The Impact of Welfare Reform Across Metropolitan and Nonmetropolitan Areas: A Nonparametric Analysis

Bradford F. Mills
Jeffrey R. Alwang
Gautam Hazarika

Department of Agricultural and Applied Economics
Virginia Tech

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ABSTRACT

Recent welfare reform initiatives aimed at moving recipients off welfare and into the workforce represent the most important change in United States social welfare policy in recent decades. Concerns have been raised that nonmetropolitan heads of single-female families with children, the primary recipients of welfare payments, may experience greater difficulties in transiting from welfare to work and be more negatively affected by reform measures. Changes in the economic well-being of nonmetropolitan and metropolitan single female-headed families with children are examined in this paper using a kernel density estimator. The results show that the well-being of both nonmetropolitan and metropolitan families has increased since the implementation of reform measures. Further, density re-weighting methods show that increased education levels of family heads and strengthening of area economic conditions explain more of observed gains in the economic well-being of nonmetropolitan single female-headed families with children than recent welfare policy reforms.

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1) Introduction

Recent welfare reform measures have been widely hailed as a success. The most notable reform has been the replacement, under the 1996 Personal Responsibility and Work Opportunity Reconcilement Act (PRWORA), of the Aid to Families with Dependant Children (AFDC) program with state specific cash assistance programs funded by federal Temporary Assistance to Needy Families (TANF) block grants. TANF grant guidelines require able-bodied individuals to work within two years of receiving TANF assistance and set five-year cumulative limits on the receipt of TANF funds. Many states have used the autonomy granted under PRWORA to set even more stringent cash assistance eligibility requirements (see Gallagher et al. for a description of state cash public assistance programs).

Work requirements are just beginning to become binding in many states and most recipients will not face lifetime limits on benefits for several years. Still, widespread caseload declines have been interpreted as an initial indicator of program success. Yet, three prominent concerns remain about the long-term efficacy of reform measures. First, caseload declines do not necessarily indicate that those leaving the welfare roles have successfully transited into the workforce. Transitions from welfare to work may differ by location. Heads of single female headed families with children (SFHFwC), the primary recipient group of federally funded cash public assistance, may face particular difficulties in transiting from welfare to work in nonmetropolitan areas due to relatively weak demand for the labor market skills of family heads, more pronounced childcare and transportation barriers to workforce participation, and economies of scale in delivery of public programs to assist in transition (see, among others, Whitener; Findeis and Jensen; RUPRI). Second, successful transition from welfare to work may not result in significant gains in total family receipts since remuneration levels are often quite low for former welfare recipients (Blank, 1995). Third, recent welfare to work transitions may be strongly associated with regional economic performance suggesting that caseload reductions may not be sustained in the next economic downturn (for estimates of parametric relationships between caseload numbers and economic conditions see, among others, Blank 1997; Zilak et al.; Bartik).

Despite these concerns both nonmetropolitan and metropolitan SFHFwC have generally shown widespread economic gains since the initial implementation of welfare reform measures. Average per-capita total cash and noncash receipts of SFHFwC (in real 1999 dollars) increased significantly from 1993 to 1999 in both nonmetropolitan and metropolitan areas (table 1). This increase was fueled by growth in the 'earnings' components of total receipts, as average cash and noncash payments from public assistance programs showed a significant decline over the same period for both metropolitan and nonmetropolitan households. Further, the decline in public assistance

receipts was driven by decreases in federal funded cash public assistance receipts. In 1993 cash public assistance payments, almost exclusively AFDC payments, accounted for 21 percent of total cash and noncash receipts in poor and near-poor SFHFwC. By 1999 cash public assistance payments under the TANF program accounted for 11 percent of total cash and noncash receipts in poor and near-poor SFHFwC households. Yet the underlying source of overall economic gains is still unclear. Are gains attributable to structural changes in workforce and welfare program participation, given impending work requirements and lifetime benefits limits, or are economic gains the result of concurrent changes in the individual attributes and area economic conditions of SFHFwC?

Perhaps the most noticeable change has been strong and sustained economic growth and an accompanying decrease in unemployment rates in metropolitan and nonmetropolitan areas since the early nineties. In 1993 the average area unemployment rate faced by metropolitan SFHFwC was 7.2 percent.[1] By 1999 the average metropolitan area unemployment rate had declined to 4.1 percent. Area unemployment rates faced by nonmetropolitan SFHFwC residents showed a smaller, but still significant, decrease from 8.2 in 1993 to 6.0 percent in 1999. The work force status of SFHFwC has also changed in line with economic conditions (table 2). The proportion of heads of metropolitan SFHFwC not participating in the work force declined from 40.7 percent in 1993 to 27.4 percent in 1999. Conversely, the proportion of metropolitan household heads employed full-time increased from 49.5 to 58.8 percent and those employed part-time increased from 9.8 to 13.8 percent. SFHFwC in nonmetropolitan areas show a similar decline in the rate of workforce nonparticipation, from 39.3 to 25.8 percent between 1993 and 1999. Full-time employment in nonmetropolitan areas increased from 47.4 to 59.2 percent, and part-time employment increased from 13.4 to 14.9 percent.

Change in family and individual characteristics of SFHFwC may also be partly responsible for observed economic gains. In 1993 22.6 percent of heads of nonmetropolitan SFHFwC did not have a high school degree; by 1999 only 15.3 percent did not have a high school degree. Similarly, the proportion of nonmetropolitan heads with education beyond high school also showed a significant increase from 35.6 percent to 44.7 percent between 1993 and 1999. In metropolitan areas, a smaller decline occurred in the percentage of family heads without a high school degree, from 26.2 percent in 1993 to 22.4 percent in 1999. The percentage of metropolitan heads of SFHFwC with education beyond high school increased from 36.9 percent to 43.4 percent between 1993 and 1999. In both nonmetropolitan and metropolitan areas the children in SFHFwC tended to be older on average in 1999 than in 1993. This trend is consistent with observed decreases in births among teenagers throughout the nineties. Nonmetropolitan and metropolitan heads of SFHFwC were also noticeably less likely to have been previously been married in 1999 than 1993. Finally, heads of nonmetropolitan SFHFwC appear to be less likely to be Black in 1999 than in 1993, but more likely to be Hispanic. SFHFwC in metropolitan areas are also more likely to be Black or Hispanic than in nonmetropolitan areas.

The rest of this paper explores the roles that changes in workforce and welfare participation, as well as underlying changes in areas economic conditions and individual characteristics, have played in observed shifts in the economic well-being of SFHFwC. We begin by comparing density functions for per-capita total receipts of SFHFwC in 1993 and 1999 for metropolitan and nonmetropolitan areas. Probability density functions are estimated for the major components of per-capita total receipts (earnings, other income, and public assistance). Then, a method of re-weighting the 1999 nonmetropolitan per-capita receipts density to construct counterfactual density functions is presented, along with the first of five counterfactual experiments. The experiment simulates the counterfactual distribution of nonmetropolitan 1999 per-capita total receipts if the frequency of workforce – welfare participation states in the 1999 data were at 1993 levels, but the distribution of per-capita receipts within each of four possible states of workforce and welfare participation were at 1999 levels. The experiment identifies the overall contributions of workforce and welfare program participation shifts to observed 1993 to 1999 shifts in the distribution of per-capita total receipts of SFHFwC, but does not control for changes in area economic conditions and individual attributes that may have given rise to these workforce – workfare shifts.

Counterfactual experiments two through five are presented in section four. The second counterfactual density simulates the 1999 nonmetropolitan area distribution of per-capita receipts that would have prevailed if structural relationships between workforce – welfare participation decisions and area and individual attributes were at 1993 levels, but area and individual attributes remained at 1999 levels. The third counterfactual experiment simulates the 1999 distribution of per-capita receipts that would have prevailed with both the 1993 structural relationship between workforce – welfare participation and 1993 area and individual attributes. This experiment highlights the role substantive shifts in area economic conditions and individual attributes have played in the observed 1993 to 1999 shift in the density of total per-capita receipts in nonmetropolitan areas, above and beyond the structural shifts in workforce – welfare program participation.

The fourth counterfactual experiment simulates 1999 distributions of per-capita receipts that would have prevailed if area unemployment and individual attributes in each workforce – welfare state remained at 1993 levels, but the distribution of workforce – welfare participation were at 1999 levels. This experiment again highlights the important role area and individual attribute shifts have played in economic gains of nonmetropolitan SFHFwC. Given concerns that future downturns in area economic conditions will erode observed welfare to work transitions and associated economic welfare gains, the fifth and final counterfactual density presents 1999 distributions of per-capita receipts that would have prevailed with 1999 workforce – welfare participation rates arising from 1993 levels of unemployment in nonmetropolitan areas.

Overall, the results reveal significant positive rightward shifts in the per-capita distributions of total cash and noncash receipts for both metropolitan and nonmetropolitan SFHFwC from 1993 to 1999. Consistent with the group means presented in table 1, these gains are largely attributable to a rightward shift in the distribution of earnings, as the public assistance component of the distribution of total

receipts shifted leftward over the same period. Further, SFHFwC appear to have made slightly greater economic gains in nonmetropolitan areas than metropolitan areas. SFHFwC exhibit a slightly larger rightward shift in the distribution of earnings in nonmetropolitan areas than in metropolitan areas, as well as a smaller reduction in the distribution of public assistance payments at economically meaningful levels.

Many proponents of welfare reform measures cite aggregate movement of heads of SFHFwC off welfare and into the workforce as proof of initiative success. However, structural change in the relationship between area and individual attributes and workforce – welfare program participation decisions from 1993 to 1999 accounts for only a small portion of observed nonmetropolitan shifts when area and individual attributes are held at 1999 levels. Changes in individual and area attributes, by contrast, account for much of the observed rightward shift in nonmetropolitan per-capita total receipts from 1993 to 1999. However, economic gains at the upper-most tail of the per-capita receipts distribution do not appear to be associated with structural changes in workforce – welfare participation decisions or attribute changes. That is, between 1993 and 1999 the economy created higher returns at the upper end of the distribution than is accounted for by changes in these factors. Finally, the finding that the influence of improved area economic conditions on workforce – welfare participation decisions cannot account for a significant portion of observed economic gains of nonmetropolitan SFHFwC suggests that observed gains of SFHFwC will be relatively resilient to future economic downturns.

2) Nonparametric Kernel Density Estimation

Nonparametric density estimation techniques are particularly useful in exploratory data analysis since they avoid the rigid assumptions associated with parametric specification of the distribution.[2] The basic kernel density estimator can be written

$$(1) \quad \hat{f}(w) = \frac{1}{nh}\sum_{i=1}^{n} K\left(\frac{w - W_i}{h}\right)$$

where n is the number of observations, W_i are sample observations of per-capita total receipts, h is the bandwidth of the kernel estimator and K denotes the kernel. The choice of bandwidth is crucial in density estimation. Since the number of observations differ between the 1993 and 1999 metropolitan area samples and between the 1993 and 1999 nonmetropolitan area samples, bandwidth for initial density estimates is chosen to minimize the mean integrated square error for a Gaussian distribution in pooled 1993 and 1999 samples for both areas. This procedure ensures that density estimates are under-smoothed, a less serious problem for exploratory data analysis than over-smoothing. Density estimates are less dependent on the choice of kernel than the choice of bandwidth. The Epanechnikov kernel is used to estimate the densities, since it is optimal among nonnegative kernels in minimizing the mean integrated square error when the bandwidth described above is employed (Silverman).

Data on earnings, public assistance, and 'other' receipts of SFHFwC, as well as other variables used later in the analysis, are obtained from the 1993 and 1999 Annual Demographic files of the Current Population Survey.[3] Public assistance receipts include the imputed value of Food Stamp program and Medicaid program benefits.

Probability density function estimates of logarithm real per-capita total annual family receipts are presented for metropolitan and nonmetropolitan SFHFwC in figure 1, panels a and b, respectively. The metropolitan and nonmetropolitan distributions of total per-capita receipts exhibit a similar rightward shift from 1993 to 1999. However, the nonmetropolitan distribution has total receipts that are concentrated at slightly lower levels than the metropolitan distribution in both periods.

Changes in the estimated densities, shown at the bottom of each panel, suggest that gains in well-being in both metropolitan and nonmetropolitan areas have been broad-based. Each distribution has density increases above 6,000 dollars. For nonmetropolitan SFHFwC density decreases are concentrated around 2,000 dollars. For metropolitan areas the decrease in density occurs between 2,000 and 6,000 dollars. Thus, households with very low levels of per-capita receipts appear to have shown greater gains in *nonmetropolitan* areas than metropolitan areas. Nonmetropolitan SFHFwC also show a greater increase in the prevalence of families with total per-capita receipts above 7,000 dollars per year.

Per capita total receipts are broken down into earnings and public assistance components in figures 2 and 3, respectively. The increased portion of households with positive wage and self-employment earnings accounts for a major portion of the rightward shift in total receipts in both metropolitan and nonmetropolitan areas (figure 2 – panels a & b). The positive shift in the earnings density between 1993 and 1999 occurs primarily at annual per-capita earnings above 2,000 dollars per year. Increases in the prevalence of per-capita earnings above 2,000 per-year also appear to be greater among nonmetropolitan SFHFwC than metropolitan SFHFwC.

For both nonmetropolitan and metropolitan areas, density estimates for per-capita public assistance receipts are concentrated around zero and three positive per-capita levels (figure 3 – panels a & b). Note, however, that the first two positive peaks occur at very low levels of public assistance. The 1999 densities for public assistance payments also show decreases in per-capita provision of benefits in the economically meaningful 1,000 to 8,000 dollar range for both metropolitan and nonmetropolitan SFHFwC, but the density reduction for nonmetropolitan SFHFwC appears to be smaller. The 1999 nonmetropolitan density for public assistance payments also shows a small increase in families with no public assistance receipts in the previous year. Clearly, decreases in public assistance have had a negative influence on gains in total per-capita family receipts from 1993 to 1999. But, in both metropolitan and nonmetropolitan areas per-capita earning gains have, on average, more than offset losses in public assistance during the period.

3) Re-weighting for Changes in Workforce and Welfare Program Participation

Overall, changes in per-capita receipt distributions across metropolitan and nonmetropolitan areas are fairly similar. Changes in workforce and welfare program decisions and underlying individual and area economic attributes all contribute to these changes. The remainder of this paper examines in more detail these relationships in nonmetropolitan areas.

In order to better understand how workforce and welfare program changes have contributed to observed rightward shifts in the per-capita total receipts density of nonmetropolitan SFHFwC, the 1999 sample is re-weighted for 1993 levels of workforce and welfare program participation.[4] For each period, the probability density function of total receipts can be derived as a frequency-weighted aggregation of the probability density functions of total receipts in four jointly determined, and mutually exclusive, states of workforce and welfare program participation. These states are: (1) in the workforce – not on welfare; (2) not in the workforce – not on welfare; (3) in the workforce – on welfare; and (4) not in the workforce – on welfare. The distribution of heads of SFHFwC across these states shifted significantly from the not in the workforce – on welfare category into the in the workforce – not on welfare category from 1993 to 1999 (table 2).

The influence of shifts between states of workforce and welfare participation on the 1999 distribution of total per-capita receipts, but not shifts in per-capita receipt densities within each state, is accounted for by adjusting the relative frequency of each workforce – welfare participation state in the 1999 density estimate to 1993 levels. The procedure for re-weighting the 1999 per-capita receipts density is as follows. Let *f(w,z)* be the joint distribution of total receipts, *w*, and the four workforce – welfare program participation states, *z*, in domain Ω_z. The 1999 distribution of total receipts, t_w=1999, with 1999 workforce and welfare participation levels, t_z=1999 can be written

$$(2) \quad f(w; t_w = 99, t_z = 99) = \int_{z \in \Omega_z} f(w|z, t_w = 99) dF(z|t_z = 99)$$

Assume the conditional density of 1999 per-capita total receipts $f(w|z,t_w=99)$ is structurally invariant to the distribution of workforce – welfare program states $F(z|t_z = t)$. The counterfactual density for the distribution of 1999 total receipts with states of workforce and welfare program participation set to 1993 levels can be expressed

$$(3)\quad f(w;t_w=99,t_z=93)=\int f(w|z,t_w=99)dF(z|t_z=93)$$
$$=\int f(w|z,t_w=99)dF(z|t_z=99)\Psi_z$$
where $\Psi_z(z)=dF(z|t_z=93)/dF(z|t_z=99)$

For each observation Ψ_z is simply estimated as the ratio of the relative frequency of the observed state in 1993 to the relative frequency of the observed state in 1999. The estimated counterfactual density by the weighted-Kernel method is then

$$(4)\quad \hat{f}(w;t_w=99,t_z=93)=\sum_{i\in S_{99}}\frac{1}{nh}\hat{\Psi}_z(z_i)K\left(\frac{w-W_i}{h}\right)$$

The re-weighted estimate of the 1999 probability density function of total receipts for nonmetropolitan SFHFwC, with states of workforce and welfare participation held at 1993 levels, is presented in figure 4. The adjusted density is situated slightly to the left of the unadjusted 1999 probability density function of per-capita total receipts. This shift means that if workforce and welfare participation states were held at 1993 levels, but the structural relationship between workforce – welfare participation and per-capita receipts remained as it existed in 1999, SFHFwC well-being would have been worse than observed in 1999. That is, part of the gains in well-being occurred because of these state shifts. The difference between the 1999 participation-adjusted density and the 1999 unadjusted density is then compared to the difference between the 1993 and 1999 density estimates in the bottom section of the figure. Since the major share of the shift in workforce – welfare participation occurred away from the not in the workforce – on welfare category and into the in the workforce – not on welfare, the comparison suggests that this shift accounts for most of the decrease in the frequency of families at lower levels of total per-capita receipts. Shifts at the lowest levels and upper tail of the per-capita total receipts distribution from 1993 to 1999 cannot, however, be completely accounted for by shifts of heads of families off welfare and into the workforce. Fewer families are observed at the lowest levels of the per-capita total receipts and more families are observed at the upper end of the distribution than expected based solely on changes in workforce – welfare participation.

4) Decomposition of Workforce – Welfare, Area and Individual Attribute Changes

Observed changes in nonmetropolitan workforce – welfare program participation from 1993 to 1999 may stem from structural change in the relationship between participation decisions and individual and area economic attributes, as well as significant changes in individual characteristics and area economic conditions that underlie workforce – welfare participation decisions. Attribute changes may also have caused a shift in the distribution of per-capita receipts that is not also manifest in shifts in workforce – welfare states. The first counterfactual density does not distinguish between sources of change, but welfare reform measures have been largely designed to foster structural shifts in workforce – welfare participation. Specifically, the major goal of welfare reform measures is to

increase the propensity of individuals to work and decrease the propensity to rely on public assistance. The contribution of structural changes in the relationship between workforce – welfare participation and individual and area attributes, as well as the contribution of changes in area and individual attributes, to observed shifts in per-capita receipts are isolated in this section.

Structural shifts in workforce – welfare program participation

The joint distribution of workforce – welfare participation, z, and other individual and area attributes, x, is the product of $f(z|x, t_{z|x} = t)$ and $f(x|t_x = t)$. The density of 1999 per-capita total receipts is now written

$$(5) \quad f(w; t_w = 99, t_{z|x} = 99, t_x = 99)$$
$$= \int\int f(w|z, x, t_w = 99) dF(z|x, t_{z|x} = 99) dF(x|t_x = 99)$$

Again, the conditional density for per-capita total receipts is assumed to be structurally invariant to the distribution of workforce – welfare participation states. The 1999 density that would have prevailed with the 1993 structural relationship between workforce – welfare participation states and area and individual attributes, but with attributes at 1999 levels is

$$(6) \quad f(w; t_w = 99, t_{z|x} = 93, t_x = 99)$$
$$= \int\int f(w|z, x, t_w = 99) \Psi_{z|x} dF(z|x, t_{z|x} = 99) dF(x|t_x = 99)$$

where $\Psi_{z|x}$ is the re-weighting function $\Psi_{z|x} = dF(z|x, t_{z|x} = 93) / dF(z|x, t_{z|x} = 99)$.

$dF(z|x, t_{z|x} = t)$ represents the period t conditional probability of being in the observed state of workforce – welfare program participation with attribute set x.[5] In this case set x reflects area and individual attribute levels in the 1999 CPS dataset. The 1999 conditional density function $z|x$=99 is estimated by regressing the four observed 1999 states of workforce – welfare program participation by multinomial logit on area unemployment rates, age, previously married, number of children under 6, number of children between 6 and 17, and dummy variable indicators of residence in the South, residence in a nonmetropolitan area, race, ethnicity, high school degree, some college beyond high school, and college degree.[6] A similar multinomial estimate is performed with the 1993 CPS data to recover structural relationships for $z|x$=93. Probabilities of workforce – welfare participation with the 1999 attribute set, but 1993 workforce – welfare participation decisions, are then simulated with the estimated 1993 conditional density function.

The resulting adjusted distribution of per-capita total receipts is presented in figure 5. A comparison of differences between the adjusted density and the 1999 density estimate and between the 1993 density estimate and the 1999 density estimate is also presented in the bottom portion of the figure 5. Structural change in workforce – welfare program participation appears to account for only a small portion of the observed change in the distribution of per-capita receipts of nonmetropolitan SFHFwC from 1993 to 1999.

Structural workforce – welfare shifts and area - individual attribute shifts

As shown in table 1, area unemployment rates and individual attributes of nonmetropolitan SFHFwC showed significant changes from 1993 to 1999. To account for the role of changes in these attributes a counterfactual density adjusting the structure of workforce – welfare program participation to 1993 levels and area and individual attributes to 1993 levels is generated for the 1999 distribution of per-capita total receipts.

$$(7)\quad f(w; t_w = 99, t_{z|x} = 93, x = 93)$$

$$= \int\int f(w|z, x, t_w = 99)\, dF(z|x, t_{z|x} = 93)\, dF(x|t_x = 93)$$

$$= \int\int f(w|z, x, t_w = 99)\, dF(z|x, t_{z|x} = 99)\, dF(x|t_x = 99)\, \Psi_{z|x}\, \Psi_x$$

where by Bayes' rule $\Psi_x = dF(x|t_x = 93) / dF(x|t_x = 99) = \left[\frac{\Pr(t_x = 93|x)}{\Pr(t_x = 99|x)}\right] \left[\frac{\Pr(t_x = 99)}{\Pr(t_x = 93)}\right]$

The probability of being in sample period t given attributes x, $\Pr(t_x = t|x)$, is estimated by a logit model using the 1993 and 1999 samples of SFHFwC (see appendix 2). The same covariates are employed in the logit as in the previously specified multinomial logit model, except for a quadratic specification of area unemployment rates to account for a possible nonlinear relationship. $\Pr(t_x = t)$ is simply the number of observations in sample year t divided by the number of observation in both sample years.

The simulated 1999 nonmetropolitan density of per-capita total receipts with the structure of workforce – welfare participation decisions as well as area and individual attributes adjusted to 1993 levels is presented in figure 6. Adjustment for 1993 workforce – welfare participation decisions and other attributes produces a strong leftward shift in the distribution of per-capita total receipts. In fact when compared with unadjusted density shifts from 1993 to 1999, except for an increase at the upper tail of the distribution, the adjusted density accounts for nearly all of the rightward shift in per-capita total receipts that occurred from 1993 to 1999. In other words, heads of SFHFwC would have been as well off with 1999 distributions of per-capita total receipts, adjusted for 1993 attributes and relationships between attributes and workforce – welfare participation states, as with the initial 1993 distributions of per-capita receipts. Further, when compared to figure 5, the result implies that most of the 1993 to 1999 gains of nonmetropolitan SFHFwC are accounted for by individual and area attribute changes. However families with per-capita receipts above approximately 10,000 dollars per year have shown a slight increase above

and beyond the increase accounted for by structural change in workforce – welfare participation decisions and attribute shifts. This change at the upper tail of the per-capita total receipts distribution may stem from structural change in the conditional density of the per-capita receipts distribution $f(w|z,x,t_w)$ between the two periods.

Attribute shifts with changes in welfare – workforce states

Changes in area unemployment rates and individual attributes clearly play a major role in the observed 1993 to 1999 shift in the distribution of per-capita total receipts. The fourth counterfactual density adjusts the 1999 distribution of per-capita total receipts for area and individual attribute levels associated with each workforce – welfare program participation state in 1993, but the distribution of workforce – welfare program participation states held at 1999 levels, $f(w; t_w = 99, t_{x|z} = 93, t_z = 99)$. Since $f(z,x) = f(z|x)f(x) = f(x|z)f(z)$, an estimate of $\Psi_{x|z}$ can be recovered from estimated weights in the previous three experiments.

$$(8) \quad \hat{\Psi}_{x|z} = \hat{\Psi}_{z|x}\hat{\Psi}_x / \hat{\Psi}_z$$

As shown in figure 7, setting individual and area attributes within specific workforce – welfare states to 1993 levels, and keeping the distribution of workforce – welfare states at 1999 levels, also accounts for a share of the observed rightward shift in the distribution of per-capita total receipts from 1993 to 1999. However, the rightward shift in per-capita receipts above 15,000 dollars per year remains largely unexplained when frequencies of workforce – welfare states are held at 1999 levels. When compared with figure 6, this result suggests that gains at the upper tail of the distribution arise partially from the association of attribute shifts with movements into the relatively remunerative in the workforce – not on welfare state.

Area unemployment rate influences on workforce – welfare states

The final counterfactual density explores the contribution of welfare to workforce shifts associated with area unemployment rate decreases to observed rightward shifts in the distribution of per-capita total receipts, all other attributes held at 1999 levels. This experiment has important policy implications since observed human capital increases are relatively permanent, but nonmetropolitan area economic conditions and associated outcomes of workforce – welfare participation decisions are likely to vary with national economic cycles. The question has previously been addressed through estimation of parametric relationships between caseload numbers and economic conditions (see, among others, Blank; Zilak et al.).

Formally, let $z(x)$ now indicate the distribution of workforce – welfare program participation decisions associated with area economic conditions x.

$$(9)\quad f(w; t_w = 99, t_{z(x)} = 93)$$
$$= \int f(w|z(x), t_w = 99) dF(z(x)|t_{z(x)} = 93)$$
$$= \int f(w|z(x), t_w = 99) y_{z(x)} dF(z(x)|t_{z(x)} = 99)$$

where $y_{z(x)} = \dfrac{dF(z(x)|t_{z(x)} = 93)}{dF(z(x)|t_{z(x)} = 99)}$

Probabilities associated with $dF(z(x)|t_{z(x)} = 99)$ are generated from previous 1999 multinomial logit estimates and the 1999 dataset. For $dF(z(x)|t_{z(x)} = 93)$ probabilities are generated using 1999 multinomial logit parameter estimates and 1999 observations of workforce – welfare states and individual attributes. However, 1993 nonmetropolitan area unemployment rates are used, instead of 1999 rates, to generate probabilities of observed states of workforce – welfare program participation.

The 1999 estimated distribution of total per-capita receipts, adjusted for the influence of generally higher 1993 unemployment rates on workforce and welfare program participation decisions, is presented in figure 8. The changes in workforce and welfare participation decisions associated with area unemployment rate decreases from 1993 to 1999 appear to account for a negligible portion of the observed total shift in per-capita total receipts from 1993 to 1999. This result is not surprising. In the 1999 multinomial logit the unemployment rate shows a statistically significant association with two of the three workforce – welfare states, relative to the base state of working – not on welfare, but observed increases in educational levels of heads of SFHFwC and other attribute changes also show consistently strong statistical associations. The result also suggests that if increased levels of education and other attributes changes can be maintained, future downturns in nonmetropolitan area economic conditions, at least to 1993 levels, will not completely erode observed welfare to workforce transitions and associated economic gains of SFHFwC in nonmetropolitan areas.

5) Discussion and Conclusions

Historically SFHFwC have been the primary recipients of welfare payments. As part of recent reform measures, the AFDC program was replaced with federally funded block grants that give states considerably greater flexibility in setting eligibility requirements. Concurrent with reform measures, public cash assistance payments have decreased dramatically as a share of total receipts in SFHFwC. Keeping the results of the counter-factual experiments presented above in mind, we return to the three commonly raised concerns about the impact of welfare reform initiatives.

Have nonmetropolitan areas been more adversely affected by welfare reform measures?

Nonmetropolitan SFHFwC appear to have shared in widespread national economic gains of the mid to late nineties. SFHFwC in nonmetropolitan areas have shown as large, if not larger, increases in per-capita total receipts from 1993 to 1999, but average per-capita receipts are still lower for nonmetropolitan SFHFwC than for metropolitan SFHFwC. The composition of gains in nonmetropolitan areas differs from those seen in metropolitan areas. Nonmetropolitan SFHFwC actually showed more pronounced gains in per-capita earnings from 1993 to 1999 and smaller reductions in economically significant levels of public assistance benefits. Smaller reductions in public assistance payments in nonmetropolitan areas at the upper end of the benefits distribution appear to arise from the fact that families in nonmetropolitan areas are less likely to have been receiving public cash assistance benefits initially and, therefore, are less affected by reductions in benefits. Little evidence is found to support the claim that nonmetropolitan SFHFwC have been disproportionately harmed by welfare reform measures.

Have welfare to work transitions resulted in significant gains in total family receipts?

Welfare to work transitions have resulted in significant gains in total per-capita SFHFwC receipts in nonmetropolitan areas. Between 1993 and 1999 the status of heads of SFHFwC shifted from not in the workforce - on welfare toward the generally more remunerative state of in the workforce - not on welfare. This shift accounts for nearly all of the observed gains in total per-capita receipts of SFHFwC.

However, structural shifts in the propensity of heads of SFHFwC to leave welfare and enter the workforce, given a set of area and individual attributes, account for a minor portion of the observed rightward shift in the per-capita distribution of total receipts from 1993 to 1999. Concurrent increases in education levels and decreases in area unemployment rates, as well as other attribute shifts of SFHFwC from 1993 to 1999 appear, on the other hand, to account for a major portion of the observed rightward shift in the per-capita distribution. Attribute changes in SFHFwC and in area economies where they reside explain a greater portion of welfare to work shifts and resulting economic gains than do structural shifts that may be related to social welfare system policy changes.

Can advantageous area economic conditions explain welfare to work transitions and associated increases in per-capita receipts of SFHFwC?

Increases in education levels and area unemployment rates, as well as other attribute shifts of SFHFwC from 1993 to 1999 appear to account for a major portion of the observed rightward shift in the per-capita distribution. Many analysts of reform measures note that future economic downturns may reverse observed shifts from welfare to work and associated gains in SFHFwC well-being. Lower unemployment rates are found to be positively associated with being in the workforce and not on welfare, relative to not in the workforce and on welfare. However, 1993 to 1999 unemployment rate shifts explain only a minor portion of the influence of workforce and welfare program participation changes on per-capita receipts. Significant changes in other attributes, particularly

increases in levels of education and ages of family heads, have occurred. Thus, workforce - welfare participation rates are unlikely to return to pre-reform levels under economic conditions similar to those present in 1993.

Between 1993 and 1999, the propensity of heads of SFHFwC to leave welfare and enter the workforce did increase slightly, even after controlling for concurrent attribute shifts. This shift is consistent with the stated goals of welfare reform initiatives, but does not necessarily imply direct causality. The contribution of structural change in workforce – welfare participation to the observed distribution of economic gains of nonmetropolitan SFHFwC is relatively small compared to the distribution of gains associated with area and individual attribute shifts. Given that work restrictions were just beginning to become binding during the later sample period and lifetime benefit restrictions were not yet binding in most states, greater structural change in the workforce – welfare participation might be expected in the future.

At a minimum, efforts need to be made to monitor the well-being of SFHFwC as welfare eligibility time limits become binding and economic conditions change. Many women who left welfare and entered the workforce were hired late in the economic expansion and are more likely to be laid off early in an economic downturn. Different responses to economic downturns may be needed in metropolitan and nonmetropolitan areas if the demand for low-skill female labor in differentially impacted. Policies to increase the geographic distribution of economic gains through alternate uses of TANF funds, given that program expenditures are far below prior forecasts, may also be considered. For example, the recently developed Workforce Investment Act could be used to channel surpluses to address chronic deficiencies in nonmetropolitan area labor markets with continued high nonparticipation of SFHFwC in the workforce, but the general targeting of nonmetropolitan areas with differential assistance to counter negative shocks from reform measures does not appear warranted.

References:

Bartik, Timothy, J. (1998), "The Labor Supply Effect of Welfare Reform," *mimeo*, W.E. Upjohn Institute for Employment Research.

Blank, Rebecca M. (1995), "Outlook for the U.S. Labor Market and Prospects for Low-Wage Entry Jobs." *The Work Alternative: Welfare Reform and the Realities of the Job Market*, ed. Demetra Smith Nightingale and Robert H. Haveman, pp. 33-69. Washington, D.C.: Urban Institute Press, 1995.

Blank, Rebecca M. (1997), "What Causes Public Assistance Caseloads to Grow," Working Paper 6343. Cambridge Mass.: National Bureau of Economic Research.

Bloomquist, Leonard E., Leif Jensen, and Ruy A. Teixeira (1988), "Too Few Jobs for Workfare to Put Many to Work." *Rural Development Perspectives* 5: 8-12.

DiNardo, John, Nicole M. Forton, and Thomas Lemieux (1996), "Labor Market Institutions and the Distribution of Wages, 1973-1992: A Semiparametric Approach." *Econometrica*, 64(5): 1001-1044.

Findeis, Jill L. and Leif Jensen (1998), "Employment Opportunities in Rural Areas: Implications for Poverty in a Changing Policy Environment." *American Journal of Agricultural Economics*, 80(5): 1001-1008.

Gallagher, L. Jerome, Megan Gallagher, Kevin Perese, Susan Schreiber, and Keith Watson (1998). "One Year After Federal Welfare Reform: A Description of State Temporary Assistance for Needy Families (TANF) Decisions as of October 1997," *mimeo*, The Urban Institute.

Marron, J.S. and H.P. Schmitz (1992), "Simultaneous Density Estimation of Several Income Distributions." *Econometric Theory*, 8(4): 476-488.

Silverman, B. W. (1986), *Density Estimation for Statistics and Data Analysis*. London: Chapman and Hall.

Ziliak, James P., David N. Figlio, Elizabeth E. Davis, and Laura S. Connolly (1997), "Accounting for the Decline in AFDC Caseloads: Welfare Reform or Economic Growth?" Discussion paper no. 1151-97, Institute for Research on Poverty, University of Wisconsin-Madison.

Table 1: Economic, Area, and Individual Attributes of Single Female-Headed Families with Children

	NonMetropolitan				Metropolitan			
	1993		1999		1993		1999	
Variable	Mean	Standard Error	Mean	Standard Error	Mean	Standard Error	Mean	Standard Error
Per-capita total receipts	6,544.67[a]	164.89	7703.34	209.74	7714.42	110.50	8828.55[b]	145.38
Earnings	4244.35[a]	155.72	5625.18	203.09	5372.97	110.40	6680.56[b]	134.98
Other	1474.99	90.44	1484.07	82.86	1198.03	41.39	1439.71	55.27
Public Assistance	926.97[a]	39.71	690.20	42.45	1143.43	25.36	708.27	19.66
Area unemployment (%)	8.238[a]	0.065	5.998	0.064	7.159	0.025	4.112[b]	0.019
Education								
Below high school	0.226[a]	0.013	0.153	0.013	0.262	0.007	0.224 [b]	0.007
High school degree	0.418[a]	0.015	0.400	0.017	0.369	0.008	0.342 [b]	0.008
Some college	0.274[a]	0.014	0.329	0.017	0.267	0.007	0.308	0.008
College degree	0.082[a]	0.008	0.118	0.012	0.102	0.005	0.126	0.006
Age	34.513	0.253	35.276	0.301	34.653	0.137	35.218	0.151
Children								
Under 6	0.546[a]	0.024	0.466	0.025	0.635	0.0140	0.555[b]	0.013
6 to 17	1.309	0.032	1.312	0.037	1.248	0.017	1.332	0.019
Race and ethnicity								
Black	0.183[a]	0.012	0.103	0.011	0.288	0.008	0.278[b]	0.008
Other nonwhite	0.062	0.008	0.064	0.009	0.033	0.003	0.036[b]	0.003
Hispanic	0.052[a]	0.007	0.102	0.011	0.226	0.007	0.245[b]	0.008
Never married	0.235[a]	0.013	0.276	0.016	0.325	0.008	0.391[b]	0.009
No. Observations	1022		785		3581		3172	

Source: Bureau of Labor Statistics, 1999; Current Population Surveys, March 1993 and March 1999. All figures are in 1999 real dollars.

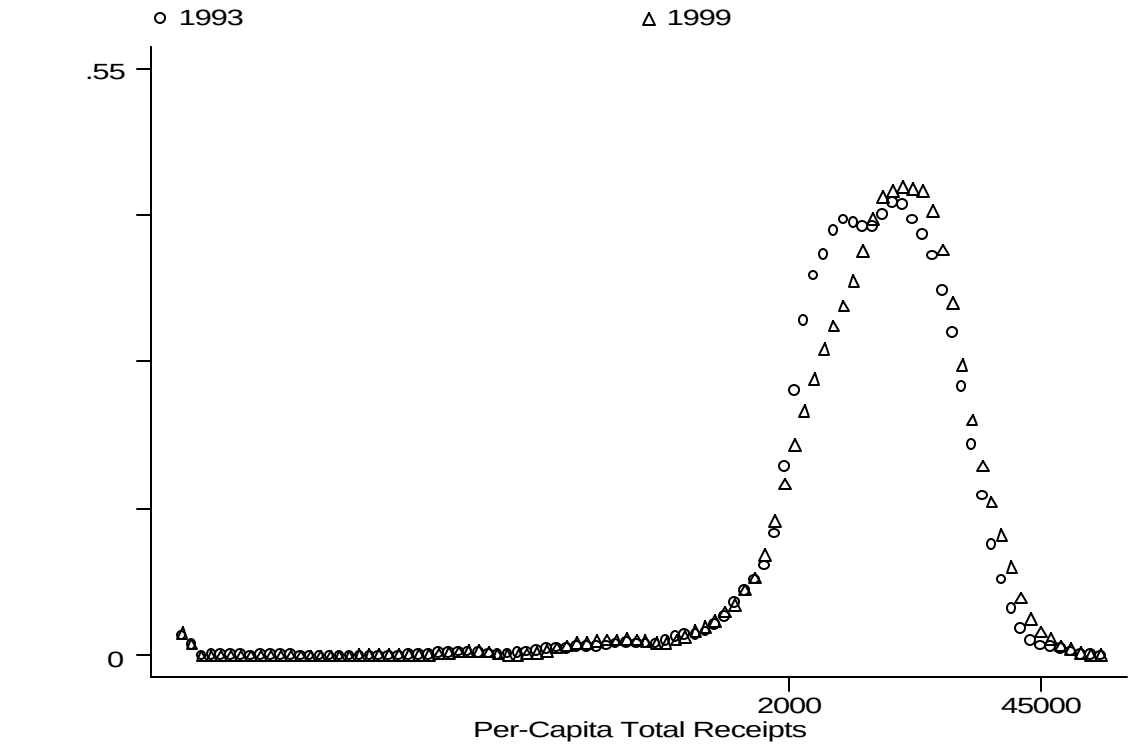
Note: a – 1993 and 1999 nonmetropolitan means significantly different at p=0.05 level in two-tailed t test. b – 1999 nonmetropolitan and metropolitan means significantly different at p=0.05 level in two-tailed t test. Earnings are defined as wage and self-employment income (including farming). Other income is defined as unemployment, social security, supplemental social security, veterans, disability, retirement, interest, dividend, rental property, child support, alimony, educational assistance and other miscellaneous income sources. Public assistance income is defined as cash public assistance payments plus the imputed value of Food Stamps, Medicaid and federal housing subsidy programs.

Table 2: Distribution of SFHFwC by Workforce and Welfare Participation Status

	Nonmetropolitan		Metropolitan	
	1993	1999	1993	1999
Not workforce participant, not welfare participant	19.2	18.2	15.0	16.7
Workforce participant, not welfare participant	53.3	67.3	53.0	65.6
Workforce participant, welfare participant	7.4	6.9	6.3	7.0
Not workforce participant, welfare participant	20.1	7.6	25.7	10.8

Note: Welfare program participation indicates AFDC program participation in 1993 and TANF program participation in 1999.

Figure 1, Panel A: Total Receipts Densities Metropolitan Areas, 1993 & 1999.



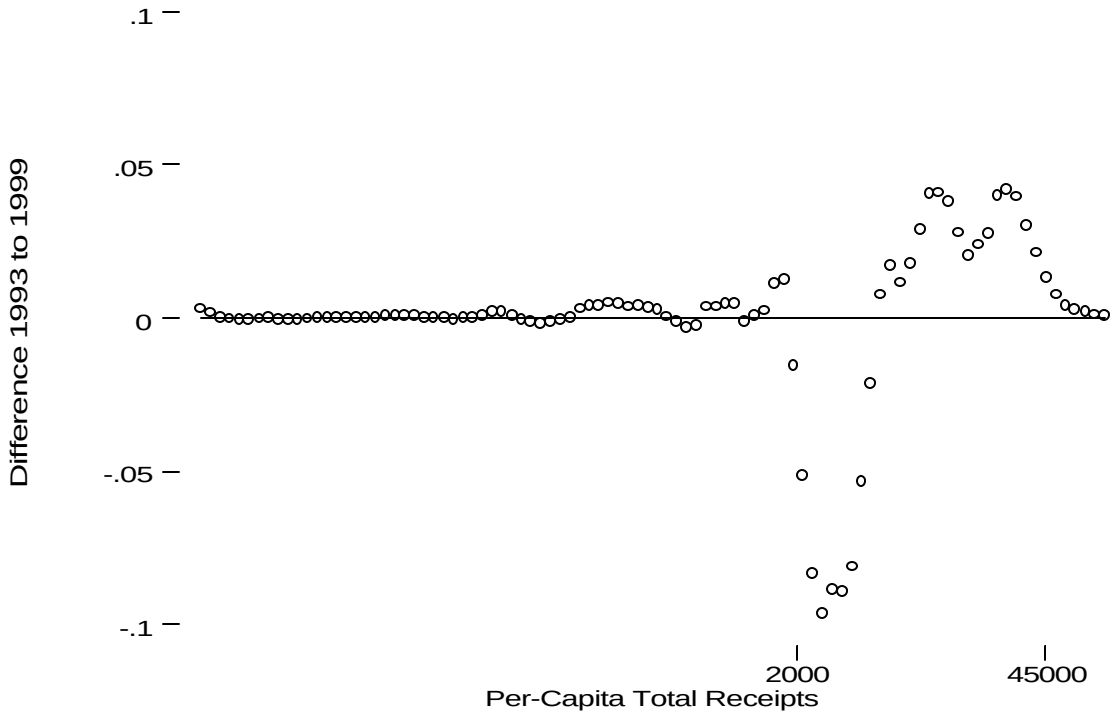


Figure 1, Panel B: Total Receipts Densities Nonmetropolitan Areas, 1993 & 1999.

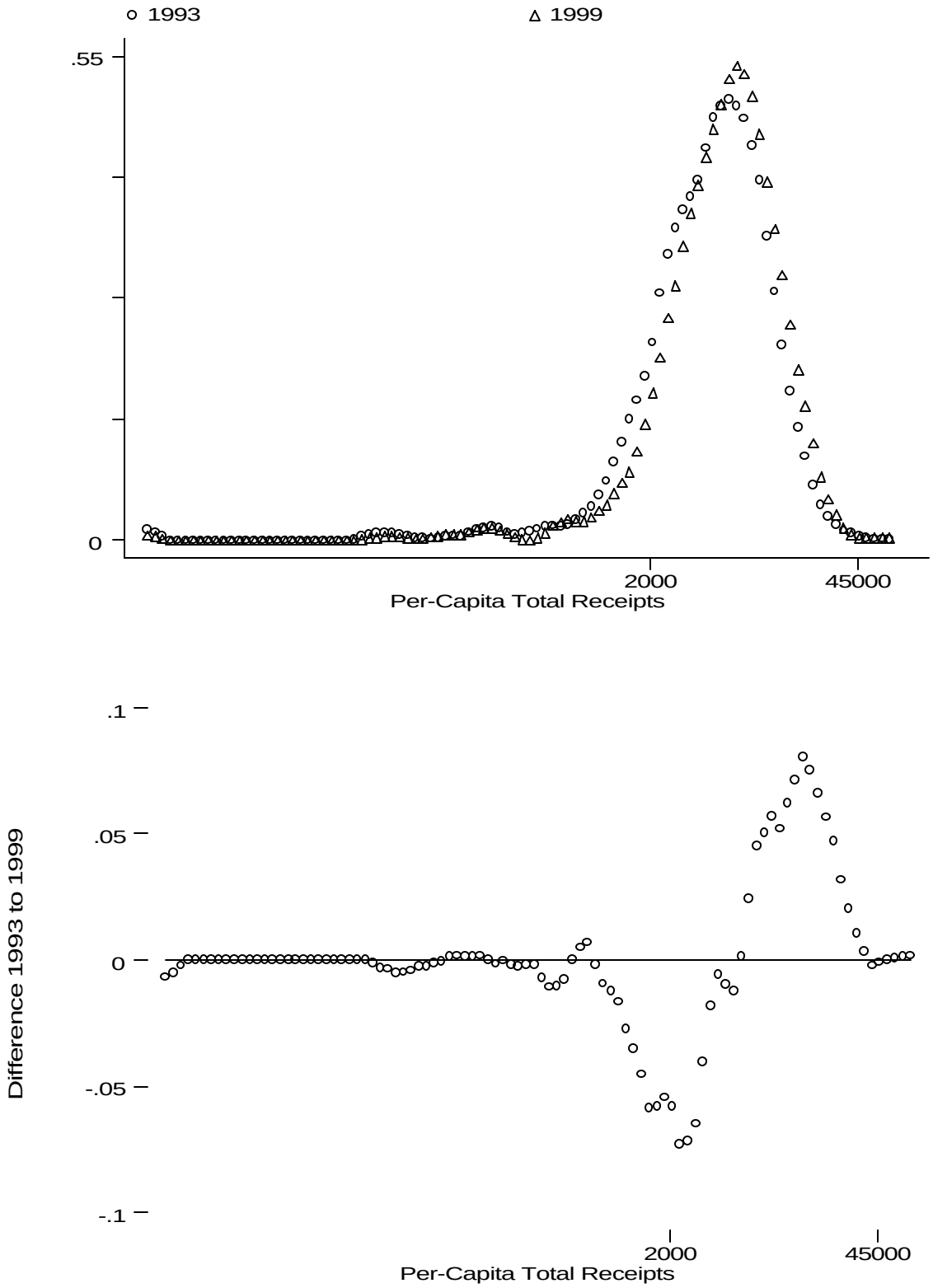


Figure 2, Panel A: Total Earnings Densities Metropolitan Areas, 1993 & 1999.

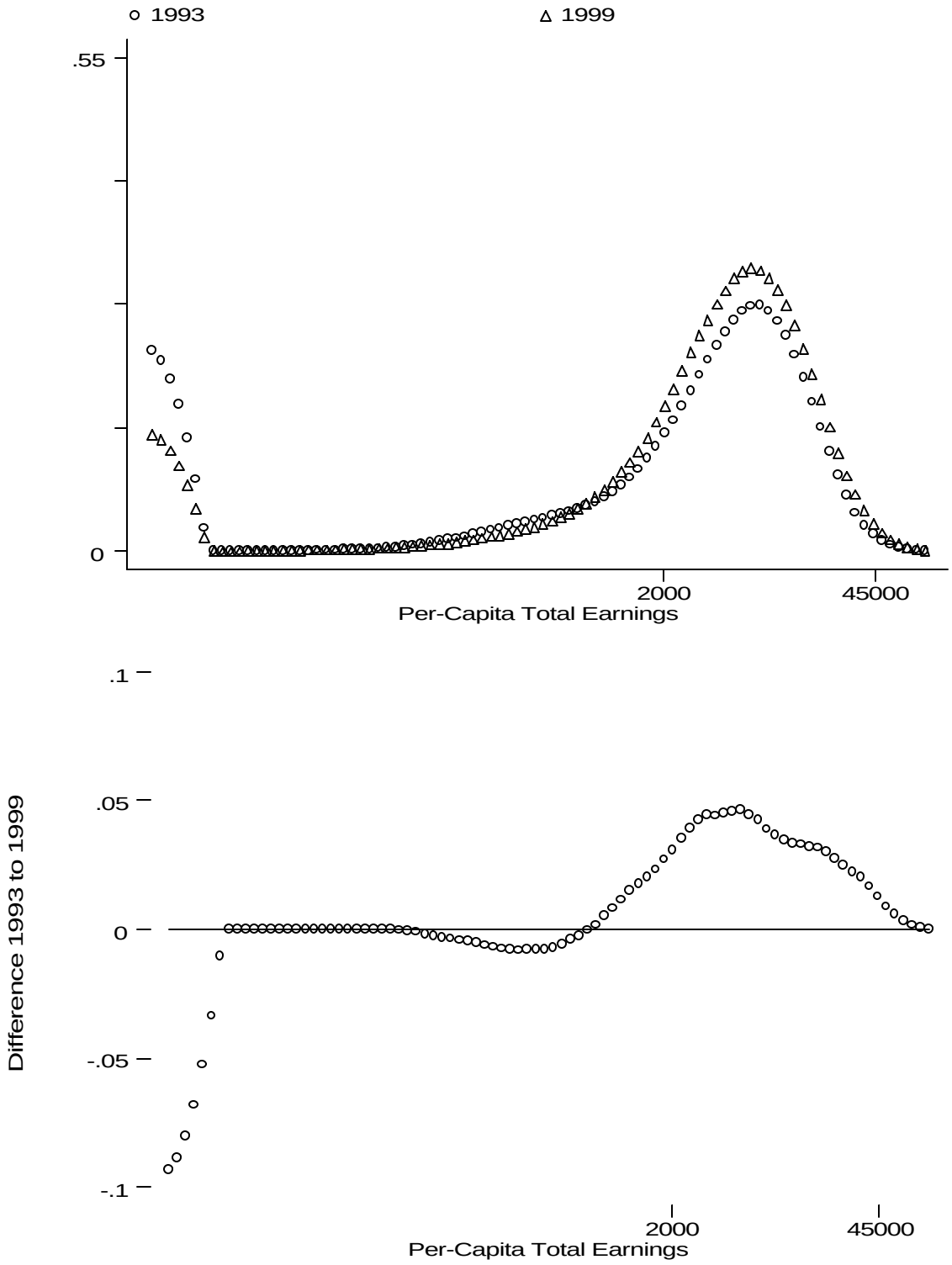


Figure 2, Panel B: Total Earnings Densities, Nonmetropolitan Areas, 1993 & 1999.

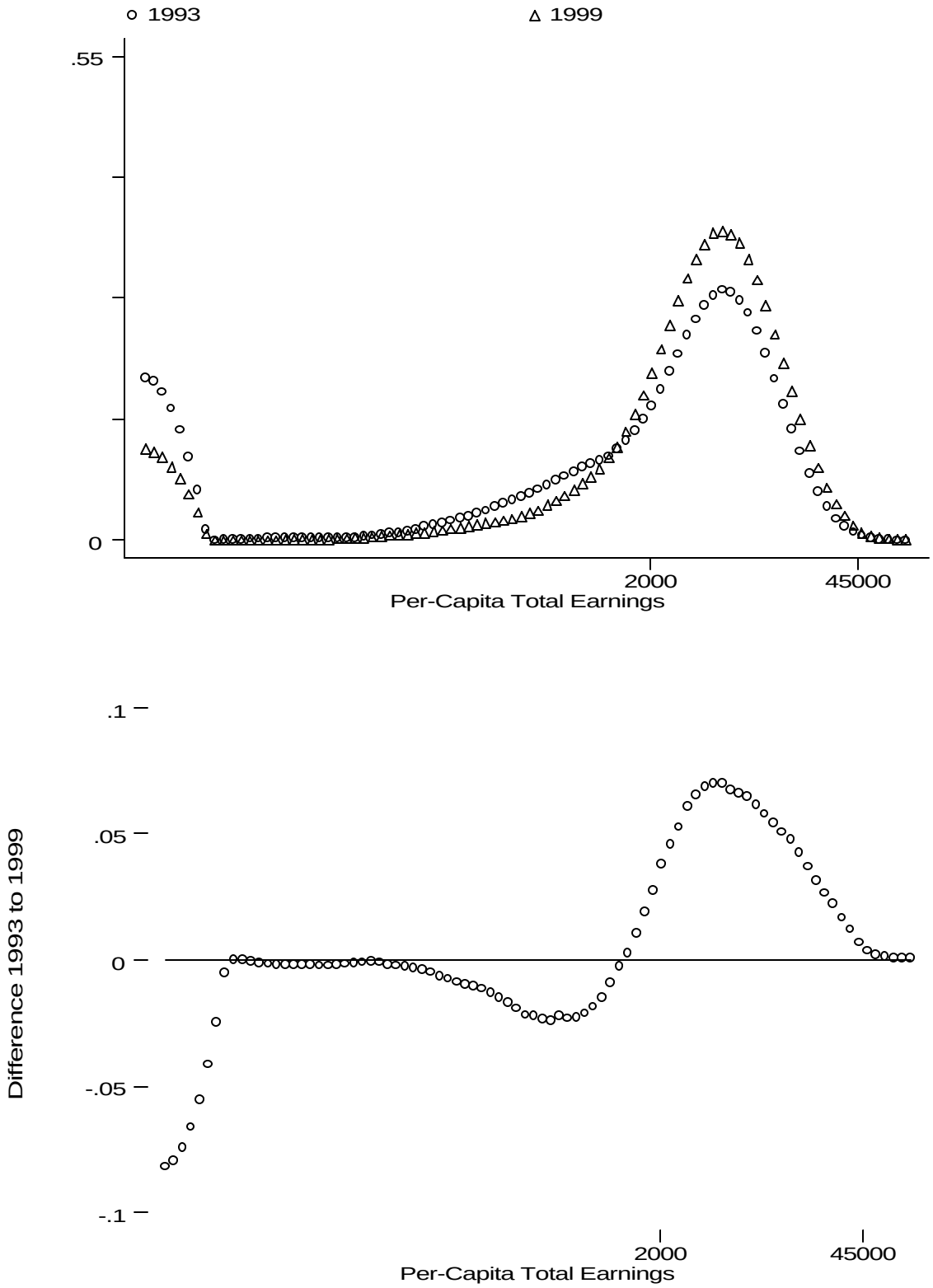


Figure 3, Panel A: Total Public Assistance Densities Metropolitan Areas, 1993 & 1999.

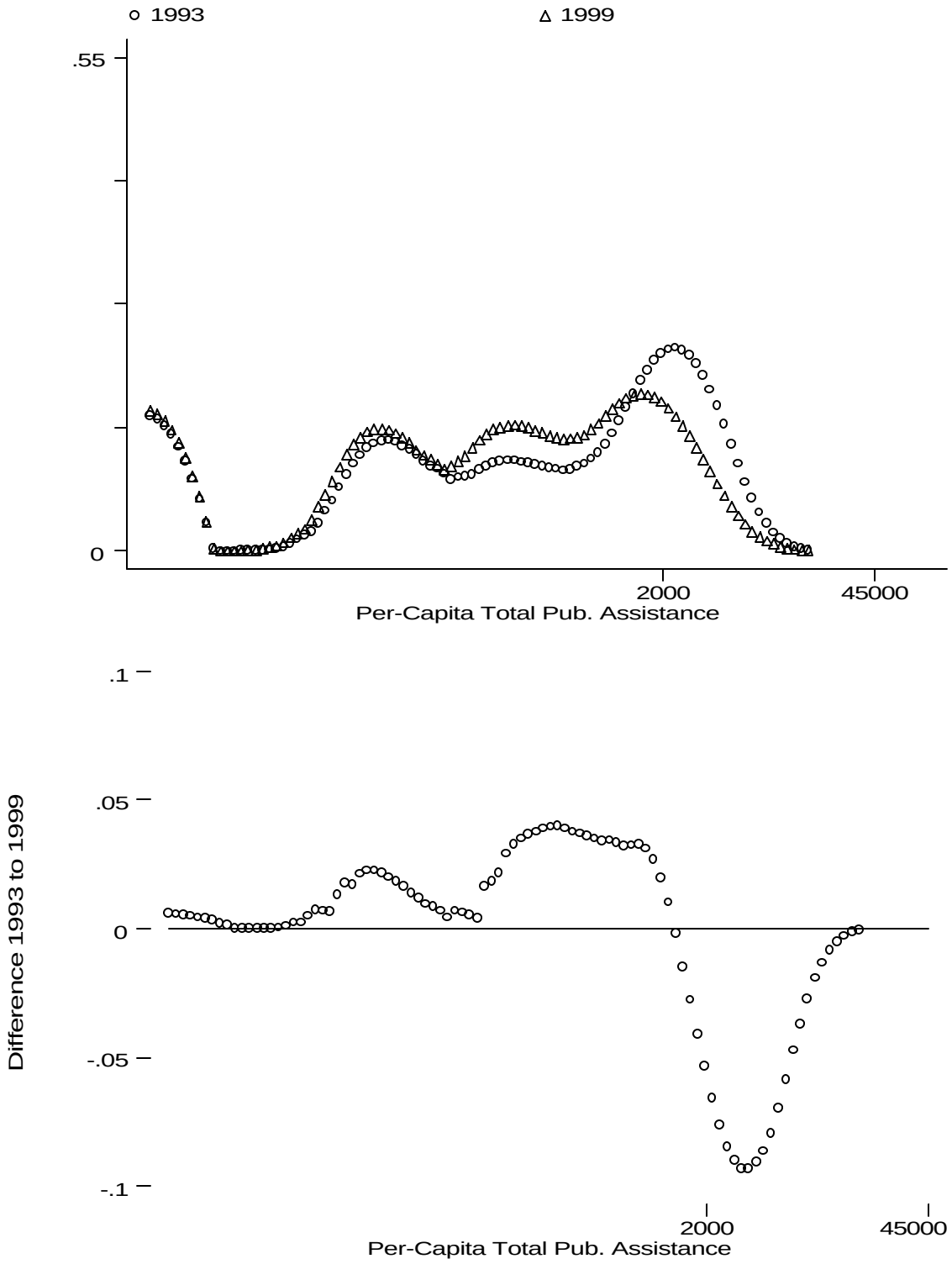


Figure 3, Panel B: Total Public Assistance Densities Nonmetropolitan Areas, 1993 & 1999.

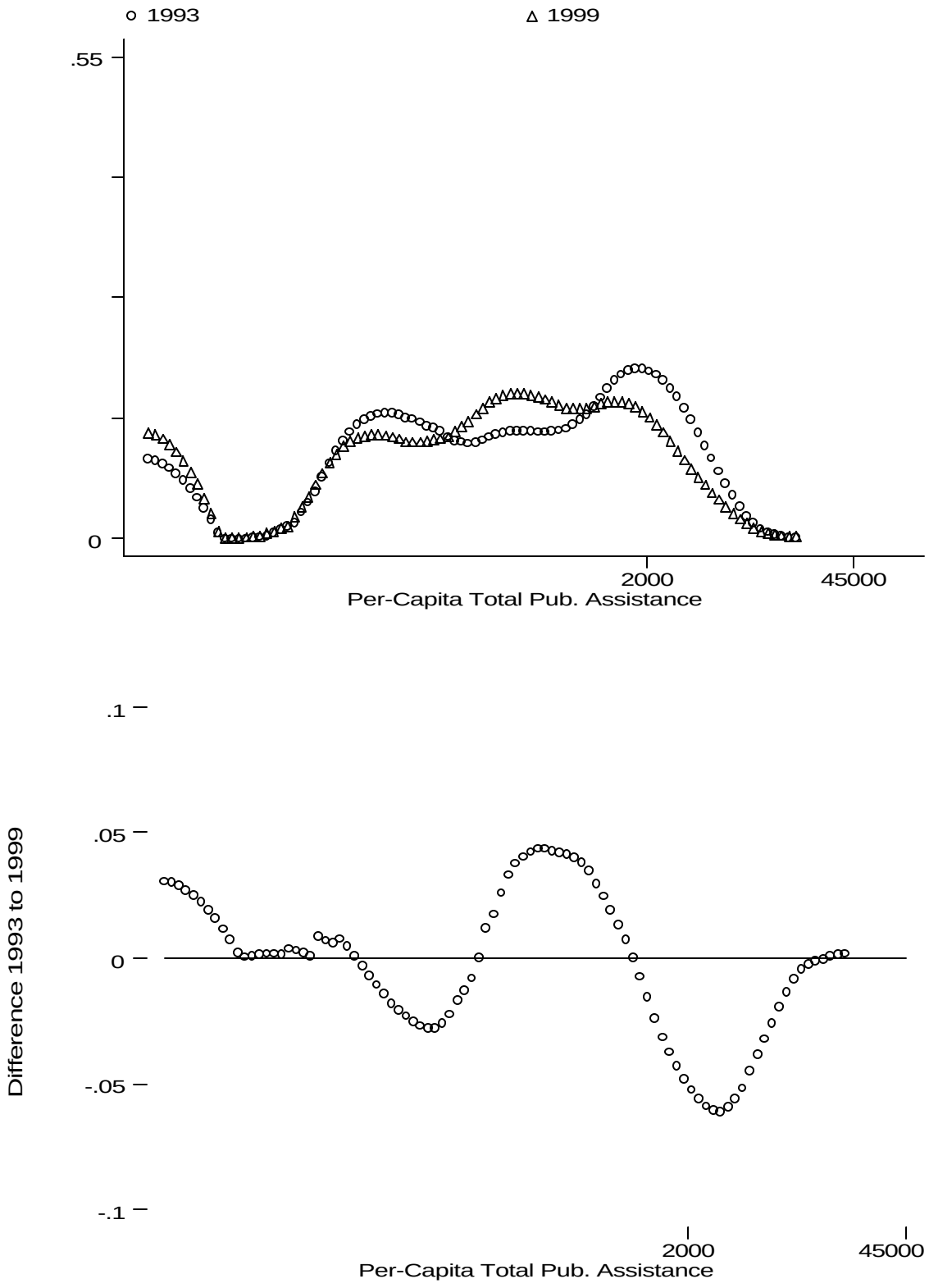


Figure 4: Re-Weighted 1999 Probability Density Function for Nonmetropolitan Per-Capita Total Receipts

Workforce participation and welfare program participation at 1993 levels

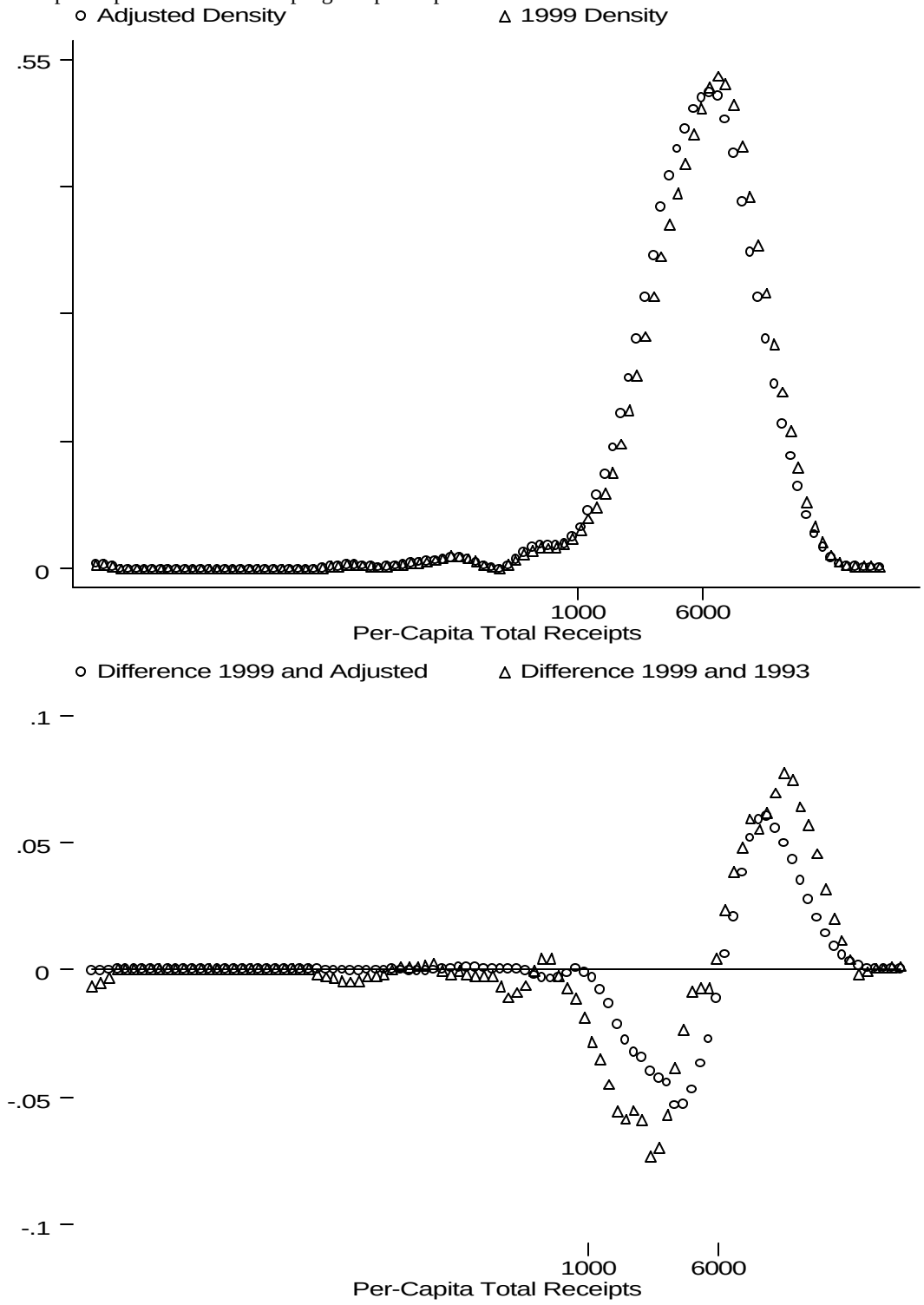
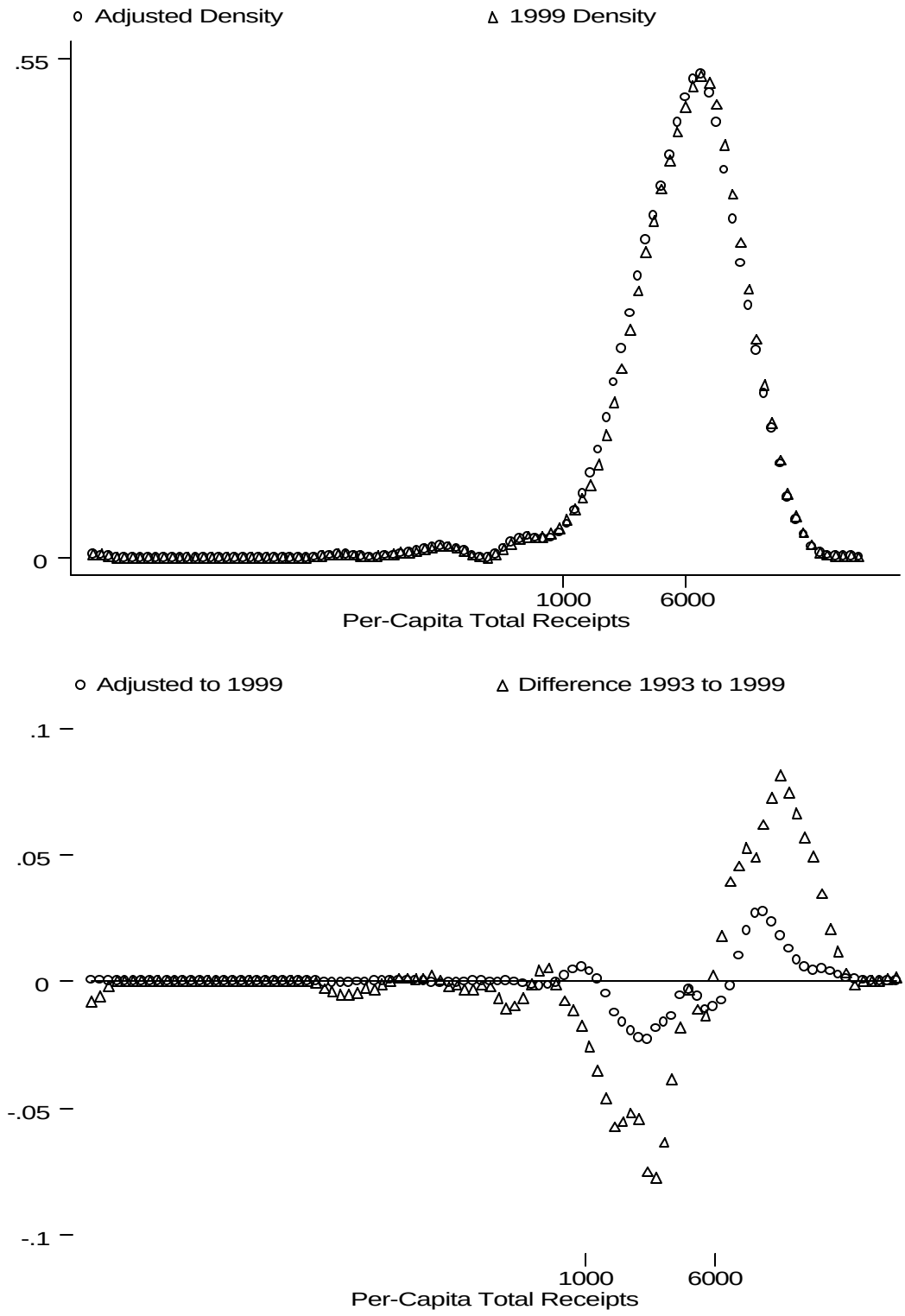
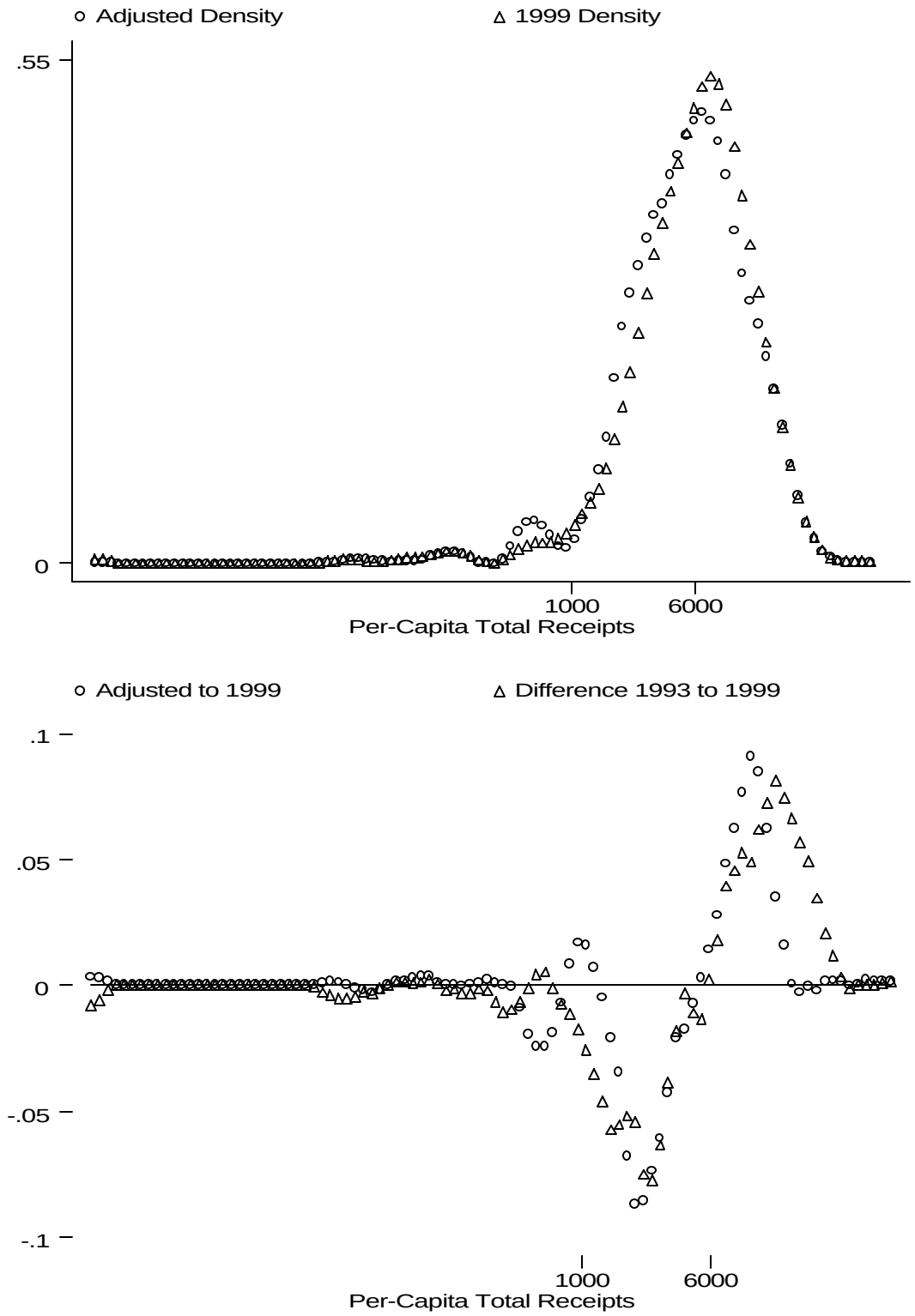


Figure 5: 1999 Nonmetropolitan Per-Capita Total Receipts Density Adjusted for 1993 Structure of Workforce – Welfare Program Participation



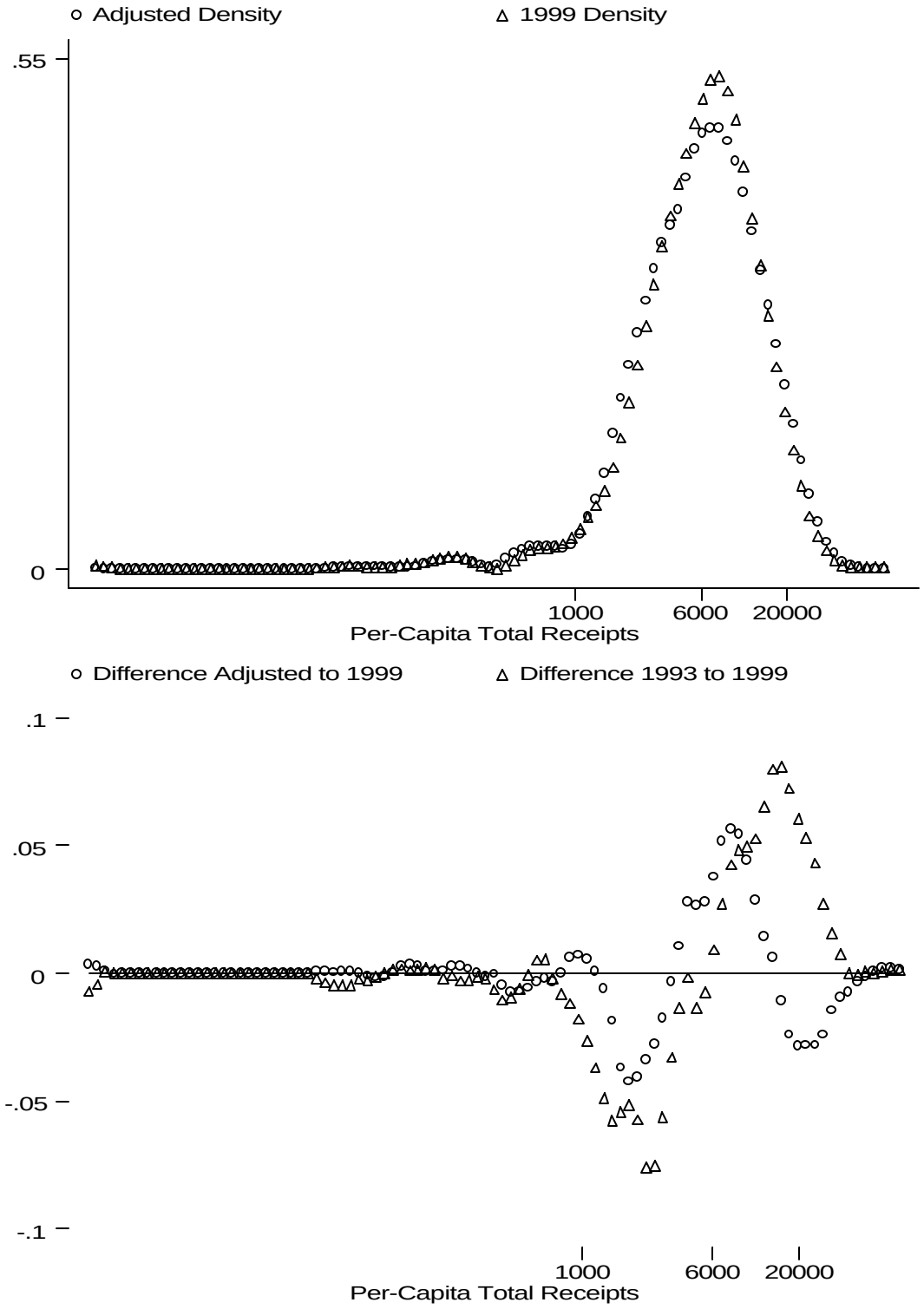
Note: The adjusted density represents the 1999 nonmetropolitan distribution of per-capita receipts that would have prevailed if the 1993 structural relationship between workforce – welfare participation decisions and area and individual attributes remained, but area and individual attribute were at 1999 levels.

Figure 6: 1999 Nonmetropolitan Per-Capita Total Receipts Density Adjusted for 1993 Workforce – Welfare Program Participation and Other 1993 Attributes



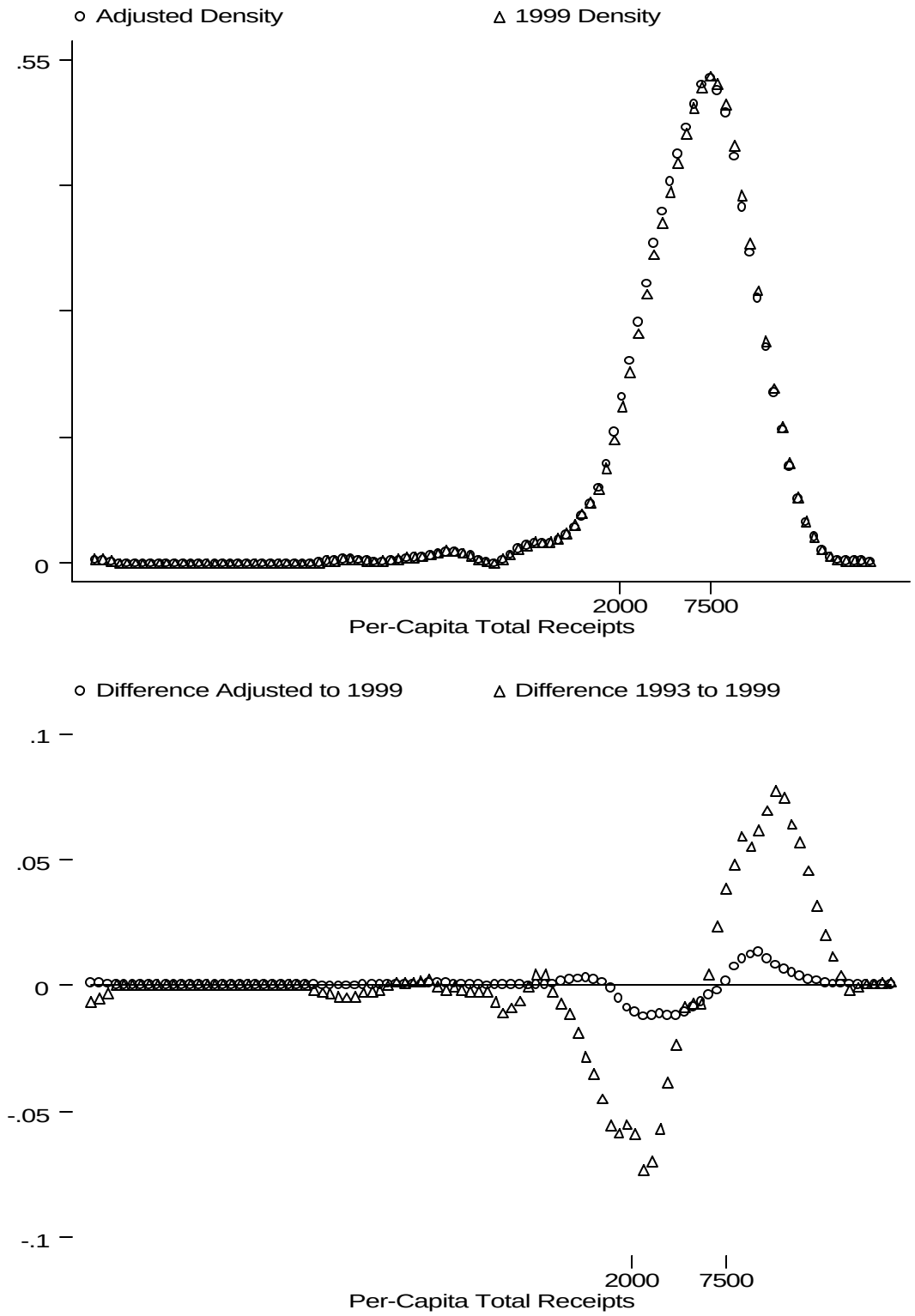
Note: The adjusted density represents the 1999 nonmetropolitan distribution of per-capita receipts that would have prevailed if both the structural relationship between workforce – welfare participation and area and individual attributes and area and individual attributes were held at 1993 levels.

Figure 7: 1999 Nonmetropolitan Per-Capita Total Receipts Density Adjusted for 1993 Area Unemployment Rates and Individual Attributes



Note: The adjusted density represents the 1999 nonmetropolitan distribution of per-capita receipts that would have prevailed if area unemployment and individual attributes in each workforce – welfare state remained at 1993 levels, but the distribution of workforce – welfare participation states were at 1999 levels.

Figure 8: Nonmetropolitan Per-Capita Total Receipts Density Adjusted for Workforce – Welfare Participation Levels Associated with 1993 Area Unemployment Rates



Note: The adjusted density represents the 1999 nonmetropolitan distribution of per-capita receipts that would have prevailed with 1999 workforce – welfare participation decisions arising from 1993 levels of unemployment.

Appendix 1: Parameter Estimates for the Multinomial Logit Model of Nonmetropolitan Work Force and TANF Program Participation Decisions (Workforce =1, Welfare=0 as Base)

Table A.1.1 Results for 1993

	Workforce=0, Welfare=0		**Workforce=1, Welfare =1**		**Workforce=0, Welfare =1**	
Variable	Coefficient	ASE	Coefficient	ASE	Coefficient	ASE
Constant	-.859	.633	-1.233	.962	-.149	.687
Unemployment Rate	.020	.043	-.056	.061	.108**	.045
South	-.150	.212	-.160	.316	-.631**	.248
High School Degree	-1.178***	.229	-.380	.357	-1.381***	.233
Some College	-1.492***	.238	-.628*	.381	-2.343***	.280
No. Children Under 6	.520**	.148	.617***	.189	.976***	.142
Number Children under 6 to 18	.015	.098	.257**	.128	.246**	.099
Black	.119	.279	.564	.371	.383	.302
Other Nonwhite	-.032	.393	-.284	.648	.556	.364
Hispanic	-.221	.412	-.344	.655	-.046	.907
Age	.014	.012	-.047**	.021	-.044***	.015
Never Married	.178	.246	.497	.316	.770***	.235
No. observations	196		76		205	
Total Number of Observations	1022					
Log likelihood	-1043.94					

Note: 1= Participated in state. * Indicates significance in a two-tailed t-test at the P=0.10 level, ** indicates significance in a two-tailed t-test at the P=0.05 level, and *** indicates significance in a two-tailed t-test at the P= 0.01 level.

Table A.1.2: Results for 1999

	Workforce=0, Welfare =0		**Workforce=1, Welfare =1**		**Workforce=0, Welfare =1**	
Variable	Coefficient	ASE	Coefficient	ASE	Coefficient	ASE
Constant	-1.956***	.720	-.962**	1.101	-2.462**	1.032
Unemployment Rate	.033	.059	.182**	.082	.176**	.081
South	.395	.249	-1.277**	.516	-.396	.425
High School Degree	-1.068***	.276	-1.550***	.405	-.969**	.379
Some College	-1.792***	.294	-1.972***	.429	-1.57***	.412
No. Children Under 6	.635***	.168	.751***	.234	.752***	.213
Number Children under 6 to 18	.001	.113	.263*	.156	.240*	.139
Black	-.637	.391	.052	.639	.092	.569
Other Nonwhite	-.922**	.383	.318	.554	.647	.525
Hispanic	.043	.342	-1.340**	.651	.524	.401
Age	.031**	.014	-.051**	.026	-.017	.021
Never Married	.382	.253	.706**	.354	.240	.348
No. observations	143		54		60	
Total Number of Observations	785					
Log likelihood	-667.80					

Note: 1= Participation in state. * Indicates significance in a two-tailed t-test at the P=0.10 level, ** indicates significance in a two-tailed t-test at the P=0.05 level, and *** indicates significance in a two-tailed t-test at the P= 0.01 level.

Appendix 2: Logit Estimates of Probability of Being in 1999 Nonmetropolitan Sample

Variable	Coefficient	ASE
Constant	2.352***	.872
Unemployment Rate	-.447*	.234
Unemployment Rate Squared	-.016	.010
South	.126	.146
High School Degree	.390**	.160
Some College or Higher	.621***	.164
No. Children Under 6	-.107	.094
Number Children under 6 to 18	.046	.062
Black	- .720***	.197
Other Nonwhite	.158	.238
Hispanic	1.486***	.227
Age	.023***	.009
Never Married	0.578***	0.153
Total Observations	1807	
Log likelihood	-923.98	

[1] All statistics are derived from 1993 and 1999 March Current Population Survey Annual Demographic files, unless noted. Metropolitan and nonmetropolitan area unemployment rates are calculated by aggregating Bureau of Labor Statistics labor-market area rates into nonmetropolitan and metropolitan area rates within each state. These rates are then averaged across SFHFwC in the Current Population Survey (CPS) sample based on state and nonmetropolitan and metropolitan designations, since nonmetropolitan county of residence can not be identified in the CPS sample.

[2] Silverman (1986) provides an excellent review of kernel density functions and their applications.

[3] The value of 1993 receipts is adjusted to 1999 dollars. Receipts are estimated for the previous calendar year.

[4] See DiNardo, Fortin, and Lemieux (1996) for one of the first economic applications of semiparametric density re-weighting methods to shifts in U.S. hourly-wage distributions.

[5] $\int dF(z|x, t_{z|x} = t)$ could also be expressed as $\sum_{j=1}^{4} \Pr(z = j|x, t_{z|x} = t)$, where j=1,2,3,4 is an indicator of the observed discrete workforce – welfare state.

[6] See appendix 1 for 1999 and 1993 multinomial logit model parameter estimates.