HUD METHODOLOGY FOR ESTIMATING FY 2005
CBSA-BASED MEDIAN FAMILY INCOMES
(ECONOMIC AND MARKET ANALYSIS DIVISION,
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For informational purposes, the Department of Housing and Urban Development (HUD) has prepared revised FY 2005 estimates of median family income (MFI) using the new metropolitan statistical area definitions first released by the Office of Management and Budget (OMB) in June 2003. These estimates are not intended for use in HUD programs. They are being published here as a service to agencies that have implemented the new OMB metropolitan definitions.

The new metropolitan area definitions are normally referred to as Core-Based Statistical Areas (CBSAs). As with the original publication of median family incomes (MFIs) at the CBSA level last year, these MFIs area based on 2000 Census data. However, two things have changed in the calculation of these FY2005 estimates. First, HUD acquired an extract of Census 2000 income distributions that provided a finer income breakdown than was available from the SF3 data used last year.[1] These new data have allowed HUD to produce base year median family incomes that are closer to Census published median family incomes.[2] Second, after additional research into the determinants of income change between 1990 and 2000, HUD has refined its update process to re-include BLS wage data in a limited fashion to localize income changes, pending availability of ACS data for this purpose. Separate median family income estimates are calculated for all metropolitan areas, metropolitan area divisions[3], micropolitan areas, and nonmetropolitan counties that are not part of a micropolitan area[4].

Estimates of income need to be associated with a point in time. This poses the need to attribute an "as of" date to survey estimates when such dates are not explicitly defined. The 2000 Census income data, for instance, are based on questions regarding total income for 1999. For most households, income for a year is based on an income stream with at least some changes during the year. For purposes of estimation, HUD therefore assumes that the 2000 Census income estimates have an "as of" date of mid-1999. For the same reason, it assumes that March CPS income estimates, which are based on responses to questions about the previous year's total income, also relate to the middle of the previous calendar year.

ACS estimates present a more complex timing issue, because they are based on samples drawn throughout a year that collect information on income obtained during the previous 12 months. Adjustments are made to incomes collected prior to December to make them approximate a December reporting period. This is done by adding the CPI change between the month of the survey and December of that year to the survey income data. Income figures collected in January are inflated by the CPI change from January to December of that year, the

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[1] HUD is making these data available publicly along with the program HUD used to generate the base year MFIs.

[2] Attachment 2 shows the differences between the 2000 MFIs published last year and the 2000 MFIs published this year.

[3] Metropolitan divisions are major subparts of large metropolitan areas. They are conceptually equivalent to the OMB Primary Metropolitan Statistical Area (PMSA) definitions previously in use.

[4] Micropolitan areas consist of one or more nonmetropolitan counties that have an urban cluster with a population of at least 10,000 but less than 50,000.

February income figures are inflated from February to December, etc. If median income changes during the year (which are not known when the estimates are done) exactly parallel the CPI changes, an ACS-based median family income estimate will approximate a median family income estimate based on surveying all respondents in December. That, in turn, means that the ACS income data have an approximate "as of" date of the middle of the year if median incomes changed at the same pace during the course of a year.

The importance of the "as of" assumptions becomes less important over time. After the initial income estimates are produced, annual updates are estimated using the same data sources. Any estimation error or bias associated with the "as of" assumptions effects only the first year a data series starts to be used. The impact of this type of bias cannot be measured but, since it is a fixed amount and incomes increase over time, the effect should be modest. The potential for bias is further mitigated by the fact that the CPI and CPS changes for the period in question were very similar at the national level.

Three attachments follow:

- Attachment 1 provides more detail on the quantitative calculations used to estimate median family incomes for CBSAs.
- Attachment 2 provides information on the pattern of percentage increases in CBSA median family incomes between FY 2004 and FY 2005.
- For informational purposes only, Attachment 3 provides information on the unconstrained pattern of percentage changes in CBSA median family incomes between FY 2004 and FY 2005. (HUD does not permit median family income estimates to decline based solely on update data, so areas where the update factors would produce a decline are frozen at the previous year's level.)

Attachment 1

Detailed FY 2005 HUD Income Estimation Methodology for CBSAs

The step-by-step normal procedures used to develop FY 2005 estimates are as follows:

1. The 2000 Census was used to estimate what are treated as mid-1999 local median family income estimates.

2. The March 2000 and 2001 CPS surveys, which provided what were effectively mid-1999 and mid-2000 median family income estimates, provided an estimate of change in median family income levels at the national level that was applied to 2000 Census-based local median family income estimates to update them from mid-1999 to mid-2000. The national change in median family incomes for this period was 3.58 percent. (Multi-state Census Division CPS changes could have been used in place of a national factor, but research suggests that it is questionable whether this would have improved estimation accuracy if used only for one year.)

3. The 2000 and 2003 American Community Surveys were used to estimate the change in State MFIs for the mid-2000 to mid-2003 period. The ACS income change factors for each State for the 2000-2003 period were calculated as follows:

$$\frac{\text{ACS MFI (2003)}}{\text{ACS MFI (2000)}} = \begin{array}{l}\text{3-year increase factor for}\\ \text{ACS Median Family Income}\end{array}$$

State and Local (metropolitan areas and nonmetropolitan counties) BLS average wage changes for all employees for the 1999-2002 period were calculated:

$$\frac{\frac{\text{BLS Wages (2002)}}{\text{BLS Employees (2002)}}}{\frac{\text{BLS Wages (1999)}}{\text{BLS Employees (1999)}}} = \begin{array}{l}\text{3 year BLS wage}\\ \text{increase factor}\end{array}$$

4. Local area update factors were derived using local BLS average wage changes in conjunction with State level Income changes. They were combined according to the results of research done on the determinants of income change between 1990 and 2000.[5]

    (17% * Local BLS Average wage change)
    + (83% * ACS State Income Change) = Local Update Factor

5. A state level factor was generated using the same formula, as follows:

    (17% * State BLS Average wage change)
    + (83% * ACS State Income Change) = State Update Factor

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[5] In ten low-population counties with suspect wage changes, which in the past have typically been associated with reporting errors, BLS wage increases/ decreases were constrained to fall within the 99th percentile of the BLS wage change distribution.

6. A state ACS control factor was developed that adjusted for differences between the step 6 update factor and the actual ACS state change factor for the same period. Changes in BLS-reported average wages, even though they lead to changes in family income, are not a direct measure of changes in family income and require adjustment if being used for that purpose. This was done as follows:

$$\frac{\dfrac{\text{ACS State MFI (2003)}}{\text{ACS State MFI (2000)}}}{\begin{array}{c}\text{State Update factor}\\ \text{Generated in Step 6}\end{array}} = \text{State control factor}$$

7. Local area update factors were adjusted with the state control factor as follows:

Local update factor (step 5) * State control factor (step 7)
= Adjusted local update factor

Convert the step 1 median family income estimate to an April 1, 2005 estimate as follows:

Step 1 median family income
* Step 2 mid-1999 to mid-2000 CPS factor
* Step 8 adjusted local update factor
* 1.035 (3.5% annual trending) * 1.75 years
= FY 2005 Median Family Income estimate

Median Family Income estimates are frozen if they would otherwise be less than the previous year's estimate (held harmless).

Attachment 2

FY2005 - FY2004 Distribution of changes in CBSA Area Median
Family Income -- Metropolitan and Micropolitan areas
(100 Percent = FY2004 Income Level)

	Percent Change											
	less than 80%	80% to 84.9%	85% to 89.9%	90% to 94.9%	95 to 99.9	100% to 105%	105.-1% to 110%	110.-1% to 115%	115.-1% to 120%	120.-1% to 125	125.-1% or more	Median
AK						5						100
AL						24						103
AR						20						100
AZ						10						100
CA						37						101
CO						14						104
CT						6						102
DE							3					106
FL						32						102
GA						37						102
HI						4						103
IA						22						104
ID						10	1					104
IL						31						101
IN						39						101
KS						18						102
KY						21						100
LA						25						102
MA						7						101
MD						7	2					105
ME						5						103
MI						32						102
MN						21						102
MO						25						100
MS						20	3					101
MT						8						101
NC						40						100
ND						8						103
NE						12						102
NH						7						100
NJ						7						100
NM						18						100
NV						7						104
NY						30						102
OH						41	1					104
OK						20						100
OR						19						100
PA						35						100
PR						13						102
RI							1					106
SC						21						101
SD						11						101
TN						30						102
TX						67						100
UT						10						102
VA						12						104
VT						5						101
WA						20						101
WI						24						103
WV						10						100
WY						9						102
US						956	11					101

FY2005 - FY2004 Distribution of changes in CBSA Area Median
Family Income -- Non Metropolitan Counties
(100 Percent = FY2004 Income Level)

	Percent Change											Median
	less than 80%	80% to 84.9%	85% to 89.9%	90% to 94.9%	95 to 99.9	100% to 105%	105.-1% to 110%	110.-1% to 115%	115.-1% to 120%	120.-1% to 125	125.-1% or more	
AK						21						100
AL						24						102
AR						37						100
AZ						3						100
CA						12						101
CO						34	5					104
FL						18						101
GA						56	2					102
GU						1						101
HI							1					106
IA						62						104
ID						17	4					104
IL						37						101
IN						20						101
KS						69						101
KY						59						100
LA						17						102
MA						2						101
MD						3						105
ME						9						103
MI						34						102
MN						46						102
MO						57						100
MS						36		1	1			101
MT						46						102
NC						29						100
ND						40	1					103
NE						62	2					103
NH						1						100
NM						12						100
NV						7	1					103
NY						11						101
OH						16	3					105
OK						42						100
OR						11						100
PA						13						100
PR						1						103
SC						11						101
SD						46						101
TN						33						102
TX						133						100
UT						14						103
VA						34	7					104
VI						2						101
VT						5						101
WA						13						101
WI						34						103
WV						26						100
WY						14						101
US						1330	26	1	1			101

Attachment 3

Unconstrained FY2005 - FY2004 Distribution of Changes in CBSA Area
Median Family Income -- Metropolitan and Micropolitan areas
(100 Percent = FY2004 Income Level)

	Percent Change											
	less than 80%	80% to 84.9%	85% to 89.9%	90% to 94.9%	95 to 99.9	100% to 105%	105.-1% to 110%	110.-1% to 115%	115.-1% to 120%	120.-1% to 125	125.-1% or more	Medi-an
AK				5								93
AL						24						103
AR				20								98
AZ				3		7						100
CA						37						101
CO						14						104
CT						6						102
DE							3					106
FL						32						102
GA						37						102
HI						4						103
IA						22						104
ID						10	1					104
IL						31						101
IN						39						101
KS						18						102
KY					21							98
LA						25						102
MA						7						101
MD						7	2					105
ME						5						103
MI						32						102
MN						21						102
MO					16	9						99
MS					8	12	3					101
MT						8						101
NC					36	4						99
ND						8						103
NE						12						102
NH					7							99
NJ					1	6						100
NM					17	1						98
NV						7						104
NY						30						102
OH						41	1					104
OK					2	18						100
OR					17	2						98
PA					3	32						100
PR					1	12						102
RI							1					106
SC						21						101
SD					1	10						101
TN						30						102
TX					43	24						99
UT						10						102
VA						12						104
VT						5						101
WA						20						101
WI						24						103
WV						10						100
WY						9						102
US				5	196	755	11					101

Unconstrained FY2005 - FY2004 Distribution of changes in Area Median
Family Income -- Non Metropolian Counties
(100 Percent = FY2004 Income Level)

	Percent Change											
	less than 80%	80% to 84.9%	85% to 89.9%	90% to 94.9%	95 to 99.9	100% to 105%	105.-1% to 110%	110.-1% to 115%	115.-1% to 120%	120.-1% to 125	125.-1% or more	Median
AK				20	1							93
AL						24						102
AR					36	1						98
AZ					2	1						99
CA						12						101
CO						34	5					104
FL					2	16						101
GA					1	55	2					102
GU						1						101
HI							1					106
IA						62						104
ID						17	4					104
IL						37						101
IN					1	19						101
KS					2	67						101
KY					58	1						98
LA						17						102
MA					1	1						100
MD						3						105
ME						9						103
MI						34						102
MN					1	45						102
MO					35	22						99
MS				1	11	24		1	1			101
MT					1	45						102
NC					22	7						99
ND						40	1					103
NE						62	2					103
NH					1							99
NM				1	10	1						98
NV						7	1					103
NY						11						101
OH						16	3					105
OK					5	37						100
OR					8	3						99
PA					2	11						100
PR						1						103
SC					1	10						101
SD					2	44						101
TN						33						102
TX				1	69	63						99
UT					1	13						103
VA						34	7					104
VI						2						101
VT						5						101
WA					1	12						101
WI						34						103
WV					11	15						100
WY					1	13						101
US				23	286	1021	26	1	1			101