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The Effects of Metropolitan Job Growth on the Size Distribution of Family Income

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**THE EFFECTS OF METROPOLITAN JOB GROWTH
ON THE SIZE DISTRIBUTION OF FAMILY INCOME**

Upjohn Institute Staff Working Paper 91-06

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THE EFFECTS OF METROPOLITAN JOB GROWTH ON THE SIZE DISTRIBUTION OF FAMILY INCOME

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Abstract

This paper examines how a metropolitan area's job growth affects its income distribution. The research uses annual Current Population Survey data on the income distribution in different metropolitan areas from 1979 through 1988. Faster metropolitan job growth increases real family income in the lowest income quintile by a significantly greater percentage than for the average family. Metropolitan job growth also increases the value of property owned by upper income quintiles, but property value effects are not large enough to offset the progressive effects of growth on labor income. Simulations indicate that economic development programs to increase metropolitan job growth will have a progressive effect if the cost per job created is low, and these costs are financed by personal taxes. But economic development programs with a high cost per job created, or financed by cutting social welfare programs, will have a net negative effect on the lowest income quintile.

THE EFFECTS OF METROPOLITAN JOB GROWTH ON THE SIZE DISTRIBUTION OF FAMILY INCOME

I. Introduction

The effects of metropolitan employment growth on the income distribution have received little attention from researchers. Income distribution is a perennial central issue in economics, and some researchers have looked at national business cycle effects upon the income distribution (Blank, 1989; Blank and Blinder, 1986; Blinder and Esaki, 1978). Local labor markets have been the subject of increased research attention in recent years, and some researchers have examined how metropolitan employment growth affects wages (e.g., Eberts and Stone, 1988; Bartik, 1991). But no research has directly linked local labor market trends with income distribution issues.

One plausible argument is that metropolitan employment growth will worsen the income distribution, due to the phenomenon of capitalization. In the long-run, it could be argued, faster metropolitan employment growth will be offset by population in-migration, driving up land prices, with little effect on real wages or unemployment. A well-known essay by Louis Winnick some years ago used this argument to support the proposition that people rather than places should be the target of anti-poverty policies: "real estate owners, banks, retailers, and utilities are surer beneficiaries (from new industry) than are the unemployed coal miners or loggers who are less likely to get the jobs in the new plants than are new in-migrants, younger and with more appropriate skills" (Winnick, 1966).

But there are persuasive arguments for why labor market benefits of faster metropolitan employment growth may be significant and persistent. People are reluctant to move; going back to Adam Smith, economists have been aware that "a man is of all sorts of luggage the most difficult to be transported" (Smith, 1776, Book I, chapter VIII). Furthermore, faster metropolitan employment growth may provide current residents with labor market experience and insider status that will increase their long-run labor market success. To use the current jargon, local labor market equilibria may be subject to hysteresis effects (Cross, 1988).

Who benefits from faster metropolitan employment growth is thus a open question, whose answer is uncertain from a theoretical perspective. The empirical results presented here suggest that faster metropolitan employment growth significantly increases the income share of the lowest income quintile. The poor's labor income gains offset the rich's capital gains.

These findings are relevant to state and local economic development policies. Politicians promise that these policies will help the unemployed and the poor. Simulations using my results indicate that this promise may be fulfilled, but only under certain conditions: if the cost per job created is low, and if these costs are not financed too regressively.

II. Model and Data

The model estimated in this study is simple. The equations estimated are of the form

$$(1) \quad \%Dy_{imt} = B_0 + B_t + C(L)g_{mt} + e_{imt}.$$

$\%Dy_{imt}$ is the percentage change in mean family income for quintile i in metropolitan area m from year $t-1$ to t ; B_t represents a vector of dummy variables for each year; g_{mt} is percentage employment growth from year $t-1$ to t for metropolitan area m ; e_{imt} is the disturbance term. $C(L)$ indicates that up to ten lagged values of g_{mt} are also included--that is, growth trends from up to ten years ago are allowed to affect income trends today--with each lag allowed to have its own coefficient. To estimate equation (1), all metropolitan areas and years in the data are pooled. Variants of equation (1) look at overall mean family income, or at income of different types (e.g., wage and salary income, self-employment income).

The time dummies included in equation (1) imply that this study is focusing not on the effects of national job trends, but on the effects of a metropolitan area's job trends. Including time dummies is equivalent to all variables being differenced from their time period means. Hence, equation (1) is trying to explain variations across metropolitan areas in income distribution trends as a function of variations of metropolitan area job growth from the national average.

Including more and more lagged values of the employment variables would eventually make all the estimates statistically insignificant. Hence, the reported results sometimes focus on the specification with the "optimal lag length". The "optimal lag length" is defined as the lag length, among the 11 lag lengths tested (from zero to ten lagged years in the employment variables), that minimizes the "Akaike Information Criterion" (Amemiya, 1985). The AIC is a standard model selection criterion that selects the model that explains the most with the least. The AIC is reduced for models with a lower sum of squared errors or fewer explanatory variables. I also report estimates for the most general specifications estimated in this study, which allow effects for employment growth as long as ten years ago.

The data for the model's dependent variables come from March Current Population Survey tapes. The surveys included run from March 1980 through March 1989; each CPS reports family income information for the preceding year. To calculate metropolitan area quintile incomes, I include all families in identified metropolitan statistical areas (MSAs); from March 1980 to March 1985, only 44 MSAs were identified, but an additional 192 MSAs are identified from March 1986 onwards. All types of CPS families are included in the analysis, including unrelated individuals, and "unrelated subfamilies".¹

¹"Related subfamilies" are counted by the CPS as part of the main family in the household, and I also follow this convention.

For each MSA and year, I order families by income, and calculate the mean family income for each quintile of the MSA's income distribution. These quintiles are separately defined for each MSA and year. I also calculate mean family income for the MSA, and the mean of various types of family income for each quintile and the MSA. These estimated means are used to calculate equation (1)'s dependent variables.

The annual aggregate MSA employment data that are used, covering 1969 through 1988, come from the Regional Economic Information System of the U.S. Bureau of Economic Analysis. The aggregate employment data use a consistent set of MSA definitions.

The models and data used in this study have two important limitations. The first limitation is that the CPS omits much family income. In-kind transfers are omitted. Capital gains on real estate and other assets are also omitted. Personal income of a given type (such as wage and salary income) is top-coded at \$99,999. Finally, survey respondents may lie.

I only try here to deal with two of these problems, the omission of capital gains, and the top-coding of some income. Some of the tables report the annual income equivalent of growth-induced capital gains on real estate. In addition, some tables adjust the income gain of the top quintile to account for top-coding. Ten percent or less of the total income of the highest income quintile is top-coded on average.² If top-coded income increases at the same rate as non-top coded income for the highest income quintile, then the reported results need only be modestly adjusted upwards. For example, if 10% of the income of the highest income quintile is top-coded, the reported effects of growth on quintile income need only be adjusted upwards by around 11%. The problem with this adjustment is that because we fail to observe top-coded income, its response to metropolitan growth is unknown.

The second limitation of the model and data is that in-migration and out-migration from metropolitan areas make this study's estimates more difficult to interpret. For policy purposes, we would like to know how metropolitan job growth affects the economic fortunes of a given family. But the CPS data used here is simply a collection of cross-sections of the families in an MSA during a particular year. The composition of the MSA population may change over time due to growth. These compositional effects of growth can not be distinguished in this study from the effects of growth on the incomes of a given family. For example, if MSA job growth is observed to increase average MSA family income, we can not tell in this study the extent to which this is due to MSA job growth causing the income of the original residents to increase, or whether MSA job growth is attracting families with higher incomes as in-migrants.

²Based on analysis of the March 1988 computer tape, 10.15% of top quintile wage and salary income, 2.74% of self-employment income, and zero dividend income, was top-coded. I did not examine other income categories for top-coding. Thus, less than 10% of the upper income quintile's income was top-coded in March 1988, and this year was one of the last years in my sample, when top-coding would be expected to be the greatest problem.

This limitation can only be fully addressed by using other data bases that follow the same individuals over time. However, in my previous work, (Bartik, 1991), I found that the estimated earnings, wage and unemployment effects of MSA growth were not sensitive to whether short-term residents (less than five years of residence in the MSA) were included in the sample.

III. Estimates of Effects of MSA Job Growth on CPS-Measured Income

Table 1 shows the estimated long-run effect of employment growth--the sum of all the coefficients on the employment variables--on the total income of different quintiles. The optimal lag length for all quintiles is zero lags. The long-run effects of employment growth on family incomes are not significantly different from the short-run effects.

Column (3) in Table 1 presents these estimated employment shock effects from the zero lag specification. The percentage effect of a shock to metropolitan area employment is greatest for the lowest income quintile: compared to the average family, the percentage effect for the lowest income quintile is twice as great. Percentage effects of employment shocks are smallest for the highest income quintile. These effects on the highest income quintile may be biased downward somewhat by top-coding.

Column (4) in Table 1 shows the estimated percentage effect of employment shocks on the income share of each quintile, using the optimal lag length specification. The percentage effect on a quintile's share will be approximately equal to the difference between the shock's effect on that quintile's income and its effect on average family income.³ Column (4) shows that an MSA employment shock increases the income share of the lowest income quintile by an amount that is statistically significant. Hence, an MSA employment shock has a statistically significant greater percentage effect on the income of the lowest income quintile than for the average family. The percentage effects of MSA employment shocks on the other four quintiles fail to statistically differ from effects for the average family.

These results do not imply that the lowest income quintile gains the most from metropolitan growth in absolute dollar amounts. Because the income share of the lowest income quintile is so low (3.91% from column (2) of Table 1), even large percentage effects represent small dollar effects. The lowest income quintile receives only 8.05% of the total MSA nominal income gain from a shock to job growth.⁴ However, any usual definitions of the "progressivity"

³When using a logarithmic measure of percentage change, this equality will be exact if all equations are estimated by OLS. The equality is not exact in columns (3) and (4) of Table 1 because all estimates are corrected for serial correlation.

⁴This share of the total MSA nominal income gain is equal to the income share of the lowest income quintile, times the ratio of the percentage effect on the lowest income quintile to the effect on the average family. Thus, $8.05 = .0391 * (1.415/.687) * 100$.

of some event would define the greater percentage effect on the lowest income quintile as increasing the progressivity of the family income distribution.

These results are robust. Column (5) shows the estimated long-run percentage effects of an MSA employment shock in the most general specification, with ten lagged years of the employment growth variables. The estimated effects of an MSA employment shock are lower in this more general specification. But except for the highest income quintile, the estimated effects are still statistically significant. Furthermore, the decline in the estimated effects is modest compared to their imprecision.

Column (6) reports estimated long-run percentage effects with percentage change defined differently. The previous columns use as a dependent variable the change in the logarithm of mean family income. Column (6) is based on a specification which uses as a dependent variable the absolute dollar change in mean family income for a quintile, divided by that quintile's mean income over all MSAs and years. The results are insensitive to these different functional form assumptions. This alternative definition of percentage change is used below to examine changes in different types of income for particular quintiles. In examining different income types, a logarithmic specification is infeasible because particular income types frequently are zero or negative for a particular MSA, year, and quintile.

These employment shock effects on nominal income imply positive effects on real income. In previous research, the long-run consumer price effect of a 1% shock to a metropolitan area's employment was estimated to be between .170% and .200% (Bartik, 1991). Direct testing of the statistical significance of real income effects is only possible for the twenty-five MSAs in the sample for which the U.S. Bureau of Labor Statistics reports annual inflation. Column (7) reports these real income effects. Except for the highest income quintile, all these real income effects of an employment shock are significantly greater than zero.⁵

Table 2 reports the percentage effects of a shock to a metropolitan area's employment on the eleven types of income reported in the CPS. Effects are reported for the optimal lag specification for each type of income. Estimates for a ten lag specification are similar.

How different types of income respond to employment shocks is a useful check on whether this empirical research is sensible. For example, if all the positive effects of metropolitan job growth came from an increase in farm income, the results should be doubted. Furthermore, different types of income may have different social value. For example, welfare income may be less socially valued than wage and salary income.

⁵These estimated real income effects are somewhat smaller than would be expected from subtracting .200 from the estimates in column (3). Additional estimation indicates that these smaller real income estimates are largely due to these 25 MSAs having somewhat smaller nominal income effects than the entire sample. But the differences in nominal income effects between the 25 MSAs and all other MSAs are statistically insignificant.

The estimates in table 2 seem sensible. Most of an employment shock's effect on total income is due to its effect on wage and salary income. The contribution of the wage effect to the total income effect is the product of the wage effect and the wage and salary share of total income. This product in Table 2, for the long-run results, is equal to .847 (= .7441 times 1.138), which is 127% of the change in total income of .665.⁶

The estimates provide evidence that an increase in MSA employment postpones retirement. In the long-run, an increase in MSA employment is associated with lower social security and retirement income.

The estimates provide evidence that an employment shock causes some declines in public and private transfers. Child support and other income, which includes private transfers, declines in both the short-run and long-run. Public assistance and unemployment insurance income both decline in the short-run, although only the unemployment insurance decline is statistically significant. In the long-run, unemployment insurance income increase. The increase could reflect the positive effects of metropolitan growth on state and local tax bases. In addition, a healthier local economy may increase the percentage of the unemployed eligible for UI.

The estimates also suggest that an increase in MSA employment reduces interest income, particularly in the short-run. Perhaps MSA growth causes individuals to reduce precautionary saving, using the proceeds to increase consumption, buy a house, or invest in other local real estate assets.

Table 3 reports estimates of the long-run percentage effects of metropolitan area growth on different types of income for the lowest income quintile, the highest income quintile, and the average family. For these three groups, I report the share of each type of income in total income, the estimated percentage effect of growth on that type of income, and the contribution of that type of income to the increase in total income (the product of the first two numbers). To ensure consistency among the various estimates, all estimates are based on the most general specification, with ten lags in the employment growth variables. The highest and lowest income quintiles are highlighted because the rich and the poor are of special interest, and growth effects differ the most from the average for these two quintiles.

Wage and salary income explains most of the differences between the average family and the lowest income quintile. Wage and salary income is a smaller share of income for the lowest income quintile than for the average family. Other things equal, growth's effects on wage and salary income should increase total income less for the lowest income quintile. But compared to the average family, the lowest income quintile experiences growth effects on wage and salary income that are almost three times as great in percentage terms. These greater percentage effects

⁶For example, in the 0-lag results, .7441 times .951 is equal to .707, which is 108% of the total income effect of .665.

outweigh the smaller share of wage and salary income, and wage and salary effects tend to help the lowest income quintile compared to the average family.

Wage and salary income also explains most of the differences in growth effects between the average family and the highest income quintile. Wage and salary income increases more slowly for the highest income quintile than for other quintiles. Social Security income, retirement income, unemployment insurance income, child support and other income, and interest income, also respond more in percentage terms for the highest income quintile, but these differences explain little about why the highest income quintile benefits less from growth than the average family.

IV. Including Real Estate Capital Gains in Estimates of the Real Income Distribution Effects of Metropolitan Growth

Omitted from the estimates above are growth-induced increases in real estate values. Land ownership is concentrated in upper income groups, so if real estate capital gains are large enough, the overall benefits of metropolitan growth could be distributed regressively.

Table 4 reports estimates of how metropolitan growth affects the distribution of real income, including real estate capital gains. The table focuses on the effects of metropolitan growth on the local income distribution; hence, nominal income gains and nominal real estate capital gains are adjusted for local price changes, and effects on real estate are only considered if it is locally owned. The conservative assumption is made, however, that most real estate is locally owned.

Nominal property values are assumed to respond to a 1% metropolitan growth shock with an increase of .451%, based on my book's estimates of how metropolitan growth affects the value of owner-occupied housing (Bartik, 1991). Nominal property value increases and nominal income increases are adjusted separately for each quintile for the rate of increase of overall local prices. Each quintile's price increases are based on Consumer Expenditure Survey estimates of the quintile's pattern of expenditures (percentage of expenditures on housing, food, etc.) and on estimates of how growth affects the price of different local goods (Bartik, 1991).⁷

⁷Raw consumer expenditure shares were taken from Table 715, Statistical Abstract of the United States (1990). These categories do not exactly match those used in the U.S. CPI. As a rough adjustment, I multiplied each quintile's expenditure share by the ratio of the CPI relative importance weight (CPI Appendix 2, p. 187, BLS Handbook of Methods, 1988) to the average consumer expenditure share from the Abstract table. These quintile expenditure shares were then adjusted to ensure that they summed to 1.0. The price effects of 1% growth estimated in my book, by expenditure category, were: .34 (Shelter); .147 (food); .072 (transportation); .025 (fuel); .08 (furnishings); .136 (apparel); .139 (medical care), .114 (entertainment), and .137 (other). The resulting price changes, for quintile 1 through quintile 5, were: .177; .169; .167; .166; .172. The overall price change for the average family is estimated as .170.

The total value of residential real estate is taken from Tax Capacity of the Fifty States (Table 5-26, 1990). Total values of corporate and non-corporate business real estate, and the division of residential real estate into rental and owner-occupied, are calculated from the Survey of Current Business (p. 101, 1990).⁸ The ratios of total real estate values to CPS income are calculated based on CPS income figures from Current Population Reports (1988 figures on p. 55 of the 1990 edition). 75% of corporate real estate is assumed to be locally owned; all other types of real estate are assumed to be 100% locally owned.

Corporate and rental real estate capital gains are allocated across quintiles based on CPS estimates of each quintile's share of rental and dividend income.⁹ Non-corporate business real estate capital gains are allocated across quintiles based on CPS estimates of each quintile's share of self-employment income. Home-ownership capital gains are allocated across quintiles based on CPS estimates of the homeownership percentage in each quintile, and projections from the 1979 Annual Housing Survey on how the ratio of owner-occupied home value to income varies across the income distribution.¹⁰ Based on these calculations, owner-occupied home values are distributed more progressively than current income. The ratio of home value to current income is high enough for low current income homeowners to offset the lower homeownership percentages in lower income groups.

Finally, all these capital gains are made equivalent to real income effects using a 10% discount rate: the calculated real capital gains are multiplied by .10 for all quintiles.

Even with real estate capital gains, the overall benefits of metropolitan growth are still distributed progressively. The lowest income quintile gains the most, and the highest income quintile gains the least. Real estate capital gains are distributed regressively overall, but are not large enough to offset the progressive effects on other types of income.

These simulation results are unlikely to be overturned except by changes in the maintained assumptions that seem implausible. For example, suppose we assume that all real estate is owned by the highest income quintile, real estate prices increase in inflation-adjusted terms by twice as much as estimated above, and the appropriate discount rate is 20%. Even under these extreme assumptions, capital gains on local real estate would only add .682% to the real income of the

⁸Figures for structure value are adjusted upwards by $1/(1-.8)$ to derive total structure and land value, on the assumption that land is 20% of total real estate value.

⁹There may be some double-counting here, as some of the increased capital gains may be reflected in increased rental and dividend income. Hence, the estimates presented here may exaggerate the effects of real estate capital gains on the income distributional effects of growth.

¹⁰A regression was run of the median home value to income ratio for homeowners, for various groups, from the 1979 AHS, on the average percentile of the income distribution for different income groups. The regression results were then used to predict this ratio for each of the quintiles.

highest income quintile. The percentage effect of growth would still be greatest for the lowest income quintile, although the highest income quintile would be close behind.¹¹

V. Net Distributional Effects of Policies to Increase MSA Growth

Although metropolitan job growth has progressive distributional effects, state and local governments may find it difficult to help the poor using economic development policies. Economic development policies have costs to local taxpayers. Because state and local tax systems are generally believed to be regressive, it is quite possible that state and local policies to promote job growth will have a distributional effect, including tax costs, that is regressive.

I consider three scenarios varying in the assumed costs of economic development policies, and how they are financed. The first and second scenarios assume that an economic development subsidy which reduces business costs, via tax abatements or other subsidies, by an amount equivalent to 1% of average state and local business taxes, will cause a long-run employment increase of .24%. A long-run elasticity of .24% of local business activity with respect to state and local business taxes is the average across 46 studies summarized in Bartik (1991).

The first scenario goes on to assume that these economic development subsidies are paid for through increased personal state and local taxes. To make the appropriate calculations, I assume the business share of state and local taxes is 33.9% (p. 63, U.S. Advisory Commission on Intergovernmental Relations, 1981), and use figures on how state and local tax burdens vary across different income quintiles reported in Pechman (1985).¹²

The second scenario assumes that the economic development subsidies are financed through across the board reductions in welfare payments. CPS data on welfare income by quintile are used to allocate the burden of this financing scheme.

The third scenario returns to financing economic development with higher personal taxes, but assumes that the subsidy cost to create one job is higher. A puzzling finding in business location studies is that estimated elasticities of local business activity with respect to wages, and with respect to state and local business taxes, are often similar, even though labor costs are

¹¹To derive this re-estimate, sum the real estate effects for the average family in Table 4, divide by .4483 (to express as a percentage of the top quintile's income), multiply by .279/.281 (to account for the slightly higher inflation rate for the top quintile), and then multiply by four to reflect the higher discount rate and the larger effect of growth on real estate prices.

¹²Pechman estimates of state and local tax burden by income decile are taken from variant 3b on p. 61; these figures are adjusted upwards to be percentages of unadjusted money income based on Pechman data on p. 44 of relationship of unadjusted money income to adjusted family income by quintile. State and local personal tax burden by quintile is assumed to be 66.1% of these total state and local burden figures; this implicitly assumes that the distribution of the state and local personal tax burden is the same as the distribution of the state and local business tax burden. While this assumption is probably not true, it is unclear in which direction it errs.

around fifteen times state and local business tax costs (Bartik, 1991). If business location patterns are based on relative costs, we would expect state and local business tax elasticities to be around 1/15th of wage elasticities.¹³ Average elasticities of state and local business activity with respect to wages are around $-.60$, so the implied elasticity with respect to state and local business taxes would be $-.04$ (Bartik, 1991). Scenario three is based on this $-.04$ elasticity, which increases the cost per job created by fifteen times.

Table 5 reports the gross benefits, gross costs, and net benefits of economic development policies under these three scenarios. The net efficiency and distributional effects of economic development policies are obviously quite sensitive to assumptions about financing. If the cost per job created is relatively low (scenarios one and two), then on average local families gain from the economic development policy. But with a high cost per job created (scenario three), local families on average lose from an economic development policy. Even if the cost per job created is low, cutting welfare to pay for economic development subsidies (scenario two) results in enormous net losses for the poor. Growth's benefits are progressively distributed, but welfare payments are even more progressively distributed.

Exercises of this sort are subject to manipulation to get whatever results one wants. But the finding that net benefits and their distribution are quite sensitive to the cost per job created, and how that cost is financed, would survive plausible changes in the maintained assumptions.

VI. Conclusion

Metropolitan job growth "trickles down" to provide long-run benefits for the poor, and these long-run benefits for the poor are greater in percentage terms than for other groups. But trickle-down economic development policies may hurt the poor if these policies are too costly or are financed through cuts in social programs.

The results here would be strengthened by future research that would follow the same individuals over time, and control for changes in the composition of the MSA population in examining the effect of job growth. In addition, this research could be extended to examine the effects of other types of changes in MSA employment, such as shifts in employment across industries, or the suburbanization of employment.

¹³This ignores differences in substitution effects if local business activity is measured by employment, and most state and local business taxes increase the price of capital. Appendix 2-1 of my book argues that the output effect of local cost variables probably outweighs the substitution effect.

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Table 1

BASIC QUINTILE RESULTS
FOR LONG-RUN EFFECTS OF 1% SHOCK TO MSA EMPLOYMENT

| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|-----------------|----------------------------------|---|--|--|---|---|
| <u>Quintile</u> | <u>% of Total Income</u> | <u>LR % Effects on Nominal Income, 0 lag length</u> | <u>LR % Effects on Quintile Share 0 lags</u> | <u>LR % Effects on Nominal Income, 10 lags</u> | <u>LR % Effects on Nominal Income, 10 lags, % Change at Means Specification</u> | <u>Effects on Real Income 0 lags, 25 MSAs with Price Data</u> |
| 1 | 3.91% | 1.415 (.374) | .719 (.328) | 1.086 (.492) | 1.025 (.484) | .900 (.346) |
| 2 | 9.84 | .798 (.237) | .108 (.173) | .570 (.313) | .631 (.313) | .667 (.216) |
| 3 | 16.46 | .727 (.194) | .037 (.112) | .594 (.256) | .605 (.257) | .539 (.172) |
| 4 | 24.96 | .755 (.161) | .066 (.086) | .629 (.214) | .615 (.210) | .362 (.150) |
| 5 | 44.83 | .588 (.179) | -.102 (.094) | .287 (.234) | .292 (.241) | .247 (.161) |
| Average | 100.00 | .687 (.152) | | .471 (.200) | .479 (.202) | .389 (.141) |

Note: Standard errors are in parentheses. All estimates correct for first-order serial correlation.

Table 2

EFFECTS OF 1% SHOCK TO MSA EMPLOYMENT
ON VARIOUS TYPES OF INCOME,
AVERAGE EFFECTS FOR ALL FAMILIES

| <u>Income Type</u> | <u>% of Total Income</u> | <u>Optimal Lag Length</u> | <u>Optimal AIC Results</u> | |
|-----------------------|----------------------------------|-----------------------------------|----------------------------|-------------------|
| | | | <u>Short-Run</u> | <u>Long-Run</u> |
| Wage and Salary | 74.41% | 4 Lags | 1.098* (.280) | 1.138* (.209) |
| Self-Employment | 5.08 | 0 Lags | .728 (.897) | .728 (.897) |
| Farm | .21 | 0 Lags | 3.939 (5.090) | 3.939 (5.090) |
| Social Security | 6.17 | 3 Lags | -.097 (.535) | -.909* (.398) |
| SSI | .29 | 0 Lags | -1.544 (1.313) | -1.544 (1.313) |
| Public Assistance | .47 | 0 Lags | -1.282 (1.034) | -1.282 (1.034) |
| UI/Vets | 1.12 | 2 Lags | -3.398* (1.382) | 1.347 (.920) |
| Child Support & Other | 1.28 | 0 Lags | -2.628* (.994) | -2.628* (.994) |
| Interest | 4.58 | 2 Lags | -2.316* (.980) | -.677 (.647) |
| Dividends/Rents | 2.32 | 0 Lags | 1.382 (1.181) | 1.382 (1.181) |
| Retirement | 4.07 | 2 Lags | .089 (1.055) | -1.342* (.727) |
| Total | 100.00% | 0 Lags | .665* (.153) | .665* (.153) |

Note: Standard errors are in parentheses. Coefficients with T-statistics greater than 1.645 in absolute value are indicated with an asterisk. Short-run results are immediate effects of this year's employment shock. Long-run results are the sum of the coefficients on all employment variables included in the optimal AIC specification.

Table 3

CONTRIBUTION OF DIFFERENT INCOME TYPES
TO MSA GROWTH'S LONG-RUN EFFECTS
ON TOTAL INCOME, LOWEST AND HIGHEST INCOME QUINTILES,
10 LAG SPECIFICATION

| <u>Income Type</u> | <u>Lowest Income Quintile</u> | <u>Average Family</u> | <u>Highest Income Quintile</u> |
|---------------------|-------------------------------|---------------------------|--------------------------------|
| Wage & Salary | (.3854) (2.447)* = .943 | (.7441) (.867)* = .645 | (.7837) (.664)* = .520 |
| Self Employment | (.0151) (10.116) = .153 | (.0507) (.829) = .042 | (.0689) (.521) = .036 |
| Farm | = .036 | (.0021) (4.493) = .010 | (.0028) (2.563) = .007 |
| Social Security | (.3290) (-.293) = -.096 | (.0617) (-1.402)* = -.087 | (.0158) (-3.025)* = -.048 |
| SSI | (.0393) (-.412) = -.016 | (.0029) (-1.416) = -.004 | (.0004) (.446) = .000 |
| Public Assistance | (.0771) (.300) = .023 | (.0047) (.363) = .002 | (.0002) (-1.542) = -.000 |
| UI/Vets | (.0283) (-.679) = -.019 | (.0112) (1.769)* = .020 | (.0053) (5.589)* = .030 |
| Child Support/Other | (.0451) (-1.678) = -.076 | (.0128) (-2.513)* = -.032 | (.0077) (-5.617)* = -.043 |
| Interest | (.0379) (1.069) = .041 | (.0458) (-1.071) = -.049 | (.0500) (-1.862)* = -.093 |
| Dividends/Rent | (.0090) (-3.855) = -.035 | (.0232) (.068) = .002 | (.0342) (-.134) = -.005 |
| Retirement | (.0358) (1.271) = .046 | (.0407) (-1.429) = -.058 | (.0311) (-2.931)* = -.091 |
| Summed Total | .999 | .490 | .313 |
| Estimated Total | 1.025* | .479* | .292 |

Note: First number in parentheses is share of that type of income in total income for the group examined; the second number in parentheses is the long-run percentage effect of a 1% MSA employment shock on that type of income for that group. Percentage effects whose T-statistics are greater than 1.645 in absolute value are marked with an asterisk. The product of these two numbers is the contribution of that type of income to the percentage change in total income. Because mean farm income for lowest income quintile is negative, effects for this income type were directly estimated as a percentage of mean total income for that quintile.

Table 4

OVERALL LONG-RUN DISTRIBUTIONAL EFFECTS
OF 1% SHOCK TO MSA EMPLOYMENT

| <u>Quintile</u> | <u>% of Total Income</u> | <u>% Effect on Real Income</u> | <u>Rental Home- Ownership Effect</u> | <u>Corporate Real Estate Effect</u> | <u>Non-Corp. Business Real Estate</u> | <u>Business Real Estate</u> | | <u>Total</u> |
|-----------------|----------------------------------|------------------------------------|--|---|---|-------------------------------------|---|--------------|
| 1 | 3.91% | .848 | .060 | .004 | .005 | .002 | = | .919 |
| 2 | 9.84 | .462 | .051 | .006 | .007 | .005 | = | .531 |
| 3 | 16.46 | .438 | .047 | .007 | .008 | .006 | = | .506 |
| 4 | 24.96 | .449 | .046 | .008 | .009 | .006 | = | .518 |
| 5 | 44.83 | .180 | .042 | .016 | .018 | .010 | = | .266 |
| Average | 100.00 | .343 | .045 | .011 | .013 | .008 | = | .420 |

Note: Calculations based on lag 10 specification, with percentage change calculated at means. Highest income quintile and average real income figures adjusted upwards to reflect top-coding of 10.15% of wage-and-salary income of top quintile, 2.74% of self-employment income, with adjustment assuming top-coded income would have increased at similar rate to non-top-coded. All figures state gains as percentage of that group's base income. Thus, the increase in home prices provides the lowest income quintile with a capital gain equivalent to a .060% increase in annual income.

Table 5

NET DISTRIBUTIONAL EFFECTS OF LOCAL ECONOMIC DEVELOPMENT POLICIES
UNDER ALTERNATIVE COST SCENARIOS

| <u>Quintile</u> | <u>TAX FINANCING -.24 Tax Elasticity</u> | | <u>TRANSFER FINANCING -.24 Tax Elasticity</u> | | <u>TAX FINANCING -.04 Tax Elasticity</u> | | |
|-----------------|--|---------------------|---|--------------------------|--|---------------------|-----------------------|
| | <u>Gross Benefit</u> | <u>Tax Cost</u> | <u>Net Effect</u> | <u>Transfer Cost</u> | <u>Net Effect</u> | <u>Tax Cost</u> | <u>Net Effect</u> |
| 1 | .919 | -.268 | .651 | -2.980 | -2.061 | -1.608 | -.689 |
| 2 | .531 | -.200 | .331 | -.437 | .094 | -1.200 | -.669 |
| 3 | .506 | -.176 | .330 | -.076 | .430 | -1.056 | -.550 |
| 4 | .518 | -.165 | .353 | -.023 | .495 | -.990 | -.472 |
| 5 | .266 | -.180 | .086 | -.007 | .259 | -1.080 | -.814 |
| Average | .420 | -.181 | .239 | -.181 | .239 | -1.086 | -.666 |

Note: Calculations assume 1% MSA job growth, brought about by a business tax reduction or equivalent subsidy, and financed by increased personal taxes or cuts in transfers. All costs and benefits are stated as percentages of that particular group's base income. For example, under scenario 1, quintile 1 receives income benefits of .919%, pays increased taxes of .268%, for a net gain of .651%.