

**Evaluating the Construct of a Canberra Household Income Definition
Using the Annual Social and Economic Supplement to the
Current Population Survey (CPS ASEC)**

Jessica Semega
U.S. Census Bureau
Jessica.L.Semega@census.gov

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Abstract

The Canberra Group is an expert panel that initially came together in 1996 to discuss and to enhance the comparability of national household income statistics. The result of this panel was the *Canberra Group Handbook* (The Canberra Group, 2001). This paper discusses the use of CPS ASEC variables to construct household income estimates based on the recommendations in an updated version, *Canberra Group Handbook on Household Income Statistics Second Edition* (The Canberra Group, 2011). This is the Census Bureau's attempt to apply Canberra Group methodology and concepts to broaden the money income definition to compare internationally. This paper will discuss the feasibility and limitations of using ASEC variables in a Canberra Group definition of household income. Summary measures presented for calendar year 2010.

Introduction

In the early 1980's the Census Bureau began working on alternative income measures to better show the effects of taxes and government transfers (both means and non-means tested, as well as cash and non-cash transfers) on the standard money income definition (which does not include taxes and non-cash transfers) using the Current Population Survey Annual Social and Economic Supplement (CPS ASEC). Incorporating taxes and non-cash transfers allows for analysis on the effectiveness of domestic policy on income and poverty, as well as the effect taxes and transfers have on income distribution. This paper discusses how the methods used to construct the alternative income measures might apply to a unified international income construct developed by the Canberra Group.

Background

The Canberra Group is an expert panel convened by the United Nations at the initiative of the Australian Bureau of Statistics to bring together a collection of experts from both national statistical agencies as well as other national and international statistical offices, to discuss and enhance the comparability of national household income statistics.

Charged with the goal of addressing common conceptual, definitional and practical problems facing different nations in being able to compare household income distribution statistics, the result of this panel was the first edition *Final Report and Recommendations of the Expert Group on Household Income Statistics* (2001), commonly referred to as the *Canberra Group Handbook*. In 2008, the Conference of European Statisticians (CES) did a review of income statistics and poverty resulting in some recommendations for a revised *Canberra Group Handbook*. The *Canberra Group Handbook on Household Income Statistics, Second Edition* (2011) is a consolidated reference that expresses the current international standards and provides guidelines on best practices for internationally comparable household income statistics. There is no difference in the concept of household income between the two editions of the handbook. The main exceptions are the *value of unpaid domestic services* and the *value of services from household consumer durables* which are included in the conceptual definition of income but not the operational.

This paper uses the Annual Social and Economic Supplement (ASEC) to the Current Population Survey (CPS), conducted by the US Census Bureau, to evaluate household income in accordance with the Canberra Group's recommendation. The ASEC asks each person in the sample 15 years old and over detailed questions categorizing income into over 50 sources along with question about participation in various government noncash programs. The ASEC is the official source of the US national poverty estimates (DeNavas-Walt et al., 2010). The ASEC is a sample survey and therefore is affected by two types of error: sampling and nonsampling.¹ Included in nonsampling error, Roemer (2000) claims that respondents to the ASEC are reluctant to report certain income amounts, they could fail to report the receipt of income, fail to report the amount, under-report or over-report the amount, or misclassify income. This can affect imputation rates to those respondents who do not provide certain income amounts.

Weinberg (2004) details in his paper *Income Data Quality Issues in the CPS ASEC*, "Conceptually at least, the CPS ASEC collects or imputes almost all of the components of income necessary to compute the Canberra Group's comprehensive measure. The major components that are missing are home production for home use or barter transactions (relatively unimportant in the U.S. context), transfers paid to another household or payments made on behalf of another household², and some employer provided fringe benefits (particularly company cars and subsidized meals)." Also missing from ASEC data are the two concepts added to the Canberra Group Handbook (2011): *value of unpaid domestic services* and the *value of services from household consumer durables*. Weinberg (2004) discusses, in detail, the qualifications of using the CPS ASEC to construct the Canberra income definition. As part of the data processing of the CPS ASEC, the Census Bureau imputes or models values not collected in the survey such as state and federal taxes, return to home equity, housing subsidies, market values of Medicaid and Medicare, employer provided health benefits, and net imputed rental income. The methods used to value each have their benefits and drawbacks. A

¹ Data are subject to error arising from a variety of sources. For more information on sampling and non-sampling error, see www.census.gov/apds/techdoc/cps/cpsmar11.pdf (accessed June 21, 2012).

² Beginning in ASEC survey year 2010, new questions on the cost of child care, amount of child support paid and received, and the value of medical expenditures were added to the questionnaire.

complete description of the methods used to value non-cash benefits and model taxes can be found in the Census Bureau report, P60 series, No. 176 RD *Measuring the Effect and Benefits of Taxes and Transfers on Income and Poverty, 1990*.

This next section discusses the individual components, defined by the Canberra Group, that constitute the different definitions of internationally comparable household income, as well as, the feasibility and limitations of using data from the CPS ASEC to construct those income components. Table 1 shows the individual elements of the Canberra income construct (Canberra Group Handbook Table 2.1) and whether the CPS ASEC provides the income elements by directly collecting the data, imputing or modeling the data, or not providing the data. There are four main components in the Canberra income construct (shown in Table 1): 1) Income from employment, 2) Property income, 3) Income from household production of services for own consumption, and 4) Current transfers received. Those components are then summed to produce 5) Income from production, 6) Primary income, and 7) Total income. From ‘Total income’, Canberra subtracts ‘Current transfers paid’ (or received based on tax refunds) to arrive at 9) Disposable income, from which 10) Social transfers in kind (STIK) received, are added to get to the final international household income definition, 11) Adjusted disposable income. Social transfers in kind, and therefore adjusted disposable income, are part of the conceptual but not operational definition of the Canberra income construct. Because the CPS ASEC does allow for the valuation of some different types of STIK, they have been included in this research.

Estimating Canberra Income Using the CPS ASEC

The first component of Canberra household income is ‘Income from employment’, which includes payments received by individuals as a result of current or former involvement in paid or self-employment jobs. Using information available on the ASEC we can value total earnings from main job and ‘other’ jobs, as well as, employer contributions to health insurance. The ASEC does not provide data separately for some of the components of earnings such as some free or subsidized goods and services from an employer. Though not collected separately, commissions, tips, director fees, profit sharing bonuses, and severance or termination pay are included in ASEC earnings. The ASEC does collect earnings data on self-employment (including farm self-employment) but has no way to value *goods produced for barter, less cost of inputs or goods produced for own consumption, less cost of inputs*, so they are not included. The ASEC collects information on the number of people that were covered by an employer provided health care plans, and whether they had full or partial coverage. The ASEC file is statistically matched to the 1977 National Medical Care Expenditure Survey (NMCES), which was considered to be the best data source because of its large sample size and it is based on responses from employers of the persons who were in the household portion of the NMCES sample, to assign information on employer provided health care. This method of imputing non-government employer provided health care over 20 years old, referencing data over 35 years old from the NMCES, and should be updated to a more current data source for a more accurate estimate of employer provided healthcare.³ Current earning in ASEC are deflated to 1977 dollars to pick up the values of employer contributions for all or part of the individual’s health insurance and then these contributions are re-inflated to current dollars. A separate valuation is used for government employees (postal or non-postal)

³ The Census Bureau is currently working on a new procedure to impute employer provided health insurance contributions using a more current Medical Expenditure Panel Survey Insurance/Employer Component.

using administrative data (U.S. Census Bureau, 1992). The ASEC median for ‘Income from employment’ was \$45,176 and the mean was \$65,951 in 2010, as shown in Table 2. Income from employment is received by 77 percent of all households as measured by the ASEC.

The second income component included by the Canberra Group is property income, defined as “receipts that arise from the ownership of assets (return for use of assets) provided to others for their use. They comprise returns, usually monetary, from financial assets (interest, dividends), from non-financial assets (rent) and from royalties (return for services of patented or copyrighted material)” (Canberra Group Handbook, 2011). The ASEC collects information on rental income, interest, dividends, royalties, and income from estates and trusts.⁴ All are included in this definition of property income. Property income is received by 50 percent of all households. Table 2 shows an ‘1,250-’ for this type of income because it falls below the \$1,250 income intervals used to create the medians for this report. Amounts are however, carried forward in the medians for definition 6 ‘Primary income’ and retained to ‘Adjusted disposable income’.⁵ The mean was \$2,778 for property income.

The third component from Canberra is ‘Income from household production of services for own consumption’ which includes the net value of owner-occupied housing in the operational definition of Canberra income.⁶ Adding the value of owner-occupied housing in this calculation allows for an equalization of the difference between renters and homeowners. Also included in the conceptual but not operational definition are the *value of unpaid domestic services* and the *value of services from household consumer durables*, as both of which cannot be valued with the CPS ASEC. The ASEC collects data on tenure (owned or rented), but does not ask for a value of home equity from home owning respondents. In order to value owner-occupied housing Census uses a ‘Return to equity’ approach, by statistically matching the ASEC file to the most recent American Housing Survey (AHS) by household characteristics to obtain values of home equity and property taxes, both are calculated in the AHS. The amount of net rental income is calculated by applying the rate of return on high-grade municipal bonds (from Standard and Poor’s series), to the derived equity and subtracting property taxes. There are drawbacks to this method. Short et al., (2007) argues that using the return to municipal bonds is arbitrary and that conceptually, property taxes are already accounted for in the selected rate or return. Garnier and Short (2009) showed that estimates of rental equivalence and net rental income are highly sensitive to different methods and data used. Approximately 66 percent of households are imputed to have home ownership equity. New questions recently added to the 2010 CPS ASEC on property value and presence of a first or second mortgage may be used in the future to update this method. As with property income, the median for return on home equity is also too low to compute a median, however, the

⁴ As Roemer (2000) documents in his paper “Assessing the Quality of the March CPS and the Survey of Income and Program Participation Income Estimates, 1990-1996” there is an issue with underreporting for interest, dividends, and transfer payments. The Census Bureau uses an enhanced imputation procedure for interest.

⁵ The Census Bureau estimates median income using linear interpolation. The CPS ASEC typically uses \$2,500 income intervals, but for this report \$1,250 income intervals were applied.

⁶ Canberra (2011) states that imputed rent estimates should be presented separately from estimates for other services, though they are included in this report they could be removed for comparability.

income value is retained in the summed definitions starting with definition 5) ‘Income from production’. The mean was \$1,910 for return to equity in 2010.

The fourth Canberra income component is ‘Current transfers received’, defined as cash receipts for which the recipient does not provide anything to the donor in direct return for the receipts and can be made between households, between household and government, or between households and charities. Current transfers are a way to redistribute income by government or private entities (Canberra Group Handbook, 2011). Current transfers include alimony or child support, government and employer sponsored social insurance schemes such as pensions, unemployment and sickness benefits, as well as, other government sponsored social assistance benefits not included in social security and financial gifts from non-profit institutions such as scholarships, union strike pay, and relief payments. The ASEC, through direct data collection and imputation, is able to account for many of these transfers. The ASEC directly collect information for social security, retirement income, survivor benefits, disability benefits, workers’ compensation, veterans’ benefits, pension income from government and private employers, annuities, welfare or public assistance, union strike, alimony received, child support received, and cash gifts received. These were all included in this component of Canberra income. The median is again below \$1,250 though it is retained moving forward. About 50 percent of households in the ASEC received transfer income with a mean of \$10,104 per household.

Canberra then sums the values of the first component ‘Income from employment’ and the third ‘Income from household production of services for own consumption’ to arrive at ‘Income from production’. The ASEC median for ‘Income from production’ was \$46,299 with a mean of \$67,861 in 2010. The beginning of the summed Canberra definitions is where this report starts looking at the Gini index because all cash income has now been accounted for in the first four components. The Gini index shows the degree of income inequality. The Gini varies between 0 (all households have the same income) and 1 (one household receives all the income). By looking at the Gini index across the summed Canberra definitions one can see the effects of adding (or subtracting) different income components on the distribution of income. As shown in Table 3, the Gini index for ‘Income from production’ in 2010 was 0.563.

The sum of ‘Income from production’ and the second Canberra component, ‘Property income,’ is the sixth component called ‘Primary Income’. Using the ASEC, the median of ‘Primary income’ is \$48,048 with a mean of \$70,639 for 2010. About 94 percent of households in the ASEC have primary income. Adding in property income lowered the Gini index 1.2 percent to 0.556 in 2010 (see Table 3). Taking ‘Primary income’ and incorporating ‘Current transfers received’ gives us ‘Total income’, the seventh income component in the Canberra Group Handbook, with a median of \$58,302 in 2010. The addition of income from current transfer received has a significant impact on the Gini index, lowering it 15.0 percent to 0.473 in 2010 because most of these government transfers are distributed to households with lower income.

From ‘Total income’ Canberra subtracts definition 8 ‘Current transfers paid’, which for the ASEC includes deducting state and federal taxes, employee contributions to social insurance (since social insurance was counted from employers in employment income), child support and alimony paid to another household, to arrive at definition 9, ‘Disposable income’. The ASEC does not have any estimates for compulsory fees and fines, monies paid to charities as donations, or other compulsory inter-household transfers besides alimony and child support. Using the information available from the ASEC, the median of ‘Current transfers paid’ was \$8,945 in 2010. Approximately 83

percent of households paid transfers. The Census Bureau uses the CPS ASEC, in combination with other sources, to model individual state income taxes, individual federal income taxes, property taxes, and payroll taxes.⁷ Using detailed household and individual characteristics, the ASEC is statistically matched to IRS data and the AHS to obtain missing pieces to enhance the ASEC tax model. The original federal and state tax models applied to ASEC data are explained at a high level in U.S. Census, p60, no. 176 RD report. In the 2005 CPS ASEC, refinements were made to the tax model, detailed in a paper by Amy O’Hara (2004) entitled “New Methods for Simulating CPS Taxes”. Using a statistical match to the Statistics of Income (SOI) provided by the IRS, this model closely follows the IRS 1040 tax form and rules on filing unit formation and dependent assignment. There are limitations to the ASEC tax model when building tax units, as O’Hara states, “It is important to note that Census tax estimates assume that the tax unit will take advantage of every available credit to its legal limit. The IRS data reveal what taxpayers actually filed, not what they were eligible to file.” It is also of note that the Census tax model builds filing units based on those that live in the household when interviewed and not on who may have lived there during the previous calendar year and are no longer there, or on nonresidents who may be dependents to those living at the address. Starting in income year 2008, capital gains and losses were no longer included in the tax model, which are not included in the Canberra definition of income. Due to these limitations and various other deficiencies of the ASEC tax model and the ASEC data (under reporting and misreporting of income data), (see O’Hara, 2004) adjusted gross income (AGI), aggregate taxable income, and aggregate federal taxes are lower for the CPS ASEC than IRS benchmarks. Subtracting current transfers paid (state and federal taxes, as well as child support paid) creates a more equal distribution of income, as noted by a lowering of the Gini index 9.5 percent (to 0.428). The Canberra Group claims that disposable income is the preferred measure for income distribution analysis because most nations are progressive in taxing income in order to generate a more equally distributed household income across the distribution. The ASEC median for disposable income is \$49,119 with a mean of \$63,579 in 2010.

Disposable income is the final ‘operational’ income definition though social transfers in-kind, considered ‘conceptual’ by Canberra, are added to get to the final income definition of ‘Adjusted disposable income’. Social transfers in kind (STIK) are goods and services provided by the government and other non-profit institutions at a subsidized or free price. The ASEC collects estimates of the face value of food stamps (now called the Supplemental Nutrition Assistance Program or SNAP) received by households along with the number of households that receive housing subsidies, the number of children within a household that receive free or reduced school lunches, and participation in Medicaid and Medicare. Because ASEC does not collect data on housing cost and the AHS does collect data on actual rent directly from respondents, housing subsidies are based on a model developed by matching the ASEC to the 1985 AHS file, adjusted each year using the Consumer Price Index Residential Rent Index. The model estimates the market rent using region and various housing characteristics, subtracted from actual rent taken from the AHS provides the value of the housing subsidy.⁸ To compute the market value of

⁷ The tax model includes additional credits, including the earned income tax credit (EITC), the child tax credit, the additional child tax credit, elderly and disabled credits, the making work pay credit, and various state credits.

⁸ See Johnson et al., 2010 for a discussion of an updated method of evaluating housing subsidies discussed in detail, the paper compares the method used here and a new method developed for

Medicaid and Medicare the ASEC asks respondents if they were covered by Medicare and/or Medicaid at any time during the previous calendar year. It is assumed if they were covered at any point then they were covered the entire year. A value of Medicare and/or Medicaid is assigned based on the mean government outlay per enrolled in a given risk class.⁹ All of these valuation methods are subject to limitations for internationally comparable household income estimates and up for interpretation on whether they should be included in disposable household income. This report, in an effort to use what was readily available from the ASEC to construct the Canberra definition of adjusted disposable income, did not change any methodology in evaluating these social transfers in kind. As Canberra states, more research is needed in the methods used to value different STIK. Current methods to value in-kind transfers such as health care and housing subsidies are lacking. Is a disabled person that receives more income from Medicaid, better off monetarily? Because some STIK are available from the ASEC, they have been included in this report. Since the median falls below the \$1,250 income interval, there is no median estimate shown for social transfers in kind in Table 1, though the income is carried forward to ‘Adjusted disposable income’ and its estimate of \$55,965 in 2010. Adding ‘Social transfers in kind’ to ‘Disposable income’ decreased the Gini index 11.4 percent to 0.379 in 2010.

Conclusions

The CPS ASEC can be used to estimate a majority of the income components included in the Canberra income definition, but there are limitations and less than ideal imputations and models being used for their derivation. The CPS ASEC tax model is currently being evaluated to more adequately create filing units and more closely align with IRS benchmarks. As updated models become available they can be applied to the Canberra income construct. Some information, such as employer contributions to health insurance, are based on old data and require looking further into as health insurance has become a major issue. Return on home equity and the way the Census Bureau currently models it is open for debate as to the best way to incorporate differing geographical price differences and questions remain as to how the Census Bureau model compares internationally. Research currently underway for developing and evaluating a Supplemental Poverty Measure will likely lead to enhancements for many of Census’ evaluation methods, especially for home equity and employer provided health insurance. How these enhancements affect our Canberra income construct will be interesting future work.

the Supplemental Poverty Measure

<http://www.census.gov/hhes/povmeas/methodology/supplemental/research/Short_ResearchSPM2010.pdf>.

⁹ Medicare data are the mean outlays per state by risk class calculated by dividing the total program payments for Medicare Part A and Part B minus the total Part B premiums by the number of enrollees in Part A and/or Part B. The data are inflated to the ASEC survey year by an inflation factor found in Table V.B1.HI and SMI Average per Beneficiary Costs from the Annual Report of the Board of Trustees of the Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds. Medicaid data is obtained from the Medicaid Statistical Information System (MSIS) State Summary Datamart. Depending on the most recent year available data are inflated by 2010 Actuarial Report on the Financial Outlook for Medicaid from the Department of Health and Human Services.

Table 1. Canberra Income Components and Availability in the CPS ASEC		
	Table 2.1 Income components in the conceptual and operational definitions (Canberra Group Handbook, 2011)	Availability in the CPS ASEC
1	Income from employment (2.3.1)	
a	Employee income	
	Wages and salaries	✓
	Cash bonuses and gratuities	✓
	Commissions and tips	✓
	Directors' fees	✓
	Profit-sharing bonuses and other forms of profit-related pay	×
	Shares offered as part of employee remuneration	×
	Free or subsidised goods and services from an employer	×
	Severance and termination pay (<i>optional</i>)	✓
	Employers' social insurance contributions (<i>optional</i>) ¹	I
b	Income from self-employment	
	Profit/loss from unincorporated enterprise	✓
	Goods produced for barter, less cost of inputs	×
	Goods produced for own consumption, less cost of inputs	×
2	Property income (2.3.2)	
a	Income from financial assets, net of expenses	✓
b	Income from non-financial assets, net of expenses	×
c	Royalties	✓
	Income from household production of services for own consumption (2.3.3)	
	Net value of housing services provided by owner-occupied dwellings and subsidised rentals	I
a	subsidised rentals	I
b	Value of unpaid domestic services	×
c	Value of services from household consumer durables	×
4	Current transfers received (2.3.4)	
a	Social security pensions / schemes	✓
b	Pensions and other insurance benefits	✓
c	Social assistance benefits (excluding social transfers in kind, see 10)	✓
d	Current transfers from non-profit institutions	✓
e	Compulsory and quasi-compulsory inter-household transfers received	✓
5 (sum of 1 and 3)	Income from production (2.4)	
6 (sum of 2 and 5)	Primary income (2.4)	
7 (sum of 4 and 6)	Total income (2.4)	
8	Current transfers paid (2.4)	
a	Direct taxes (net of refunds)	I
b	Compulsory fees and fines	×
c	Compulsory and quasi-compulsory inter-household transfers paid	✓
d	Employee and employers' social insurance contributions (if included in 1a)	I
e	Current transfers to non-profit institutions	×
9		
(7 less 8)	Disposable income	
10	Social transfers in kind (STIK) received (2.3.5)	✓
11		
(9 plus 10)	Adjusted disposable income	

✓ Collected separately or jointly in the CPS ASEC

× Not collected in the CPS ASEC

I Imputed or modeled in the CPS ASEC

¹ Includes employer contributions to health insurance and to government insurance schemes (including payroll taxes)

Income Measure		Median All Households	SE	Mean All Households	SE	Number of Households with Addition/ deduction (thousands)	Percentage of Households with Addition/ deduction	SE
Money Income CPS ASEC		49,445	325	67,530	363	n/a	n/a	n/a
Canberra Income Construct:								
1	Income from employment (2.3.1)	45,176	356	65,951	384	91,293	76.9%	0.18
2	Property income (2.3.2)	x	x	2,778	52	59,732	50.3%	0.27
Income from household production of services for own consumption (2.3.3)		x	x	1,910	42	78,569	66.2%	0.29
4	Current transfers received (2.3.4)	x	x	10,104	67	58,838	49.6%	0.20
5 (sum of 1 and 3)	Income from production (2.4)	46,299	347	67,861	397	109,325	92.1%	0.16
6 (sum of 2 and 5)	Primary income (2.4)	48,048	377	70,639	419	111,253	93.7%	0.14
7 (sum of 4 and 6)	Total income (2.4)	58,302	389	80,743	424	117,528	99.0%	0.04
8	Current transfers paid (2.4)	8,945	87	17,165	131	98,874	83.3%	0.18
9	(7 less 8) Disposable income	49,119	274	63,579	300	117,533	99.0%	0.04
10	Social transfers in kind (STIK) received (2.3.5)	x	x	6,251	37	67,749	57.1%	0.19
11 (9 plus 10)	Adjusted disposable income	55,965	250	69,830	295	118,217	99.6%	0.03

Canberra Sum Definitions		2010		Percent change	SE
		Gini Index	SE		
5 (sum of 1 and 3)	Income from production (2.4)	0.563	0.0018	n/a	n/a
6 (sum of 2 and 5)	Primary income (2.4)	0.556	0.0015	-1.24	0.03
7 (sum of 4 and 6)	Total income (2.4)	0.473	0.0017	-14.96	0.07
9 (7 less 8)	Disposable income	0.428	0.0016	-9.54	0.03
11 (9 plus 10)	Adjusted disposable income	0.379	0.0014	-11.42	0.05

References

- DeNavas-Walt, Carmen, Bernadette D. Proctor, and Jessica C. Smith. 2011. *Income, Poverty, and Health Insurance Coverage in the United States: 2010*. U.S. Census Bureau, Current Population Reports, P60- 239. Washington DC: U.S. Government Printing Office.
- Expert [Canberra] Group on Household Income Statistics. 2001. *Guidelines for Income Distribution Statistics: Final Report of the International Expert [Canberra] Group on Household Income Statistics [to the United Nations Statistical Commission]*. Ottawa, Canada: Statistics Canada, March.
- Garner, Thesia I., Short, Kathleen. 2009. Accounting for owner-occupied dwelling services: Aggregates and distributions. *Journal of Housing Economics*. 18, (3), 233-248.
- Johnson, Paul, Trudi Renwick, and Kathleen Short. 2010. "Estimating the Value of Federal Housing Assistance for the Supplemental Poverty Measure." Poverty Measurement Working Paper, U.S. Census Bureau.
- O'Hara, Amy. 2004. "New Methods for Simulating CPS Taxes." U.S. Census Bureau Technical Paper. <www.census.gov/hhes/www/income/oharataxmodel.pdf>.
- Roemer, Marc I. 2000. "Assessing the Quality of the March Current Population Survey and the Survey of Income and Program Participation Income Estimates, 1990-1996." U.S. Census Bureau Working Paper, Housing and Household Economic Statistics Division, June <<http://www.census.gov/hhes/www/income/assess1.pdf>>.
- Short, Kathleen, O'Hara, Amy, Susin, Scott, 2007. Taking Account of Housing in Measures of Household Income. U.S. Census Bureau Poverty Measurement Working Paper.
- Smeeding, Timothy M. and Daniel H. Weinberg. 2001. "Toward a Uniform Definition of Household Income." *Review of Income and Wealth* series 47 no. 1 (March), pp. 1-24.
- U.S. Census Bureau, 1993. Measuring the Effect of Benefits and Taxes on Income and Poverty: 1992. Current Population Report, P60-186-RD. <www.census.gov/hhes/www/poverty/prevcps/p160-186rd.pdf>.
- Webster, Jr., Bruce H. 2012. "Methods of Modeling Tax Units to Estimate Tax Credit." U.S. Census Bureau Working Paper, Social, Economic, and Housing Statistics Division.