BUREAU OF THE CENSUS
STATISTICAL RESEARCH DIVISION REPORT SERIES
SRD Research Report Number: Census/SRD/RR-91/01

How Does Smoothing Estimated Monthly Control Totals Affect SIPP Estimation?

by

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Report completed: February 7, 1991

Report issued: February 7, 1991

1. Introduction

For each of the Census Bureau's household surveys, calculating final person weights involves several stages of adjustment to the initial sampling weights. The number of stages and details of the procedures differ somewhat by survey, but they all have two stages in common: adjustment for household nonresponse and adjustment to monthly age x race x sex (demographic) totals. When the latter adjustment is carried out for the Survey of Income and Program Participation (SIPP), it is done simultaneously with adjustment to monthly controls for six household types. These controls are estimated from the Current Population Survey, whereas the demographic totals are projected from the previous decennial census using birth, death and immigration data.

Each survey uses these same demographic totals and they follow smooth long term trends with little month-to-month variability. SIPP is the only survey to use household type controls which, being estimates, show quite a bit of month-to-month variation. It seems reasonable that since these controls are being treated as the "truth" for SIPP, it is desirable to fit to their "true" values rather than the "true" values plus monthly variability due to sampling. This study considers a smoothing of the household type controls by time series methods and compares properties of the original and smoothed controls, as well as properties of estimates derived from the two sets of controls. Section 2 summarizes the adjustment procedure being analyzed and the smoothing methodology used. The estimates are compared in section 3, and the final section discusses the results.

The investigation carried out is in the spirit of exploratory data analysis. No statistical tests have been performed or statistical claims made. We have compared the month-to-month variability for estimates using the original and smoothed weights, and tried to determine if there is a consistent pattern of variability reduction when the smoothed weights are applied. This analysis will help to determine the utility of smoothing household type controls before using them in the final adjustment procedure.

2. Final Adjustment and Smoothing Methodology

Figure 1 shows the two-way table used in the SIPP final stage adjustment of black males aged 15+. There is a similar table for each of eight age (0-14, 15+) x race (black, nonblack) x sex (male, female) combinations. The weighted cell counts in a table are alternately ratio adjusted to the row and column controls until each marginal weighted total is within a specified closeness to its control. The overall adjustment procedure is quite complicated, including adjustments for Hispanic totals and swapping of husband and wife weights between male and female tables, and will not be further described (See Waite (1988 a,b).) This study includes only persons age 15+ because of the additional work that would be required to write a separate adjustment program for the four age 0-14 tables, but any patterns in the results should still hold when these additional persons are included.

For a given combination of race and sex there are six household type control totals that we want to smooth, for a total of twenty-four different control totals. For example, in Figure 1 the control totals correspond to the column totals C1 through C6 of the six columns. Figure 2 demonstrates

the much larger monthly variability over time of such a control total (in this case for black males age 30-34 in household type 1) as compared to demographic controls. Plots such as this reveal the need to investigate possible adjustment of the household control totals to reduce their variability.

There are several restrictions on the results of any smoothing adjustments which are employed to reduce the variability of the household type controls. First, the sum of the column totals for a given race/sex combination must add up to the sum of the row totals, so any smoothing performed on the column totals must preserve their sum. Second, some of the variability of the household type controls may be due to seasonality. Since seasonal variations may be important for analyses or other uses of the adjusted data, it is undesirable to remove these effects. There is ample reason to believe that the household control totals should be seasonal, since some of the factors (e.g. births, deaths, and marriages) that contribute to change in household type exhibit seasonal patterns of variation. In fact, seasonal variations in household type may explain some of the vast difference between the variability in the two series plotted in Figure 2.

Another restriction on the approach to the smoothing is that only 72 data points, monthly observations for June 1983 through May 1989, were available for each of the household type control totals when this study commenced. In our experience estimation of parameters for seasonal ARIMA models is typically not very good for short time series which exhibit this degree of variability, so we eliminated methods which use such models. For this reason we did not consider using either X-11-ARIMA (Dagum, 1980) or X-12 (Findley, et al, 1988) seasonal adjustment methodologies.

We used the Census Bureau's X-11 seasonal adjustment program (Shiskin, 1967) diagnostics, and spectrum plots generated using Splus, to determine which of the series were seasonal. Only two of the twenty-four control total series, household types 5 and 6 for black females, were found to not have a seasonal component. These last two series may also in reality be seasonal, but we were unable to reliably identify and estimate any seasonality for the series based on only six years of data. The two nonseasonal series were viewed as the sum of two components, (trend + variability), while the remaining seasonal series were viewed as the sum of three components, (trend + seasonality + variability). Our goal for all the control total series was to remove the variability without disturbing the remaining components.

ARIMA models for the two nonseasonal series were identified. In contrast to seasonal ARIMA models, we believe six years is adequate for estimation of nonseasonal ARIMA models for these series. The series were extended by one year of forecasts and one year of backcasts based on the ARIMA model. The extended series were then smoothed using a locally weighted regression procedure, LOESS, (Cleveland and Devlin, 1988, Cleveland, 1979). The ARIMA modeling and series extension was performed prior to the LOESS smoothing in order to improve the quality of the smoothing at the endpoints of the series. The remaining series were adjusted by removing the variability component estimated by X-11 from the seasonal series. To avoid later confusion, we will refer to the 24 resultant series as "presmoothed".

The presmoothed series were obtained without the requirement that the monthly values of the six series for each race/sex combination sum to the monthly table totals. Fortunately, these two totals were nearly equal. This was probably because when the six estimates were calculated from CPS the two totals were required to be equal, and so the total of the variability components of the series as estimated by X-11 is very close to zero. Because the monthly presmoothed totals are so close to the table totals, a last simple monthly adjustment was made by multiplying each of the six presmoothed controls in a month by the ratio of the original table total to the presmoothed table total. (This does not change the component proportions.) We call the resulting series the smoothed series.

Table 1 lists the proportions of the table total contributed by each household type control each month in the black male series. Pairs of columns labeled OI and PI compare the proportions for the original and presmoothed controls for household type I. An examination of this table shows that the proportions do not differ much between the two sets. In fact, the mean absolute % changes in proportions between the original and presmoothed controls range from .6% to 5.7%, as shown in the first row of Table 2. There are two means larger than 2.3% and they are for series that combined make up only about .04 to .05 of the total. Even smaller changes in proportions occur for the other three race x sex groups. The ratios by which each of the six presmoothed controls in a month are multiplied are given in the OT/PT column of Table 2. Note these ratios range only between .987 and 1.012. For the other three race x sex groups these ratios constitute even smaller intervals about 1.0.

Table 3 summarizes the effect of smoothing on the relative month-to-month changes in the controls, $(c_{i+1} - c_i)/c_i$, where c_i is a control for month i, by comparing their mean absolute values for the original and smoothed series. An examination of these statistics shows that the smoothing has satisfied our objective of reducing month-to-month variability in the series. The minimum reduction for a series smoothed by X-11 is 20.2%, and the two series smoothed using LOESS have reductions of 58.8% and 80.8%. The time series plots in Figure 3 compare the original and smoothed controls for black females in household type 1. This is typical of the results of the X-11 smoothing, with the largest monthly % changes being generally reduced. Figure 4 demonstrates the extreme effect of the LOESS smoothing which does not include monthly seasonality. For black females in household type 6 the range of variability has been reduced from about (-22%,30%) to about (-3%,5%).

3. Comparison of Estimates

So far we have smoothed the household type controls used in the final stage of adjusting person weights. Because of the iterative procedure used in the final stage, we cannot predict the effect this smoothing will have on final weights or on estimates made using them. What we expect is that the month-to-month variation in many estimates will be reduced, especially for variables closely related to household type. For each variable in our analysis we compute 1988 monthly estimates using the 1987 SIPP panel. The eleven month-to-month differences are then summarized by their mean absolute value. In Tables 4 to 7 this mean absolute deviation (MAD) statistic is compared for final weights calculated using the original and smoothed controls. Recall

that these are informal comparisons of the patterns of increase/decrease in computed change estimates, not statistical significance tests.

There are three types of estimates included in this study: demographic characteristics (household type and marital status), income-related (number of persons in poverty and mean income), and program benefits recipiency (social security, unemployment compensation, AFDC, food stamps and child support). They are calculated for various demographic combinations as given in the Appendix.

For all household types, Table 4 compares the estimates of numbers of households calculated from columns 1, 2 and 5 of the appropriate final stage adjustment tables. For each of the demographic breakdowns within household type, except Hispanic, there is a substantial reduction in the MAD. We expect the observed pattern of variability reduction for blacks and nonblacks because their household type totals have been directly smoothed. The differing Hispanic behavior apparently occurs because in the final stage adjustment Hispanics are removed after several iterations and are separately adjusted to Hispanic controls. The results for Hispanics follow this same lack of pattern for other estimates, so they will not be discussed further. Figure 5 for nonblack married couple family households shows a typical comparison of original and smoothed monthly differences for household type estimates within non-Hispanic racial groupings. In this case the reduction in monthly differences is especially noticeable from February through July. In contrast, Figure 6 demonstrates how much less effect the smoothing has on monthly differences for Hispanic household types.

We expect that the effect on other types of estimates will be less noticeable, since they haven't been directly smoothed. Table 5 has estimates of number of persons in marital statuses. Single and married, spouse present show a pattern very similar to those for household type. Excluding Hispanics, there are no cases for which the MAD is increased by using the smoothed weights. The changes for married, spouse absent and widowed are not as marked, and in a few cases the MAD increases. Divorced males have increased MADs in all cases, while divorced females have changes in both directions. These different patterns evident in marital status reflect our general expectations, with reduction in variation dependent on how close the categories are to household types. For example, married, spouse present persons are mostly from the married couple family type, and we expect the effect on MAD to be similar for the two. Divorced persons fall into both other family and nonfamily households, so the estimates are a combination of estimates from the two types, and do not closely follow the pattern of either.

The poverty and program recipiency estimates in Tables 6 and 7 show no pattern of reduction in monthly variability. The MADs for numbers of persons in poverty show little change in either direction, even for household types in the bottom half of Table 6. One factor probably contributing to this is that there is a lot of movement of households into and out of poverty each month, which is in no way affected by the smoothing. We have computed similar tables for marital status and household type cross-classified by age groups. The results are closer to what we see in Table 6 and 7 than in Table 4. For household type the MADs are usually marginally smaller for the smoothed estimates, but not noticeably so, while for marital status there are small

changes in both directions. The sum over age groups was smoothed, not the individual groups themselves, which is the likely reason for this result.

We also compared the quarter-to-quarter MADs and the annual totals for the original and smoothed weights, in order to determine the effects of the smoothing on longer-term estimates. Before doing the study, we thought that the differences between the two weightings would decrease as the time period of an estimate increased. This turned out to be the case for annual estimates, as there is rarely as much as a .1% difference between the original and smoothed. This is due to the trend component of the original series being changed little in the smoothing process. However, no overall pattern emerged for the quarterly estimates. This is because quarterly trends are not fit by the smoothed procedures, and the calendar definition of quarters has no inherent relationship with the monthly seasonality of the series.

4. Discussion

This study was initiated with the idea that smoothing the monthly household type controls would reduce month-to-month variation in person weights, which would lead to a reduction in month-to-month change estimates for many variables. This could be the case for SIPP because of the relative constancy of sample persons constituting a SIPP panel, but not for other Census Bureau household surveys because of their rotating samples.

The results were as expected for household type estimates and some marital statuses that are closely related to individual household types. For the other variables examined there was no general reduction in monthly variability. After rethinking the study, two possible reasons for the latter result were proposed. First, monthly variability for a characteristic will most noticeably be reduced only if the group of people having the characteristic remains largely unchanged from month to month. If the individuals in the group are changing, so are the weights of those who make up the group, and the estimates will also change. Second, the smoothed household type controls still have too much variation to give a general reduction in the month-to-month variability of person weights. The validity of this reasoning could be examined in further studies by, respectively, finding estimates that are derived from an almost unchanging cohort and making the household type series much smoother. The latter could be accomplished by, for example, eliminating all seasonality.

We are left with the question, "Is it worth the effort to incorporate this smoothing procedure into SIPP processing if it reduces the monthly variability of only household type and closely related marital status estimates?" We suggest that the answer is no. Any changes in the estimation process are warranted only if there is a "general benefit" for a wide or very important class of estimates. This study did not show such a benefit. It could be argued that there are estimates related to household type, such as numbers of marriages, births and deaths, which have some problems that might be improved by the smoothing. A separate study would be necessary to determine if this is the case. However, these problems are related to the levels of these

estimates, not month-to-month changes.

If the opinion of the SIPP Research and Evaluation Steering Committee was that this work should be pursued further, a necessary next step is the comparison of estimates such as marriages, births and deaths to benchmarks. If these comparisons show that the smoothed estimates are significantly closer to the benchmarks than the original estimates, then the inclusion of the smoothing procedure would be recommended.

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Appendix

Estimates Compared

Demographic Characteristics

Household types 1, 2, and 5
- Total, Race of householder
- Hispanic origin of householder
- Age of householder

Marital status by sex
- Total, Race, Hispanic origin, Age

Poverty and Income

Number of persons in poverty
- Total, Household type, Hispanic origin
- Race x sex, Race x age

Median income
- Household type, Hispanic origin, Race x sex

Program Recipiency

Number of persons receiving benefits: social security, unemployment compensation, AFDC, food stamps, child support
- Hispanic origin, Race x sex

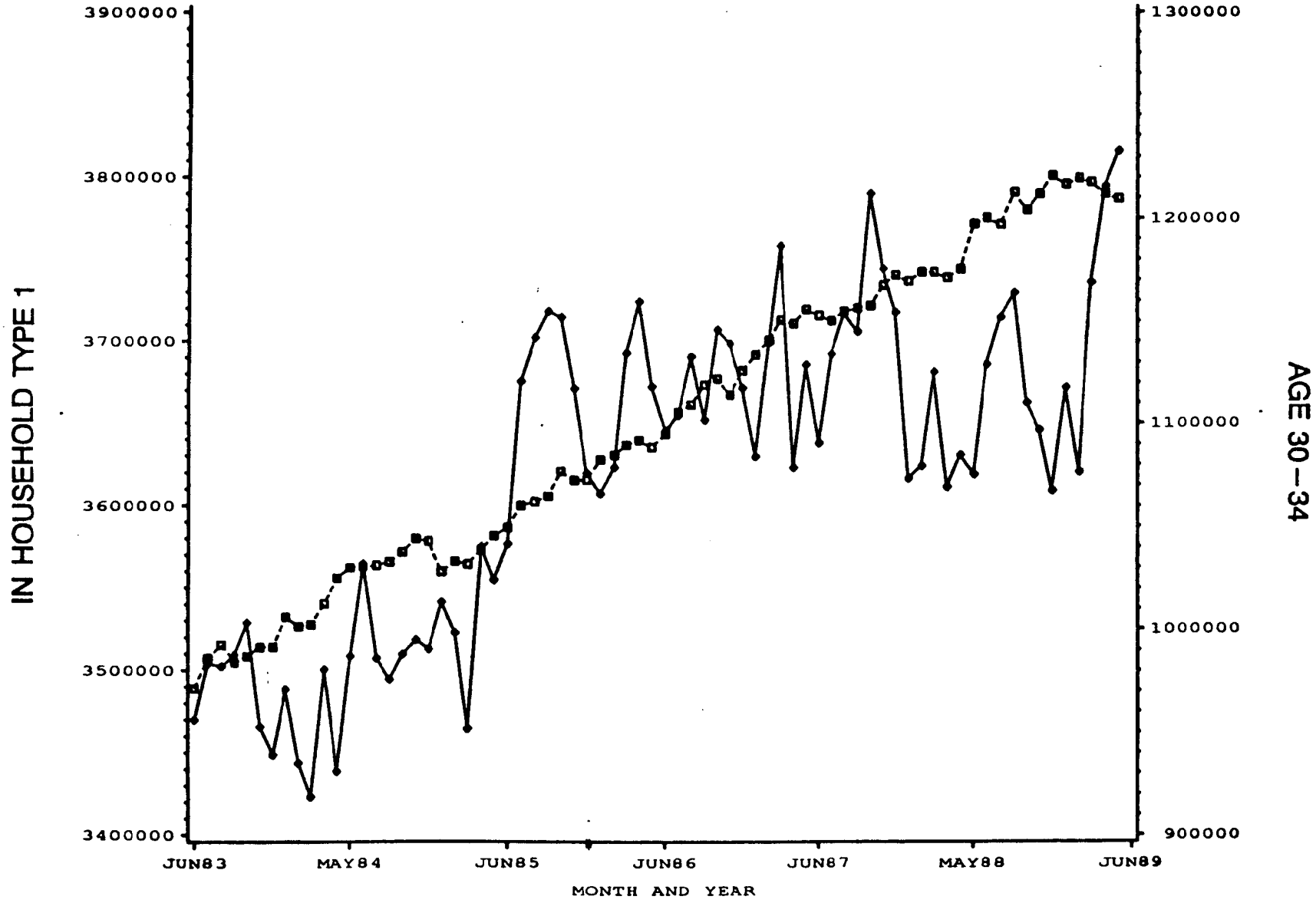
Figure 1

Second Stage Cells for Black Males (15+ years of age)

	Persons in Households that contain a primary family or a subfamily				Persons not in Households containing a primary family or a subfamily		
	Husband of Primary family	Male Householder No Spouse Present	Other household members		Householder	Not Householder or Persons in Group Quarters	
			Husband of Subfamily	Not a Husband			
Age							
15							R1
16-17							R2
18-19							R3
20-21							R4
22-24	column 1	column 2	column 3	column 4	column 5	column 6	R5
25-29							R6
30-34							R7
35-39							R8
40-44							R9
45-49							R10
50-54							R11
55-59							R12
60-64							R13
65-69							R14
70+							R15
	C1	C2	C3	C4	C5	C6	

Figure 2

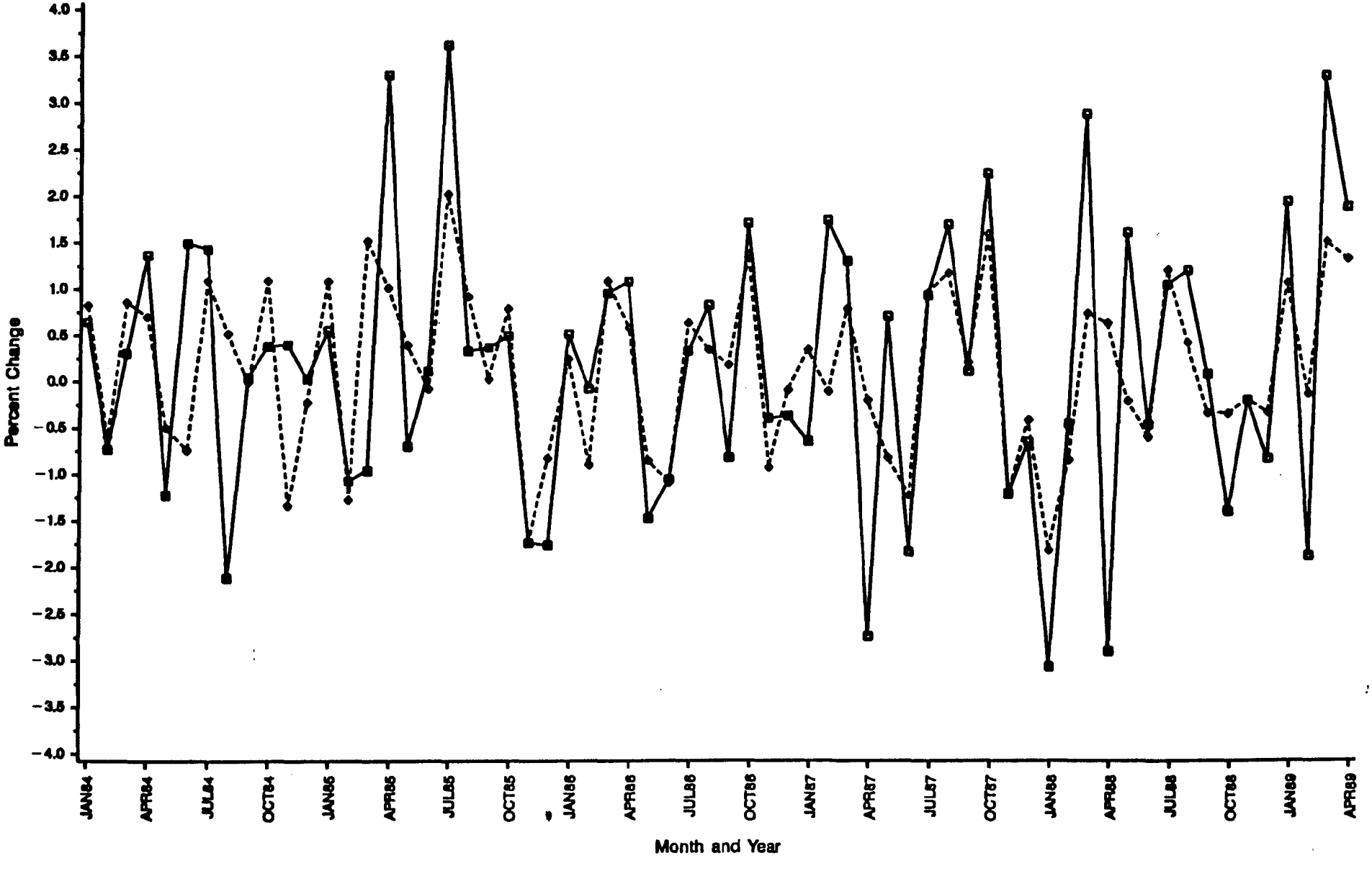
Comparison of Monthly Variability of Controls for Black Males in Household Type 1 and Age 30-34



SOLID LINE DENOTES ORIGINAL HOUSEHOLD TYPE 1 CONTROL DATA FOR BLACK MALES
BROKEN LINE DENOTES ORIGINAL AGE (30-34, BLACK MALES) DATA

Figure 3

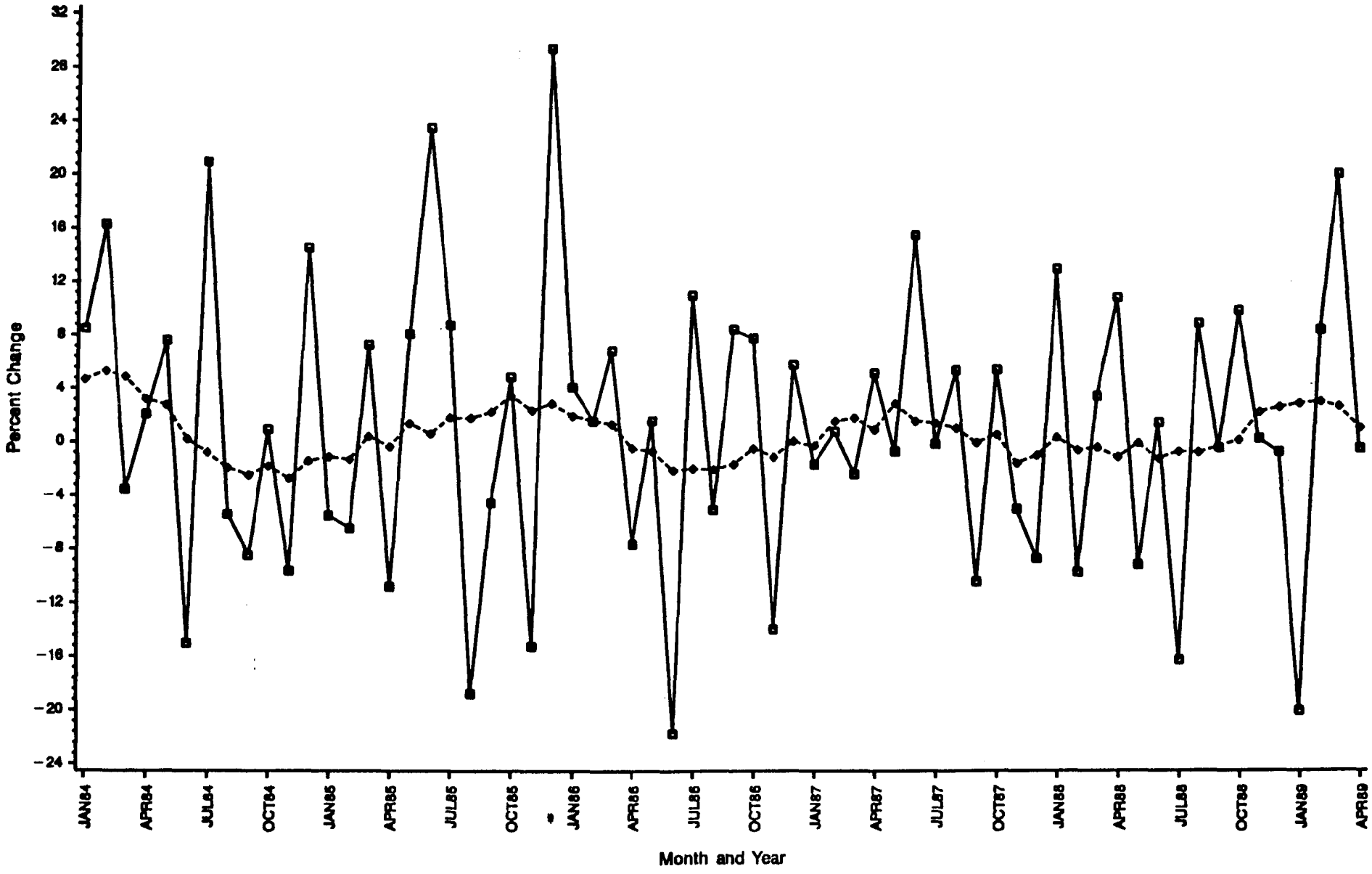
Month-to-Month % Change for Black Females in Household Type 1:
Original and Smoothed Controls



SOLID LINE DENOTES ORIGINAL DATA
BROKEN LINE DENOTES SMOOTHED DATA

Figure 4

Month-to-Month % Change for Black Females in Household Type 6:
Original and Smoothed Controls



SOLID LINE DENOTES ORIGINAL DATA
BROKEN LINE DENOTES SMOOTHED DATA

Figure 5

Month-to-Month Differences for Nonblack Married Couple Family Households

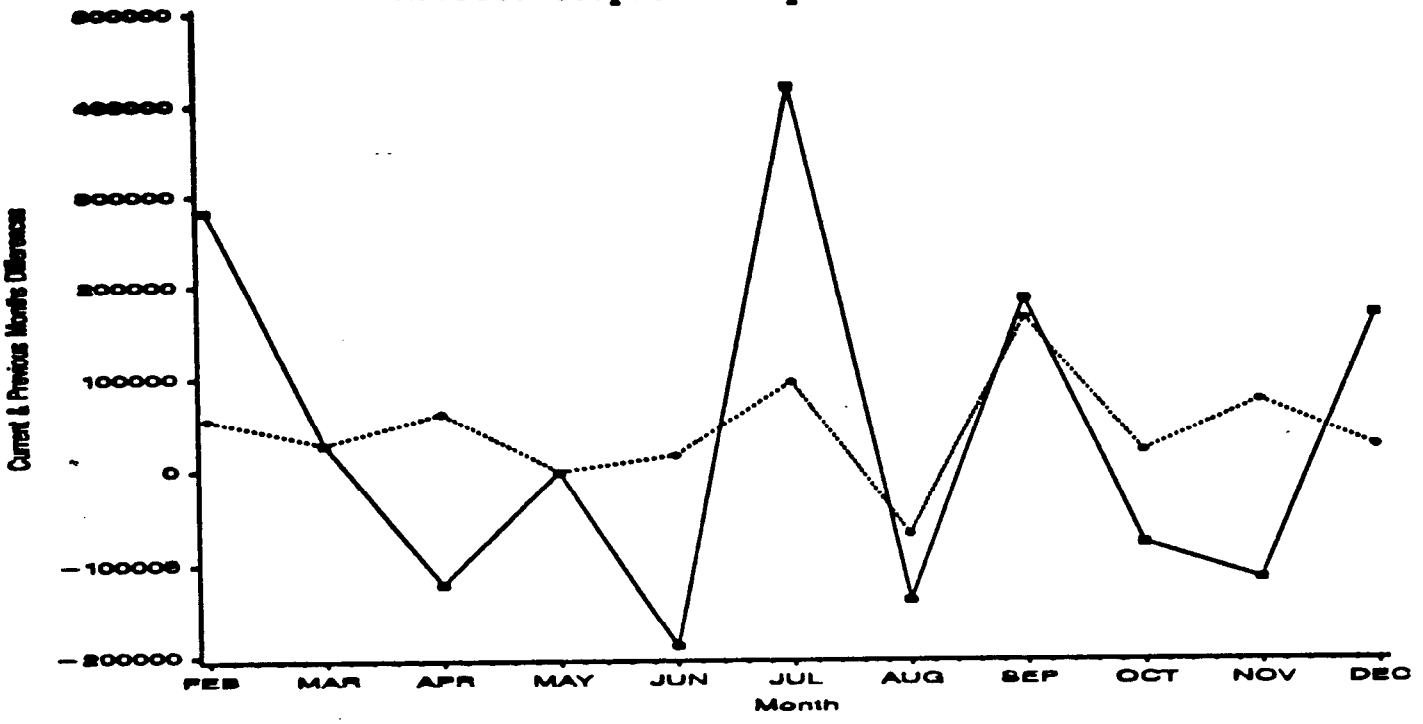
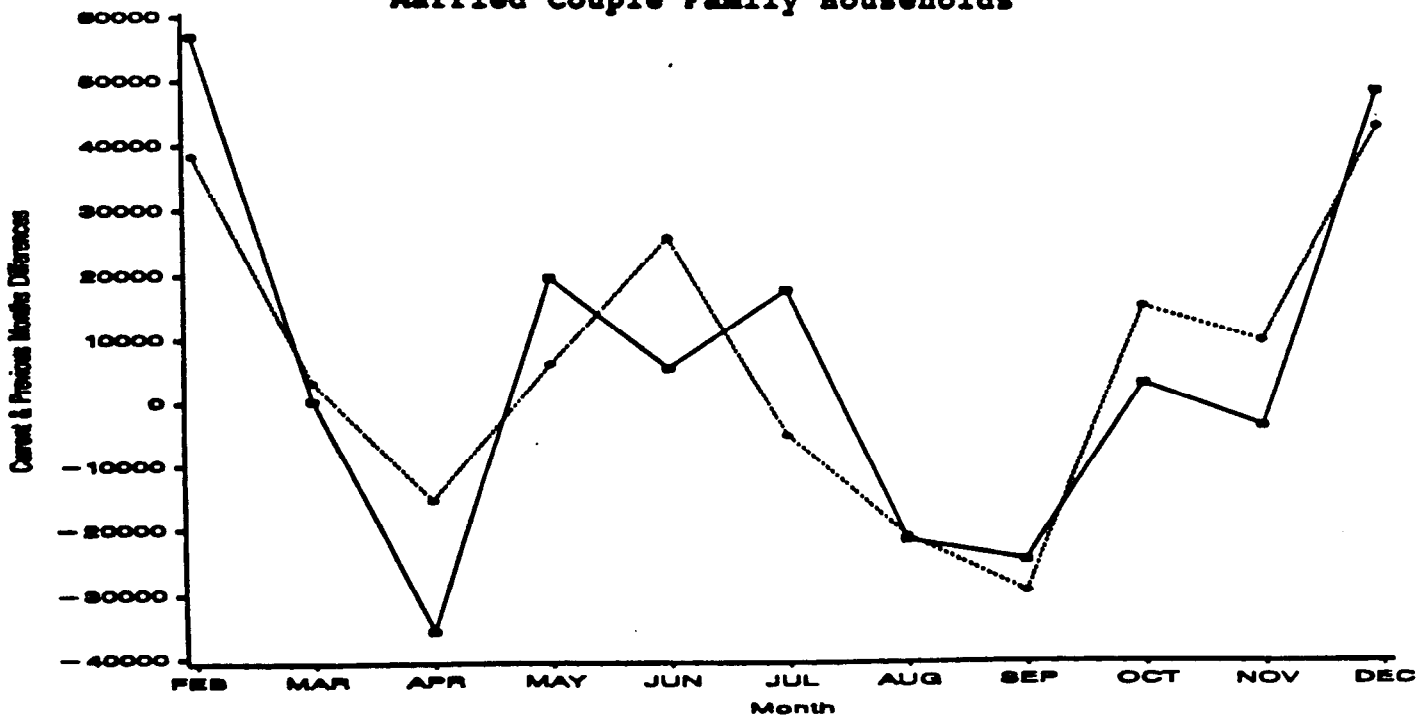


Figure 6

Month-to-Month Differences for Hispanic Married Couple Family Households



SOLID LINE DENOTES ORIGINAL DATA
BROKEN LINE DENOTES SMOOTHED DATA

Table 1

Household Type Proportions of Monthly Totals for the Black Male Population: Original and Presmoothed Series

Month	O1	P1	O2	P2	O3	P3	O4	P4	O5	P5	O6	P6	OT/PT
JUN83	.395	.392	.041	.042	.008	.008	.409	.404	.119	.124	.028	.029	0.993
JUL83	.398	.397	.042	.042	.009	.009	.398	.395	.123	.126	.030	.030	1.000
AUG83	.397	.398	.043	.044	.009	.009	.387	.387	.133	.131	.030	.031	1.001
SEP83	.398	.395	.046	.044	.009	.008	.380	.386	.130	.130	.037	.037	0.994
OCT83	.399	.394	.044	.042	.008	.008	.384	.384	.133	.132	.031	.040	0.991
NOV83	.390	.393	.040	.041	.008	.008	.378	.378	.140	.137	.044	.042	1.001
DEC83	.388	.388	.041	.042	.009	.009	.387	.386	.136	.136	.040	.040	0.998
JAN84	.389	.391	.042	.042	.010	.010	.378	.385	.140	.135	.042	.037	1.011
FEB84	.384	.382	.044	.043	.011	.009	.392	.392	.130	.135	.039	.039	0.995
MAR84	.381	.387	.046	.043	.010	.010	.402	.399	.129	.129	.031	.032	1.000
APR84	.390	.389	.042	.042	.009	.009	.406	.403	.124	.126	.029	.030	1.001
MAY84	.383	.386	.040	.044	.009	.009	.408	.404	.127	.125	.031	.032	0.997
JUN84	.390	.387	.047	.048	.009	.009	.397	.401	.125	.126	.032	.030	1.004
JUL84	.397	.391	.046	.047	.010	.010	.394	.398	.124	.125	.028	.029	1.003
AUG84	.389	.389	.049	.047	.009	.009	.397	.398	.128	.128	.028	.028	0.999
SEP84	.386	.391	.047	.048	.007	.008	.403	.393	.125	.127	.032	.034	1.007
OCT84	.388	.392	.045	.045	.009	.009	.390	.387	.133	.129	.036	.037	1.005
NOV84	.388	.389	.044	.044	.008	.008	.382	.385	.133	.133	.045	.040	1.005
DEC84	.387	.386	.045	.044	.008	.009	.388	.389	.132	.132	.040	.040	1.002
JAN85	.391	.389	.044	.044	.010	.010	.382	.386	.132	.132	.040	.039	0.999
FEB85	.387	.385	.044	.045	.009	.009	.381	.383	.133	.135	.045	.043	0.996
MAR85	.380	.384	.043	.043	.009	.008	.405	.397	.132	.130	.032	.037	0.987
APR85	.390	.394	.042	.043	.008	.008	.386	.387	.137	.133	.036	.036	1.008
MAY85	.386	.389	.045	.044	.007	.008	.391	.388	.134	.134	.037	.038	1.001
JUN85	.390	.390	.047	.048	.008	.009	.385	.383	.135	.135	.035	.035	0.997
JUL85	.399	.397	.047	.047	.010	.010	.374	.374	.137	.137	.034	.034	1.002
AUG85	.402	.397	.048	.048	.009	.010	.374	.372	.136	.140	.032	.032	0.991
SEP85	.403	.401	.049	.048	.010	.010	.362	.366	.141	.140	.035	.036	1.001
OCT85	.402	.399	.047	.046	.011	.010	.361	.368	.142	.140	.038	.037	0.996
NOV85	.396	.396	.045	.045	.010	.010	.365	.368	.143	.143	.040	.037	1.001
DEC85	.390	.394	.045	.045	.010	.010	.380	.374	.141	.143	.034	.033	1.005
JAN86	.387	.392	.045	.045	.009	.009	.392	.381	.139	.142	.028	.030	1.002
FEB86	.389	.390	.046	.046	.008	.008	.383	.377	.146	.146	.027	.034	0.999
MAR86	.399	.396	.045	.046	.006	.007	.374	.377	.145	.143	.030	.031	0.999
APR86	.402	.396	.050	.045	.006	.007	.369	.379	.142	.141	.031	.033	0.994
MAY86	.394	.393	.046	.047	.007	.007	.372	.375	.140	.140	.039	.038	0.998
JUN86	.390	.390	.050	.050	.010	.009	.373	.375	.138	.138	.040	.038	1.000
JUL86	.389	.393	.051	.050	.011	.010	.376	.375	.135	.134	.039	.038	1.004
AUG86	.392	.391	.050	.050	.010	.010	.378	.377	.133	.135	.037	.036	1.000
SEP86	.387	.388	.051	.051	.008	.008	.386	.385	.132	.131	.035	.037	0.996
OCT86	.393	.393	.049	.049	.008	.008	.381	.381	.131	.133	.038	.036	1.001
NOV86	.393	.391	.048	.048	.008	.008	.382	.382	.137	.136	.033	.035	0.999
DEC86	.391	.391	.049	.048	.007	.008	.382	.383	.138	.137	.033	.032	1.002
JAN87	.386	.392	.046	.048	.008	.008	.390	.385	.141	.137	.030	.030	0.999
FEB87	.391	.387	.046	.049	.007	.008	.382	.381	.140	.140	.033	.035	0.996
MAR87	.397	.393	.049	.049	.008	.008	.379	.381	.135	.138	.032	.032	1.005
APR87	.381	.387	.056	.055	.009	.008	.384	.383	.135	.135	.035	.032	0.992
MAY87	.388	.385	.058	.057	.009	.009	.371	.376	.136	.136	.039	.037	0.998
JUN87	.381	.385	.059	.058	.009	.010	.376	.372	.139	.137	.035	.037	1.004
JUL87	.379	.379	.053	.054	.010	.010	.390	.387	.133	.133	.035	.037	0.998
AUG87	.390	.390	.053	.053	.011	.010	.368	.369	.140	.140	.039	.038	1.000
SEP87	.388	.390	.050	.051	.007	.007	.374	.373	.138	.137	.044	.041	1.000
OCT87	.397	.393	.047	.048	.007	.007	.368	.372	.137	.138	.044	.042	0.998
NOV87	.392	.389	.047	.046	.006	.007	.375	.373	.142	.142	.038	.042	0.996
DEC87	.388	.386	.047	.047	.007	.007	.379	.378	.144	.143	.036	.039	1.001
JAN88	.376	.386	.049	.048	.007	.008	.388	.378	.143	.144	.037	.037	1.003
FEB88	.377	.378	.047	.051	.008	.007	.380	.378	.149	.147	.040	.040	0.995
MAR88	.382	.381	.051	.051	.007	.007	.377	.379	.144	.145	.038	.035	1.005
APR88	.375	.380	.051	.051	.008	.007	.385	.383	.144	.144	.036	.035	1.000
MAY88	.376	.374	.058	.054	.010	.007	.370	.373	.155	.155	.030	.037	0.993
JUN88	.374	.373	.058	.057	.009	.008	.384	.385	.142	.142	.033	.035	0.995
JUL88	.380	.379	.057	.056	.008	.009	.377	.380	.142	.141	.036	.035	1.000
AUG88	.383	.380	.052	.056	.009	.009	.378	.377	.144	.143	.035	.035	1.001
SEP88	.383	.382	.051	.057	.007	.007	.390	.385	.127	.129	.042	.040	1.012
OCT88	.376	.376	.054	.055	.007	.008	.387	.380	.135	.139	.041	.042	0.994
NOV88	.374	.375	.058	.056	.008	.008	.377	.374	.142	.144	.042	.044	1.002
DEC88	.370	.373	.055	.056	.010	.009	.373	.376	.149	.144	.043	.042	0.999
JAN89	.377	.378	.058	.057	.011	.010	.367	.369	.144	.145	.042	.041	1.003
FEB89	.371	.375	.059	.057	.010	.009	.366	.367	.151	.148	.044	.044	0.995
MAR89	.383	.383	.056	.056	.009	.009	.365	.366	.147	.146	.040	.040	1.000
APR89	.389	.387	.053	.054	.008	.008	.378	.377	.135	.134	.038	.039	0.999
MAY89	.389	.385	.052	.054	.007	.008	.368	.367	.143	.145	.040	.041	1.000

O1 = Original HH type 1
P1 = Presmoothed HH type 1
OT = Original Total
PT = Presmoothed Total

Table 2

Mean Absolute % Change in Component Proportions of Total between Original and Presmoothed Household Type Control Series

	Household Type					
	1	2	3	4	5	6
Black Males	0.6	2.3	5.7	0.8	1.1	4.8
Black Females	0.6	0.7	5.3	0.6	1.4	1.6
Nonblack Male	0.2	1.4	1.4	0.4	0.5	1.6
Nonblack Females	0.1	0.4	2.0	0.3	0.3	1.4

Table 3

Comparison of Mean Absolute Month-to-Month % Change for Original and Smoothed Household Type Control Series

HH Type Control	Black Males	Black Females	Nonblack Males	Nonblack Females
1 Original	1.15%	1.12%	0.25%	0.25%
1 Smoothed	0.74%	0.77%	0.19%	0.16%
Reduction	35.7%	31.3%	24.0%	36.0%
2 Original	4.23%	1.54%	2.43%	0.99%
2 Smoothed	2.58%	0.98%	1.25%	0.79%
Reduction	39.0%	36.4%	48.6%	20.2%
3 Original	11.32%	11.46%	3.55%	3.54%
3 Smoothed	7.87%	8.03%	2.64%	1.58%
Reduction	30.5%	29.9%	25.6%	55.4%
4 Original	2.02%	1.25%	0.97%	0.64%
4 Smoothed	1.27%	0.86%	0.63%	0.45%
Reduction	37.1%	31.2%	35.1%	29.7%
5 Original	2.81%	1.82%	0.98%	0.59%
5 Smoothed	2.20%	0.75%	0.75%	0.39%
Reduction	21.7%	58.8%	23.5%	33.9%
6 Original	9.12%	8.53%	3.49%	2.82%
6 Smoothed	6.25%	1.64%	2.46%	2.17%
Reduction	31.5%	80.8%	29.5%	23.0%

Table 4

Household Type

		Mean Absolute Deviation		
		Original	Smoothed	% Change in MAD
Married Couple Family HH (Type 1)				
Total		186659	56655	-69.4
Hispanic	Householder	21413	19109	-10.8
Non-Hispanic	"	171180	61495	-64.0
Black	"	48247	26322	-45.4
Nonblack	"	156789	54801	-65.0
Other Family HHs with Male Householder (Type 2)				
Total		51002	33149	-35.0
Hispanic	Householder	17332	18217	5.1
Non-Hispanic	"	49875	32031	-35.8
Black	"	20870	16445	-21.2
Nonblack	"	53530	29690	-44.5
Other Family HHs with Female Householder (Type 2)				
Total		104048	75633	-27.3
Hispanic	Householder	16860	19184	13.8
Non-Hispanic	"	101568	75955	-25.2
Black	"	54109	41452	-23.4
Nonblack	"	73647	56192	-23.7
Nonfamily HHs with Male Householder (Type 5)				
Total		134591	92154	-31.5
Hispanic	Householder	28314	30909	9.1
Non-Hispanic	"	158516	115530	-27.1
Black	"	59019	50505	-14.4
Nonblack	"	105901	53272	-49.7
Nonfamily HHs with Female Householder (Type 5)				
Total		82161	47951	-41.6
Hispanic	Householder	15109	12753	-15.6
Non-Hispanic	"	79642	50718	-36.6
Black	"	17596	10687	-39.3
Nonblack	"	81238	42805	-47.3

Table 5

Marital Status

		Mean Absolute Deviation		
		Original	Smoothed	% Change in MAD
Single Males				
Total		122533	72237	-41.0
Hispanic	Householder	34961	30941	-11.5
Non-Hispanic	"	101812	62992	-38.1
Black	"	42238	27129	-35.8
Nonblack	"	114322	81489	-28.7
Single Females				
Total		71067	37227	-47.6
Hispanic	Householder	23682	23908	1.0
Non-Hispanic	"	72881	45658	-37.4
Black	"	28751	19537	-32.0
Nonblack	"	57514	36214	-37.0
Married, Spouse Present: Male				
Total		139203	50466	-63.7
Hispanic	Householder	27218	22561	-17.1
Non-Hispanic	"	124580	52586	-57.8
Black	"	42546	23196	-45.5
Nonblack	"	115456	44422	-61.5
Married, Spouse Present: Female				
Total		139203	50466	-63.7
Hispanic	Householder	13235	14235	7.6
Non-Hispanic	"	133262	48225	-63.8
Black	"	41040	18328	-55.3
Nonblack	"	118957	43447	-63.5
Married, Spouse Absent: Male				
Total		46395	43922	- 5.3
Hispanic	Householder	32412	31488	- 2.9
Non-Hispanic	"	35955	32094	-10.7
Black	"	11582	13107	13.2
Nonblack	"	46901	44572	- 5.0
Married, Spouse Absent: Female				
Total		54009	41384	-23.4
Hispanic	Householder	10358	10991	6.1
Non-Hispanic	"	54778	43960	-19.7
Black	"	19895	23323	17.2
Nonblack	"	49566	42762	-13.7

Table 5

(continued)

		Mean Absolute Deviation		% Change in MAD
		Original	Smoothed	
Widowed Males				
Total		28742	22781	-20.7
Hispanic	Householder	4752	4444	- 6.5
Non-Hispanic	"	30752	24382	-20.7
Black	"	6586	8738	32.5
Nonblack	"	28233	19203	-32.0
Widowed Females				
Total		53642	39383	-26.6
Hispanic	Householder	9285	9027	- 2.8
Non-Hispanic	"	48405	38716	-22.0
Black	"	11290	8204	-27.3
Nonblack	"	47372	33637	-29.0
Divorced Males				
Total		43145	52959	22.7
Hispanic	Householder	14426	15318	6.2
Non-Hispanic	"	44075	50755	15.2
Black	"	23739	24424	2.9
Nonblack	"	33370	48069	44.0
Divorced Females				
Total		38117	38134	0.0
Hispanic	Householder	11398	11338	- 0.5
Non-Hispanic	"	39467	34895	-11.6
Black	"	22342	15603	-30.0
Nonblack	"	30275	39763	31.3

Table 7

Program Recipiency

Mean Absolute Deviation

	Original	Smoothed	% Change in MAD
Social Secruity			
Total	86424	90888	5.2
Hispanic	17492	17432	0.0
Non-Hispanic	79651	80594	1.2
Black Male	17548	17257	- 1.7
Black Female	21125	22756	7.7
Nonblack Male	31396	33876	7.9
Nonblack Female	61735	61075	- 1.0
Unemployment Compensation			
Total	173128	173131	0.0
Hispanic	38115	38284	0.4
Non-Hispanic	149021	149285	0.2
Black Male	21912	21545	- 1.7
Black Female	26558	26264	- 1.0
Nonblack Male	106887	106975	0.1
Nonblack Female	58934	59015	0.1
AFDC			
Total	40813	33672	-17.5
Hispanic	17394	16714	- 3.9
Non Hispanic	33902	31622	- 6.7
Black Male	5057	5043	- 0.3
Black Female	14990	14169	- 5.5
Nonblack Male	9768	9787	0.2
Nonblack Female	30925	28432	- 8.9
Food Stamps			
Total	58602	66839	-14.1
Hispanic	17011	15302	10.0
Non-Hispanic	65415	73951	13.0
Black Male	19157	19626	2.4
Black Female	27576	30985	12.4
Nonblack Male	25330	25510	0.7
Nonblack Female	35508	40594	14.3
Child Support	45033	36704	-18.5
Total	7812	7932	1.5
Non-Hispanic	45763	36523	-20.2
Black Male*	0	0	0
Black Female	19990	19160	- 4.2
Nonblack Male	7009	6655	- 5.1
Nonblack Female	38645	32533	-15.8

* = No Case