Household wealth, public consumption and economic well-being in the United States

Edward N. Wolff, Ajit Zacharias and Asena Caner⋆

Standard official measures of household economic well-being in several countries are based on money income. The general consensus is that such measures are limited because they ignore certain crucial determinants of well-being. We examine two such determinants—household wealth and public consumption—in the context of the US. Our findings suggest that the level and distribution of economic well-being is substantially altered when money income is adjusted for wealth or public consumption. Over the 1989–2000 period, median well-being appears to increase faster when these adjustments are made than when standard money income is used. Adding imputed rent and annuity from household wealth to household income increases measured inequality, while adding public consumption reduces it. However, all three measures show about the same rise in inequality over the period.

Key words: Living standards, Public consumption, Household wealth, Inequality
JEL classifications: D31, D6, H4, P16

1. Introduction

Conventional measures of household economic well-being have been criticised for focusing on money income and for not incorporating the appropriate concept of money income. The official measure of the level and distribution of economic well-being in the US is gross money income. It consists mainly of money wage or salary income, self-employment income, property income (excluding capital gains), and government cash transfers (e.g., Social Security). However, it is well known that this measure does not adequately reflect households' command over, or access to, the

products OF a modern capitalist economy. For example, the official measure is gross of taxes and does not reflect the actual purchasing power of households (Citro and Michael, 1995, pp. 206–7). In recognition of the limitations of the official measure, the US Bureau of the Census has been publishing measures of household disposable income that takes into account certain non-cash transfers and taxes since the early 1980s (US Bureau of the Census, 1993). At present, there appears to be a consensus that the measures used for assessing the level and distribution of economic well-being need to rely on a better definition of money income and include items not reckoned as part of money income (Canberra Group, 2001).

The aim of this paper is to contribute to the effort of developing comprehensive measures of economic well-being (Smeeding and Weinberg, 2001; Wolff and Zacharias, 2003). We examine two factors that are central to economic well-being in modern capitalist economies—household wealth and public consumption. Annual property income (interest, dividends and rent) included in the usual definition of money income may not be an adequate measure of the economic advantage derived from the ownership of assets. The Canberra Group adds the imputed rental income from owner-occupied housing, whereas Smeeding and Weinberg add the imputed return on equity in owner-occupied housing and net realised capital gains.

Similarly, restricting attention to government transfer payments in considerations of economic well-being ignores government expenditures for the provisioning of public amenities (such as highways) that have a substantial influence on the standard of living. The Canberra Group recommends including some items of public expenditure (e.g., education). The Office for National Statistics in the UK issues an annual publication assessing the effects of taxes, transfers and some items of public expenditure on household income (Lakin, 2002, pp. 43–6). Admittedly, there are serious conceptual and measurement problems involved in integrating wealth and public expenditures into a measure of economic well-being. It also appears that there is no 'correct' solution to many of these problems. The general approach and particular methods deployed here represent one way of approaching these issues.

In developing the approach and methods, we have relied on two strands of literature. The first one—relating to household wealth—follows a lineage of studies that have attempted to develop measures of economic well-being that incorporate net worth. These studies have used such measures to examine inequality, the extent and duration of poverty among different demographic groups and the economic well-being of the elderly (Weisbrod and Hansen, 1968; Moon, 1977; Lerman and Mikesell, 1988; Caner and Wolff, 2004). The second strand of literature has addressed the questions of how the size distribution of personal income or the functional distribution of income is affected by government expenditures (Gillespie, 1965; Ruggles and O'Higgins, 1981; Shaikh and Tonak, 1999). Both questions were pursued to shed light on the ultimate distribution of actual (or *ex post*) economic well-being across income groups or social classes, after accounting for taxation and government spending. While there is a large variety of estimates for post-tax, post-transfer measures of household income, estimates of the distribution of government expenditures on public amenities across households are relatively scarce. Owing to the paucity of estimates and limitations of space, we shall restrict our attention here to government expenditures on goods and services, rather than developing estimates of net

government expenditures (all government expenditures, including cash and non-cash transfers for households less taxes paid by households).

Our focus is on the US. Hailed by many as the model for the rest of the world to follow, the US macroeconomic performance during the 1980s and the 1990s was exceptional among the advanced capitalist nations. We have chosen to study 1989 and 2000 because they can be considered as the terminal years of the last two economic expansions in the US.

We begin by describing the main sources of data and concepts of wealth and government expenditures used in the study (Section 2). This is followed by a discussion of how we incorporate wealth into a combined income–net worth measure of economic well-being and the distribution of that measure (Section 3). We then turn to the allocation of government expenditures to the household sector and the distribution of such expenditures among households (Section 4). The effects of the incorporation of wealth and government expenditures on the overall distribution of economic well-being are discussed next (Section 5). The final section concludes by outlining the limitations of the study and directions of future research.

2. Data and concepts

Our empirical strategy is to begin with the public-use datafiles developed by the US Bureau of the Census from the Current Population Survey's Annual Demographic Supplement (ADS).[1] The survey is the most comprehensive source of information that is available annually regarding household income, housing tenure, receipt of non-cash transfers and a number of key demographic characteristics of US households. Because the ADS does not have any information on household wealth, we integrated the Federal Reserve Board's Surveys of Consumer Finances (SCF) for 1989 and 2001 into the ADS.[2] Statistical matching was used to integrate the datafiles, with the objective of obtaining for each household record in the ADS the most appropriate portfolio from the SCF on the basis of household characteristics.

Wealth is defined here as marketable wealth (or net worth)—the current value of all marketable or fungible assets less the current value of debts (see Table 1 for the main components of wealth). We include only assets that can be readily converted to cash without compromising current consumption. Hence, the value of consumer durables is not included. Moreover, future Social Security benefits, and future retirement benefits from defined-benefit private pensions are also excluded. This measure reflects wealth as a store of value and therefore as a source of potential consumption. Such a measure is appropriate in considerations of economic well-being.

Just as in the case of wealth, there is no information in the ADS regarding the use of various public amenities. We therefore had to impute usage patterns to households in the ADS, based on summary information from other surveys (e.g., shares of vehicle miles travelled by households by location and income are imputed from official surveys on personal transportation). The definition of government expenditures used here is the one on the product side of the US National Income and Product Accounts (NIPA): government consumption expenditures and gross investment. This definition has

---

[1] There were 59,941 and 78,054 household records, respectively, for 1989 and 2000.
[2] The SCF—the premier survey on household wealth in the US—had completed interviews for 3,143 and 4,449 households, respectively, in 1989 and 2001.

Table 1. *Asset and debt components of net worth and ownership rates*

| | Mean (2000 dollars) | | | Ownership rates (%) | |
	1989	2000	Change (%)	1989	2000
Net worth	243,934	368,421	51	100.00	100.00
Assets					
Owner-occupied housing	94,501	114,871	22	63.93	67.73
Real estate and businesses	97,921	118,647	21	41.59	34.91
Liquid assets	31,827	36,683	15	87.26	92.05
Financial assets	41,345	98,064	137	46.81	47.25
Retirement assets	16,279	54,926	237	36.57	52.33
Debts					
Mortgage debt	25,578	41,274	61	40.29	45.43
Other debt	12,360	13,496	9	67.13	66.59
Memo items					
Median household wealth	58,326	69,225	19	100.00	100.00
Household money income	49,571	57,140	15	100.00	100.00

Notes: The figures in the 'Mean' column are for the entire sample, and not just for those who own the wealth component. The values of net worth components in year 2000 are computed by applying the rates of return in year 2000, adjusted for inflation, to the values of components in the 2001 matched file.
Source: Authors' calculations using Survey of Consumer Finances (SCF) data matched with ADS data, 1989 and 2001.

several advantages from the point of view of our study: It is more comprehensive than the definitions used in government budget documents, excludes transfer payments, and avoids double-counting intergovernmental transfers by reporting expenditures at the level of government at which they are incurred.

In order to allocate government expenditures to the households and distribute it among households, it is essential to have expenditures grouped according to purpose. We have adopted here the functional classification given in the US NIPA, with minor modifications. Since the disparities in state and local expenditures that exist across US states could possibly have effects on the distribution of economic well-being, we distributed the NIPA aggregate of state and local expenditures among the states. The distribution of expenditures was estimated using the Annual Survey of Government Finances conducted by the US Bureau of the Census, which contains a detailed functional breakdown of expenditures for each state.

3. Household wealth

The most common technique of combining income and wealth into a single measure of household well-being is to convert the stock of wealth into a flow and add that flow to current income. Our approach to income from wealth differs from the standard approach in two significant ways. First, we distinguish between home and non-home wealth. Housing is a universal need and owning a house frees the owner from the obligation of paying rent, leaving more resources for spending on other needs. Hence, benefits from owner-occupied housing are reckoned in terms of the replacement cost

of the services derived from it, i.e., a rental equivalent.[1] We impute the rental cost by distributing the total amount of imputed rent in the GDP to homeowners in the ADS, based on the values of their houses.[2]

Income from non-home wealth is reckoned in terms of a lifetime annuity value. However, we depart from the standard approach to annuity estimation by taking into account the differences among households in the portfolio composition of non-home wealth. The lifetime annuity is computed as the sum of annuity flows generated by individual non-home wealth components. The amount calculated is such that (i) it is the same for all remaining years of the younger spouse's life, and (ii) it brings wealth down to zero at the end of the expected lifetime.[3] The rates of return used in the calculation are the long-term (1960–2000) total real rates of return that are inclusive of the incomes generated by the assets.[4]

Following our estimation of imputed rent and annuity in the SCF, we assign these estimates to the households in the ADS using statistical matching. Each household record in the SCF is matched with a household record in the ADS, where a match represents a similar unit. The strata variables used in the matching procedure are the race of the household head (white vs non-white), the homeownership status of the household (owns or buying vs rents), the family type (married couples, single males, single females) and age of the household head (age difference within a range of two, five, ten or more). Within these strata, records are matched by minimising a distance function based on the education and occupation of the household head, and money income and size of the household. After the matching, we calculate the 'Wealth Adjusted Income' (WI) for each household by subtracting property income from money income and adding to this the imputed income from wealth.

Summary measures of household net worth based on the matched dataset are presented in Table 1. Some well-known features of the distribution of household wealth are maintained by our matching procedure. Owner-occupied housing represents an important part of wealth for the majority of households. Approximately 90% of households have liquid assets, such as bank accounts; however, the amounts invested in liquid assets are usually small; the median household has $4,500–$5,000 in liquid assets (not shown). The ownership of real estate, unincorporated businesses and financial assets is less prevalent than homes.

Both mean and median wealth increased between 1989 and 2000; however, the mean increased faster than the median did, hinting at growing inequality. The increase in the mean was dominated by the increase in the value of financial assets and

---

[1] This is consistent with the approach adopted in most national income accounts. An alternative would be to use a 'foregone returns' approach. It posits that, by tying up their financial resources in acquiring a home, the owners are foregoing the returns that they could have earned by investing the same in financial assets. Estimates are already available in the ADS for imputed return to equity in owner-occupied housing.

[2] The NIPA procedure is to assign each unit of owner-occupied housing a rental equivalent on the basis of actual market rents paid on a tenant-occupied unit of similar value. (See NIPA Table 8.21, line 172 for the estimated imputed rent.) In our dataset, on average, imputed rent was 5.6% and 5.4% (respectively) of the value of the house in 1989 and in 2000.

[3] We use life expectancy estimates differentiated by race, sex and age (US Bureau of the Census, 2002, Table 93).

[4] The real rate of return on real estate and businesses is 2.12%, liquid assets is 0.97%, financial assets is 3.75%, retirement assets is 1.07%, debt is –4.28%. The rate of inflation (in CPI-U) is 4.47%. The data on rates of return are obtained mainly from the Flow of Funds Accounts and the Economic Report of the President.

retirement assets. In the case of retirement assets, this rise was due to an increase in both the holding rate and the mean holdings. The increase in mortgage debt, both in the ownership rate and in the mean value for those who owe mortgage debt, is also noteworthy.

The distribution of imputed income from wealth among households belonging to different money income deciles displays certain interesting features (see Table 2).[1] First, mean imputed income from wealth and its components (imputed rent and annuities) generally increase with income decile—indicative of the positive overall correlation between wealth and income—and they soar as we move from the ninth to the top decile. However, the rate of increase from the ninth to the top decile is much higher in annuities than in imputed rent, showing the greater concentration of this type of wealth (primarily financial assets) among households at the very top decile. From the ninth to the top decile, annuities almost tripled in 1989 and increased almost fivefold in 2000. Second, the value of income from wealth as a percentage of money income displays a U-shape. If we judge the importance of income from wealth relative to the level of money income, it appears that the correlation between income and wealth is far from perfect, as shown by the high percentages for the lowest three deciles. This reflects the relatively low incomes but high wealth holdings of the elderly. Third, the value of annuities is the main component of income from wealth, dominating imputed rent in all income deciles. On average, imputed rent is about half of annuities in 1989 and only about one-third in 2000. Fourth, compared to property income, which we replace, annuities are remarkably higher in all income deciles.

Although a direct comparison of our findings with the findings of previous research is not possible owing to differences in the data, period and methodology, there are some common patterns: Income and wealth are highly but not perfectly correlated. Property income is lower than the imputed income from wealth. And, adding wealth to income improves the economic status of the elderly substantially, which is consistent with our observation that the biggest percentage increase in income is for the lowest income groups, which include the elderly.

4. Public consumption

The standard approach to combining public consumption and income is to add them together. We refer to the augmented income measure as 'Public Consumption Adjusted Income' (PCI) and present our analogous estimates in the next section. Here, our focus is on public consumption as such and its distribution along the income ladder.

An important distinction between our approach and the traditional studies on the distribution of expenditure benefits (e.g., Musgrave et al., 1974) is that we do not consider all public provisioning as augmenting the consumption possibilities of households. Public provisioning is also consumed by the non-household sectors. For example, highways are used directly by individuals for personal purposes, by commercial trucks for transporting merchandise and by government vehicles for transporting troops.

---

[1] Although it can be argued that our estimates are biased upwards owing to inflated prices, the degree of bias is probably comparable for the chosen years owing to their similar positions in the economic cycle.

Table 2. *Distribution of imputed income from wealth by household income decile (all dollar amounts are in 2000 dollars)*

	Lowest	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth	Ninth	Top	All
					1989						
Income from wealth	6,954	5,830	7,169	7,969	12,035	12,471	14,321	17,621	20,476	48,632	15,520
	116.4	*44.1*	*35.4*	*28.8*	*33.9*	*28.3*	*26.5*	*26.6*	*24.2*	*35.0*	*31.3*
Imputed rent	1,227	1,917	2,711	2,958	3,340	4,248	4,917	6,404	8,028	14,034	5,030
	20.5	*14.5*	*13.4*	*10.7*	*9.4*	*9.6*	*9.1*	*9.7*	*9.5*	*10.1*	*10.1*
Annuities	5,727	3,914	4,458	5,011	8,695	8,222	9,404	11,217	12,449	34,598	10,490
	95.8	*29.6*	*22.0*	*18.1*	*24.5*	*18.6*	*17.4*	*16.9*	*14.7*	*24.9*	*21.2*
Memo items:											
Property Income	193	779	1,357	1,846	2,355	2,544	2,813	3,495	4,816	14,802	3,557
	3.2	*5.9*	*6.7*	*6.7*	*6.6*	*5.8*	*5.2*	*5.3*	*5.7*	*10.7*	*7.2*
Mean income	5,976	13,236	20,262	27,653	35,537	44,104	53,959	66,290	84,645	138,760	49,570
					2000						
Income from wealth	8,443	10,178	11,278	13,059	12,712	13,200	15,511	18,446	25,356	91,131	21,773
	131.8	*68.3*	*49.6*	*42.7*	*32.5*	*27.0*	*25.8*	*24.8*	*26.4*	*48.4*	*38.1*
Imputed rent	1,620	2,650	3,027	3,518	3,905	4,549	5,789	7,143	9,250	16,778	5,743
	25.3	*17.8*	*13.3*	*11.5*	*10.0*	*9.3*	*9.6*	*9.6*	*9.6*	*8.9*	*10.1*
Annuities	6,822	7,528	8,251	9,541	8,807	8,651	9,722	11,303	16,107	74,353	16,030
	106.5	*50.5*	*36.3*	*31.2*	*22.5*	*17.7*	*16.2*	*15.2*	*16.7*	*39.5*	*28.1*
Memo items:											
Property Income	200	627	986	1,339	1,557	1,812	2,436	3,236	5,692	15,802	3,319
	3.1	*4.2*	*4.3*	*4.4*	*4.0*	*3.7*	*4.0*	*4.3*	*5.9*	*8.4*	*5.8*
Mean income	6,404	14,902	22,725	30,549	39,115	48,869	60,196	74,443	96,203	188,240	57,140

Notes: (1) Figures in italics indicate mean amount of the component as a percentage of mean income. (2) Property income is the sum of rent, interest and dividend income in the ADS.
Source: Authors' calculations using SCF data matched with ADS data, 1989 and 2001.

Table 3. *Government consumption and gross investment expenditures by function (in billions of current dollars): total expenditure and, the amount and share (%) allocated to the household sector*

	1989			2000		
Function	Total	Allocated	Household share	Total	Allocated	Household share
General public service	88	0	0	172	0	0
National defence	363	0	0	374	0	0
Public order and safety	92	24	26	203	53	26
Economic affairs	161	92	57	278	166	59
Housing and community Services	23	16	69	28	19	68
Health	57	57	100	92	92	100
Recreation and culture	13	13	100	25	25	100
Education	270	245	90	511	469	91
Income security	29	29	100	63	63	100
Total government expenditures	1,100	479	44	1751	890	51

Source: Authors' calculations based on NIPA, Annual Survey of Government Finances and supplementary data.

The traditional approach assumes, on the basis of specific propositions regarding the character of the state and the functioning of a capitalist economy, that public consumption in the non-household sectors ultimately benefits the household sector alone.[1] Hence the costs involved in such public provisioning are considered as incurred on behalf of households. In contrast, we make no assumptions regarding the benefits from public consumption; our assumptions are about the direct usage (actual or potential) of public amenities in different sectors. Government expenditures incurred in the provision of such amenities are considered as the cost of providing them to the relevant actual or potential users.

The rationale for our approach may be made clear by its application to the functions of government expenditures as found in today's NIPA for the US. Our data allowed us to construct a schema consisting of 44 functions. Allocation of expenditures between the household and other sectors was done on the basis of a set of assumptions regarding these functions. In Table 3, we group the functions into nine major functions and summarise the results derived from the assumptions regarding the household share in various functions.

Two types of assumptions are at work here. The first type designates functions either as expanding only the household sector's potential consumption or not. Functions such as public (state) schools (included under Education) or Income security (consisting of administrative costs alone, since we exclude all cash and non-cash transfers from the definition of public consumption) are assumed to expand

---

[1] For example, in the case of highways, it is usually asserted on the assumption of perfectly competitive markets that business use of highways always translates into lower consumer prices. Similarly, it is assumed, on the basis of an explicitly or implicitly formulated liberal theory of the capitalist state, that expenditures on elected officials are ultimately incurred on behalf of all individuals.

directly amenities available only to the household sector.[1] The other kind of functions constitute social overheads that keep the ship of state afloat. They are necessary for households to exercise command over the necessaries and conveniences of life, but they do not inherently constitute a part of the objects over which such command is exercised (e.g., defence).

The second type of assumption concerns functions that can potentially serve household and non-household sectors. Expenditures on these functions (under Economic affairs and Housing and community services) are allocated to the household sector according to the extent of its 'responsibility' in generating costs. We made judgments regarding the extent of responsibility, as far as possible, on the basis of available empirical information. A prominent example of this type of function is highways, where we estimated that about 60% of expenditures were incurred on behalf of households. Our estimates were based on the 1997 Federal Highway Administration study that calculated costs per mile and miles travelled by various types of vehicles.

However, a certain degree of arbitrariness is unavoidable in dealing with some functions that can serve all sectors. An example is Police and Fire (included under Public order and safety), encompassing activities presumably performed in the protection of persons and property. They play a dual role in that they constitute a social overhead and provide direct services to the household sector. We have therefore arbitrarily allocated half of these expenditures to the household sector.[2]

We define 'public consumption' as the total government expenditure allocated to the household sector. Once public consumption under different functions was determined, we distributed it among households. While doing this, we attempted to follow, as much as possible, the same principles of direct usage and cost responsibility that were employed in splitting total government expenditures between the household and non-household sectors. The problem becomes more complex now because we need household-level information on a number of variables that are not available in the ADS. Just as in the previous studies, various assumptions had to be made in classifying functions into general and specific public consumption, and in distributing the expenditures among households.

General public consumption pertains to expenditures on the provisioning of goods and services that, at least in principle, are equally available to all individuals (public hospitals, parks etc.). Of course, the actual patterns of utilisation of these public amenities are bound to vary according to a number of individual or household characteristics. However, they are universally available, in contrast to, say, veterans' hospitals, which are available only to a specific segment of the population. Therefore, we distributed general public consumption equally across persons.

---

[1] If one were to consider the 'benefits' of education or income security expenditures, additional considerations necessarily come into play: externalities as discussed in the usual neoclassical fashion is the most common approach. An alternative, proposed by James O'Connor, would be to analyse these expenditures in terms of the 'accumulation' and 'legitimisation' functions of the capitalist state (O'Connor, (1973) 2002). According to this approach, for example, a portion of expenditures on income security will have to be allocated to non-recipients also (see Peppard, 1975). However, our assumptions are regarding direct usage and cost-responsibility rather than 'benefits' as discussed in the two approaches.

[2] A full description of the treatment of individual government functions and distribution procedures is available from the authors upon request.

Specific public consumption consists of expenditures that are distributed according to person-level or household-level characteristics. The functions falling into this group and the relevant characteristics used in the distribution procedures are listed below:

Agriculture: amount of farm self-employment income received

Public Housing, Administrative costs of Medicare, Disability, Retirement income (Social Security), Welfare and social services and Unemployment compensation: receipt of cash transfers or welfare services

Energy, Pollution control and abatement, Postal service, Liquor stores, Water supply, Sewerage and Sanitation: Shares in consumption expenditures on relevant items

Education: enrolment in public educational institutions

Transportation and Parking: patterns of vehicle ownership and transportation usage

Occupational safety and health: employment status.

Information on income, receipt of most transfers and welfare services, and the employment status of individuals were available in the ADS. All other characteristics were imputed to individuals or households in the ADS from information gathered from external sources.

The estimated distribution of public consumption across households in different deciles of household money income is shown in Table 4. Average household public consumption (in 2000 dollars) was $8,242 in 2000, about 15% higher than it was in 1989. Average household income was also 15% higher in 2000 than 1989, so the ratio of public consumption to household income remained unchanged at 14%. However, there were notable changes across income deciles and across different functions.

Mean public consumption increases with income decile. This is the case for general public consumption (distributed on an equal per capita basis) because household size increases with income decile. This is also the case for specific public consumption, with the exception of the top decile in 1989 whose public consumption is slightly lower than that of the ninth decile. The results are mixed for particular government functions: Economic affairs and Education generally shows a positive correlation between average expenditures and income level, while the correlation is negative for Income security and Health, with the exception that, in the latter, case there is a jump in the mean level from the lowest decile to the next. Housing and community services is the only function that shows a change in the distributional pattern between 1989 and 2000. The 1989 pattern is roughly U-shaped, while in 2000, after a decline from the first to the third, mean public expenditure generally remains flat across deciles.

Why does public consumption increase with income? Apart from the already-noted influence of household size, the positive correlation is also driven by the distribution of expenditures on Schools and Economic affairs. The distribution of schooling expenditures is determined by the distribution of school-age children and expenditures per child across income deciles. There is relatively little variation in the mean number of school-age children among households with children in public schools or in per-pupil expenditures across income deciles. Instead, the observed correlation between educational expenditure and income level is due to the larger number of households without school-age children in the lower income deciles than in the higher income deciles. However, it should be noted that the minor variation in per pupil

Table 4. *Distribution of household public consumption by household income decile (all dollar amounts are in 2000 dollars)*

	Lowest	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth	Ninth	Top	All
					1989						
Public consumption	6,289	6,039	6,045	6,414	6,730	7,109	7,675	8,128	8,956	8,614	7,211
	105.2	*45.6*	*29.8*	*23.2*	*18.9*	*16.1*	*14.2*	*12.3*	*10.6*	*6.2*	*14.5*
Public consumption A	1,450	1,548	1,707	1,820	1,922	2,054	2,160	2,259	2,446	2,534	1,994
	24.3	*11.7*	*8.4*	*6.6*	*5.4*	*4.7*	*4.0*	*3.4*	*2.9*	*1.8*	*4.0*
Public consumption B	4,839	4,491	4,338	4,594	4,808	5,055	5,515	5,870	6,509	6,080	5,217
	81.0	*33.9*	*21.4*	*16.6*	*13.5*	*11.5*	*10.2*	*8.9*	*7.7*	*4.4*	*10.5*
Economic affairs	528	629	797	877	1,030	1,114	1,164	1,143	1,378	1,384	1,007
	8.8	*4.8*	*3.9*	*3.2*	*2.9*	*2.5*	*2.2*	*1.7*	*1.6*	*1.0*	*2.0*
Housing and community services	295	289	227	214	210	196	199	224	265	270	239
	4.9	*2.2*	*1.1*	*0.8*	*0.6*	*0.4*	*0.4*	*0.3*	*0.3*	*0.2*	*0.5*
Health	48	69	65	56	52	46	43	43	44	48	51
	0.8	*0.5*	*0.3*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.0*	*0.1*
Education	2,568	2,504	2,658	3,038	3,248	3,548	4,012	4,374	4,735	4,323	3,508
	43.0	*18.9*	*13.1*	*11.0*	*9.1*	*8.0*	*7.4*	*6.6*	*5.6*	*3.1*	*7.1*
Income security	1,400	1,000	591	409	269	152	98	86	87	56	411
	23.4	*7.6*	*2.9*	*1.5*	*0.8*	*0.3*	*0.2*	*0.1*	*0.1*	*0.0*	*0.8*
Memo items:											
Schools	2,380	2,333	2,437	2,737	2,935	3,168	3,624	3,869	4,040	3,322	3,088
	39.8	*17.6*	*12.0*	*9.9*	*8.3*	*7.2*	*6.7*	*5.8*	*4.8*	*2.4*	*6.2*
Highways	298	397	543	613	745	797	809	792	809	696	651
	5.0	*3.0*	*2.7*	*2.2*	*2.1*	*1.8*	*1.5*	*1.2*	*1.0*	*0.5*	*1.3*
Mean income	5,976	13,236	20,262	27,653	35,537	44,104	53,959	66,290	84,645	138,760	49,570
Mean household size	1.85	2.00	2.24	2.39	2.53	2.71	2.86	3.01	3.19	3.23	2.60
					2000						
Public consumption	6,229	6,473	7,153	7,413	7,981	8,505	9,254	9,649	9,727	10,537	8,242
	104.2	*48.9*	*35.3*	*26.8*	*22.5*	*19.3*	*17.1*	*14.6*	*11.5*	*7.6*	*16.6*
Public consumption A	1,465	1,649	1,847	2,012	2,145	2,315	2,471	2,590	2,653	2,754	2,174
	24.5	*12.5*	*9.1*	*7.3*	*6.0*	*5.2*	*4.6*	*3.9*	*3.1*	*2.0*	*4.4*
Public consumption B	4,764	4,824	5,306	5,401	5,836	6,190	6,783	7,058	7,074	7,783	6,068

Table 4. *(continued)*

	Lowest	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth	Ninth	Top	All
	79.7	*36.4*	*26.2*	*19.5*	*16.4*	*14.0*	*12.6*	*10.6*	*8.4*	*5.6*	*12.2*
Economic affairs	515	670	872	961	1,153	1,229	1,287	1,297	1,321	2,125	1,132
	8.6	*5.1*	*4.3*	*3.5*	*3.2*	*2.8*	*2.4*	*2.0*	*1.6*	*1.5*	*2.3*
Housing and community services	212	177	165	147	147	150	156	164	164	167	165
	3.6	*1.3*	*0.8*	*0.5*	*0.4*	*0.3*	*0.3*	*0.2*	*0.2*	*0.1*	*0.3*
Health	43	56	48	43	36	30	28	25	24	26	36
	0.7	*0.4*	*0.2*	*0.2*	*0.1*	*0.1*	*0.1*	*0.0*	*0.0*	*0.0*	*0.1*
Education	2,626	2,874	3,368	3,628	3,994	4,431	5,059	5,380	5,408	5,344	4,171
	43.9	*21.7*	*16.6*	*13.1*	*11.2*	*10.0*	*9.4*	*8.1*	*6.4*	*3.9*	*8.4*
Income security	1,367	1,047	853	622	506	350	253	193	158	121	563
	22.9	*7.9*	*4.2*	*2.2*	*1.4*	*0.8*	*0.5*	*0.3*	*0.2*	*0.1*	*1.1*
Memo items:											
Schools	2,377	2,614	3,036	3,280	3,632	4,003	4,572	4,815	4,756	4,525	3,726
	39.8	*19.8*	*15.0*	*11.9*	*10.2*	*9.1*	*8.5*	*7.3*	*5.6*	*3.3*	*7.5*
Highways	331	455	648	745	896	884	923	887	758	688	714
	5.5	*3.4*	*3.2*	*2.7*	*2.5*	*2.0*	*1.7*	*1.3*	*0.9*	*0.5*	*1.4*
Mean income	6,404	14,902	22,725	30,549	39,115	48,869	60,196	74,443	96,203	188,240	57,140
Mean household size	1.73	1.95	2.18	2.37	2.54	2.73	2.91	3.04	3.09	3.18	2.55

Notes: (i) Figures in italics indicate mean public consumption as a percent of money income; (ii) General public consumption is distributed equally across persons; (iii) Specific public consumption is distributed according to household or individual characteristics. S*ource*: Authors' calculations.

expenditures across income deciles in our data might well be due to the neglect of intra-state disparities in educational expenditures per student.[1]

Economic affairs encompasses a number of functions, which are all distributed on the basis of characteristics that tend to be positively correlated with income. The largest expenditures in this category are incurred for transportation. The principal mode of transportation in the US, highways, is used more intensely (as measured by the share of total highway miles driven) by the more affluent households; the distribution of highway expenditures is largely a reflection of this usage pattern. The other major mode of transportation, air travel, is characterised by a usage pattern that is even more concentrated in the upper income deciles. Functions distributed on the basis of shares in consumption expenditures—energy, pollution control, postal service, and part of Housing and community services—are dominated by items for which higher income groups generally have higher shares in consumption expenditure.

Though mean levels of public consumption rise with income, its ratio to income falls steadily because the disparity in income between deciles is far greater than the disparity in public consumption. As can be inferred from Table 4, households in the top decile experienced the fastest growth in both income and public consumption between 1989 and 2000. At the tails of the distribution (the top two deciles and the bottom), income grew faster than public consumption, while the opposite pattern prevailed among the middle seven deciles. As a result, the relative importance of public consumption declined for the households at the tails of the distribution and increased for those in the middle.

It is difficult to compare our findings with previous studies because of differences in methodology, underlying data on expenditures, and years studied (e.g., Ruggles and O'Higgins, 1981; Reynolds and Smolensky, 1977; Gillespie 1965). To the best of our knowledge, the last published study for the US that utilised household-level data to produce estimates of distribution of public consumption (Ruggles and O'Higgins, 1981) used 1970 data. Similar to our findings, it also reported a positive correlation of public consumption and income across deciles.[2] However, our distribution is more compressed: the percentage deviation from the overall mean for almost all income deciles is higher in 1970 than in 2000. General public consumption, which had a more uneven distribution (especially at the bottom deciles) and a larger share in overall public consumption in the 1970 estimates than in ours (59% versus 26%), is the main explanatory factor here. In turn, the compression in the distribution of general public consumption mainly reflects the extent to which inter-state disparities have declined from the early 1970s: the coefficient of variation in per capita general public consumption incurred at the state and local levels has shrunk from 0.40 in 1972 to 0.31 in 2000.

---

[1] The public-use version of the ADS did not contain a variable identifying the county of residence in 1989; a county variable is available for 2000, but only for 60% of household records.
[2] The study did not contain separate estimates of public consumption strictly comparable to the one used by us, since it also included transfer payments and a variety of other government expenditures (e.g., national defence). We constructed a somewhat comparable public consumption estimate by aggregating the following functions: labour, education, housing, highways, police, fire, and unallocable expenditures (Ruggles and O'Higgins, 1981, Tables 2 and 3). The other studies cited above used dollar brackets rather than deciles; however, they also display a positive correlation between income and public consumption across income groups.

5. Inequality

An important motivation behind developing more comprehensive measures of economic well-being than money income is to further the understanding of economic inequality. Here, we examine the overall distribution of three measures: money income (MI), wealth adjusted income (WI) and public consumption adjusted income (PCI).

The distribution of well-being changes considerably when MI is adjusted for wealth or public consumption (see Table 5). The distribution of WI is less equal, while the distribution of PCI is more equal than the distribution of MI. In the case of WI, the share of the top decile increases from 29% to 36% in 1989 and from 33% to 41% in 2000. The shares of all other deciles decline slightly. In the case of PCI, there is an increase in the shares of the first to the sixth or seventh deciles (depending on the year) and a decrease in the shares of the upper deciles. If we adjusted money income for both wealth and public consumption (EI), their combined effect would be to increase the shares of the first three deciles and the top one, while decreasing the share of all others.

Summary measures of overall inequality also reveal that the distribution of well-being is sensitive to the measure of well-being used (see Table 6). Adjusting income for wealth increased inequality, and adjusting income for public consumption lowered inequality in both years. Adjusting income for both increased inequality, but as expected, not as much as it would in the case of adjusting for wealth, owing to the equalising effect of public consumption. A characteristic of the Atkinson Index is that the closer the inequality aversion parameter, e, is to zero, the more sensitive the index becomes to the changes in the upper end of the distribution. In the case of wealth, since the major effect of adjusting for wealth on the income distribution is seen in the top of the distribution, we observe bigger increases in the value of the Atkinson index as e gets closer to zero. In the case of public consumption, the opposite is true. We observe bigger drops in the value of the index for bigger values of e.

How significant are the differences in the level of inequality across income measures? One way to answer this question is to compare the magnitudes of these

Table 5. *Income shares of deciles for money income (MI), wealth adjusted income (WI), public consumption adjusted income (PCI) and for income adjusted for both wealth and public consumption (EI), 2000 (%)*

Decile	MI	WI	PCI	EI
Lowest	1.19	0.98	1.82	1.51
Second	2.79	2.27	3.53	3.02
Third	4.13	3.48	5.01	4.22
Fourth	5.40	4.60	6.18	5.30
Fifth	6.85	5.73	7.47	6.44
Sixth	8.31	6.97	8.59	7.37
Seventh	9.86	8.68	10.18	8.88
Eighth	12.38	10.85	12.11	10.81
Ninth	16.20	14.85	15.41	14.23
Top	32.89	41.57	29.69	38.21
All	100.00	100.00	100.00	100.00

Source: Authors' calculations.

Table 6. *Effects of adding wealth and public consumption on inequality measures, 1989 and 2000 (inequality coefficient $\times 100$)*

	1989				2000			
		Atkinson				Atkinson		
	Gini	$e = 0.25$	$e = 0.50$	$e = 0.75$	Gini	$e = 0.25$	$e = 0.50$	$e = 0.75$
MI	41.8	7.3	14.8	22.7	45.1	8.9	17.4	26.4
WI	48.3	11.3	20.6	29.3	52.3	13.2	24.0	33.7
PCI	38.4	6.1	12.2	18.4	41.1	7.3	14.3	21.0
EI	44.5	9.6	17.4	24.5	48.0	11.1	20.2	28.0

Source: Authors' calculations.

changes with historical trends observed for the US. The Census Bureau reports that the Gini coefficient was very stable during 1993–98; it varied only from 45.4 to 45.9. During the period 1967–92, when 'the shape of the household income distribution changed dramatically' (US Bureau of the Census, 2000, p. 3), it changed from 39.9 to 43.4. During the same period, the Atkinson index (with $e=0.50$) changed from 14.3 to 16 (US Census Bureau, 2000, p. 9). Judging by this yardstick, it appears that the picture of inequality changes quite substantially if the conventional income measure is adjusted for wealth or public consumption.

It is also informative to look at the changes in the entire distributions of MI, WI and PCI over time. Figure 1 shows the percentage change in the percentile cut-offs at five-percentile increments. Clearly, the rate of increase is the highest for WI at all percentiles and not only at the median. Furthermore, the percentage increase at the 95th percentile of the WI distribution is striking (27%). The rate of increase in PCI falls somewhat short of the rate of increase in MI up until the 20th percentile, after which it is either slightly higher or equal to the rate of increase in MI.

6. Conclusions

The level and distribution of economic well-being is substantially affected by household wealth and public consumption. Measures of economic well-being that incorporate these determinants of well-being therefore display significant differences from the widely used official measure, MI (see Table 7).

The mean values of MI and PCI have changed at about the same rate between 1989 and 2000, while mean WI shows substantially faster growth. However, *median* PCI and WI both grew faster than median income. The results remain unchanged when the various income measures are adjusted for household size and composition using an equivalence scale.[1] The rates of increase in all three equivalence-scale-adjusted

---

[1] We employed the three-parameter equivalence scale used currently in the Census Bureau's experimental poverty measures (Short, 2001, Technical Appendix (Table A-2)). For single parents, the scale is $(A+0.8+0.5\star(C-1))^{0.7}$, while for all other households, it is $(A+0.5\star C)^{0.7}$, where A is the number of adults and C is the number of children.
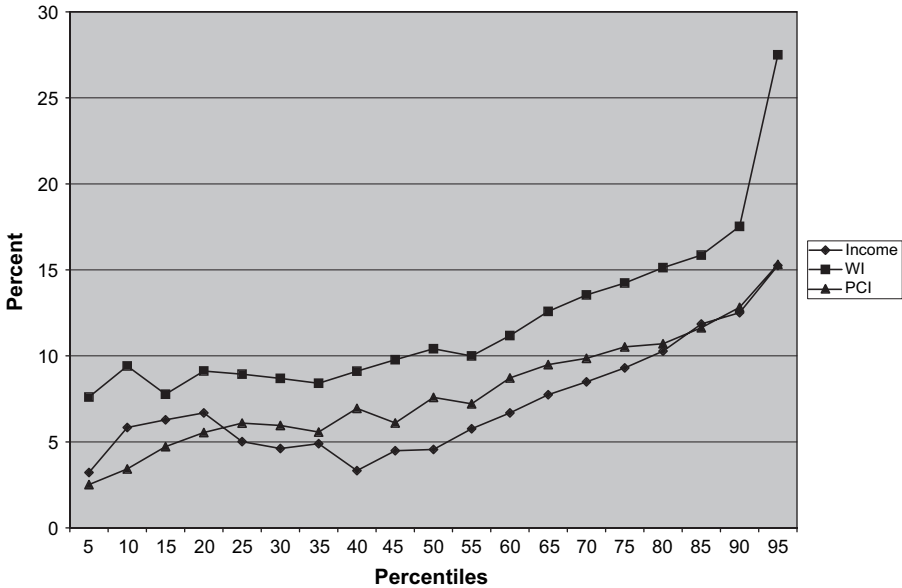
Fig. 1. *Percentage change in money income (Income), wealth adjusted income (WI) and public consumption adjusted income (PCI) percentiles, 1989–2000.*
Source: Authors' calculations.

Table 7. *Alternative measures of economic well-being, 1989 and 2000 (in 2000 dollars)*

Measure	Median			Mean		
	1989	2000	Change (%)	1989	2000	Change (%)
MI	40,167	42,000	5	49,570	57,140	15
WI	43,514	48,044	10	61,533	75,594	23
PCI	47,265	50,904	8	56,710	65,382	15
EI	51,137	56,711	11	68,743	83,836	22
Equivalence scale adjusted						
MI	*53,655*	*57,095*	*6*	*65,659*	*76,236*	*16*
WI	*58,700*	*65,134*	*11*	*83,108*	*102,996*	*24*
PCI	*62,218*	*67,396*	*8*	*73,799*	*85,597*	*16*
EI	*67,340*	*74,987*	*11*	*91,359*	*112,358*	*23*

Source: Authors' calculations.

measures are comparable with the rates of increase in the unadjusted measures. We also found that measured inequality increased when imputed income from wealth was included in household income and reduced when public consumption was included. However, the inequality of income adjusted for wealth or public consumption increased to about the same degree over the 1989–2000 period as MI alone.

We tested the sensitivity of our findings to certain key assumptions we made.[1] For income from wealth, we tested two alternative assumptions separately: (a) for home wealth, assign homeowners the annual benefits of converting one's home equity into an annuity; (b) for non-home wealth, assign households the sum of property income and net realised capital gains. Both alternatives reflect Census Bureau practices (see DeNavas-Walt et al., 2003). The main conclusions of the paper remain unchanged under the two new alternatives. However, the new assumptions both yield lower mean values of income from wealth with the difference more pronounced under alternative (b). Under assumption (a), the mean value of home wealth is similar to ours for the lower half of the income distribution and increasingly lower than ours in the upper half whereas, under assumption (b), the mean value of non-home wealth is substantially lower than ours throughout the distribution, and the difference is striking at the top.

In the case of public consumption, we tested three alternative assumptions separately: (a) distributing general public consumption according to money income; (b) allocating the non-household portion of highway expenditures to the households according to the share in personal consumption expenditures by income groups; and (c) distributing half of the schooling expenditures to capitalist households according to their shares in aggregate capitalist income and distributing the remainder among students by making adjustments for differentials in high-school graduation rates between students in various income groups and differentials in future earnings between high-school graduates and non-graduates.[2] Our main findings based on our original assumptions remained largely unchanged by the three new alternative assumptions. The one exception is that the use of assumption (c) leads to a large share of public consumption allocated to recipients of capitalist income, and a correspondingly greater share of public consumption and PCI concentrated in the top decile.

A fuller picture of economic well-being can be obtained only if other determinants are also taken into account. In particular, the analysis of public consumption and wealth reported here needs to be supplemented by accounting for taxes and government non-cash transfers. Non-market production, especially, household production, is also crucial to economic well-being. A measure that incorporates these additional determinants along with those discussed in this paper is perhaps the ideal yardstick against which the adequacy of the official money income measure should be compared.

Bibliography

Canberra Group. 2001. *Expert Group on Household Income Statistics: Final Report and Recommendations*, Ottawa

Caner, A. and Wolff, E. N. 2004. Asset poverty in the United States, 1984–1999: evidence from the panel study of income dynamics, *Review of Income and Wealth*, vol. 50, no. 4, pp. 493–518

[1] The results of the sensitivity analysis are available from the authors upon request.

[2] The first two assumptions have often been made in previous studies (e.g., Musgrave et al., 1974) while the assumption regarding schooling follows the methodology of Peppard (1975). A household was considered as a capitalist household if (a) it received interest, dividends, rent, capital gains or income from non-farm self-employment, and (b) the combined income from such sources was at least half of its total income.

Citro, C. and Michae, R. (eds) 1995. *Measuring Poverty: A New Approach.* Washington, DC, National Academy Press

DeNavas-Walt, C., Cleveland, R. and Webster, B. H. Jr. 2003. US Census Bureau, Current Population Reports, P60-221, *Income in the United States: 2002*, US Government Printing Office, Washington, DC

Gillespie, W. 1965. The effect of public expenditure on the distribution of income: an empirical investigation, in Musgrave, R. (ed.), *Essays in Fiscal Federalism*, Washington, DC, Brookings Institution

Lakin, C. 2002. *The Effects of Taxes and Benefits on Household Income, 2000–1*, Social Analysis and Reporting Division, Office for National Statistics, UK, http://www.statistics.gov.uk/

Lerman, D. L. and Mikesell, J. J. 1988. Impacts of adding net worth to the poverty definition, *Eastern Economic Journal*, vol. 14, no. 4, 357–70

Moon, M. 1977. *The Measurement of Economic Welfare: Applications to the Aged*, New York, Academic Press

Musgrave, R. A., Case, K. E. and Leonard, H. 1974. The distribution of fiscal burdens, *Public Finance Quarterly*, vol. 2, no. 3, 259–311

O'Connor, J. (1973). 2002. *The Fiscal Crisis of the State.* New Brunswick, NJ, Transaction

Peppard, D. M. Jr 1975. 'Public Expenditure Incidence in Michigan, 1970: An Orthodox and a Radical Approach', unpublished PhD thesis, Economics Department, Michigan State University

Radner, D. B. and Vaughan, D. R. 1987. Wealth, income, and the economic status of aged households, in Wolff, E. (ed.), *International Comparisons of the Distribution of Household Wealth*, New York, Oxford University Press

Reynolds, M. O. and Smolensky, E. 1977. *Public Expenditures, Taxes, and the Distribution of Income: The United States, 1950, 1961,* 1970, New York, Academic Press

Ruggles, P. and O'Higgins, M. 1981. The distribution of public expenditure among households in the United States, *Review of Income and Wealth*, vol. 27, no. 2, 137–64

Shaikh, A. M. and Tonak, E. A. 1999. The rise and fall of the US welfare state, pp. 247–65 in Baiman, R. *et al.* (eds), *Political Economy and Contemporary Capitalism: Radical Perspectives on Economic Theory and Policy*, Armonk, NY, M.E. Sharpe

Short, K. 2001. Experimental poverty measures, pp. 60–216 in *US Census Bureau Current Population Reports*

Smeeding, T. M. and Weinberg, D. H. 2001. Toward a uniform definition of household income, *Review of Income and Wealth*, vol. 47, no. 1, 1–24

US Bureau of the Census 1993. *Measuring the Effect of Benefits and Taxes on Income and Poverty: 1992*, Washington, DC, US Government Printing Office

US Bureau of the Census 2000. The changing shape of the nation's income distribution: 1947–1998, *P60 Series*, *Current Population Reports*, P60, 204

US Bureau of the Census 2002. *Statistical Abstract of the United States: 2002*, Washington, DC, US Government Printing Office

Weisbrod, B. A. and Hansen, W. L. 1968. An income-net worth approach to measuring economic welfare, *The American Economic Review*, vol. 58, no. 5, 1315–29

Wolff, E. N. and Zacharias, A. 2003. The Levy Institute measure of economic well-being, *Indicators: A Journal of Social Health*, vol. 2, no. 4, 44–73