-expenditure surveys, such as those of the BLS, obtain information from the consumers themselves. Thus the entity that does the expenditures (the consumer) is the direct source of information. One would expect reliability of data to be thereby enhanced. However, on the downside, there is a human tendency to underreport expenditures, whether deliberately or for lack of memory.

PCE is derived primarily from entities other than the consumer. For many components of PCE, non-consumer (that is, government and business) purchases are subtracted from domestic supply. Thus consumer expenditures are obtained indirectly—in fact, as residuals. This method has the advantage of reliance on hard data rather than memory or cooperative inclination of human beings (consumers), but the disadvantage of sampling error at multiple stages.

There is disagreement as to which approach to data collection leads to the more-reliable data. Some observers see the CES as superior:

"Thus the BLS surveys permit greater assurance of consistency for estimates of urban family expenditures than does the Commerce [BEA] series, which was designed for another purpose and for which data from a variety of sources must be combined."—Department of Labor (1959, p. 229)

"Normally, one expects that a direct measure of an economic variable is more accurate than an indirect and roundabout estimation procedure."—Triplett (1997, p. 6)

However, Schultze and Mackie (2002, p. 255), discussing the matter in the context of expenditure weights for PCE and the consumer price index, and based on empirical comparisons, conclude:

"It seems implausible that estimates of business purchases of consumer goods could be off by enough to generate the kind of ratios between NIPA [national income and product accounts] and CEX [consumer-expenditure] weights that are now produced."

d. direction and quantitative importance of inconsistencies

Most inconsistencies in sections a, b, c involve a known directional implication for the effect on the relative values of PCE and (CU · VCB). In section a.i, points 1, 3, 5, and 6 yield PCE higher in value than (CU · VCB); while points 2, 4, 8, and 9 produce the reverse relationship. In section a.ii, point 2 involves a substantially higher PCE compared to (CU · VCB). The inconsistency in section b definitely yields higher PCE than (CU · VCB); that in section c indicates a tendency for PCE to be higher.

On balance, one would expect that PCE is the aggregate of higher value. Various empirical studies, mostly concerned with expenditure components rather than the aggregate, confirm that this expectation is fulfilled in most cases. [See Department of Labor (1959, pp. 226-30), Lamale (1959, pp. 113-27), Branch (1994), Triplett (1997, pp. 16-22), and Schultze and Mackie (2002, pp. 253-56).] This result does not mean that PCE

is to be avoided as a proxy for (CU · VCB), in constructing synthetic VCB. The reason is that the resulting synthetic VCB is to be used only for interpolation and estimation. If synthetic VCB differs from VCB up to a constant for a given interpolation or estimation period (which constant can change between interpolation or estimation periods), or if the ratio of PCE to "true" (CU · VCB), even though varying, remains close to unity, then it is appropriate to utilize synthetic VCB—and, with it, its PCE component—for the purpose at hand.

C. Extension of PCE Series to 1900

PCE for 1929 onward is the official, BEA, series. It is carried back to 1900 via a consumption-expenditures series constructed by Stanley Lebergott for comparability to the official series. The Lebergott series is:

PCEL = personal consumption expenditures, Lebergott series, millions of dollars
Source: Lebergott (1996, p. 148); reprinted in Carter, Gartner, Haines, Olmstead, Sutch, and Wright (2006, vol. 3, p. 230).
Available years: 1900-1929

So PCE is extended back to 1900, via ratio-linking to the Lebergott series on the basis of the year-1929 overlap: $PCE = (PCE_{1929}/PCEL_{1929}) \cdot PCEL$, this computation performed for 1900-1928. The ratio $(PCE_{1929}/PCEL_{1929})$ is 0.9991. Originally, prior to revision of the BEA PCE series, the ratio was unity; for Lebergott denominated his series for that to occur.

The Lebergott series begins in 1900—and it is the only pre-1929 series of PCE that is constructed to be in accord with the official aggregate series. That is a second reason why the three series (VCB, CU, SZ) constructed in this study begin with 1900. (For the first reason, see section IV.C).

D. Estimated Population in Consumer-Unit Universe

To adjust PCE for the entity universe, so that it involves only the number of persons in consumer units, one requires a series of the population in households and in noninstitutional group quarters—to represent the population in the consumer-unit universe. A series (GQ) of the population of noninstitutional group quarters was derived annually for 1900-1980 in section IV.C. For the population in households, the best available series is that of Brower and Ruggles. This series is based on the 1950-1970 criterion of households and is therefore consistent with the H and GQ series (see sections IV.B and IV.C). The limitation of the series is its availability. The series is summarized as follows.

PH = population in households, 1950-1970 criterion, thousands of persons
Source: Carter, Gartner, Haines, Olmstead, Sutch, and Wright (2006, vol. 1, p. 668), contribution of Susan Brower and Steven Ruggles.
Available years: 1900, 1910, 1920, 1940, 1950, 1960, 1970, 1980

Define the desired series, PHGQ:

PHGQ = population in households and noninstitutional group quarters, thousands of persons

This series is computed as PHGQ = PH + GQ, for the years 1900, 1910, 1920, 1940, 1950, 1960, 1970, 1980. To estimate the intervening years, the "civilian resident population," a series available annually, is utilized:

PCR = civilian resident population, thousands of persons
Source: 1900-1929, 1960-1980—Carter, Gartner, Haines, Olmstead, Sutch, and Wright (2006, vol. 1, pp. 28-29), contribution of Michael R. Haines and Richard Sutch. 1930-1959—Riley and Williamson (2006).
Available years: 1900-1980

For 1930-1959, the Riley-Williamson series is preferred, for two reasons. First, Riley and Williamson exclude Alaska and Hawaii from their series until 1960, whereas Haines and Sutch include the population of these territories in 1950-1959. Alaska and Hawaii were admitted as the 49th and 50th states only in 1959; so the Haines-Sutch treatment makes their series inconsistent with other U.S. data for 1950-1959. Second, for the period 1930-1959, the Riley-Williamson series has no incorrect figures, whereas the Haines-Sutch figure for 1931 is incorrect.

It should be mentioned that the civilian resident population coincides with the total resident population 1900-1916 and 1920-1929, a reflection of the original (Bureau of the Census) data: the military resident population no doubt was sufficiently small to exclude a separate count during these years.

Ideally, off-post military personnel should be added to PCR, as these personnel are included in CU and, presumably, PHGQ. However, the omission is of small quantitative importance.

The ratio R5 = PHGQ/PCR is computed for 1900, 1910, 1920, 1940, 1950, 1960, 1970, 1980. As one might expect, the ratio R5 is close to, but always less than, unity. (If the ratio were above unity, that would be an indication of noncomparable data.) The minimum value of R5 is 0.96 (in 1900). The ratio then climbs, reaching 0.99 in 1940, and subsequently it never falls below that value.

R5 is estimated for intervening years by linearly interpolation between adjacent values; that is, 1900-1909 via (1900, 1910), 1911-1919 via (1910, 1920), 1921-1939 via (1920, 1940), and so on. PHGQ is then estimated for 1900-1909, 1911-1919, 1921-1939, etc., as: PHGQ = R5 · PCR.

E. Adjustment of PCE for Consumer-Unit Universe

The variable PHGQ represents the population in the consumer-unit universe. To complete information for the entity-universe adjustment of PCE, one needs a series to represent the PCE entity universe, the entire personal sector (people-component only, excluding nonprofit institutions) as it stands. The appropriate series involves the most-encompassing population concept:

POP = total population, including armed forces overseas, thousands of persons
Source: 1900-1949, 1960-1980—Carter, Gartner, Haines, Olmstead, Sutch, and Wright (2006, vol. 1, pp. 28-29), contribution of Michael R. Haines and Richard Sutch.
1930-1959—Riley and Williamson (2006).
Available years: 1900-1980

Again, the Riley-Williamson series is selected for 1950-1959, because of the exclusion of Alaska and Hawaii.

Now, it is a simple matter to adjust PCE so that it embodies only the consumer-unit universe rather than the entire personal sector. Denoting adjusted PCE as PCEA,

PCEA = personal consumption expenditures adjusted for consumer-unit universe, millions of dollars

PCEA is constructed, for 1900-1980, as:

$$PCEA = (PHGQ/POP) \cdot PCE$$

The underlying assumption is that per-capita consumption is the same for components of POP excluded from PHGQ—principally residents of institutional group-quarters and military personnel overseas—as it is for components of POP incorporated in PHGQ.

(PHGQ/POP) is both a high and stable ratio. Considering years of noninterpolated values of PHGQ, the ratio is 0.96 in 1900, 0.98 in 1910 and 1920, 0.99 in 1940, and 0.98 in 1950, 1960, 1970, and 1980. Therefore the computation of PCEA makes sense.

F. Construction of Synthetic VCB

The synthetic VCB series, SVCB is defined as:

SVCB = synthetic value of the consumer bundle, dollars per consumer unit

and constructed, for 1900-1980, as:

SVCB = PCEA/(CU/1000)

The factor 1000 is needed to account for the differing measurement of PCEA (millions of dollars) and CU (thousands of consumer units).

G. Estimate of VCB

Finally, the series VCB—heretofore with values only for benchmark years (1935-36, 1941, 1944, 1950, 1960-61, 1972-73, 1980-2004)—can be estimated for the remaining years over 1900-1980. For the benchmark years, compute the ratio of "true VCB" to "synthetic VCB":

R6 = VCB/SVCB

The ratio for intervening years is interpolated in the usual way. Thus R6 for 1937-1940 is interpolated from R6 for (1936, 1941), 1942-1943 from (1941, 1944),…, 1974-1979 from (1973, 1980).

Then VCB for the intervening years—1937-1940, 1942-1943,…, 1974-1979—is estimated as:

$VCB = R6 \cdot SVCB$

With no benchmark values of VCB prior to 1935, one must resort to ratio-linking SVCB to VCB via the 1935 overlap of the series, just as done for CU. So, for 1900-1934, VCB is estimated as follows:

$VCB = R6_{1935} \cdot SVCB$

Interestingly, the VCB/SVCB ratio for 1935 ($R6_{1935}$), at 1.0007, is just about unity. This result is suggestive that SVCB may be a good representation of VCB for 1900-1934. On the other hand, the ratio is (0.90, 0.92, 0.91) in (1936, 1941, 1944). So, as is the nature of the beast, one cannot be certain of the reliability of estimation via ratio-linking, in the absence of benchmark values on each side of the desired values.

VI. Completion of SZ Series

Recall that SZ, the average size of the consumer unit, has benchmark values for 1935-36, 1941, 1960-61, 1972-73, 1980, and 1984-2004. It should be noted that SZ is the average size of all consumer units, including single-individual units. Therefore SZ is *not* to be interpreted as the average size of a family or family household. Indeed, the value of SZ is always less than the average size of family consumer units.

Figures for intervening years are obtained as follows. SZ is 3.2 both in 1935-36 and in 1960-61, which indicates an unchanged value of 3.2 in the intervening years. However, the figure is 3.3 (3.27, to two decimal places) in 1941; yet it falls to 3.2 (3.22, to two decimal places) in the first quarter of 1942. This pattern suggests that 1941 was a, temporary, prewar peak. It is logical to keep SZ at 3.2 for 1942-1961; but, for the 1937-1940 values, to interpolate linearly between the 1936 (3.2) and 1941 (3.3) figures. It is reasonable to assume a steady decline thereafter, as benchmark figures keep falling: 3.2 (1960-61), 2.9 (1972-73), 2.7 (1980), 2.6 (1984-1991), 2.5 (1992-2004). So one linearly

interpolates 1962-1971 via (1961, 1972), 1974-1979 via (1973, 1980), and 1981-1983 via (1980, 1984). Thus one has SZ annually 1935-2004.

For 1900-1934, benchmark data are lacking. So one resorts to ratio-linking; but a "synthetic SZ" (SSZ) series must then be constructed for 1900-1935. In fact, it is readily constructed for all years, 1900-1980. The construction formula is:

SSZ = PHGQ/CU

SSZ is a most-logical proxy for SZ, the average size of the consumer unit; as the numerator is the estimated number of persons in consumer units and the denominator is the estimated number of consumer units.

Then compute the ratio of actual to synthetic size: R7 = SZ/SSZ. To complete the SZ series, one uses the 1935 value of R7 as the linking factor. Thus, for 1900-1934, SZ is estimated as:

$SZ = R7_{1935} \cdot SSZ$

It happens that the ratio R7 is 1.0055 in 1935, 0.9989 in 1936, 0.9947 in 1941, 0.9983 in 1960, and 0.9817 in 1961. In this case, the reasonable stability of the ratio for about 25 years is suggestive that ratio-linking to extend the series to 1900 is a reliable procedure.

VII. Behavior and Quality of Series

Having generated VCB (value of the consumer bundle), CU (number of consumer units), and SZ (average size of the consumer unit) for 1900-2004, some reflections on the behavior and the quality of the series are in order. Consider first the movements of the series. The more-or-less steady increase, or trend increase, in VCB over more than a century reflects both (i) growth in the standard of living and (ii) inflation. Interruption of the increase in the 1930s reflects the Great Depression, of course.

The increase in CU (number of consumer units) over the long time period is a consequence of several factors: growth in total population, increase in household count, and change in living patterns (number of consumer units within a household, such as groups of young professionals financially independent but living together), and a change in a criterion for a consumer unit (college students living away from home counted as separate consumer units, beginning in 1980).

The gradual decline in SZ (average size of the consumer unit) occurs because of (i) increase in single-individual consumer units and (ii) decline in the average number of children in a family consumer unit, as is mentioned by Jacobs and Shipp (1993, p. 73). The decline in SZ makes the trend increase in VCB less than otherwise. In other words, fewer people in the (average) consumer unit reduce "average annual expenditures" (VCB), other things being equal.

Turning to quality, the judgment of this author is as follows. The three series, considered together, fall into ten groups, in descending order of quality:

1. 1984-
2. 1972-1973
3. 1941, 1960-1961
4. 1980
5. 1935-1936
6. 1981-1983
7. 1950
8. 1944
9. 1974-1979
10. 1937-1940, 1945-1949, 1942-1943, 1951-1959, 1962-1971
11.1901-1934

Obviously, the current survey, but from 1984 onward, constitutes the "gold standard," to which all other figures of the series adjust—that is how this study was conducted. In general, it is only logical that the benchmark years yield the highest quality, then intervening years between benchmark years, and then the pre-1935 period. The only exception is the 1981-1983 years of interpolated values, judged superior to the benchmark years for which the original data were for urban areas only. Placing cardinal numbers on each group, or on the difference between two groups, would be enlightening, but requires information that is not available.

References

Brady, Dorothy S. (1946). "Expenditures and Savings of City Families in 1944." *Monthly Labor Review* 62 (January), pp. 1-5.

Branch, E. Raphael (1994). "The Consumer Expenditure Survey: A Comparative Analysis." *Monthly Labor Review* 117 (December), pp. 47-55.

Brown, Clair (1994). *American Standards of Living, 1918-1988*. Oxford: Blackwell.

Bureau of Labor Statistics (1919). "Cost of Living in the United States." *Monthly Labor Review* 9 (August), pp. 117-119.

_____ (1924). *Cost of Living in the United States*. Bulletin No. 357 (May), Bureau of Labor Statistics. Washington, DC: U.S. Government Printing Office.

_____ (1945). *Family Spending and Saving in Wartime*. Bulletin No. 822, Bureau of Labor Statistics. Washington, DC: U.S. Government Printing Office.

_____ (1965). *Consumer Expenditures and Income: Total United States, Urban and Rural, 1960-61*. BLS Report No. 237-93 (February).

_____ (1966). *Consumer Expenditures and Income, Detail of Expenditures and Income: Total United States, Urban and Rural, 1960-61*. Supplement 3-Part A to BLS Report No. 237-93 (May).

_____ (1978). *Consumer Expenditure Survey: Integrated Diary and Interview Survey Data, 1972-73*. Bulletin 1992, Bureau of Labor Statistics. Washington, DC: U.S. Government Printing Office.

_____ (1997 updated). BLS *Handbook of Methods* (April). Bureau of Labor Statistics website.

_____ (2005a). *Consumer Expenditure Survey Anthology, 2005*. Bureau of Labor Statistics website.

_____ (2005b). *Consumer Expenditures in 2003*. Bureau of Labor Statistics website.

Bureau of the Census (1913). *Thirteenth Census of the United States, Taken in the Year 1910. Vol. 1: Population, 1910: General Report and Analysis*. Washington, DC: Government Printing Office.

_____ (1921). *Fourteenth Census of the United States, Taken in the Year 1920. Population, 1920: Number and Distribution of Inhabitants*. Washington: Government Printing Office.

_____ (1975). *Historical Statistics of the United States, Colonial Times to 1970, Bicentennial Edition, Part 2*. Washington, DC: U.S. Government Printing Office.

Carter, Susan B.; Gartner, Scott Sigmund; Haines, Michael R.; Olmstead, Alan L.; Sutch, Richard; and Wright, Gavin, eds. (2006). *Historical Statistics of the United States, Earliest Times to the Present: Millenial Edition*, five vols. Cambridge: Cambridge University Press.

Census Office (1892). *Report on Mineral Industries in the United States at the Eleventh Census: 1890*. Washington, DC: Government Printing Office.

_____ (1895). *Report on Manufacturing Industries in the United States at the Eleventh Census: 1890*. Part III, Selected Industries. Washington, DC: Government Printing Office.

_____ (1902). *Twelfth Census of the United States, Taken in the Year 1900. Population, Part II*. Washington, DC: Government Printing Office.

Commissioner of Labor (1891). *Sixth Annual Report, 1890. Cost of Production: Iron, Steel, Coal, etc*. Bureau of Labor. Washington, DC: Government Printing Office.

_____ (1892). *Seventh Annual Report, 1891. Cost of Production: Iron, Steel, Coal, etc*. Bureau of Labor. Washington, DC: Government Printing Office.

_____ (1904). *Eighteenth Annual Report, 1903. Cost of Living and Retail Prices of Food*. Bureau of Labor. Washington, DC: Government Printing Office.

Department of Agriculture (1958). *Farmers' Expenditures in 1955 by Regions for Production and Farm Living…with Tables on Off-Farm Income: A Cooperative Survey*. U.S.D.A. Statistical Bulletin No. 224 (April). Washington, DC: U.S. Government Printing Office.

Department of Labor (1959). *How American Buying Habits Change*. Washington, DC: U.S. Government Printing Office.

Jacobs, Eva, and Shipp, Stephanie (1990). "How Family Spending Has Changed in the U.S." *Monthly Labor Review* 113 (March), pp. 20-27.

_____ (1993). "A History of the U.S. Consumer Expenditure Survey: 1935-36 to 1988-89." *Journal of Economic and Social Measurement* 19 (no. 2), pp. 59-96.

Kirkpatrick, Ellis Lore (1926). *The Farmer's Standard of Living: A Socio-Economic Study of 2886 White Farm Families of Selected Localities in 11 States*. Bulletin No. 1466, Department of Agriculture.

_____ (1929). *The Farmer's Standard of Living*. New York: Century.

Lamale, Helen Humes (1959). *Study of Consumer Expenditures, Incomes and Savings: Methodology of the Survey of Consumer Expenditures in 1950*. Philadelphia: University of Pennsylvania.

Lebergott, Stanley (1996). *Consumer Expenditures: New Measures & Old Motives*. Princeton, NJ: Princeton University Press.

Massachusetts Bureau of Statistics of Labor (1975). *Sixth Annual Report* (March). Public Document No. 31. Boston: Wright and Potter.

McCully, Clinton P.; Parker, Robert P.; and Tice, Helen Stone (1990). *Personal Consumption Expenditures*. Methodology Papers: U.S. National Income and Product Accounts, Bureau of Economic Analysis. Washington, DC: U.S. Government Printing Office.

Mead, Charles Ian; McCully, Clinton P.; and Reinsdorf, Marshall B. (2003). "Income and Outlays of Households and of Nonprofit Institutions Serving Households." *Survey of Current Business* 83 (April), pp. 13-17.

National Resources Committee (1939). *Consumer Expenditures in the United States: Estimates for 1935-36*. Washington, DC: U.S. Government Printing Office.

National Resources Planning Board (1941). *Family Expenditures in the United States: Statistical Tables and Appendixes*. Washington, DC: U.S. Government Printing Office.

Officer, Lawrence H., and Williamson, Samuel H. (2006). "Better Measurements of Worth." *Challenge: The Magazine of Economic Affairs* 49 (July-August), pp. 86-110.

Riley, James G., and Williamson, Samuel H. (2006). *The Population of the United States, 1790-2005*. Economic History Services. EH.Net website, Databases, U.S. Population Series.

Ruggles, Steven, and Brower, Susan (2003). "Measurement of Household and Family Composition in the United States, 1850-2000." *Population and Development Review* 29 (March), pp. 73-101.

Schultze, Charles L., and Mackie, Christopher, eds. (2002). *At What Price: Conceptualizing and Measuring Cost-of-Living and Price Indexes*. Washington, DC: National Academy Press.

Sobek, Matthew (2001). "New Statistics on the U.S. Labor Force, 1850-1990." *Historical Methods* 34 (Spring), pp. 71-87.

Triplett, Jack E. (1997). "Measuring Consumption: The Post-1973 Slowdown and the Research Issues." Federal Reserve Bank of St. Louis *Review* 79 (May/June), pp. 9-42.

Warburton, Clark (1934). "The Utilization of Income." In Maurice Levin, Harold G. Moulton, and Clark Warburton, *America's Capacity to Consume*, pp. 239-65. Washington DC: Brookings Institution.

Weir, David R. (1992). "A Century of U.S. Unemployment, 1890-1990: Revised Estimates and Evidence for Stabilization." In Roger L. Ransom, Richard Sutch, and Susan B. Carter, eds., *Research in Economic History*, vol. 14, pp. 301-46. Greenwich, CT: JAI.

Weiss, Thomas (1999). "Estimates of White and Nonwhite Gainful Workers in the United States by Age Group, Race, and Sex: Decennial Census Years, 1800-1900." *Historical Methods* 32 (Winter), pp. 21-35.

Williams, Faith M., and Hanson, Alice C. (1941). *Money Disbursements of Wage Earners and Clerical Workers, 1934-36: Summary Volume*. Bulletin No. 638, Bureau of Labor Statistics. Washington, DC: U.S. Government Printing Office.

Winslow, Emma A. (1925). "Contributions from Budget Studies to the Construction of a Statistical Index of the Purchasing Power of Consumers in the United States." In William A. Berridge, Emma A. Winslow, and Richard Flinn, *Purchasing Power of the Consumer: A Statistical Index*, pp. 125-280. Chicago: A. W. Shaw.