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Savings and the distribution of income

During the last twenty years the rate of personal savings in the United States has declined to a level unprecedented in modern times. Using national income (NIPA) data, Summers and Carroll (1987, p. 619) found that personal savings as a percentage of disposable private income averaged 8.5 percent between 1971 and 1975, fell to 6.8 percent between 1976 and 1980, and further declined to 5.6 percent between 1981 and 1986. While the statistical record seems clear, the reasons for the decline are uncertain. For example, Montgomery (1986, pp. 694–695) found that "changes in current income relative to permanent or expected income, increases in the wealth/income ratio, increases in investment in durables, changes in the variability of inflation, and demographic shifts were important determinants of the recent fall in the NIPA accounts," but, as is common with elaborate econometric studies of this type, the author did not indicate why savings behavior itself changed. On the other hand, Summers and Carroll (1987, p. 625) looked at "informal" factors representing the "primary motivations of savings," such as "provision for old age, the possibility of 'rainy days,' the desire for big-ticket items, and the desire to leave bequests," and concluded that "quantifying the separate contributions of all these factors to the secular downward trend in private savings is impossible." Perhaps the title of a recent review bests summarizes the uncertainty regarding current savings behavior: "There's No Simple Explanation for the Collapse in Saving" (Bosworth, 1989).

Savings rates and income weights

Lost in the efforts to explain aggregate savings has been the basic fact that savings behavior originates at the household level. After all, aggregate savings, S_t, simply summarizes the savings of all households:

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$$S_t = S_{1t} + \ldots + S_{mt} \quad (1)$$

where m = number of households in year t.

On the other hand, the aggregate savings rate, s_t, reflects not only household savings behavior but also relative income:

$$s_t = w_1 s_{1t} + \ldots + w_m s_{mt} \quad (2)$$

where $w_{it} = Y_{it}/Y_t$, and $s_{it} = S_{it}/Y_{it}$. This implies that the aggregate rate, as the income-weighted average of the individual rates, depends on the distribution of income across all households. If the income weights (w_{it}) are equal, then the aggregate rate simply represents the "average" household savings rate. If the weights are unequal, then the aggregate rate has no easy interpretation, and could, depending on the number of households below and above the rate, disguise very complicated individual savings behavior.

Overwhelming evidence indicates that the distribution of household incomes and savings rates are highly skewed. Annual U.S. Bureau of the Census (1989a, p. 42) data beginning in 1947 consistently show that the average income of the highest family quintile is about nine times larger than that of the lowest quintile. Bureau of Labor Statistics (BLS) household expenditure studies dating back to 1900 uniformly indicate that household income and savings rates are directly related (U.S. Bureau of the Census, 1975, pp. 320–324). For example, found in Table 1 are quintile savings rates and disposable income shares from BLS integrated Consumer Expenditure Surveys (CES) for 1972 and 1986 (BLS, 1978, 1989). In each survey, the lowest quintiles have both the lowest savings rates and smallest income shares, while the highest have the highest rates and largest shares. Further, the large differences between the aggregate weighted savings rates of 0.1513 and 0.0576, and the unweighted ones of 0.0002 and –0.3907 indicate that the weighted measures might not usefully reflect "average" household behavior.

In effect, Table 1 shows that concern about the aggregate savings rate should be directed toward household rather than aggregate behavior. Between 1972 and 1986, the aggregate (weighted) rate fell from 0.15 to 0.06. The quintile data provide a clear reason for this. Although the savings rate of the upper household fifth declined slightly from 0.29 to 0.27, its income-weighted rate increased from 0.12 to 0.13 because its income share increased from 0.42 to 0.47. On the other hand, the lowest quintile's income share fell from 0.05 to 0.03 and its dissavings rate

Table 1
Quintile income shares, savings rates, and weighted savings rates

	1972 BLS CES Survey			1986 BLS CES Survey		
Q_i	w_i	s_i	$w_i s_i$	w_i	s_i	$w_i s_i$
1	.0475	- .5104	- .0241	.0321	-1.9581	- .0629
2	.1115	- .0469	- .0052	.0898	- .3253	- .0292
3	.1760	.0886	.0156	.1561	- .0652	- .0102
4	.2487	.1769	.0440	.2485	.1208	.0300
5	.4165	.2908	.1211	.4733	.2744	.1299
Tot	1.0000	.0002[a]	.1513	1.0000	- .3907[a]	.0576

a = average.

increased from –0.51 to –1.96, causing its weighted share of savings to increase from –0.02 to –0.06. The effect of these changes on the aggregate savings rate is dramatic. In 1972, the gross savings rate was 0.18, dissavings –0.03 and the net rate 0.15. In 1986, the gross rate declined somewhat to 0.16 but dissavings more than tripled to –0.10, causing the net rate to decline to 0.06. These distinctions in household spending behavior are completely lost at the aggregate level. They suggest a relative rather than a universal explanation for the decline in the national savings rate.

Measuring household savings

The only surveys of household spending behavior that have appeared with enough regularity to permit more than incidental historical comparisons of aggregate savings rates are the Consumer Expenditure Surveys (CES) undertaken by the Bureau of Labor Statistics. Originally intended to determine the "costs of living," these surveys are used to construct and rebase various consumer price indexes as well as to provide information on household economic conditions. In recent times, annual surveys were conducted in 1960–61 and 1972–73; quarterly surveys were begun in 1980.[1]

As might be expected, the surveys have undergone considerable change. The 1960–61 CES covered all urban and rural families and single consumers with data collected in an interview where respondents were asked to recall their previous year's expenditures, except for food details which were determined by purchases in the week preceding the

[1] Surveys are collected under various Bureau of Labor Statistics entries in the references. Any of these contains a brief expenditure survey history, definitions and concepts, methodological information, and statistical tables by income, region, quintile, age, and so on.

interview.[2] The 1972–73 survey was conducted under contract with the Bureau of the Census, and was divided into two separate components: a diary survey for two consecutive one-week periods, and an interview survey (Carlson, 1974, p. 16). In 1980 the CES became quarterly with a 5,000 consumer unit diary panel sampled in two separate one-week periods over a 52-week period and rotating panels of 5,000 units interviewed in five consecutive quarters (Gieseman, 1987, p. 8). More subtle changes involve general "learning by doing," advances in statistical and survey techniques, changed questions and interview formats, different questions and methodologies, and changed survey objectives. Budgetary considerations have also reduced the coverage of some surveys.

For purposes here as well as for construction of consumer price indexes, it is of critical importance that the findings of one survey be comparable with those of others. According to official BLS statements, while CES techniques and methodologies have changed over time, continuity has been retained in contents (Carlson, 1974, p. 16). For example, in a recent paper, Eva Jacobs, chief of the Division of Expenditure Surveys, and Stephanie Shipp compared "how family spending has changed in the U.S.," using detailed urban wage-earner consumption expenditure figures from the 1960–61, 1972–73, and 1986–87 surveys, as well as from four other surveys going as far back as 1901. Noting differences in scope and technique, the authors maintained that "despite some lack of comparability of the detail and the methodology and coverage in expenditure surveys over time, broad trends in spending patterns can be compared" (Jacobs and Shipp, 1990, p. 21).

There have been a number of efforts to evaluate the accuracy of the survey results, usually by comparisons with the Personal Consumption Expenditure (PCE) component of the national income accounts as prepared by the U.S. Bureau of Economic Analysis.[3] In a detailed review, Gieseman (1987, p. 9) concluded that "available evidence suggests possible underreporting for many items in the expenditure survey; overreporting does not appear to be a problem." He also stressed the consistent underreporting over time, the great difficulty in compar-

[2] See, generally, "Historic Overview of Expenditure Survey Methodology" in Jacobs and Shipp (1990, p. 24), and "Historic Note on Consumer Expenditure Surveys," in Carlson (1974, p. 20).

[3] See BLS (1971), which compares CES and PCE methodology in detail; Houthakker and Taylor (1970) dissect the 1960–61 expenditures estimates; Pearl (1978, 1979) details differences between 1972 CES and PCE estimates.

ing the two estimates because of "significant differences in concept, coverage and classification of expenditures," and the absence of any exact measure of bias "because the specific estimates from other sources are not necessarily the 'true' values."

Ratios of CES to PCE estimates for comparable expenditure categories are collected in Table 2 (details are found in the appendix table). It must be emphasized that major items such as expenditures for owned dwellings, health care, education, and contributions are excluded because of noncomparability. Thus, the total ratio represents items included in the table, not all household expenditures. Nonetheless, with the exception of 1960–61, the ratios of the two estimates are remarkably consistent. As the underlying appendix table shows, much of the difference can be explained by deterioration in CES food expenditures, probably caused by greater reliance on convenience foods and meals consumed away from home. On the other hand, the PCE figures could be excessive. According to Gieseman (1987, pp. 12–13), "Department of Agriculture estimates of food consumption at home for the years 1980–84 are about 20 percent lower than PCE estimates," while the CES estimates compare favorably with an annual diary survey conducted by *Supermarket Business* and are lower than those from another diary survey by *Progressive Grocer*.

The BLS also compared CES income estimates with alternatives, usually Current Population Survey (CPS) estimates.[4] As Table 2 shows, the ratios of the estimated incomes are stable over time. Overall, while the CES surveys might understate both household expenditures and income, the survey figures are consistent and comparable over the period covered in this paper. If major methodological changes rendered any particular survey incomparable with others, then its ratio of expenditures or income to PCE or CPS estimates should be much different than found in the other surveys. No survey, except 1960–61 which seems more accurate than the others, has these anomalous ratios.

A second point in measuring household savings involves the definition of savings. The financial model of household behavior used here is implicitly a cash flow one, whereby efforts are made to identify all cash

[4] Different income estimates yield different ratios. Current Population Survey personal income estimates are about 10 percent lower than Internal Revenue estimates, which in turn are about 10 percent lower than adjusted NIPA estimates. The income ratios used are those published by the BLS. More favorable ratios—that is, closer to the expenditure ones—could be found using the IRS or adjusted NIPA estimates (cf. U.S. Bureau of Economic Analysis, 1986, p. 405).

Table 2
CES expenditure and income estimates as percentage of alternative estimates

Expend. Type	1961	1972	1980	1981	1982	1983	1984a	1984b	1985	1986	1987
Food	.97	.85	.85	.83	.75	.76	.75	.72	.74	.71	.71
Alcoholic Bev.	.40	.25	.47	.46	.46	.46	.48	.47	.50	.43	.45
Housing	.96	.93	.82	.82	.84	.84	.88	.91	.90	.91	.90
Apparel	.88	.73	.53	.53	.53	.55	.56	.66	.68	.62	.63
Transportation	.98	.91	.97	.93	.92	.97	.95	.94	.92	.98	.88
Entertainment	.76	.68	.65	.65	.63	.64	.65	.68	.67	.62	.57
Other	.82	.65	.65	.64	.63	.63	.64	.63	.61	.59	.58
Total	.91	.81	.79	.77	.75	.77	.78	.78	.78	.77	.75
Income	.91	.90	.91	.93	.94	.91	.91	.91	.92	.88	.90

flows into and out of the consumer unit. Unlike the NIPA accounts, which seek to track all incomes and expenditures regardless of source, incomes paid but not received, such as employer pension and health contributions (other labor income), are ignored in the household model. Similarly, items that are ignored in the household national accounts, such as social security contributions, are treated as savings since households actually make these contributions from their current incomes. Overall, household savings is defined as a residual, found by subtracting total expenditures (representing all forms of net outlays) from total money income and receipts.[5]

Finally, whenever savings is calculated as a residual, small differential errors in the measurement of income and consumption can have dramatic effects on the savings rate, regardless of data utilized. For example, if expenditures are measured with 90 percent accuracy and income with 100 percent accuracy, then the calculated savings rate will be 0.10 when the true rate is 0.00, or 0.19 when the true rate is 0.10.[6] If expenditures are measured with perfect accuracy and income with 90 percent accuracy, then calculated rates are –0.11 and 0.00, respectively. Since all economic variables are estimated and cost considerations preclude direct counts, any savings study, including this one, is inherently flawed. Perhaps this explains some of the uncertainty surrounding recent savings behavior.

Gross and net savings

Table 3 reports quintile savings rates from interview and integrated (combining interview and diary samples) expenditure surveys from 1960 to 1986.[7] Rates for two years, indicated by "c," are directly

[5] Household income includes, after deduction of personal taxes (federal, state, and other): total money earnings; social security and retirement income; interest and dividends; unemployment and workers' compensation; public assistance and food stamps; regular contributions for support; other income; and other money receipts. The last item, never a large amount, represents yard sale earnings, lottery and gambling winnings, lump sums, and similar forms of irregular income. Household expenditures include net outlays (cost minus trade-in) for new or used vehicles, mortgage interest (but not principal) payments, food, household durables, cash contributions, and so on. Payments for personal insurance and pensions, life insurance, retirement, and social security were excluded.

[6] Calculated savings rate = 1 – [accuracy of expenditures/accuracy of income] × "true" apc.

[7] All calculations involve household data weighted to represent the entire U.S. population. Weights were not recalculated when subsamples were examined.

Table 3
Quintile savings rates

Survey/Year	Q1	Q2	Q3	Q4	Q5	Overall
Interview:						
1960c	-.2307	-.0582	-.0037	.0510	.1583	.0545
1980	-1.3394	-.2282	.0351	.1346	.2723	.0822
1981	-1.1228	-.1120	.0670	.1682	.2982	.1254
1982	-.8959	-.1180	.0810	.2207	.3376	.1690
1983	-1.0658	-.1640	.0654	.1934	.3234	.1473
1984	-1.9782	-.2772	.0141	.1795	.3097	.0997
1984c	-1.8774	-.2949	.0122	.1870	.3180	.1082
Integrated:						
1972	-.5104	-.0469	.0886	.1769	.2908	.1513
1984	-2.1981	-.3824	-.0429	.1155	.2726	.0471
1985	-2.0470	-.3684	-.0241	.1279	.2787	.0623
1986	-1.9581	-.3253	-.0652	.1208	.2744	.0576
1987	-1.1991	-.2661	-.0102	.1570	.3170	.1128

calculated from BLS data tapes, while the others are based on published BLS summaries.[8] The overall savings rates from either type of survey do not follow the generally smoother ones found in the NIPA aggregate data. Instead, the rate rose from 1960 to 1972, and then, depending on the survey, fluctuated around 12 percent in the early 1980s or declined to 6 percent by the mid-1980s and sharply rose thereafter. The quintile rates explain this pattern.[9] In 1960 all rates were much lower than in subsequent years. By 1972 savings, but not dissavings, had sharply increased. In the 1980s, savings continued at historic levels but dissavings rates significantly increased. However, by 1987 a new trend had apparently begun as upper quintile savings increased, perhaps reflecting gains from corporate takeovers and mergers, and lower quintile dissavings declined, suggesting that the 1980s economic expansion had finally reached the lowest tier of workers.[10]

Underlying Table 3 are some staggering income differences between the lowest and highest quintiles, even after conversion to 1982 prices using the NIPA personal consumption deflator. As shown in Table 4, during the 1980s household income in the interview surveys of the

[8] The 1960–61 CES involved annual data, while the 1984 CES involved quarterly data that were first matched by household and then annualized if incomplete. This was necessary because 1984 BLS data include responses from the fourth quarter 1983 and first quarter 1985 tapes, which were not available for this paper.

[9] Quintiles were determined by ascending rank order of income.

[10] For an insightful study of the differential effects of the prosperity of the 1980s, see Blecker (1990).

Table 4
Deflated quintile average disposable income

Survey/Year	Q1	Q2	Q3	Q4	Q5	Ave.
Interview:						
1960c	4814	10502	15213	20387	33886	16960
1980	3742	10271	17025	24326	42292	19531
1981	3874	10548	16827	24408	42151	19562
1982	4168	10028	16246	24666	44277	19877
1983	3885	9855	16353	24884	45226	20040
1984	3393	9532	16398	25451	47653	20485
1984c	3016	8766	15211	23477	43610	18816
Integrated:						
1972	5227	12328	19456	27497	46043	22110
1984	3040	9133	16032	24562	46611	19876
1985	3234	9400	16506	25488	49077	20741
1986	3297	9219	16022	25502	48566	20521
1987	3840	9867	16506	25655	49284	21030

lowest quintile averaged between $3,393 and $4,168 annually as opposed to $42,151 to $47,653 for the highest. Figures from the integrated surveys are similar but with less variation, ranging from $3,040 to $3,840 for the lowest quintile and from $46,611 to $49,284 for the highest. Put another way, households in one quintile earned in a month what those in another earned in a year. These differences, which strongly correlate with the savings rates found in Table 3, imply that savings largely depends on current income. Regardless of survey year, households with high incomes saved, while those with low incomes dissaved.

Income-weighted average saving rates are found in Table 5. Since the quintile rates can be directly added, differences between gross and net savings, as well as the impact of dissavings, are now more obvious. Despite popular fears, the savings rate has not declined in recent years; instead, the dissavings rate has increased. From 1960 to 1972 the gross rate more than doubled, then into the 1980s, the dissavings rate tripled. Gross savings increased from 0.08 in 1960 to 0.18 in 1972, and, depending on the survey, ranged from 0.16 to 0.22 during the 1980s. The dissavings rate was –0.02 in 1960 and –0.03 in 1972, but sharply increased thereafter, ranging between –0.05 and –0.11. Quintile savings rates are consistent with this pattern: relative savings remained virtually constant in recent years as dissavings increased.

Since 1960 dissavings has reduced the U.S. net savings between 16 and 70 percent annually. This consistent, significant difference between gross and net savings has important practical considerations. Most apparent is that aggregate savings statistics do not accurately measure

Table 5
Quintile income-weighted saving rates

Survey/Yr	Q1	Q2	Q3	Q4	Q5	Gross Saving	Dis-saving	Net Saving
Interview:								
1960c	-.0131	-.0072	-.0006	.0123	.0632	.0755	-.0209	.0546
1980	-.0513	-.0240	.0061	.0335	.1179	.1575	-.0753	.0822
1981	-.0445	-.0121	.0115	.0402	.1285	.1820	-.0566	.1254
1982	-.0376	-.0119	.0132	.0548	.1504	.2184	-.0494	.1690
1983	-.0413	-.0161	.0107	.0480	.1460	.2047	-.0574	.1473
1984	-.0654	-.0258	.0023	.0446	.1441	.1910	-.0913	.0997
1984c	-.0602	-.0275	.0020	.0467	.1474	.1961	-.0877	.1083
Integrated:								
1972	-.0241	-.0052	.0156	.0440	.1211	.1807	-.0294	.1513
1984	-.0672	-.0351	-.0069	.0285	.1279	.1564	-.1093	.0471
1985	-.0638	-.0334	-.0038	.0314	.1319	.1633	-.1010	.0623
1986	-.0629	-.0292	-.0102	.0300	.1299	.1599	-.1023	.0576
1987	-.0438	-.0250	-.0016	.0346	.1486	.1832	-.0704	.1128

personal saving behavior. National income (NIPA) procedures determine savings simply by deducting aggregate current expenditures from aggregate current income. This method both understates the amounts actually saved and hides millions of dissaving households. With inaccurate savings rates and no information about dissavings, recent efforts to increase the aggregate rate have focused on savings incentives or consumption penalties. Both could be misdirected and ineffective. During the 1980s, the average income of the lowest quintile has been, as Table 4 shows, two or three times less than the approximate $10,000 four-person nonfarm "poverty level" (U.S. Bureau of the Census, 1989b, p. 452). Since Table 3 indicates that dissavings falls as income rises, perhaps reducing dissavings through income redistribution programs would be the most effective method to increase overall savings. Not only would this benefit millions of households now in desperate circumstances, it would also benefit all other households, including the very richest, by increasing investment funds, and ultimately, real incomes.[11]

Aggregate and household behavior

The quintile savings rates suggest that household spending depends on the level and distribution of current income. Alternatively, this behavior might be explained by life cycle or permanent income considerations. As initially proposed by Modigliani and Brumberg (1954), and Ando and Modigliani (1963), savings behavior varies over a household's life cycle. In terms of quintile data, the lowest-income quintiles might be largely composed of young, newly formed households who are borrowing from future expected incomes for current consumption and old, retired households who, with no current earnings, are spending from past incomes. On the other hand, the highest quintiles could largely include middle-aged households whose current incomes reflect their peak years of greatest potential productivity.

Table 6 contains 1984 quintile savings rates by age group. Data for this table are derived from individual household responses ($n = 9,401$) found in the quarterly 1984 CES data sets. The last column of the table shows aggregate savings rates by age group consistent with the life cycle hypothesis. The under-25 group has a negative rate, while the 65 and

[11] The general view of the relationship between savings and economic growth is that savers will lead the nation to prosperity; perhaps the truth is that dissavers will prevent the nation from reaching prosperity.

older group has a rate half or less that of any of the middle-aged groups. However, when quintile rates are considered, the expected life cycle pattern disappears. In both the lowest and the highest quintiles, savings behavior is opposite that expected: for low-income households, the youngest or oldest age groups have the smallest dissaving rates; for high-income households, the youngest or oldest have the highest savings rates.

The second lowest quintile also shows savings behavior contrary to the life cycle hypotheses while the third and fourth show the expected lower rates by young households but unexpected high rates by old households. Because household income includes both income from own farm or nonfarm business, partnership, or professional practice that can show large losses, the table was recalculated excluding business income. Significant changes in the savings rate were found only for the lowest quintile but the pattern of rates by age remained unaltered.

The apparent inconsistency between quintile and overall saving behavior for any age group is explained by the distribution of income within the group. As Table 7 shows, age groups with relatively high savings rates have a much greater proportion of their income in the highest income quintiles than those with low savings rates. Since each overall age group savings rate is the income-weighted average of the quintile rates in it, the young and old groups, with incomes concentrated in the lowest quintiles, have savings rates lower than the other groups with incomes mostly in the upper quintiles. However, the key test of the life cycle hypotheses is not aggregate average behavior but the behavior of households of different ages with similar incomes. As Table 6 shows, low-income, middle-aged households save less than young or old households while high-income young or old households save more than middle-aged ones. Overall, savings depends more on income than age: that is, savings behavior can be more accurately predicted given an income level than given an age group.

These conclusions regarding life cycle savings behavior are similar to those of Danziger et al. (1983, p. 224), who investigated elderly spending behavior using 1972 CES data: "Our results show that the elderly spend less than the nonelderly at the same level of income and that the very oldest of the elderly have the lowest average propensities to consume." However, the authors were puzzled as to "why the elderly continue to save after the great majority of them are retired." As shown here, the reason is that the elderly with low incomes dissave, while those with high incomes save.

Table 6
Quintile savings rates by age

Age Group	Q1	(ex bus.)	Q2	Q3	Q4	Q5	All
<25	-1.3908	(-1.4080)	-.2547	-.0052	.1387	.4194	-.1293
25 - 34	-2.5475	(-1.6515)	-.2983	.0126	.2025	.2921	.1166
35 - 44	-13.8392	(-3.4152)	-.4763	.0066	.1603	.2903	.1332
45 - 55	-5.0948	(-2.7198)	-.5573	-.1207	.1485	.2971	.1199
55 - 64	-1.8897	(-1.8050)	-.2424	.0161	.2388	.3835	.1825
65+	-.5666	(-.5643)	-.1863	.1192	.2275	.4302	.0539
All	-1.8774	(-1.4879)	-.2949	.0122	.1870	.3180	.1082

Table 7
Quintile income weights by age

Age Group	Q1	Q1	Q3	Q4	Q5	All
<25	.1236	.2041	.2721	.2562	.1440	1.0000
25 - 34	.0176	.0766	.1851	.3175	.4031	1.0000
35 - 44	.0038	.0483	.1231	.2455	.5794	1.0000
45 - 55	.0111	.0462	.1088	.2172	.6168	1.0000
55 - 64	.0289	.0759	.1470	.2330	.5152	1.0000
65+	.1087	.2569	.2335	.1828	.2182	1.0000
All ages	.0321	.0933	.1618	.2498	.4631	1.0000

Friedman (1957) developed the permanent income hypothesis to explain differences between short-run and long-run spending behavior. He argued that household spending is based on permanent or long-run income because unexpected, transitory events can cause measured or current income to vary unpredictably. Friedman (1957, p. 35) assumed that aggregate transitory income was zero because the positive unexpected incomes of some households offset the negative amounts of others. Without this assumption, historical data would include both permanent and transitory components and could not be used to estimate long-run spending behavior. Fundamental to Friedman's hypothesis is the distinction between permanent and transitory, that is, the difference between long-run, average, or normal behavior and immediate, temporary, or unusual behavior. If this has meaning, then most of the time the behavior of most households should reflect permanent circumstances. Otherwise, the majority of households would show transitory behavior and the distinction would not be useful.

With regard to quintile data, the high savings rates in the upper quintiles might be caused by households with current incomes larger than permanent incomes and the negative rates in the lowest quintiles by households with current incomes smaller than permanent incomes. But overall, following the permanent income hypothesis, the rates of most households should approximate the historical long-run rate. In Table 8, individual household savings rates from the 1984 BLS expenditure survey are grouped according to whether they are "high," greater than 0.2 (apc $<$ 0.8), "long-run," between 0.2 and –0.1 (0.8 $\leq$ apc $\leq$ 1.1), or "low," greater than –0.1 (apc $>$ 1.1). Justification for this grouping is that while the long-run rate approximates 0.1 (apc = 0.9), it has been below that value in the past and is currently above it. Since differences between permanent and transitory behavior are somewhat arbitrary in any respect, the long-run permanent savings rate is assumed to fall somewhere in the interval between –0.1 and 0.2.

While the expected concentration of high savers in the upper quintiles and low savers in the lower quintiles is found, the relative distribution of households by savings rate indicates that distinctions between permanent and transitory circumstances provide little insight into household savings behavior. The last column of Table 8 shows that 43 percent of the households are high savers and 34 percent low savers; that is, the savings rates of only 23 percent of the households approximate the long-run aggregate rate. In no quintile do the majority of households reflect the expected permanent behavior; instead, they tend to the

Table 8
Quintile distribution of savings rates

Savings Group	Q1	Q2	Q3	Q4	Q5	All
High	.1610	.2635	.4210	.5870	.7110	.4287
Long run	.1545	.2655	.2875	.2495	.1780	.2270
Low	.6845	.4715	.2915	.1645	.1095	.3442
Total	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Households	1874	1923	1858	1865	1881	9401

extremes of high or negative savings. These findings are similar to those of the 1960–61 CES, where 29 percent of the households had savings rates of 10 percent or more, and 24 percent had dissaving rates of 10 percent or more (BLS, 1971, p. 101). Overall, current savings depends on the level and distribution of current income. As the table clearly shows, the quintiles with the highest incomes had the highest savings rates while those with the lowest incomes had the lowest rates.

Marginal propensities

In a review of efforts to determine distributional effects on consumption, Blinder (1975) concluded that the "only rigorously correct way to test for the existence of distributional effects in the aggregate consumption function is to estimate directly separate marginal propensities to consume by income class." While the average savings rates shown in Table 3 clearly suggest that household saving depends on both the level and distribution of household income, the marginal savings rates necessary to establish distributional effects can only be inferred from the relatively constant historical quintile average rates. To estimate the marginal rates directly, quintile interactive dummy variables are used to incorporate level and distributional effects into an aggregate function. Since savings is always determined as a residual, the model is estimated using household consumption (C_i) as the dependent variable[12]:

$$(3) \qquad C_i = C\,(D_1 Y_i, \ldots, D_5 Y_i, D_2, \ldots, D_5),$$

where $D_j Y_i$ ($D_j = 1$ if quintile j, otherwise = 0) are quintile interactive terms, and D_j is a constant.

[12] The only importance of this is that the standard errors of the income coefficients are sharply reduced.

Using 1984 CES data with 9,401 households, the ordinary least-squares estimate (with standard errors in parenthesis) of consumption as a function of income level and distribution is:

$$C_i = 982.4 + 0.0547D_1Y_i + 1.0407D_2Y_i + 0.9130D_3Y_i \quad (4)$$
$$(0.040) \quad (0.050) \quad (0.053) \quad (0.028)$$
$$+ 0.7067D_4Y_i + 0.5489D_5Y_i - 0.7342D_2 - 0.8459D_3$$
$$(0.017) \quad (0.008) \quad (0.074) \quad (0.073)$$
$$- 0.6960D_4 + 0.3139D_5, \quad R^2 = 0.5453.$$
$$(0.071) \quad (0.065)$$

With the exception of the first quintile, the marginal propensity to consume (mpc) declined as the household quintile share of income increased. The unexpected mpc is largely explained by a few households in the first quintile that had zero or negative consumption or income, or extremely large or small spending rates. To compensate for these extremes, households whose average spending fell outside the interval $0.1 \leq \text{apc} \leq 10$ were excluded from the sample. While differences between transitory and extreme behavior are always somewhat arbitrary, this eliminated only 206 households, about 2 percent of the sample, and produced a much more reasonable marginal propensity for the first quintile:

$$C_i = 1486.8 + 1.5339D_1Y_i + 1.0976D_2Y_i + 0.9021D_3Y_i \quad (5)$$
$$(0.052) \quad (0.091) \quad (0.048) \quad (0.025)$$
$$+ 0.7164D_4Y_i + 0.5570D_5Y_i + 0.0050D_2 - 0.0320D_3$$
$$(0.015) \quad (0.007) \quad (0.079) \quad (0.077)$$
$$+ 0.1208D_4 + 0.4559D_5, \quad R^2 = 0.6068$$
$$(0.075) \quad (0.071)$$

The last regression strongly indicates that household spending depends on both the level and distribution of income. The marginal propensities to consume uniformly decline as the quintile share of income rises, the income coefficients are highly significant, and the model itself explains more than half of the variation in household consumption. These results

are very different from those usually found in cross-sectional research where mpc values are found by simply regressing consumption on income alone. With the 1984 CES data, this latter procedure yields, depending on sample version, an mpc of 0.57 or 0.59. As shown, these low aggregate rates (as compared to historical values around 0.90) disappear when controls for distributional influences are utilized.

The correspondence between the average rates contained in Table 2 and the estimated marginal rates is shown in Table 9. The average rates from either the 1984 BLS sample or an average of the 1980 to 1984 interview rates are comparable in sign and magnitude to the marginal rates, and imply a curvilinear aggregate household consumption function. The similarity between the average and marginal values is also consistent with historical studies of savings. The long-run rate has been found to be relatively stable, which implies that the cross-sectional quintile rates also should be relatively stable. With the exception of the lowest quintile, this is exactly what has been found. It is this exception—that is, savings variability by low-income households—that largely explains recent changes in the aggregate rate.

Conclusions

Aggregate savings statistics do not accurately measure household savings behavior. They implicitly reflect the distribution of income and largely describe the economic behavior of the highest income groups. The aggregate statistics are net figures that significantly understate actual savings and do not disclose significant forms of savings behavior. Bureau of Labor Statistics survey data, organized by households, indicate that low-income quintiles consistently dissave and high-income households consistently save. Changes in the behavior of dissavers, rather than savers, largely explain the recent decline in the aggregate savings rate. Since 1972 the household savings rate has remained virtually unchanged. The dissavings rate, however, sharply increased, causing the aggregate rate to fall. While this explanation of savings behavior is derived from average rates, estimated marginal propensities also indicate that the propensity to save increases as quintile share of income increases.

Use of household data to investigate savings behavior introduces a number of new issues into the debate about the decline of savings. What is the appropriate framework to model savings behavior? Should households be analyzed in a national accounting context or should they be

Table 9
Quintile of average and marginal savings propensities

Group	Q1	Q2	Q3	Q4	Q5
aps: 1984c sample	-1.8774	-.2949	.0122	.1870	.3180
aps: 1980-84 ave.	-1.2804	-.1799	.0525	.1793	.3082
mps: 1984c sample	-.5339	-.0976	.0979	.2836	.4430

considered in their own financial situation? For example, social security contributions are ignored when NIPA personal savings is determined, yet it is doubtful households ignore social security programs when saving for retirement. The identification of significant dissavings not only suggests alternative solutions to the savings decline but also raises questions about the persistence and magnitude of dissavings.[13] How are households able to dissave persistently? It seems unlikely that those in the lowest quintiles with spending two or three times current income will be able to borrow from regular credit sources. "Underground" sources and incomes do not seem to be the answer because they imply that rotating samples of statistically selected households consistently misstate their incomes and expenditures.[14] If dissavings represents income variability, then long-run, life cycle savings models must recognize that lifetime incomes are highly risky. This, in turn, implies that the models that use aggregate data to represent behavior must determine the actual households they represent. Finally, cross-sectional work on spending behavior has been stalled for thirty years because of conclusions derived after aggregating thousands of households into a dozen or so groups.[15] The findings and results of this paper indicate that aggregation has concealed more than it has revealed. Many of the determinates of household behavior, including savings, thus, have yet to be identified.

[13] See Borooah and Sharpe (1986) for similar behavior in the United Kingdom between 1963 and 1982.

[14] "Underground" explanations are common but largely invalid reasons for unexplainable (as yet) household behavior; see McDonald (1984).

[15] See Bunting (1989) for the effects of aggregation on consumption function estimates.

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Appendix table
Estimated aggregate expenditures for selected consumption categories

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Expend. Type	1961	1972	1980	1981	1982	1983	1984a	1984b	1985	1986	1987
Food	69	117	254	266	257	274	293	292	316	322	342
Alcoholic Bev.	4	6	22	22	23	24	26	25	28	26	27
Housing	61	121	233	258	281	307	347	385	408	433	450
Apparel	29	50	70	77	79	91	101	119	131	127	137
Transportation	43	95	222	233	236	274	300	299	318	346	317
Entertainment	11	26	58	66	69	77	86	98	111	111	114
Other	17	25	47	51	55	63	69	89	93	98	103
Total CES	234	439	905	974	1000	1111	1221	1307	1405	1463	1490
Total PCE	257	539	1149	1261	1331	1446	1575	1666	1794	1893	1999

Sources: Expenditure data: col. 1, BLS (1971), p. 106; col. 2, BLS (1985), p. 8; cols. 3–7, Gieseman (1987), p. 8; cols. 8–11, BLS (1990), p. 6. Income ratio: col. 1, calculated using unadjusted BLS and OBE figures (1971), pp. 56, 58; col. 2, calculated using 1972 CPS mean income; cols. 3–6, BLS (1986), p. 9; cols. 7–11, BLS (1990), p. 8.