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Levy Institute Measure of Economic Well-Being

How Much Does Public Consumption Matter for Well-Being?

EDWARD N. WOLFF, AJIT ZACHARIAS, and ASENA CANER

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Preface

This report supplements previous findings of the Levy Institute Measure of Economic Well-Being (LIMEW) research project within our program on distribution of income and wealth. Some readers have questioned the sensitivity of our estimates in view of our imputation techniques. Therefore, the authors explore the sensitivity of their key findings to changes in the set of assumptions that they use to impute public consumption, which is a major component of the LIMEW.

The authors consider alternative assumptions regarding three components of public consumption: general public consumption, highways, and schooling. New calculations for 1989 and 2000 show that their initial major findings remain intact using alternative estimation procedures: there is a positive correlation between public consumption and the LIMEW, overall inequality is higher in 2000 than 1989, and public consumption reduces inequality. The results show that their measure of economic well-being is robust under alternative assumptions of public consumption. They conclude that government provisioning of amenities plays an important role in sustaining living standards and should be included in a measure of economic well-being.

We intend to supplement our LIMEW reports on an ad hoc basis, while continuing to provide periodic updates of our analyses of economic well-being. Our next report will analyze differences in well-being among the four regions of the United States.

Dimitri B. Papadimitriou, *President*
December 2004

Introduction

Most available measures of household economic well-being are measures of the command over, or access to, commodities—goods and services that are exchanged for money. The official measure of well-being in the United States is gross money income. This measure includes important government cash transfer payments to households (e.g., Social Security), but omits government noncash transfers such as Medicare and Medicaid. Since noncash transfers represent payments by the government to vendors who dispense their commodities to the recipients, gross money income does not accurately reflect household access to commodities. However, in recognition of the fact that noncash transfers have become the major share of transfer payments, the U.S. Bureau of the Census has published imputed income values for the predominant types of noncash transfers since the 1980s, although these values are not included in the official measure of income. In a recent welcome development, the bureau has elevated income measures that account for taxes and transfers more comprehensively, from the status of "experimental measures" to "alternative measures" of income (DeNavas-Walt et al. 2003).

Restricting attention to government transfers when considering economic well-being ignores government expenditures for the production of public amenities that substantially influence living standards (e.g., education). A distinctive feature of the Levy Institute Measure of Economic Well-Being (LIMEW) is that it includes an estimate of public consumption, i.e., an estimate of government consumption and gross investment expenditures we consider incurred directly for households. The LIMEW is constructed as the sum of the following components: base money income (gross money income minus property income and government cash transfers), employer contributions for health insurance, income from wealth, net government expenditures (transfers and public consumption, net of taxes) and the value of household production (*see* Wolff, Zacharias, and Caner 2004a regarding our concepts, sources, and methods).[1] Our estimates show that transfers and public consumption are almost identical as a percentage of the mean value of the LIMEW (9–10 percent).

Admittedly, there are serious conceptual and measurement problems involved in integrating public expenditures into a measure of economic well-being. It appears that there is no "correct" solution to many of these problems. The estimates provided in our previous reports of the LIMEW and its components for all U.S. households, some key demographic groups, and overall inequality were based on a particular set of assumptions regarding public consumption. This supplementary report explores the sensitivity of our key findings to changes in the set of assumptions that we used to impute public consumption. We hope that our discussion of alternative assumptions and estimates will generate further thinking among academics and policymakers about the relationship between public consumption and economic well-being.

Public Consumption in the LIMEW

Our estimation of public consumption requires three steps. First, we estimate expenditures by function and level of government (federal versus state and local).[2] Second, we determine the portion of government expenditures that is allocated to the household sector. Third, expenditures allocated to the household sector (aggregate public consumption) are distributed among households. There are major differences among various schools of thought in the execution of the second and third steps.

As discussed in Wolff and Zacharias (2003), a distinguishing feature of our approach is that we do not consider all public provisioning as augmenting the consumption possibilities of households. Public provisioning also serves the nonhousehold sectors. For example, highways are used for commercial and personal transportation. Our approach is to split the entire amount of government expenditures between household and nonhousehold sectors, based on assumptions regarding direct usage (actual or potential) of public amenities by each sector. Our assumptions are derived from empirical information and judgment calls. Application of this approach to specific functions of government expenditures estimated in the first step results in the exclusion of expenditures on certain functions (e.g., defense); the exclusion of a portion of expenditures on other functions (e.g., highways); and the inclusion of all expenditures on the remaining functions (e.g., schooling).[3]

After determining the aggregate amount of public consumption, we distribute it among households using, as much as possible, the same principles of direct usage and cost responsibility that we employ when splitting total government expenditures between the household and nonhousehold sectors. As in other studies (e.g., Musgrave, Case, and Leonard 1974) we distinguish between two major categories of public consumption: general (distributed equally among persons) and specific (distributed

according to household characteristics). A basic difficulty in estimating public consumption by individual households is the identification of actual or potential users of public amenities, and, where necessary, the extent of usage. Since information regarding the use of various public amenities is not available in the Annual Demographic Survey (ADS), our main data source, we impute household usage patterns based on summary information from other surveys (e.g., the shares of vehicle miles traveled by households in various locations and income groups is imputed from official surveys on personal transportation) and the set of household characteristics reported in the ADS.

In the following discussion, we refer to the set of assumptions used in the LIMEW as benchmark assumptions. Estimates for 1989 and 2000, calculated with benchmark assumptions and reported in our previous publications (Wolff, Zacharias, and Caner 2004a, 2004b), are referred to as benchmark estimates.

Alternative Assumptions

In this report, we consider alternative assumptions regarding three components of public consumption: general public consumption (mainly expenditures on police, fire protection, and public health), highways, and schooling (elementary and secondary education). The components account for a large portion of public consumption and total government expenditures. In 2000, general public consumption constituted 27 percent of total public consumption, highways accounted for 9 percent, and schooling, the largest component by far, took up nearly 45 percent. The shares were similar in 1989.

Assigning Benefits

The alternative assumptions presented below impute monetary values to presumed benefits from government expenditures, rather than only considering the costs involved in public provisioning, as in our benchmark assumptions. These assumptions can result in a different distribution of public consumption than our benchmark assumptions. We note that Assumption 2, by allocating the entire expenditure on highways to households, also changes the total amount of public consumption.

Assumption 1: The benchmark assumption is that general public consumption consists of services that are equally available to all persons, so expenditures incurred in provisioning are distributed equally among individuals. An alternative assumption is that the benefit to households from government expenditures varies positively with household income levels, so expenditures are distributed according to money income. For example, higher-income households might benefit more from police and fire protection. They are likely to use publicly provided recreational and cultural amenities, such as museums and national parks, more often (Musgrave, Case, and Leonard 1974).

Assumption 2: In the benchmark case, we allocate about 60 percent of government expenditures on highways to the household sector, on the basis of our estimate of the division of highway and road usage between the household and business sectors.[4] An alternative assumption is that there are perfectly competitive markets, so expenditures directly attributable to commercial vehicles indirectly benefit households by lowering consumer prices. Therefore, these expenditures are distributed according to household shares in consumption expenditures (Gillespie 1965). As in the benchmark case, the expenditure directly attributable to the household sector is distributed among households according to their imputed shares in highway usage (vehicle miles traveled).

Assumption 3: In the benchmark case, we allocate all government expenditures on schooling to households with public school students who are the direct users of educational services. Schooling expenditures in each state are distributed among households, according to the number of public school students in each household. While the costs are incurred on behalf of students, it is indisputable that public schooling benefits not only students, but also the wider community, and meets the need for new workers. Hence, an alternative is that a portion of schooling costs should be allocated to other beneficiaries. Based on this logic, business owners (i.e., those who derive a substantial portion of their income from property-type income and whom we refer to below, for simplicity, as "capitalists") benefit from the creation of a trained and subservient workforce (Bowles and Gintis 1976). Furthermore, students on different rungs of the income ladder could have different levels of education and, therefore, different trajectories of future earnings. Accordingly, some account needs to be taken of the indirect benefits accruing to capitalists and differential benefits accruing to students.

Estimating Benefits

We calculate public consumption by changing the assumption regarding one component (general public consumption, highways, or schooling) while holding the other components constant. Public consumption under Assumption 1 is estimated using our basic data source (ADS), which contains data on household income. However, Assumption 2 requires information on consumption expenditures, which is not available in the ADS. For each of the four regions in the United States, we calculate the shares in aggregate consumption expenditures by various household income groups, using data from the Consumer Expenditure Survey conducted by the Bureau of Labor Statistics. The estimated shares are then imputed to households in the ADS sample.

Estimating the distribution of schooling expenditures on the basis of Assumption 3 follows the methodology developed by Peppard (1975).[5] We divide schooling expenditures between households with public school students and capitalist households equally by assuming, somewhat arbitrarily, that benefits from schooling expenditures accrue equally to capitalists and students.[6] A household is classified as capitalist if: (a) it receives either dividends, interest, rent, net realized capital gains, or nonfarm self-employment income; and (b) the total income from these sources (capitalist income) is half or more of modified money income (i.e., ADS money income plus net realized capital gains). The amount of schooling expenditures allocated to capitalist households is distributed among 20 equal-sized groups of households, ranked in terms of their capitalist income, according to each group's share of aggregate capitalist income. Each capitalist household in a specific group is assigned an equal amount of benefits.

Expenditures for households with public school students (i.e., student expenditures) in each state are split between students expected to complete high school and those not expected to complete high school. The amount for the latter is calculated by multiplying student expenditures by the national percentage of high school seniors who fail to graduate (about 6 percent and 9 percent in 2000 and 1989, respectively) and by the ratio of work-life earnings of nongraduates to graduates (0.74).[7] The total expenditures for students expected to graduate are calculated as a residual (i.e., by subtracting the total expenditure for nongraduates from the total student expenditures). Our assumption is that, since nongraduates earn less than graduates, the benefits they derive from government expenditures are also lower by the same proportion.

Within each state, public school students are separated into those expected to be graduates and nongraduates by using the national high school graduation rates, differentiated among three income groups (less than $20,000, $20,000–$40,000, and more than $40,000).[8] Since there is no information about graduation rates in the ADS, we assume that the national graduation rates by income group, which we estimated from the public-use data files of the October Supplement of the Current Population Survey, are also valid for the ADS sample. This assumption allows us to fix a control total for potential graduates in each income category. Random selections are made from the students in each category until the control total is reached. The government expenditures allocated to potential graduates and nongraduates are distributed on an equal per capita basis.

Distribution of Public Consumption

Our results indicate that there is a positive correlation between public consumption and the LIMEW under the benchmark and alternative assumptions (Figure 1 and Table 1). Under Assumption 1, general public consumption is distributed on the basis of money income rather than household size (the benchmark case). Assumption 1 produces a stronger correlation between public consumption and the LIMEW across deciles than under benchmark assumptions (Table 2) because the correlation between money income and the LIMEW is much stronger than that between household size and the LIMEW.[9] The sizeable share of general public consumption in overall public consumption also contributes to the stronger correlation.

The additional amount of highway expenditures is distributed under Assumption 2 according to household shares in consumption expenditures, which are also positively correlated with money income and the LIMEW. However, the additional amount is relatively small compared to general public consumption or schooling expenditures, so this assumption does not alter significantly the distributional profile of overall public consumption (Table 3).[10]

The distribution of schooling expenditures under Assumption 3 is quite different from the benchmark case (Table 4). In particular, the top and bottom deciles are the beneficiaries to a much greater degree. Adjusting the distribution of schooling expenditures for differential graduation rates and future earnings has almost no effect, as the percentage deviation of each decile's mean from the overall mean is almost

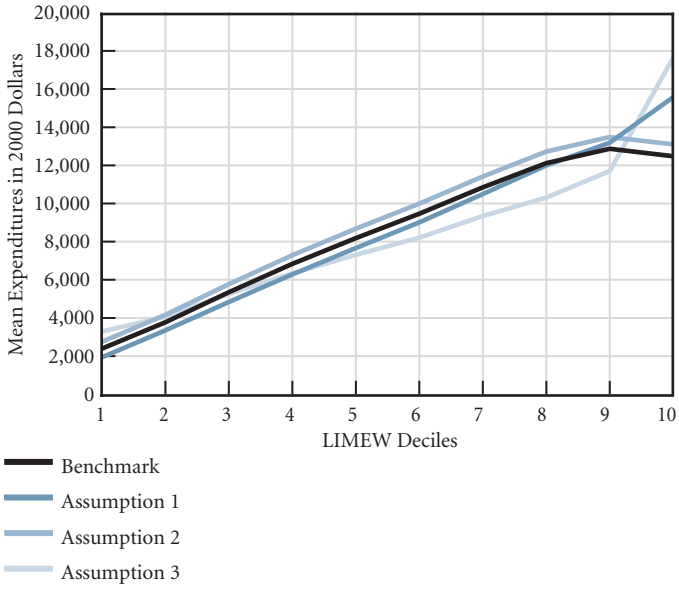
Table 1 Public Consumption by LIMEW Deciles under Benchmark and Alternative Assumptions, 1989 and 2000 (Mean amounts in 2000 dollars)

	1989				2000			
LIMEW decile	Benchmark	Assumption 1	Assumption 2	Assumption 3	Benchmark	Assumption 1	Assumption 2	Assumption 3
1	2,359	1,984	2,570	3,256	2,389	1,937	2,751	3,289
2	3,366	2,970	3,598	3,663	3,769	3,346	4,163	4,071
3	4,783	4,313	5,038	4,726	5,349	4,833	5,769	5,262
4	5,709	5,302	5,987	5,514	6,835	6,280	7,291	6,341
5	6,968	6,509	7,268	6,497	8,189	7,665	8,682	7,306
6	7,972	7,594	8,298	7,262	9,463	9,009	9,995	8,207
7	9,052	8,846	9,410	7,950	10,845	10,492	11,414	9,347
8	10,110	10,198	10,510	9,014	12,122	12,000	12,725	10,314
9	11,210	11,781	11,641	10,438	12,869	13,193	13,487	11,703
10	10,565	12,568	11,018	13,515	12,476	15,583	13,101	17,647
All	7,211	7,211	7,535	7,211	8,242	8,242	8,745	8,242

Table 2 General Public Consumption under Benchmark Assumptions and Assumption 1, 1989 and 2000 (Mean amounts in 2000 dollars)

	1989		2000	
LIMEW decile	Benchmark	Assumption 1	Benchmark	Assumption 1
1	940	565	1,018	567
2	1,192	797	1,316	893
3	1,508	1,038	1,648	1,132
4	1,703	1,297	1,955	1,400
5	1,991	1,532	2,203	1,679
6	2,181	1,803	2,437	1,983
7	2,376	2,170	2,659	2,306
8	2,528	2,617	2,858	2,735
9	2,743	3,314	3,024	3,348
10	2,774	4,778	2,983	6,090
All	1,994	1,994	2,174	2,174

Figure 1 Public Consumption under Benchmark and Alternative Assumptions, 2000



Notes for Table 1, Table 2, and Figure 1: Benchmark refers to the standard assumptions in the LIMEW.
Assumption 1 distributes general public consumption by household money income.
Assumption 2 allocates entire expenditure on highways to the household sector and distributes indirect benefits by shares in consumption expenditures.
Assumption 3 splits the expenditure on schools between student and capitalist benefits, and distributes capitalist benefits according to capitalist income.

Source: Authors' calculations

Table 3 Distribution of Highway Expenditures by LIMEW Decile under Benchmark Assumptions and Assumption 2 (Mean amounts in 2000 dollars)

	1989				2000			
	Benchmark	Assumption 2			Benchmark	Assumption 2		
LIMEW decile		Direct benefit	Indirect benefit	Total		Direct benefit	Indirect benefit	Total
1	391	391	211	602	449	449	363	812
2	495	495	232	727	622	622	394	1,016
3	573	573	255	828	688	688	420	1,109
4	642	642	278	921	744	744	457	1,201
5	686	686	301	987	780	780	493	1,273
6	718	718	325	1,043	806	806	533	1,339
7	745	745	358	1,102	813	813	569	1,381
8	768	768	400	1,168	797	797	603	1,400
9	769	769	431	1,200	775	775	618	1,394
10	723	723	453	1,177	728	728	625	1,354
All	651	651	325	975	714	714	503	1,217

Note: Assumption 2 allocates the entire expenditure on highways to the household sector and distributes indirect benefits by shares in consumption expenditures.

Source: Authors' calculations

Table 4 Distribution of Schooling Expenditures by LIMEW Decile under Benchmark Assumptions and Assumption 3 (Mean amounts in 2000 dollars)

	1989				2000			
	Benchmark	Assumption 3			Benchmark	Assumption 3		
LIMEW decile		Student benefit	Capitalist benefit	Total		Student benefit	Capitalist benefit	Total
1	331	160	1,068	1,227	233	115	1,018	1,133
2	738	368	668	1,035	871	430	743	1,173
3	1,567	790	719	1,509	1,781	883	811	1,694
4	2,085	1,041	849	1,890	2,741	1,362	884	2,246
5	2,932	1,458	1,003	2,461	3,661	1,827	951	2,778
6	3,617	1,816	1,091	2,907	4,587	2,295	1,036	3,331
7	4,473	2,244	1,127	3,370	5,583	2,793	1,292	4,085
8	5,114	2,552	1,466	4,018	6,454	3,233	1,414	4,646
9	5,631	2,825	2,033	4,858	6,827	3,423	2,238	5,661
10	4,396	2,187	5,159	7,346	5,758	2,888	8,040	10,928
All	3,088	1,544	1,544	3,088	3,726	1,863	1,863	3,726

Note: Assumption 3 splits the expenditure on schools between student and capitalist benefits, and distributes capitalist benefits according to capitalist income.

Source: Authors' calculations

Figure 2 Ratio of Public Consumption to the LIMEW, 2000

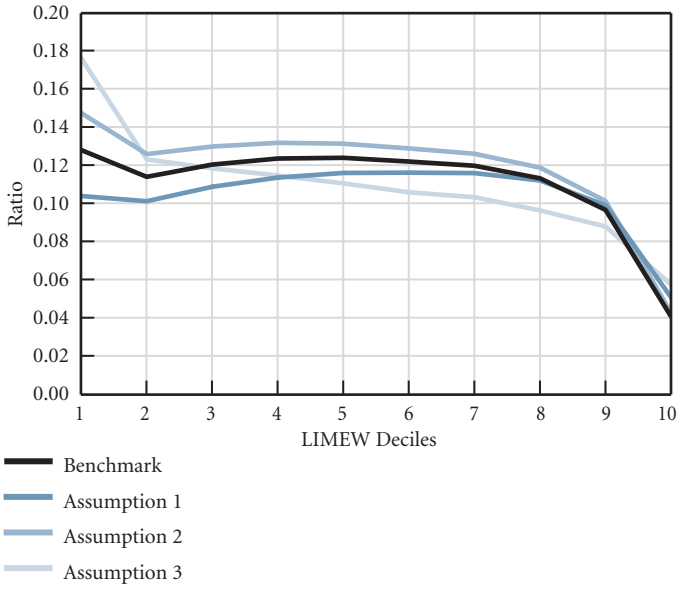
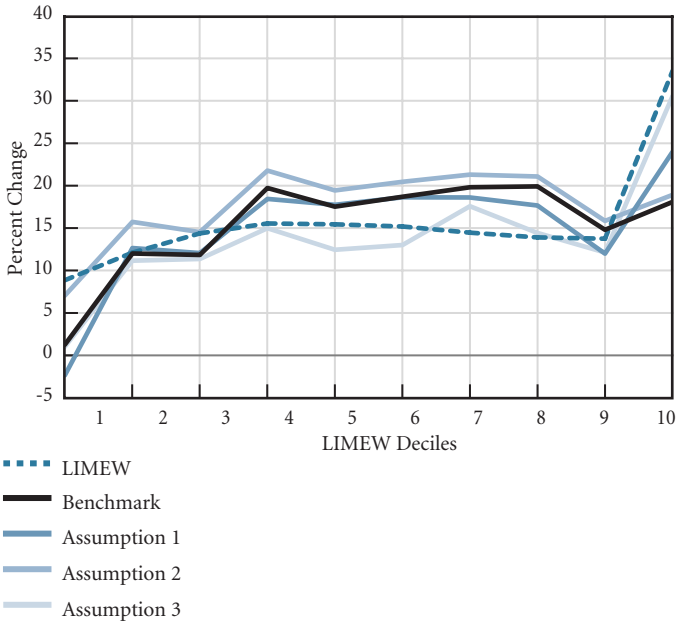


Figure 3 Change in Mean Public Consumption and Mean LIMEW, 1989–2000



Notes for Figure 2 and Figure 3: Benchmark refers to the standard assumptions in the LIMEW.
Assumption 1 distributes general public consumption by household money income.
Assumption 2 allocates entire expenditure on highways to the household sector and distributes indirect benefits by shares in consumption expenditures.
Assumption 3 splits the expenditure on schools between student and capitalist benefits, and distributes capitalist benefits according to capitalist income.

Source: Authors' calculations

identical for the benchmark estimates and student benefits. The positive correlation between schooling expenditures and the LIMEW in the benchmark case is due primarily to the fact that there are more households with school-age children in the upper deciles. Assumption 3 also produces a pattern where public consumption rises steadily with the LIMEW. However, the slope of this relationship appears flatter, except at the very top of the distribution, as a result of the skewed distribution of capitalist income (*see* Figure 1).

While the correlation between public consumption and the LIMEW is positive in all cases, the distribution of public consumption under Assumptions 1 and 3 appears to favor the rich. This is shown in Figure 1 by the intersection point of the curve corresponding to each of these assumptions and the benchmark curve. Assumption 1 results in a redistribution of public consumption from the lower to the top two deciles. Under Assumption 3, the redistribution favors the bottom two deciles slightly and the topmost decile enormously at the expense of the households in the 5th to 9th deciles. The pattern is driven by the relatively large size of the expenditures concerned (general public consumption and schooling) and the skewed distribution of money income and capitalist income. While the degree of concentration of money income is well known, it should be noted that capitalist income is even more concentrated: the top decile's shares in the respective aggregates were 33 and 59 percent, respectively, in 2000. We conclude that, while the benchmark assumptions result in a mildly pro-rich distribution of public consumption, Assumptions 1 and 3 result in a strongly pro-rich distribution.

Two other notable findings are that public consumption falls as a percentage of the LIMEW in the higher deciles and that the top decile experienced the fastest growth in public consumption and the LIMEW between 1989 and 2000. As shown in Figures 2 and 3, these findings are robust under all assumptions.

We next consider how overall inequality is affected by our alternative assumptions. Overall inequality in the LIMEW is higher in 2000 than 1989 under all assumptions. As shown in Table 5, the degree of inequality in the benchmark case and Assumption 2 (highways) is almost identical (41.6 versus 41.4 for the Gini coefficient in 2000). Alternative assumptions regarding

general public consumption (Assumption 1) and public schools (Assumption 3) result in slightly higher measured inequality (a 0.5-point increase in the Gini coefficient in 2000). We also found that, at the margin, public consumption has an inequality-reducing effect under the benchmark and alternative assumptions. We estimate that a 1 percent increase in every household's public consumption reduces the Gini coefficient by about 3 to 4 percent, all else being equal. Similar comparisons for 1989 yield similar results.

We also examined how three key demographic groups fared with respect to public consumption under our alternative assumptions in 2000 (Figure 4). Relative to our benchmark estimates, disparities are slightly different under Assumption 2, minor under Assumption 1, and substantially different under Assumption 3. However, it is noteworthy that the direction of the disparity is the same under all assumptions: in terms of the ratio of mean values of public consumption, nonwhites are greater beneficiaries than whites,[11] single female–headed families receive more than married-couple families, and the elderly receive less than the nonelderly.

Assumption 3 shows a much lower advantage for nonwhites and single female–headed families, and a significantly lower disadvantage for the elderly because it alters the distribution of schooling expenditures—the major component behind the disparities.[12] Allocating half of schooling expenditures to capitalist households under this assumption is quite obviously why the elderly appear to have a lower disadvantage in public consumption. Only a small minority of elderly households has school-age children, but their mean capitalist income is 13 percent more than nonelderly households, and their share in aggregate capitalist income is 23 percent. Gaps in capitalist income also account for the changing disparity of nonwhites and single female–headed families. The mean capitalist income of nonwhites is only 47 percent of whites and their share in aggregate capitalist income is merely 14 percent. The mean capitalist income of single female–headed families is only 24 percent of the mean capitalist income for married couple families, and their share in aggregate capitalist income is a meager 4 percent. As a result, capitalist benefits from schooling expenditures accruing to whites and married couples more than offset their disadvantage in student benefits and contribute to shrinking the relative gaps in public consumption.

As shown in Table 6, our alternative assumptions regarding public consumption have little effect on the growth of the median value of the LIMEW. Our standard LIMEW measure shows an 11 percent growth between 1989 and 2000, while the three alternative estimates show growth to be between 10.4 percent (Assumption 3) and 11.3 percent (Assumption 2).

Table 5 The Effects of Alternative Assumptions about Public Consumption on Inequality in the LIMEW, 1989 and 2000 (Inequality coefficient x 100)

	1989				2000			
	Gini	Atkinson			Gini	Atkinson		
Assumptions		e = 0.25	e = 0.50	e = 0.75		e = 0.25	e = 0.50	e = 0.75
Benchmark	38.8	7.4	13.5	19.0	41.6	8.6	15.5	21.6
Assumption 1	39.2	7.5	13.8	19.4	42.1	8.7	15.8	22.1
Assumption 2	38.7	7.4	13.4	18.9	41.4	8.5	15.4	21.4
Assumption 3	39.1	7.5	13.7	19.1	42.1	8.8	15.9	21.9

Notes: Benchmark refers to the standard assumptions in the LIMEW.
Assumption 1 distributes general public consumption by household money income.
Assumption 2 allocates entire expenditure on highways to the household sector and distributes indirect benefits by shares in consumption expenditures.
Assumption 3 splits the expenditure on schools between student and capitalist benefits, and distributes capitalist benefits according to capitalist income.

Source: Authors' calculations

Figure 4 Disparities in Public Consumption by Household Characteristics

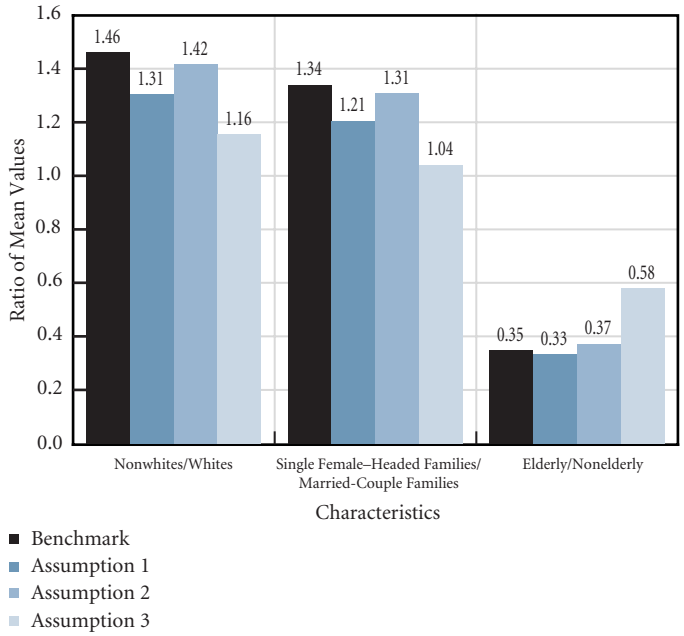


Table 6 The Effects of Alternative Assumptions about Public Consumption on Median LIMEW, 1989 and 2000 (in 2000 dollars)

Assumptions	1989	2000	Change (%)
Benchmark	62,200	69,052	11.0
Assumption 1	61,748	68,499	10.9
Assumption 2	62,521	69,566	11.3
Assumption 3	61,534	67,912	10.4

Notes for Figure 4 and Table 6: Benchmark refers to the standard assumptions in the LIMEW.
Assumption 1 distributes general public consumption by household money income.
Assumption 2 allocates entire expenditure on highways to the household sector and distributes indirect benefits by shares in consumption expenditures.
Assumption 3 splits the expenditure on schools between student and capitalist benefits, and distributes capitalist benefits according to capitalist income.

Source: Authors' calculations

Conclusion

Government provision of amenities, such as public education and public health, plays an important role in sustaining living standards. Economists disagree about the relevant types of government expenditures that should be considered when measuring economic well-being (e.g., whether to include expenditures on national defense). There is also disagreement about how to value amenities and distribute the values among households. Given the importance of public consumption, however, we have included it in the LIMEW. Inevitably, several assumptions had to be made in allocating and distributing government expenditures among households. In this report, we addressed the sensitivity of our benchmark findings to some alternative assumptions.

The distribution of public consumption across deciles of the LIMEW displays a pro-rich pattern under our benchmark and alternative assumptions. While the benchmark estimates show a mild pro-rich pattern, alternative assumptions regarding general public consumption (Assumption 1) and schooling (Assumption 3) show a stronger pro-rich pattern. We were not surprised that overall inequality was also higher under these two assumptions than under benchmark assumptions, if only by a small amount (a 0.5-point increase in the Gini coefficient). We also found that public consumption has an inequality-reducing effect under all assumptions. The disparity in public consumption between whites and nonwhites, single female–headed and married-couple families, and elderly and nonelderly households, was similar in the benchmark case and Assumptions 1 and 2. The disparity was notably different under Assumption 3, however, due to the disproportionate accrual of capitalist benefits from schooling expenditures to whites, married couples, and the elderly. Thus, the measured advantage of nonwhites, single female–headed families, and the nonelderly in public consumption was lower than under benchmark assumptions.

The results show that our estimates of the level and distribution of economic well-being based on the benchmark assumptions are quite robust under the alternative assumptions regarding public consumption considered in this report. We hope that these findings will give readers greater confidence in the LIMEW and generate further discussion about the relationship between public consumption and economic well-being.

Notes

1. Our inclusion of public consumption in a measure of economic well-being draws upon a number of sources. An international association of experts on household income statistics, known as the Canberra Group, has recommended including some items of public expenditure (e.g., education). The Office for National Statistics in the United Kingdom and the Australian Bureau of Statistics issue regular publications assessing the effects of taxes, transfers, and some items of public expenditure on households. There are numerous studies on how the distribution of economic well-being across income groups or social classes is altered after accounting for taxation and government spending.
2. The definition of government expenditures used here is the one on the product side of the U.S. National Income and Product Accounts (NIPA): government consumption expenditures and gross investment. Since the disparities in state and local expenditures that exist across states could affect the distribution of economic well-being, we allocated the NIPA aggregate of state and local expenditures among the states. The allocation of expenditures by state was estimated using the Annual Survey of Government Finances conducted by the U.S. Bureau of the Census. We followed the functional classification (classification according to purpose) schema used in the NIPA, with minor modifications.
3. Our estimates of public consumption amounted to 44 and 51 percent of total government expenditures in 1989 and 2000, respectively. The share of public consumption in nondefense expenditures was 65 percent in both years.
4. We derived this proportion from a study by the Federal Highway Administration on cost responsibility among vehicle types and shares in vehicle miles by vehicle type in each state.
5. See also Peppard (1976) and O'Connor [1973] (2002).
6. Peppard (1975) used an arbitrary share of 60 percent for the capitalists to highlight that the majority of the benefits goes to the capitalists (p. 144), in contrast to the assumption made in several earlier studies that the benefits from schooling expenditures accrue to households with students and other households equally. An alternative would be to use estimates from the recent empirical studies on social returns on education (*see* Venniker 2001 for a survey). However, these studies generally report rates of return that are far lower than 50 percent and vary widely between 4 percent and 23 percent.
7. The work-life earnings ratio estimate is taken from Day and Newburger (2002). Work-life earnings represent the average expected earnings of a worker with a given level of education during a hypothetical 40-year working life. They were calculated using the average annual earnings of workers in years 1997 to 1999 and summing their age-specific average earnings for those in the 25 to 64 age bracket.
8. These three income groups are used in official reports on school enrollment (Jamieson et al. 2001).
9. The Pearson correlation coefficient between money income and the LIMEW is 0.45 in 2000. Under benchmark assumptions, the correlation between public consumption and the LIMEW is 0.13 in 2000, while under Assumption 1, it is 0.21.
10. In fact, the correlation between these two estimates of public consumption is almost equal to 1.
11. "Whites" refers to non-Hispanic whites and "nonwhites" refer to all other racial and ethnic groups.
12. Under the benchmark assumptions in 2000, schooling accounted for about 60 to 70 percent of the absolute gap in public consumption between groups in each pair considered here (white vs. nonwhite households, married-couple vs. single female–headed families, and the elderly vs. the nonelderly).

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