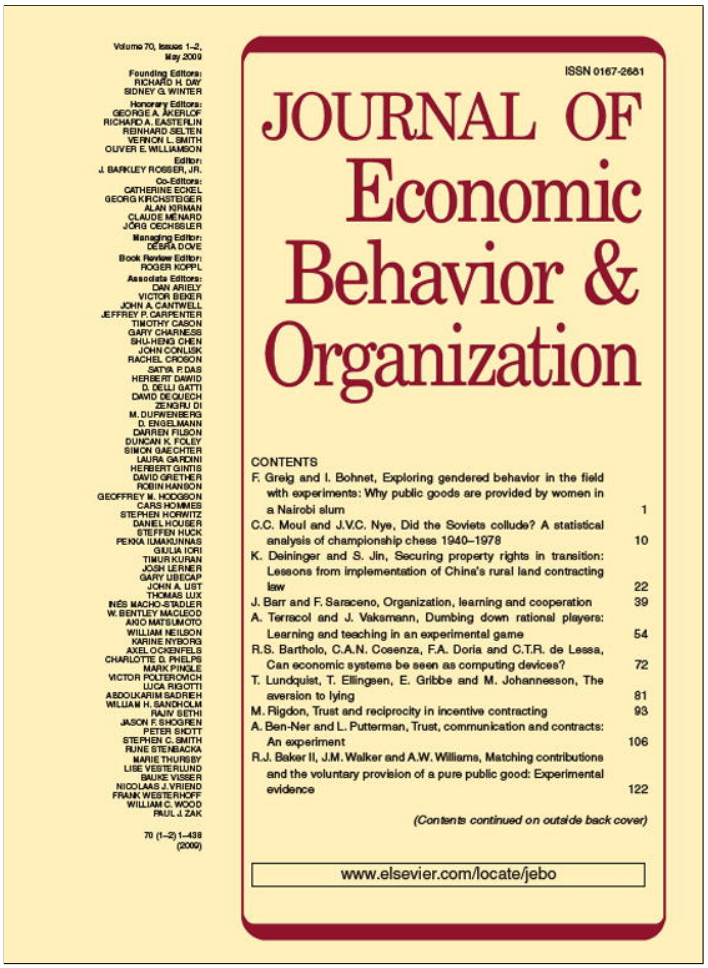

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The saving decline: Macro-facts, micro-behavior

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ABSTRACT

The macro-saving rate is decomposed into micro-components and a procedure developed to calculate household saving rates using income and expenditure shares, found with survey data for 1950, 1961, 1972 and 1980 to 2005. Low, middle and high income saving rates are calculated under alternative conditions: with income and expenditure shares alone, with changes in assets and liabilities added, with constant aggregate income, and for age-income groups. Problems of apparently excessive dissaving rates are considered. Overall, despite stable high income saving, collapsing middle income saving and increasing low income dissaving precipitated the decline in aggregate saving.

1. Introduction

Between 1952 and 1984 the aggregate personal saving rate as calculated from National Income and Product Account (NIPA) data by the Bureau of Economic Analysis (BEA) averaged 9.0 percent, ranging between 7.0 and 11.2 percent. These figures are about two percentage points lower than those found by the Federal Reserve using flow of funds (FFA) data where the aggregate rate averaged 10.9 percent, ranging between 8.7 and 13.6 percent. However, after 1984 the personal saving rate collapsed as the BEA rate fell nine percentage points, from 9.0 to −0.5 percent in 2005 while the FFA rate declined 11 percentage points, from 9.6 to −2.0 percent (BEA, 2006).

Reasons for this rise and fall remain controversial. While relatively steady saving rates facilitated development of "permanent" spending theories during the 1950s and 1960s (Modigliani and Brumberg, 1954; Friedman, 1957), these theories have been unable to explain shifts in saving behavior in the 1980s and the collapse in saving rates thereafter. After reviewing a number of largely wealth, behavioral and institutional explanations, Browning and Lusardi (1996, p. 1819) concluded that "the variety of proposed explanations is per se an indication that there exists little consensus on what underlies the decline in saving rates." Parker (1999, p. 8–13, 32, 33) added to the list of potential explanations but reached a similar conclusion. Studies of subgroups or cohorts of savers organized by age or income also have been unsuccessful (Browning and Lusardi, 1996; Attanasio, 1998; Parker, 1999; Lusardi et al., 2001).

The significance of the decline has been questioned. While a lower personal saving rate creates concerns about future productivity growth and the ability of an aging population to fund its retirement and related healthcare needs (Lansing, 2005; Marquis, 2002), after 20 years the sky has not yet fallen. Measurement issues have been raised, but Reinsdorf (2004,

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p. 25) found that no "single alternative measure of personal saving differs from the NIPA measure sufficiently to be able to account on its own for most of the change in the NIPA measure." (see also Perozek and Reinsdorf, 2002). Recently Garner (2006, p. 17, 24) noted that ongoing NIPA data and methodological revisions usually produce higher saving rates, although "exceptionally large revisions would be needed to eliminate the current downward trend." Further, the declining rate could be a rational response to expected future income increases in that "American households have correctly anticipated future gains in productivity and labor income and incorporated these expectations into their spending plans." However, evidence regarding these anticipations is limited and controversial.

Perhaps the most widely accepted explanation is based on a "wealth effect" whereby the real increase in net worth from $18 trillion in 1990 to $47 trillion in 2005 encouraged households to increase spending from income as lifetime saving targets were realized (Juster et al., 2004; Maki and Palumbo, 2001). However, no evidence has been presented showing significant declines in the average saving propensities of wealth holders. Bosworth and Bell (2005, p. 4–5) raise timing issues, pointing out that the "rise in the wealth ratio is concentrated in the years after 1994," about 10 years after the saving rate began to decline, implying that "wealth changes do not appear to be a reasonable explanation for the decline prior to 1995." Steindel (2005, p. 6) indicates that since the "bulk of U.S. wealth is owned by a small part of the population,. . . wealth changes directly impacting so few people can not reasonably be expected to affect spending by the population at large." Also, expected effects have not been found. The predicted decline in the personal saving rate from the 1994–1999 runup in wealth was in the order of 6 percentage points, yet the actual decline "was in the vicinity of 2 percentage points" while "real capital losses" between 2000 and 2003 should have pushed "up the personal saving rate several points; instead the saving rate was flat to down over these years (Steindel, 2005, p. 9).

Reflecting on the cornucopia of proposed resolutions, a Government Accounting Office report concluded that despite "a great deal of study economists have found no single reason that convincingly explains the decline in the personal saving rate (GAO, 2001, p. 10)," a view reiterated in a recent St. Louis Federal Reserve Bank paper. Asking "is it a puzzle?", the paper reviewed several contemporary explanations: wealth effects, changes in permanent income, financial innovations, social insurance and macro-stability effects, demographic changes, Ricardian equivalences and corporate shareholder compensation changes with the conclusion that "sometimes on logical grounds, in other occasions on an empirical level such theories remain insufficient to explain the. . . recent transformation of the United States into a nation of spendthrifts" (Guidolin and La Jeunesse, 2007, pp. 508–512).

Since conventional macroeconomic efforts to explain the saving decline have not proved fruitful, perhaps an explanation can be found at the micro-level in terms of changes in the distribution of income and expenditures. Although usually ignored, distributional issues are implicit in the saving problem. Long ago, when responding to allegations that he had neglected "variations in the distribution of incomes when defining (my) 'propensity to consume function'," Keynes responded that "it naturally follows that the collective propensity for a community as a whole may depend. . . on the distribution of incomes within it (Keynes, 1939, p. 129)." More recently Bosworth and Bell (2005, p. 16) made the same point: "Without direct information on the behavior of individual households or socioeconomic groups, it is doubtful that we will ever provide a convincing explanation of why saving has declined."

However, at the onset, the role of distributional influences in explaining the saving decline should be made clear. Distributional issues involve both the distribution of income and expenditures. When household shares of each as well as the average propensity to consume (APC) are known, the aggregate propensity to save (APS) can be determined. Consequently, any APS is consistent with a wide range of income and expenditure distributions. Information about distribution is useful because it can be used to describe the saving behavior of groups in the economy such as the poor or rich, young or old, which, in turn, might suggest new hypotheses regarding the saving problem. In effect, this procedure is simply a formalization and expansion of the current practice of attributing aggregate saving changes to changes in the saving propensities of particular groups such as homeowners, shareholders, the rich, or the retired.

The paper begins by decomposing the aggregate saving rate into micro-components and showing how shares and the APC can be used to determine household saving rates. Determination of income and expenditure shares is then discussed, followed by calculation of low, middle and high income saving rates under alternative conditions. Rates are determined based on income and expenditures alone, with changes in assets and liabilities added, when aggregate income and the APC are constant and for age-income groups. Problems of apparently excessive dissaving rates are considered. The overall conclusion is that despite stable or increasing high income saving, a collapse in middle income saving and increasing low income dissaving apparently precipitated the decline in both aggregate saving and the aggregate saving rate.

2. Aggregate personal saving rate

Aggregate personal saving, S_t, measures the saving and income of all m consumer units[1] in the economy:

$$S_t = s_1 + s_2 + \ldots + s_m = \sum s_i. \quad (1)$$

[1] The appropriate behavioral unit depends on data source. Census data is based on families, two or more people related by blood or marriage, while BLS data is derived from household consumer units, families plus others contributing to the maintenance of the living unit. In 2005 there were 77 million Census families and 117 million BLS households, a difference largely explained by the inclusion of single person households by the BLS.

Dividing both sides by aggregate disposable income, Y_t, multiplying each right hand side term by its appropriate income y_i/y_i and letting $z_i = s_i/y_i$, where z_i represents the average propensity to save of each household, and $v_i = y_i/Y_t$, where v_i represents the share of total income of each household, the aggregate saving rate is simply the income weighted average of micro-household saving rates:

$$\frac{S_t}{Y_t} = z_1 v_1 + z_2 v_2 + \ldots + z_m v_m = \sum z_i v_i. \tag{2}$$

By definition, the only way the aggregate rate can vary is through changes in household saving rates or income shares. However, this construction as a weighted average is usually ignored and the aggregate rate is used to represent all saving behavior. In this approach, macro-variables are treated as simple transformations, invariably averages, of underlying micro-ones while heterogeneous behavior is avoided by implicitly assuming equal micro-saving rates, $z_1 = z_2 = \ldots$

Table 1
Average annual real income and expenditures ($B).

Years	Income							Expenditures		
	BEA	BOC	CEX	EXP	BOC/BEA	CEX/BEA	EXP/BEA	BEA	CEX	CEX/BEA
1950–1972	2042	1584	1531	NA	.767	.725	NA	1870	1272	.683
1980–1984	4107	2843	2084	3440	.693	.505	.838	3681	1877	.507
1985–1987	4770	3268	2826	3981	.685	.592	.835	4387	2641	.603
1988–1990	5211	3508	2985	4220	.673	.573	.810	4839	2699	.558
1991–1993	5494	3560	3103	4251	.648	.565	.774	5114	2756	.539
1994–1996	5911	3916	3113	4704	.662	.527	.796	5645	2791	.495
1997–1999	6607	4459	3348	5313	.675	.507	.804	6380	2902	.455
2000–2002	7363	4871	3815	3440	.662	.517	.838	7204	3174	.440
2003–2005	7965	5011	5340	NA	.629	.669	NA	7841	3995	.509
Ave.	5401	3612	3055	4318	.678	.571	.800	5112	2623	.530

money income before taxes, CEX income represents money income after taxes, and the experimental measure includes capital gains, transfers and money income after taxes. Annual quintile shares from each of the three sources are found in Appendix A.

Besides providing data to calculate quintile income shares, periodic Consumer Expenditure Surveys also offer the only source for expenditure shares. The scope and coverage of these surveys has varied. Before 1980 surveys were conducted only for 1950 (Wharton School, 1957), 1960/61 (BLS, 1965) and 1971/72 (BLS, 1978) (hereafter 1961 and 1972). The first two, originally published by income levels, were reorganized into quintiles. Internal comparisons suggest methodological differences with later surveys. Because of budget limitations, surveys for 1980 through 1983 (BLS, 1985, 1986) were reduced in scope and excluded from the BLS CEX download page containing survey results from 1984 through 2005 (BLS, 2007a), again suggesting methodological or coverage differences with later surveys.[3] The BLS (2007c) measure of expenditures reflects the full cost of goods and services purchased by consumer units, including gifts and cash contributions but excluding periodic credit or instalment payments on goods and services already acquired. Since insurance premiums for life, annuities and other personal insurance and employee contributions to Social Security, retirement and pension programs largely represent saving, they are deducted from expenditures. Annual expenditure shares are shown in Appendix B.

Because of concerns that particular income estimates might be biased as a consequence of under or incomplete reporting, a problem recognized by both the Census (2007a) and the BLS (2007b, Q20), income shares here are measured as the average of the three different distributional estimates. As shown in Appendix A, these separate estimates are broadly consistent. Also, to facilitate discussion and presentation, annual data is averaged into 3 or 4 year groups, indexes based on 1985–1987 data, the period of highest household saving rates and saving, are calculated, and quintiles are combined with the lowest two becoming QL, quintiles three and four becoming QM and the highest renamed QH. Combined annual income and expenditure shares are found in Appendix B.

As Table 1 shows, average annual totals for both income and expenditures for selected year groupings are significantly different than the "official" NIPA totals produced by the BEA. The table implies that prevailing distribution figures are based on data that excludes somewhere between 20 and 50 percent of the income and expenditures actually received by consumer units. While the distribution of these exclusions across households is unknown, the exclusions are at least consistent because as Appendix A shows income shares across the three surveys are very similar. Further, there has been little controversy regarding the distributional implications of the different surveys. There has been no claim that a more complete survey would radically alter quintile shares as they are now perceived.

Table 2 shows average quintile income and expenditures shares for selected groups of years from 1950 to 2005. From 1985–1987 to 2003–2005 QL income shares declined about 6 percent, QM shares fell 3 percent and QH shares rose 5 percent. On the other hand, during the same period, expenditure shares for all three groups remained nearly unchanged.

To indicate more precisely distributional changes among the quintiles, Gini coefficients as shown in Table 3 were calculated for each time period by the trapezoid method (Ryscavage, 1999, p. 189) using the average share of each of the five quintiles. While data for the first two time periods are somewhat problematic, the income coefficients increased about 5 percent from 1985–1989 to the present. On the other hand, the expenditure coefficients slightly declined from 1985–1987 to 2000–2002 but then sharply rose in the last time period. The cause of this increase, which is also found in sharp changes in other rates and amounts, is unknown. Although occurring after saving had reached historic lows, it could reflect changes in saving behavior too recent to be measured accurately.

The Gini coefficients contradict the conventional assumptions of uniform saving behavior and constant income distributions found in macro-saving analysis. The failure of the expenditure coefficients to move in tandem with the income ones suggests changes in relative quintile spending behavior, especially after 1985–1989. That is, although the share of the highest

[3] The BLS (2007b: Q9) indicates that caution "should be used in comparing data from the current survey with those gathered during pre-1980 surveys, or even during the first few years of the current survey, due to changes in concepts and definitions. Also prior to 1984, published data covered only the urban portion of the population. Beginning in 1984, the published data are for the total population, urban and rural".

Table 2
Quintile shares.

Years	Income shares			Expenditure shares		
	QL	QM	QH	QL	QM	QH
1950–1972	.1750	.4156	.4095	.2314	.4270	.3416
1980–1984	.1577	.4160	.4263	.2334	.4145	.3521
1985–1987	.1463	.4047	.4490	.2284	.4085	.3631
1988–1990	.1491	.4025	.4484	.2247	.4142	.3610
1991–1993	.1456	.3996	.4548	.2280	.4108	.3612
1994–1996	.1432	.3939	.4629	.2338	.4118	.3545
1997–1999	.1410	.3897	.4692	.2337	.4083	.3580
2000–2002	.1395	.3885	.4720	.2357	.4103	.3540
2003–2005	.1377	.3920	.4703	.2252	.4068	.3681
Ave.	.1490	.4014	.4496	.2307	.4126	.3567
Index (1985–1987 = 100)						
1950–1972	120	103	91	101	105	94
1980–1984	108	103	95	102	101	97
1985–1987	100	100	100	100	100	100
1988–1990	102	99	100	98	101	99
1991–1993	99	99	101	100	101	99
1994–1996	98	97	103	102	101	98
1997–1999	96	96	105	102	100	99
2000–2002	95	96	105	103	100	98
2003–2005	94	97	105	99	100	101
Ave.	102	99	100	101	101	98

income quintile increased, spending shares slightly declined, indicating either increased spending by the lower quintiles or increased saving by the higher ones. Either situation implies some sort of behavioral change among the quintiles.

5. Distributional effects

In the following pages, distributional effects are calculated three ways, first using quintile income and expenditure shares as found in Appendices A and B, second using shares modified by inclusion of changes in quintile assets or liabilities, and finally using original quintile shares but holding annual income and the aggregate saving rate constant. The first method shows that QH saving has remained nearly unchanged since 1980–1984 as QL and QM saving deteriorated, the second shows a more complicated pattern of saving in that while QH saving slightly increased, deterioration of QL and QM saving is less pronounced, while the last indicates that changes in quintile saving are the result of distributional influences rather than aggregate ones.

Found in Table 4 are quintile unweighted and weighted saving rates and saving as well as respective indexes, all based on 1985–1987 values. By either saving rate, the "cause" or reason for the decline in the aggregate saving rate, APS, from 8.1 percent in 1985–1987 to 1.6 percent in 2003–2005 is not, as usually attributed, to declines in QH saving. Instead, QH saving slightly increased from 25.6 to 26.6 percent before declining to 23.0 percent in the last period while QL unweighted rates fell 40 percent and QM saving collapsed from 7.2 to −2.1 percent. In terms of weighted rates, QH rates remained nearly constant at over 11 percent while, until 1991–1993, positive QM rates offset negative QL ones producing historically high aggregate saving rates. Thereafter, rising QL dissaving rates and the collapse of QM rates from positive to negative caused the APS to fall, despite a slight rise in QH saving.

Table 3
Gini coefficients.

Years	*Y*	*E*	Index (1985–1987 = 100)	
			Y	*E*
1950–1972	.3316	.2408	87	95
1980–1984	.3572	.2429	94	96
1985–1987	.3796	.2530	100	100
1988–1990	.3767	.2571	99	102
1991–1993	.3838	.2540	101	100
1994–1996	.3901	.2454	103	97
1997–1999	.3954	.2476	104	98
2000–2002	.3983	.2428	105	96
2003–2005	.3991	.2608	105	103
Ave.	.3776	.2489	99	98

Table 4
Saving rates and saving.

Years	Unweighted			Weighted			Saving			APS
	QL	QM	QH	QL	QM	QH	QL	QM	QH	
1950–1972	−21.7	5.6	23.3	−3.8	2.3	9.6	−82	50	204	8.2
1980–1984	−32.8	10.7	26.0	−5.2	4.4	11.1	−213	183	456	10.4
1985–1987	−43.5	7.2	25.6	−6.4	2.9	11.5	−303	138	549	8.1
1988–1990	−39.9	4.4	25.2	−6.0	1.8	11.3	−310	93	589	7.1
1991–1993	−45.9	4.3	26.1	−6.7	1.7	11.9	−366	94	652	6.9
1994–1996	−55.9	0.2	26.9	−8.0	0.1	12.4	−473	4	735	4.5
1997–1999	−60.0	−1.1	26.3	−8.5	−0.4	12.4	−559	−29	815	3.4
2000–2002	−65.3	−3.3	26.6	−9.1	−1.3	12.6	−670	−95	924	2.2
2003–2005	−61.0	−2.1	23.0	−8.4	−0.8	10.8	−668	−66	859	1.6
Ave.	−46.3	3.4	25.5	−6.8	1.4	11.5	−392	51	630	6.1
Index (1985–1987 = 100)										
1950–1972	−50	79	91	−59	81	83	−27	36	37	101
1980–1984	−75	149	101	−81	153	96	−70	133	83	129
1985–1987	−100	100	100	−100	100	100	−100	100	100	100
1988–1990	−92	62	98	−94	61	98	−102	67	107	89
1991–1993	−105	60	102	−105	59	103	−121	68	119	86
1994–1996	−128	2	105	−126	2	108	−156	3	134	56
1997–1999	−138	−16	103	−133	−15	107	−184	−21	149	43
2000–2002	−150	−46	104	−143	−45	109	−221	−69	168	27
2003–2005	−140	−30	90	−132	−28	94	−220	−48	157	20
Ave.	−106	47	99	−106	49	100	−129	37	115	76

The saving rates shown in Table 4 clearly indicate that the aggregate saving rate is a poor indicator of micro-saving behavior. For example, during 1980–1984 the APS was 10.4 percent and the quintile rates were −32.8, 10.7, and 26.0 percent while during 2003–2005 the APS was 1.6 percent and the micro-rates were −61.0, −2.1, and 23.0 percent. Although the aggregate rate seems to correspond with the QM rate in some time periods, it provides little insight into trends in actual saving behavior. These trends cannot be explained by some implicit lifecycle progression through the quintiles as a consequence of chronological factors or work experience. Demographic variables collected as part of the CEX survey show persistent and consistent quintile differences in the relative number of female headed or black households as well the percent renters or college educated (Bunting, 1998). Similar findings are reported in a recent analysis of Survey of Consumer Finances data (Aizcorbe et al., 2003, p. 3).

Table 4 also includes the amounts of real saving and dissaving implied by the weighted rates. With saving calculated using real NIPA disposable income by $b_i Y_t$, QL dissaving more than doubled, from −$303 billion in 1985–1987 to −$668 billion in 2003–2005. During the same period QM saving fell by about $200 billion, from $138 billion to −$66 billion. On the other hand, QH saving increased almost 70 percent, from $549 billion in 1985–1987 to $924 billion in 2000–2002 before falling to $859 billion in 2003–2005. Thus aggregate saving is the result of two conflicting behavioral tendencies, to save and to not save. While saving behavior has been intensely studied since the 1930s, not saving or dissaving behavior has been virtually ignored. Long ago, Garvy (1948) indicated that it is probably more difficult to explain why households do not save or dissave than it is to explain why they do save. Saving by its nature is voluntary whereby current expenditures are sacrificed for future ones. Dissaving or not saving can be voluntary, reflecting preferences for present over future spending or lifecycle considerations, but also could be involuntary, caused by factors such as subsistence requirements, health needs, cyclic events, personal misfortunes and myopic budgeting.

6. Credit effects

Dissaving estimates larger by half or more than income for some income groups suggests that households have unrecognized sources of spending. While measurement error is the most commonly attributed source, it seems implausible that households could be so forgetful about their income or that spending surveys could be so poorly designed. The most obvious source of omitted spending power is credit or the ability to spend from future expected incomes. Since credit involves financial rather than real transactions, it does not directly enter into the national income accounts and hence into saving calculations. When 100 is borrowed to buy food, spending (ignoring transactions costs and debt servicing charges) is offset by factor payments and the credit disappears into a money transaction as debt. When queried, the spender can respond without error that she had no money income and expenditures of 100, implying dissaving of 100. Similarly, a high income borrower of the same amount can indicate increased expenditures of 100, thereby reducing its saving by the same amount. In effect, as Vickrey (1947) pointed out long ago, the ability to spend from sources other than money income will cause surveys using annual income concepts to overstate dissaving and understate saving (cited in Garvy, 1948, fn. 18).

Table 5
CEX income, change assets, CEX expenditures, change liabilities ($B).

Years	*Y*	*dl*	*dl*/*Y*	*E*	*da*	*da*/*E*
1985–1987	2826	184	.065	2641	467	.177
1988–1990	2985	369	.124	2699	349	.129
1991–1993	3103	480	.155	2756	351	.127
1994–1996	3113	458	.147	2791	336	.120
1997–1999	3348	584	.175	2902	522	.180
2000–2002	3815	750	.197	3174	455	.143
2003–2005	5340	1980	.371	3995	907	.227
Ave.	3055	662	.217	2623	474	.181

The existence of credit is measured by the creation of debt that represents real claims on future incomes. However, not all debt is transformed into factor payments; some could be used for financial transactions or to restructure existing claims. Nonetheless, some insight into the effects of debt on spending behavior can be found in responses to CEX survey questions regarding changes in household assets and liabilities. Since households have to borrow before they spend, net changes in liabilities, *dl*, reflect additions to income while net changes in assets, *da*, indicate additions to expenditures. These additions cause the household income/expenditure equation in any time period to become:

$$y_i + dl_i = e_i + s_i + da_i, \tag{6}$$

thereby redefining saving as

$$s_i = (y_i - e_i) + (dl_i - da_i). \tag{7}$$

It should be noted that *dl* is the income offset to credit purchases that are included in expenditures at full value and that *da* represents financial transactions excluded from the definition of expenditures. In effect, the definition of saving is expanded to include not only the usual residual (*y*–*e*) component but also a measure of credit or unused spending power as indicated by the (*dl*–*da*) term.

The quality of the CEX data is uncertain. According to the BLS (2007b, Q8): "assets and liabilities data are not as reliable as the expenditure data; respondents may be unable or unwilling to provide accurate information on their assets and liabilities." With these qualifications noted, net changes in household liabilities include changes in mortgage principal on own dwelling or other property; money owed on vehicles purchases; and money owed to creditors, such as department stores, banks, credit unions, finance companies, insurance companies, doctors, dentists, and other medical practitioners (BLS, 2007c). Net changes in household assets primarily represents savings and checking account changes; securities purchases and sales; sales, purchases and improvements to own dwelling and other property; changes in unincorporated family businesses and farms investments; amounts received from vehicle sales; and insurance policy surrender values (BLS, 2007c).

Shown in Appendix C are revised quintile shares, found by combining liability changes with income and assets changes with expenditures for 1984, the first year change data are available, through 2005. Since Census distributional data is presented as shares and for comparability purposes, CEX data alone was used to determine income shares. Table 5 shows totals for year groups since 1985–1987. For most periods, the fraction of income and expenditures represented by the change data is about equal. However, during 2003–2005 these fractions dramatically increased, from .197 in the previous period to .371 for income and from .143 to .227 for expenditures. As will be seen, this increase distorts the aggregate saving rate, based now on income plus changes in liabilities and expenditures plus changes in assets. Unfortunately, the long run effect of these increases cannot yet be determined.

Table 6 shows grouped revised quintile shares. As compared to Table 2, QL income shares are smaller but not declining, QM shares slightly larger but constant, and QH shares larger but not increasing. Whereas in Table 2, QL and QM expenditure shares were constant, now they increase somewhat with more variability when asset changes are added. After 1985–1987, QH shares are smaller but stable.

Addition of changes in liabilities and assets fundamentally alters the pattern of aggregate saving. As shown in Table 7, rather than continuously falling in recent years, the APS increased from 2.0 to 8.5 percent from 1985–1987 to 1991–1993, fell to 4.0 percent by 1997–1999 and then tripled to a modern high of 12.1 percent in 2003–2005. This inconsistency with BEA and FFA rates suggests that combining household balance sheet stocks with income flows might be inappropriate. However, the combination hopefully captures the influence of non-money income and financial transactions on household spending and saving behavior.

While the historic pattern is somewhat different, the saving rates and saving found in Table 7 replicate those found in Table 4 that are based on income and expenditures alone. After 1985–1987, QL dissaving increased until 2003–2005, QM saving rates somewhat deteriorated, and both QH rates and saving were stable or slightly increased. In effect, the addition of items omitted from conventional distributional estimates does not significantly alter the historic pattern of saving behavior implied by these original estimates.

Table 6
Revised quintile shares.

Years	Income shares			Expenditures shares		
	QL	QM	QH	QL	QM	QH
1985–1987	.1120	.4008	.4872	.1963	.3861	.4176
1988–1990	.1265	.4027	.4708	.2028	.4089	.3883
1991–1993	.1231	.3933	.4836	.2035	.3963	.4001
1994–1996	.1258	.3996	.4746	.2164	.4077	.3759
1997–1999	.1189	.3942	.4869	.2144	.3958	.3897
2000–1902	.1224	.3930	.4846	.2272	.3985	.3743
2003–1905	.1124	.3977	.4899	.2003	.4104	.3892
Ave.	.1199	.3978	.4823	.2090	.4011	.3900
Index (1985–1987 = 100)						
1985–1987	100	100	100	100	100	100
1988–1990	113	100	97	103	106	93
1991–1993	110	98	99	104	103	96
1994–1996	112	100	97	110	106	90
1997–1999	106	98	100	109	103	93
2000–2002	109	98	99	116	103	90
2003–2005	100	99	101	102	106	93
Ave.	107	99	99	106	104	93

7. Static effects

Changes in aggregate income or the APS, and therefore the APC, can complicate interpretation of quintile saving rates and saving because these changes, rather than distributional ones, could produce unique quintile saving patterns. In Table 8 quintile saving rates and saving are recalculated holding the APS at 5 percent and aggregate income at 2000 ($B) in every year while in Table 9 the same calculations are repeated using income and expenditures shares revised with liability or asset changes. Both tables show saving patterns previously identified. Table 8 shows rising QH saving, falling QL saving and collapsing QM saving while Table 9 shows rising QH saving, low QM saving and slightly falling QL saving. Thus, changes in quintile saving behavior are the result of responses to changes in the distribution of income and expenditures rather than to changes in macro-saving and spending variables.

8. Dimensions of dissaving

In an economy with large differences in income among various groups, significant saving by one group implies significant dissaving by other groups. With an aggregate saving rate (APS) of zero, approximating the modern situation in some nations, suppose income of 100 is divided between two groups. If one, the "rich," spends 35, then it saves 15 and has an aps of 0.3 (30 percent). Since the APS is zero, the other group, perhaps the "poor," must spend 65 for an aps of −0.3 (−30 percent). If

Table 7
Saving rates and saving, revised shares.

Years	Unweighted			Weighted			Saving			APS
	QL	QM	QH	QL	QM	QH	QL	QM	QH	
1985–1987	−71.9	5.6	15.9	−8.0	2.3	7.8	−398	110	388	2.0
1988–1990	−49.7	5.6	23.3	−6.2	2.3	11.0	−347	125	612	7.0
1991–1993	−51.4	7.7	24.2	−6.3	3.0	11.7	−378	183	704	8.5
1994–1996	−61.6	4.1	25.6	−7.7	1.7	12.2	−493	107	773	6.1
1997–1999	−73.2	3.6	23.1	−8.7	1.4	11.2	−625	101	813	4.0
2000–2002	−75.6	4.2	26.9	−9.3	1.7	13.1	−747	134	1067	5.5
2003–2005	−56.7	9.3	30.0	−6.4	3.7	14.8	−631	365	1464	12.1
Ave.	−63.3	5.8	24.3	−7.5	2.3	11.7	−511	160	822	6.5
Index (1985–1987 = 100)										
1985–1987	−100	100	100	−100	100	100	−100	100	100	100
1988–1990	−69	99	146	−77	100	141	−87	114	158	347
1991–1993	−72	138	152	−79	135	151	−95	166	182	419
1994–1996	−86	74	161	−97	73	156	−124	97	199	301
1997–1999	−102	64	145	−108	63	145	−157	91	210	197
2000–2002	−105	74	169	−116	73	168	−188	121	275	270
2003–2005	−79	165	189	−79	163	190	−159	331	378	598
Ave.	−88	103	153	−94	102	151	−128	145	212	322

Table 8
Saving rates and saving, constant income and APC.

Years	Unweighted			Weighted			Saving			APS
	QL	QM	QH	QL	QM	QH	QL	QM	QH	
1950–1972	−25.9	2.4	20.7	−4.5	1.0	8.5	−90	20	170	5.0
1980–1984	−40.8	5.3	21.5	−6.4	2.2	9.2	−128	44	184	5.0
1985–1987	−48.3	4.1	23.2	−7.1	1.7	10.4	−141	33	208	5.0
1988–1990	−43.1	2.2	23.5	−6.4	0.9	10.5	−129	18	211	5.0
1991–1993	−48.8	2.3	24.5	−7.1	0.9	11.2	−142	19	223	5.0
1994–1996	−55.0	0.7	27.2	−7.9	0.3	12.6	−158	5	252	5.0
1997–1999	−57.4	0.5	27.5	−8.1	0.2	12.9	−162	4	258	5.0
2000–2002	−60.5	−0.3	28.7	−8.4	−0.1	13.6	−169	−3	271	5.0
2003–2005	−55.4	1.4	25.6	−7.6	0.6	12.1	−152	11	241	5.0
Ave.	−47.8	2.3	24.5	−7.0	0.9	11.1	−140	19	221	5.0
Index (1985–1987 = 100)										
1950–1972	−54	58	89	−63	60	82	−63	60	82	100
1980–1984	−84	130	93	−91	134	88	−91	134	88	100
1985–1987	−100	100	100	−100	100	100	−100	100	100	100
1988–1990	−89	54	101	−91	54	101	−91	54	101	100
1991–1993	−101	57	106	−100	56	107	−100	56	107	100
1994–1996	−114	17	118	−112	16	121	−112	16	121	100
1997–1999	−119	12	119	−115	11	124	−115	11	124	100
2000–2002	−125	−8	124	−119	−8	130	−119	−8	130	100
2003–2005	−115	35	111	−108	34	116	−108	34	116	100
Ave.	−99	56	106	−99	57	106	−99	57	106	100

Table 9
Saving rates and saving, constant income and APC, revised shares.

Years	Unweighted			Weighted			Saving			APS
	QL	QM	QH	QL	QM	QH	QL	QM	QH	
1985–1987	−66.8	8.5	18.5	−7.4	3.4	9.0	−149	68	181	5.0
1988–1990	−53.0	3.5	21.6	−6.6	1.4	10.2	−132	28	204	5.0
1991–1993	−57.2	4.2	21.4	−7.0	1.7	10.3	−140	34	207	5.0
1994–1996	−63.5	3.1	24.8	−8.0	1.2	11.8	−160	24	235	5.0
1997–1999	−71.4	4.6	23.9	−8.5	1.8	11.7	−170	36	233	5.0
2000–2002	−76.3	3.6	26.6	−9.3	1.4	12.9	−187	29	258	5.0
2003–2005	−69.7	2.0	24.5	−7.8	0.8	12.0	−156	16	240	5.0
Ave.	−66.0	4.2	23.2	−7.9	1.7	11.2	−157	34	224	5.0
Index (1985–87 = 100)										
1985–1987	−100	100	100	−100	100	100	−100	100	100	100
1988–1990	−79	41	117	−89	42	113	−89	42	113	100
1991–1993	−86	50	115	−94	49	114	−94	49	114	100
1994–1996	−95	36	134	−107	36	130	−107	36	130	100
1997–1999	−107	54	129	−114	53	129	−114	53	129	100
2000–2002	−114	43	144	−125	42	143	−125	42	143	100
2003–2005	−104	23	132	−105	23	133	−105	23	133	100
Ave.	−99	50	125	−106	49	124	−106	49	124	100

a third group, the "middle class," is interjected with income and spending of 25 and the rich retain their income share, then poor now receive 25 and spend 40 for an aps of −0.6 (−60 percent). Thus, using plausible spending and saving figures for the rich implies what many believe to be implausible spending and saving figures for the poor.[4]

While the arithmetic is compelling, a basic concern involves how the poor finance their dissaving. No mechanism is obvious. In the example, the rich apparently "loan" their savings to the poor but the actual transmission process in a real economy is unknown. Dynan et al. (2000, p. 22) dismiss the problem, as do most others, by maintaining that it "reflects appreciable bias from measurement error and/or transitory income, as households in this quintile presumably cannot sustain such a high rate of dissaving for very long." However, if correct, this explanation brings into question the validity of any saving estimate in that if mismeasurement is possible for one group, then it is possible for all others. While this issue cannot be resolved here, some insight into the dimensions of dissaving can be gained by examining distribution figures and saving rates calculated from CEX (BLS, 2007a) cross tabulations of income level by age.

[4] For an approximate confirmation of these hypotheticals, compare the totals rows of Table 14 below.

Table 10
Saving rates (percent) by income level and age group.

Income level	Share Hds.	Age group						Total
		<25	25–34	35–44	45–54	55–64	65+	
Unweighted								
<5	4.9	−391.9	−911.6	−7867.1	2904.9	−2111.6	−1254.7	−1214.4
05–10	9.7	−126.4	−143.0	−164.6	−160.7	−150.7	−96.5	−125.8
10–15	9.9	−72.6	−78.7	−89.5	−89.6	−96.0	−74.4	−80.6
15–20	8.5	−45.4	−49.4	−58.1	−58.1	−62.2	−55.3	−54.8
20–30	14.5	−23.7	−25.0	−30.7	−34.1	−31.2	−38.8	−31.5
30–40	12.0	−2.6	−11.4	−14.5	−15.3	−14.1	−12.2	−12.9
40–50	9.9	17.2	−1.4	−5.8	−3.8	−1.3	−3.2	−1.1
50–70	13.2	–	7.7	4.8	5.2	9.1	6.6	6.3
70+	17.5	–	28.2	26.1	25.2	29.3	30.9	27.0
Total	100.0	−33.3	0.1	5.1	7.9	4.1	−21.8	0.0
Weighted								
<5	4.9	−0.4	−0.3	−0.4	−0.4	−0.3	−0.4	−2.2
05–10	9.7	−0.3	−0.3	−0.3	−0.3	−0.3	−0.8	−2.3
10–15	9.9	−0.2	−0.4	−0.4	−0.3	−0.3	−0.9	−2.5
15–20	8.5	−0.1	−0.3	−0.3	−0.2	−0.2	−0.7	−2.0
20–30	14.5	−0.1	−0.5	−0.5	−0.4	−0.3	−0.8	−2.7
30–40	12.0	0.0	−0.3	−0.3	−0.3	−0.2	−0.2	−1.3
40–50	9.9	0.2	0.0	−0.2	−0.1	0.0	0.0	−0.1
50–70	13.2	–	0.3	0.3	0.2	0.2	0.1	1.1
70+	17.5	–	1.8	3.6	3.6	2.1	0.9	12.0
Total	100.0	−1.1	0.0	1.4	1.9	0.6	−2.8	0.0

These tabulations have been conducted for 2-year groups since 1987 and for consistent income groups since 1992. Income and expenditure shares, found by totaling annual real data (household average times household number) and aggregating for all years from 1992 to 2005, are shown in Appendix D, which also includes the distribution of households. Some spectacularly high unweighted dissaving rates are apparent. For example, the rate for 35–44-year-old households with incomes less than $5000 is −7867 percent while that of the 55–64 age group in the same income category is −2112 percent. However, because of a negative income share, the lowest income households in the 45–55 age group had a saving rate of 2905 percent. All these figures suggest serious measurement problems. On the other hand, the QH rate ranges around 27 percent, a figure consistent with those previously found. The weighted rates again indicate that nearly all saving is accounted for by high-income households. They also show that households in each low-income bracket contribute about equally to the decline in the aggregate rate and the influence of age on saving in that the 65+ age group has the highest dissaving rates. Finally, the QM and QH rates are similar to those previously found.

Positive saving is exclusively identified with higher income, richer households while low or negative saving is associated with lower income, poorer households. However, low income need not be the result of poverty; it could be caused by special circumstances such as retirement from the labor force, college attendance, temporary income declines, or the ability to secure income from unconventional sources. Using figures from the 2002–2003 CEX cross tabulations (BLS, 2006: Tables 28–33), Table 11 compares the market value of homes, self-employment income, and public assistance income of households with incomes of $5000 or less with those in the next lowest income category, $5000 to $10,000, by age group. As can be seen, the alleged poorest of the poor own homes worth twice or more than those of the next poorest group, have significant self-employment losses while the next group earned small positive amounts, and although desperately poor, were four or five times less needful of public assistance than the next poorest group. These comparisons suggest that rather than being poor, the lowest income group between 25 and 64 is relatively rich and assigned to the lowest category as a consequence of temporary or unusual income circumstances.

Table 11
Selected CEX items by income level and age, 2002–2003.

Item	Income level	Age group			
		25–34	35–44	45–54	55–64
Market value house ($)	<05	23,347	50,726	99,642	110,265
	05–10	14,893	24,218	36,567	53,492
Self employed income ($)	<05	−956	−3,041	−3,846	−1,107
	05–10	−9	205	250	59
Public assistance income ($)	<05	526	519	430	308
	05–10	1,518	2,105	2,028	1,576

Table 12
Selected CEX items by age and income level, 2002–2003.

Item	Age group	Income level				
		<05	05–10	10–15	15–20	20–30
Education expenditures ($)	<25	2428	2122	1,969	1,524	923
	25–34	1248	877	400	780	352
College (Percent)	<25	81	73	63	61	56
	25–34	53	46	47	50	51
Social security retirement income ($)	55–64	1009	4009	6,230	6,281	7,888
	65+	3004	7141	11,321	15,293	19,538

Table 13
Income, expenditures and household shares.

Group	Type	1992–1996			1997–2001			2002–2005		
		Y	*E*	Hds	*Y*	*E*	Hds	*Y*	*E*	Hds
QL	Students	.0134	.0242	.0529	.0166	.0298	.0610	.0126	.0261	.0562
	Rich	.0009	.0170	.0281	.0005	.0153	.0240	.0000	.0120	.0195
	Retired	.0456	.0764	.1411	.0582	.0963	.1608	.0387	.0701	.1291
	Nonsavers	.0618	.1028	.1660	.1014	.1553	.2321	.0686	.1149	.1894
	Total	.1217	.2205	.3881	.1767	.2967	.4779	.1200	.2231	.3943
QM	Savers	.1647	.1605	.1420	.2408	.2266	.1907	.2116	.2144	.2021
	Nonsavers	.1406	.1609	.1776	.1040	.1154	.1195	.0771	.0926	.1078
	Retired	.0551	.0598	.0623	.0410	.0427	.0394	.0444	.0492	.0510
	Total	.3603	.3812	.3819	.3858	.3846	.3496	.3331	.3562	.3609
QH	Savers	.4814	.3727	.2146	.4110	.2999	.1629	.5075	.3914	.2275
	Retired	.0365	.0256	.0154	.0265	.0187	.0095	.0394	.0293	.0174
	Total	.5180	.3983	.2300	.4375	.3187	.1724	.5469	.4207	.2449
	Total	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Table 12 examines two other groups whose low income status probably reflects special circumstances. First, the educational expenditures and percent attended college of those less than 25 years old are compared to those in the 25–34 age group. The former group spent twice or more on education than the latter and a significantly greater fraction have attended college. This suggests that the less than 25 years old group is largely composed of students who will abandon their poverty status upon completion of their education. Second, the Social Security and retirement income of those in the 55–64 age group is compared with that of the 65+ group. The latter group received twice or more income from these sources than the former. This suggests that the 65+ age group is largely composed of households who are liquidating assets accumulated for retirement rather than relying on money incomes for their expenditures. Finally, those in the middle income category, $30,000 to $70,000, are divided into savers and nonsavers. Remaining from Table 10 are low income, high dissavers between 25 and 64 with incomes from $5000 to $30,000 whose circumstances seem to suggest poverty. The mechanism for dissaving by this group remains to be explained.

To provide some perspective on saving behavior of different income-age groups since 1992, the CEX cross tabulation data was divided into three time periods, 1992–1996, 1997–2001, and 2002–2005, and separate income expenditures shares calculated.[5] The data was then organized into three approximate income groups as shown in Table 13 with saver type determined by some apparent special characteristic. Thus, students are all QL households under 25, rich are all households 25–64 with incomes less than $5000, retired are all those 65 or older. Obviously, these classifications are somewhat arbitrary; not all people over 65 are retired, nor are all those QL households fewer than 25 students, and so on. Nonetheless, the assignments capture the main characteristic of each saver type. Since income levels were determined by the CEX classification, quintile assignments are approximate. In 1992–1996, the last income level included in QL was 15–20, and 40–50 for QM. For later years, the breaks were 20–30 and 50–70, respectively. Table 13 shows the percent of households in each group as well as their shares of income and expenditures.

Table 14 contains unweighted and weighted saving rates for each time period and saver type, calculated using the average APC for the time period. The high QL unweighted rates such as −125,496 percent are the result of very low income shares and slightly larger expenditure shares. The negative rates sharply decline towards zero in QM and then become positive in QH as incomes increase faster than expenditures. As previously found, high QL dissaving and negligible QM weighted rates

[5] Distribution tables are available upon request.

Table 14
Saving rates by saver type.

Group	Type	Unweighted			Weighted			Percent	
		1992–1996	1997–2001	2002–2005	1992–1996	1997–2001	2002–2005	Change[a]	Change
QL	Students	−71.6	−74.1	−102.5	−1.0	−1.2	−1.3	−0.3	9.4
	Rich	−1626.2	−2998.8	−125495.6	−1.5	−1.4	−1.2	0.3	−9.4
	Retired	−58.5	−60.6	−78.2	−2.7	−3.5	−3.0	−0.4	9.8
	Nonsavers	−57.5	−48.9	−64.5	−3.6	−5.0	−4.4	−0.9	24.2
	Total	−71.4	−63.1	−82.7	−8.7	−11.2	−9.9	−1.2	34.0
QM	Savers	7.7	8.6	0.5	1.3	2.1	0.1	−1.2	32.6
	Nonsavers	−8.3	−7.8	−18.1	−1.2	−0.8	−1.4	−0.2	6.2
	Retired	−2.8	−1.1	−8.8	−0.2	0.0	−0.4	−0.2	6.6
	Total	−0.1	3.1	−5.1	0.0	1.2	−1.7	−1.6	45.4
QH	Savers	26.7	29.1	24.2	12.9	12.0	12.3	−0.6	16.0
	Retired	33.6	31.4	27.0	1.2	0.8	1.1	−0.2	4.5
	Total	27.2	29.2	24.4	14.1	12.8	13.4	−0.7	20.5
	Total				5.4	2.9	1.8	−3.6	100.0

[a] (2002–2005) – (1992–1996).

are offset by QH saving to produce positive aggregate rates. In every time period households in special circumstances such as student, unconventional income, or retired account for more dissaving than those whose behavior has yet to be determined. In 1992–1996, households in the former group accounted for −5.2 percentage points of total dissaving of −8.7 percent while in the second period they accounted for −6.1 of −11.2 percent and in the last, −5.5 of −9.9 percent. Among QM households, the switch from saving to dissaving is clear. In 1992–1996, the combined rate of nonsavers and retired was −1.4 percent as compared to the saver rate of 1.3 percent. By 2002–2005, the first group rate had fallen to −1.8 percent while saver rate collapsed to 0.1 percent. Finally, as noted previously, the QH weighted rate slightly changed, falling less than one percentage point, from 14.1 to 13.4 percent over the three time periods.

Table 14 also shows changes in quintile and saver type weighted saving rates from 1992 to 1996 and 2002 to 2005. Between these two periods, the average aggregate rate fell 3.6 percentage points, from 5.4 to 1.8 percent. This decline represented a 1.2 point fall by QL households, 1.6 point fall by QM households, and a 0.7 point fall by QH households. In terms of percentage contribution, the decline in QL saving contributed 34 percent, QM 45 percent and QH 21 percent to the decline in the aggregate rate. Again, the overall conclusion is that the aggregate saving rate declined as a consequence of decreased saving by low and middle income households rather than by high income ones.

Overall, the tendency to reject high dissaving rates as biased or defective arises from confusion over unweighted and weighted saving rates and the reliance on macro-estimates to describe micro-saving behavior. Since saving rather than dissaving is usually investigated, high dissaving rates are unfamiliar and therefore seem to suggest some sort of error or omission. In fact, they simply reflect the influence of unequal income and expenditure shares.

9. Conclusions

Lacking information about the distribution of either saving rates or saving, proposed explanations of the saving decline have focused on methodological issues, theoretical constructs, and correlations among aggregate variables. Many recent explanations have concentrated on the saving behavior of relatively high income households. Using Federal Reserve Survey of Consumer Finances data Bosworth and Bell (2005, p. 16) concluded that "we can show. . . that high income, highly educated households account for the bulk of the aggregate saving, even if we do not know if they are responsible for the decline." As the distributional data clearly shows, since 1980 saving by high income households accounts for not the bulk, but all of aggregate saving. However, changes in saving behavior by this group do not explain the saving decline. Representing 20 percent of households, QH saving rates have remained virtually unchanged since 1985–1987 as saving increased from $549 to $859 billion. On the other hand, undetected in the aggregate data, both the saving rates and saving of the lowest 80 percent of households has deteriorated since 1985–1987 as QL rates fell 30 percent or more while dissaving increased by $360 billion and QM saving collapsed with both saving rates and saving turning from positive to negative figures.

To be valid, any aggregate estimate of spending behavior must produce estimates that are consistent with underlying micro-behavior. Quintile saving rates are calculated from prevailing income and expenditure shares and the APC. Simulated changes in the APC do not affect the pattern of these rates, indicating that distributional influences rather than aggregate income and expenditures values affect saving behavior. A decline in QH saving is a popular explanation for the decline in aggregate saving. This implies an increase in the QH share of expenditures and a decline in the expenditure shares of other quintiles. Available distributional evidence does not support this implication because neither QL nor QM saving rates have

shown any tendency to increase over the past 20 years. Redefinition of income and expenditures by adding changes in liabilities or assets alters the historic pattern of QL and QM saving but not that of QH. While the accuracy of the added data can be questioned, a bigger problem is that it fundamentally changes the meaning of saving by combining balance sheet stocks with BEA flows.

The range of quintile and age-income saving rates encountered here, both positive and negative, suggest some reasons for the failure of aggregate models to explain the decline in the aggregate saving rate. The rate is the arithmetic sum of two opposing tendencies, to save and not to save. Until the mid 1980s, saving tendencies dominated, so efforts were devoted to explaining saving rather than dissaving behavior. Since then dissaving tendencies have grown to dominate, causing not only the saving theories to fail but also a theoretical void because these tendencies went unrecognized. The basic models developed to describe saving behavior also compounded difficulties. These were proposed as universal, "one hat fits all heads" explanations, predicated on lifecycle spending behavior that produced savings over extended ranges of economic lifetimes. For households able to generate savings, these models might well describe lifetime spending behavior. However, for those unable to generate savings, 60 percent or more of all households, the models were irrelevant and, perhaps worse, presupposed spending behavior that in fact did not exist. Finally, some attempts were made to explain aggregate saving behavior using survey data, but these invariability entailed data editing to eliminate apparently anomalous or unusual spending behavior that nearly always involved low income dissavers, thereby reducing dissaving influences and perpetuating saving oriented conclusions.

The range of saving rates encountered also suggests the decline in the aggregate saving rate has many causes rather than one. Changes in educational lending practices, classification of income sources, spending practices of the retired, credit availability to low and middle income households, all could have contributed to the decline. On the other hand, the group most able to reduce average saving, high-income wealth holders, apparently were not among the contributors. Determination of mechanisms for dissaving is an unresolved problem. While transfers from saving parents to dissaving students, liquidation of retirement assets, and creation of unconventional income sources are some possibilities, the mechanism for low and middle income household dissaving remains to be identified. In effect, establishing causes for the saving decline reduces to an accounting exercise whereby the income and expenditures of various groups in the economy must be examined to discover spending behavior changes over time.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.jebo.2009.01.004.

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